



WP9 Management

Deliverable 9.5 DiSSCo Prepare final conference

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Introduction

This document aims to present the main results of the work done within DiSSCo Prepare Final Conference as part of DiSSCo Futures, a 2-days conference event.

The preparatory phase of DiSSCo was finalised with a conference in which teams from three major projects contributing to the preparatory phase of the RI (Mobilise, DiSSCo Prepare and Synthesys+) presented main achievements across different dimensions of DiSSCo RI, specifically in organisation & financial, technical, data and scientific.

Furthermore, the sessions provide main insights into the work to be carried out during the DiSSCo transition phase (2023-2024).

The event includes 8 sessions with more than 66 speakers. Physical participation reached 200+ participants from the DiSSCo community, main stakeholders and EU representatives. The event was on live streaming which increased the number of participants by 25%.

Active participation in the sessions was highly incentivized through panel discussions, mentimeters, open discussions and debates. Half of the audience and presenters were female, and attendees came from all over the 23 countries supporting DiSSCo nowadays.

This document includes links to the registrations, the attendance list, the presentations and the links to the registration of the sessions (YouTube).¹

¹ Day 1: <https://www.youtube.com/watch?v=7geZcxKfgRA>

Day 2: <https://www.youtube.com/watch?v=9oC9kPKbN1Q>

Day 3: <https://www.youtube.com/watch?v=LBOj8hpqgg8>

No.	First name	Last name	Affiliation	Country	7th	7th	8th-m	8th-m	8th-A	8th-A	9th	9th	Reception
1	Abdirahman	Mohamed	Ministry of Fisheries and Blue Economy	Somalia	x		x		x		x		Yes
2	Abdullahi	Abdulkadir haji Dahir	Ministry of Environment and Wildlife - Southwest State of Somalia	Somalia	x		x		x		x		Yes
3	Agnes	Robin	EC DG Research & Innovation	Belgium			x	✓					No
4	Aino	Juslén	Luomus/Syke	Finland	x	✓	x		x		x		Yes
5	Alan	Paton	RBG Kew		x	✓	x		x		x		Yes
6	Alessandro	Marchi	CETAF	Belgium	x	✓	x		x		x		Yes
7	Alex	Ball	NHM	United Kingdom	x		x	✓	x				Yes
8	Alexander	Weigand	MNHNL	Luxembourg	x	✓	x		x		x		Yes
9	Aline	van der Werf	BELSPO	Belgium			x		x		x		No
10	Amaryllis	Vidalis	SNSB	Germany	x	✓	x		x		x		Yes
11	Ana	Casino	CETAF	Belgium	x	✓	x		x		x		Yes
12	Ana	de Castro	NWO	Netherlands							x		No
13	Andra	Waagmeester	Micelio	Belgium	x		x		x				No

Sarah Rossi DE GASPERIS

Bouters, Kenneth ✓
Polnick Sarah ✓

No.	First name	Last name	Affiliation	Country	7th	7th	8th-m	8th-m	8th-A	8th-A	9th	9th	Reception
14	André	Heughebaert	Belgian Biodiversity Platform - Belpo	Belgium	x		x	✓	x		x		No
15	Andres	Rivera	Naturalis Biodiversity Center	Netherlands	x	✓	x		x		x		Yes
16	Ann	Bogaerts	Meise Botanic Garden	Belgium	x	✓	x		x		x		No
17	Ann	Van Baelen	KU Leuven	Belgium	x		x		x		x		No
18	Anna	Gazda		Poland	x	✓	x		x		x		No
19	Anne	Koivunen	Luomus	Finland	x	✓	x		x		x		Yes
20	Anne-Françoise	Adam-Blondon	INRAE	France	x	✓	x		x				Yes
21	Anne-Sophie	Archambeau	MNHN	France	x	✓	x		x		x		Yes
22	Anniina	Kuusijärvi	Luomus	Finland	x	✓	x		x		x		Yes
23	Anton	Güntsch	FUB-BGBM	Germany	x		x						Yes
24	Anton	Van de Putte	RBINS, ULB	Belgium	x				x		x		Yes
25	Arnald	Marcer	CREAF	Spain	x	✓	x		x		x		Yes
26	Arturo H.	Ariño	UNAV	Spain	x		x	✓	x		x		Yes
27	Beáta	Papp	HNHM	Hungary	x	✓	x		x		x		Yes
28	Beatriz	Alvarez Dorça	MNCN-CSIC	Spain	x	✓	x		x		x		Yes

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29	Ben	Scott	NHMUK	United Kingdom	x	✓	x		x		x		Yes
30	Blagoj	Ristevski	University "St. Kliment Ohridski" - Bitola, Faculty of Information and Communication Technologies - Bitola	North Macedonia, Rep. of	x		x		x		x		Yes
31	Blerina	Vrenozi	University of Tirana	Albania	x	✓	x		x		x		Yes
32	Borislav	Guéorguiev	NMNHS-BAS	Bulgaria	x	✓	x		x		x		Yes
33	Carole	Paleco	RBINS	Belgium	x	✓	x		x		x		Yes
34	CATHERINA	VOREADOU	NHMC-UOC	Greece	x	✓	x		x				Yes
35	Celia	Santos	MNCN-CSIC (National Museum of Natural Sciences, Madrid)	Spain	x	✓	x		x		x		Yes
36	Chantal	Dugardin	UGhent	Belgium	✓	✓	x		x		x		No
37	Christophe	Van Neste	MeiseBG	Belgium	x	✓	x		x		x		Yes
38	Christos	Arvanitidis	LifeWatch ERIC	Spain					x		x		No
39	Christos	Psarras	NKUA	Greece	x		x		x				Yes
40	Claus	Weiland	Senckenberg	Germany	x	✓	x		x		x		Yes
41	Colombe	WARIN	European Commission	France					x				No
42	Cristina Isabel	Huertas Olivares	LifeWatch ERIC	Spain					x		x		No

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43	Dag	Endresen	UiO	Norway	x	✓	x		x				Yes
44	Dagmar	Triebel	SNSB, COST MOBILISE	Germany	x	✓	x		x		x		Yes
45	David	Fichtmueller	FU-BGBM	Germany	x	✓	x		x		x		Yes
46	Deborah	Paul	Prairie Research Institute	United States	x	✓	x		x		x		Yes
47	Dimitri	Brosens	Belgian Biodiversity Platform	Belgium	x	✓	x		x		x		Yes
48	Dimitris	Koureas	DiSSCo / Naturalis	Netherlands	x	✓	x		x		x		Yes
49	Dominik	Röpert	BGBM	Germany	x	✓	x		x		x		Yes
50	Donat	Agosti	Plazi	Switzerland	x		x		x		x		Yes
51	Edmund	Schiller	NHMW	Austria	x	✓	x		x		x		Yes
52	Eitan	Maggeni	Oranim College of Education, Israel	Israel	x	✓							Yes
53	Elisabeth	van Noort	Picturae	Netherlands	x	✓	x		x		x		Yes
54	Elsa	Fontainha	ISEG Universidade De Lisboa	Portugal	x	✓	x		x		x		Yes
55	Emily	Veltjen	INBO	Belgium	x	✓	x		x		x		No
56	Esra	Per	Gazi University	Turkey	x	✓	x		x		x		Yes
57	Eva	Alonso	Naturalis	Netherlands	x	✓	x		x		x		Yes

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58	Eva	Chatzinikolaou	HCMR	Greece	x	✓	x		x		x		Yes
59	Eva	Häffner	BGBM	Germany	x	✓	x		x		x		Yes
60	Evangelia	Rentoumi	NKUA, AMPG	Greece	x	✓	x		x				Yes
61	Evgeniy	Meyke	EarthCape OY	Finland	x	✓	x		x		x		Yes
62	Falko	Glöckler	MfN Berlin	Germany	x	✓	x		x		x		Yes
63	Filip	Vandelook	Meise BG	Belgium			x		x				No
64	Francis	Clement	MNHN	France	x		x		x		x		Yes
65	Franck	Theeten	RMCA	Belgium	x		x		x		x		Yes
66	François	Dusoulier	MNHN	France	x		x		x		x		Yes
67	Frederik	Leliaert	Meise Botanic Garden	Belgium	x	✓	x		x		x		Yes
68	Gabor	Csorba	HNHM	Hungary	x	✓	x		x		x		Yes
69	Gael	Lymer	RBINS	Belgium	x	✓	x		x		x		Yes
70	Gergely	Babocsay	Hungarian Natural History Museum	Hungary	x	✓	x		x		x		Yes
71	Gianna	Innocenti	Natural History Museum, Florence University	Italy	x	✓	x		x				Yes
72	Gila	Kahila Bar-Gal	The Hebrew University of Jerusalem	Israel	x	✓	x		x		x		Yes

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73	Gilles	Doignon	European Commission	Belgium	x	✓							Yes
74	Hannu	Saarenmaa	Bioshare Digitization	Finland	x	✓	x		x				Yes
75	Helen	Hardy	NHM London	United Kingdom	x	✓	x		x		x		Yes
76	Henrik	Enghoff	UCPH	Denmark	x	✓	x		x		x		Yes
77	Henry	Engledow	Meise Botanic Garden	Belgium	x	✓	x		x		x		Yes
78	Hilary	Goodson	GBIF	Denmark	x	✓	x		x		x		Yes
79	Holger	Frick	MusNatColl, NMB	Switzerland	x	✓	x		x		x		Yes
80	Holly	Little	Smithsonian NMNH	United States	x	✓	x		x		x		Yes
81	Hugo	de Boer	NHM-UiO	Norway	x	✓	x		x				Yes
82	Irene	Bisang	Swedish Museum of Natural History	Sweden	x	✓	x		x		x		Yes
83	Irit	Zohar		Israel		✓	x		x		x		Yes
84	Isabelle	Gerard	RMCA	Belgium	x	✓	x		x		x		Yes
85	Jana	Hoffmann	MfN	Germany	x	✓	x		x		x		Yes
86	Joachim	Holstein	SMNS	Germany	x		x	✓	x		x		Yes
87	Joana	Pauperio	EMBL-EBI	United Kingdom			x		x		x		No

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101	Kate	Gill	Royal Botanic Gardens Kew	United Kingdom	x	✓	x		x		x		Yes
102	Kate	Holub-Young	NHM London	United Kingdom	x	✓	x		x		x		Yes
103	Katharine	WORLEY	MNHN	France	x	✓	x		x		x		Yes
104	Katherina	Wipfler	Leibniz Institute for the Analysis of Biodiversity Change	Germany	x	✓	x		x				No
105	Krishna	Khakurel	ELI beamlines (ELI ERIC)	Czech Republic	x		x		x		x		Yes
106	Kristina	Gorman	NHM London	United Kingdom	x	✓	x		x		x		Yes
107	Larissa	Smirnova	Royal Museum for Central Africa	Belgium	x	✓	x		x		x		Yes
108	Laura	Abraham	MeiseBG	Belgium	x	✓	x		x		x		Yes
109	Laura	Tilley	CETAF	Belgium	x		x	✓	x		x		Yes
110	Laurence	Bénichou	MNHN	France	x	✓	x		x		x		Yes
111	Laurence	Livermore	NHM	United Kingdom	x	✓	x		x		x		Yes
112	Lidija	Polović	Natural History Museum of Montenegro	Montenegro	x	✓	x		x		x		Yes
113	Linda	Seggi	Università degli Studi di Trieste	Italy	x	✓	x		x				Yes

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114	Lisa	French	NHM	United Kingdom	x	✓	x		x		x		Yes
115	Liselot	Breyne	ILVO	Belgium			x		x				No
116	Liselotte	De Vos	Dep EWI, Flemish Government	Belgium	x		x		x				No
117	Lissa	Breugelmans	Plantentuin Meise	Belgium	x	✓	x		x		x		Yes
118	Lorenzo	Cecchi	UNIFI	Italy	x	✓	x		x		x		Yes
119	Louise	Hendrickx	MeiseBG	Belgium	x	✓	x		x		x		Yes
120	Louise	Isager Ahl	NHMD	Denmark	x	✓	x		x				Yes
121	Maarten	Trekels	MeiseBG	Belgium	x	✓	x		x		x		Yes
122	Mafalda	Quintas	COST		x	✓							No
123	Magalie	Castelin	MNHN	France	x	✓	x		x		x		Yes
124	Marc	Sosef	Meise Botanic Garden	Belgium	x		x		x				No
125	Marcella	Rydmark	NHM-UiO	Norway	x	✓	x		x				Yes
126	Mareike	Petersen	Museum für Naturkunde Berlin	Germany	x	✓	x		x				Yes
127	Margret	Steinthorsdottir	NRM	Sweden	x	✓	x		x		x		Yes
128	Maria Judite	Alves	MUHNAC-ULISBOA	Portugal	x	✓	x		x		x		Yes

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129	Marieke	Willems	ELIXIR Hub	United Kingdom			x		x				No
130	Marko	Hyvärinen	Luomus	Finland	x	✓	x		x				Yes
131	Marko	Lovric	CETAF	Belgium	x	✓	x		x		x		Yes
132	Martijn	Roelofs		Netherlands	x	✓	x		x		x		Yes
133	Mathias	Dillen	MeiseBG	Belgium	x	✓	x		x		x		Yes
134	Matt	Woodburn	NHM London	United Kingdom	x	✓	x		x		x		Yes
135	Max	Caspers	Naturalis	Netherlands	x		x		x		x		Yes
136	Melanie	De Nolf	MeiseBG	Belgium	x	✓	x		x		x		Yes
137	Melike	Bilgin	NATURALIS	Turkey	x	✓	x						Yes
138	Michel	Guiraud	MNHN	France	x	✓	x		x		x		Yes
139	Michèle	Tixier-Boichard	INRAE	France					x		x		No
140	Michelle	Price	CETAF	Switzerland	x	✓	x		x		x		Yes
141	Myriam	van Walsum	Naturalis	Netherlands	x	✓	x		x				Yes
142	Natalija	Čadjenović	NHMM	Montenegro	x	✓	x		x		x		Yes
143	Nathalie	Poot	KU Leuven - Scientific heritage collections	Belgium	x	✓	x		x				No

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144	Nick	Fraser	NMS (National Museums Scotland)	United Kingdom	x	✓	x		x		x		Yes
145	Nicky	Nicolson	RBG Kew	United Kingdom	x	✓	x		x		x		Yes
146	Niels	Raes	Naturalis Biodiversity Center	Netherlands	x	✓	x		x		x		Yes
147	Niki	Keklikoglou	HCMR	Greece	x	✓	x		x		x		Yes
148	Nora	Battermann	Bavarian Natural History Collections (SNSB)	Germany	x	✓	x		x		x		Yes
149	Olaf	Banki	COL/Species 2000	Netherlands	x	✓	x		x		x		Yes
150	Olivier	Lambert	RBINS	Belgium			x	✓					No
151	Patricia	Mergen	RMCA and Meise BG	Belgium	x	✓	x		x		x		Yes
152	Paul	Braun	MNHNL	Luxembourg	x	✓	x		x		x		Yes
153	Paula	Kankaanpää	Finnish Natural History Museum / University of Helsinki	Finland	x	✓	x		x		x		Yes
154	Pedro	Arsénio	ULisboa / ISA	Portugal	x	✓	x		x		x		Yes
155	Peter	Hollingsworth	RBGE	United Kingdom	x	✓	x		x		x		Yes
156	Pierre	Meerts	ULB	Belgium	x	✓							No
157	Pierre-Yves	Gagnier	MNHN	France	x	✓	x		x		x		Yes

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158	Piotr	Tykowski	University of Warsaw		x	✓	x		x		x		Yes
159	Pip	Brewer	NHMD	Denmark	x		x		x		x		Yes
160	Pinar	Gültekin	Düzce University	Turkey	x		x		x		x		Yes
✓ 161	Quentin	Groom	Meise Botanic Garden	Belgium	x	✗	x		x		x		Yes
162	Rachel	Walcott	National Museums Scotland	United Kingdom	x	✓	x		x		x		Yes
163	Rafael	Zardoya		Spain	x	✓	x		x		x		Yes
164	Raffaella	Trabucco	MSNVE Natural History Museum of Venice	Italy	x	✓							Yes
165	Reinout	Verbeke	RBINS	Belgium	x	✓							Yes
166	Rob JJ	Hendriks	Biodiversa+	Netherlands	x	✓			x		x		Yes
167	Robert	Cubey	RBGE	United Kingdom	x	✓	x		x		x		Yes
168	Rocio	Deanna	Museo Botanico de Cordoba	Argentina	x	✓	x		x				Yes
169	Roger	Hyam	RBGE	United Kingdom	x	✓	x		x		x		No
170	Rui	Figueira	Universidade de Lisboa	Portugal	x	✓	x		x		x		Yes
171	Sam	Leefflang	Naturalis	Netherlands	x	✓	x		x		x		Yes

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172	Sandra	Knapp	NHM	United Kingdom	x	✓	x		x		x		Yes
173	Serge	Scory	RBINS	Belgium	x	✓	x		x		x		Yes
174	Sharif	Islam	Naturalis	Netherlands	x	✓	x		x		x		Yes
175	Simone	Cutajar	University of Malta	Malta	x	✓	x		x		x		Yes
176	Sofie	De Smedt	Botanic Garden Meise	Belgium	x		x		x		x		Yes
✓ 177	Sofie	Meeus	Meise Botanic Garden	Belgium	x	✗	x		x		x		Yes
178	Soulaine	Theocharides	Naturalis	Netherlands	x	✓	x		x		x		Yes
179	Stefaan	Pijls	APM-MBG	Belgium	x	✓	x		x		x		Yes
180	Stefano	Martellos	University of Trieste	Italy	x	✓	x		x		x		Yes
181	Steffen	Kiel	NRM	Sweden	x	✓	x		x		x		Yes
182	Steven	Janssens	Meise Botanic Garden	Belgium	x	✓	x		x				No
183	Steven	van der Mije	Naturalis	Netherlands	x	✓	x		x		x		Yes
184	Steven	Verstockt	UGent - imec, IDLab	Belgium	x		x		x				No
185	Stijn	Cooleman	RBINS (BBPF)		x	✓	x		x		x		No
186	Thierry	Bourgoin	MNHN, CETAF	France	x		x				x		Yes
187	Thomas	Neubauer	SNSB	Germany	x	✓	x		x		x		Yes

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188	Tim	Littlewood	NHM	United Kingdom					x		x		No
189	Tina Sarah Rossi	Lo De Gasperis	Naturalis	Netherlands ITALY	x		x		x		x		Yes
190	Tom	Dijkema	Naturalis	Netherlands	x	✓	x		x		x		Yes
191	Urmaz	Kõljalg	UTARTU	Estonia			x	✓	x		x		No
192	Vanessa	Demanoff	MNHN	France	x	✓	x		x		x		Yes
193	Vanessa	Pike	NHM	United Kingdom	x	✓							No
194	Vania	Ferreira	Naturalis	Netherlands	x	✓	x		x		x		Yes
195	Vincent	Smith	Natural History Museum	United Kingdom	x	✓	x		x		x		Yes
196	Visotheary	Ung	TDWG	France	x	✓	x		x		x		Yes
197	Wesley	Tack	Meise Botanic Garden	Belgium	x	✓	x		x		x		Yes
198	Wilfred	Gerritsen	Naturalis	Netherlands	x	✓	x		x		x		Yes, No
199	Wouter	Addink	Naturalis	Netherlands	x	✓	x		x		x		Yes
200	Zjef	Pereboom	KMDA/RZSA	Belgium	x		x	✓	x		x		Yes



DiSSCo Futures

Brussels 07-09-02-2023



Day 1

WELCOME

(Starts at 13:30h CET)



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Session:

OPENING PLENARY



Dr. Vince Smith
Natural History Museum, UK

Plenary Session
Welcome and introduction



Serge Scory
Royal Belgian Institute
of Natural Sciences

Plenary Session
Welcome from the host





Dr Doug Gurr
Natural History Museum, UK

Plenary Session
Three provocations for the natural history collections
community





Deborah L Paul

**Prairie Research Institute, Species File
Group, University of Illinois
Past Chair TDWG 2021-2022**

Plenary Session

**A Glimpse Into the Future of Museums: People,
Buildings, Data**

PhD position Science Museums of the Future

In the light of urgently needed system transformations that serve contemporary complex societal challenges

many science museums are - and are increasingly expected to be
~renewing their role at the interface of science and society.~

<https://www.academictransfer.com/en/321683/phd-position-science-museums-of-the-future/>

Libraries and Natural Science Museums

Oodi Helsinki Central Library as *inspiration*



<https://oodihelsinki.fi/en/>

A library and

- venue
- service
- architecture
- art
- workshop
- studying
- work
- gaming
- studios
- dining
- playground
- community

3 topics

- People
- Buildings
- Data

2 perspectives

- Visions of the future
- Ideas to empower you



People Vision - Shared Knowledge Management

- **(tacit) knowledge transfer**
- human-in-the-loop round-tripping
- inclusion



People Vision - Human (organizational / behavioral) Architecture

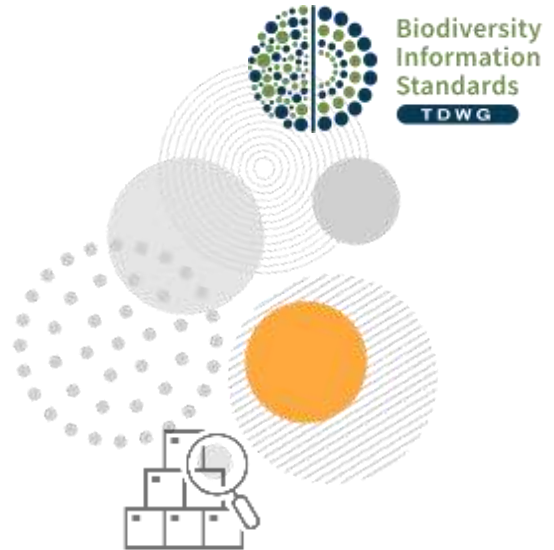
- + professional development, capacity development
- + getting credit, citation, attribution (better metrics)



<https://stats.taxonworks.org>

People Vision - Greater Impact

- people using data standards
- collections and expertise value and access
 - **integrated** in museums and universities
 - **recognized** by industry, states, countries
- **taxonomist's value** increases
 - e. g. reference libraries + BINs
- **new uses** for specimens and data



People Vision - Greater Impact

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- **taxonomist's value** increases
 - e. g. reference libraries + BINs
- **new uses** for specimens and data



Tonsor is committed to **establishing a think tank**, an environment within the museum that encourages—and expects—researchers to reach beyond the boundaries of their fields and take action by sharing ideas, interpreting data, and interacting with a variety of different communities.

Barbara Klein. The Future of Natural History: An integrated approach to actionable, community-focused science is the way forward. Science and Nature. Fall 2020.
<https://carnegiemuseums.org/carnegie-magazine/fall-2020/the-future-of-natural-history/>

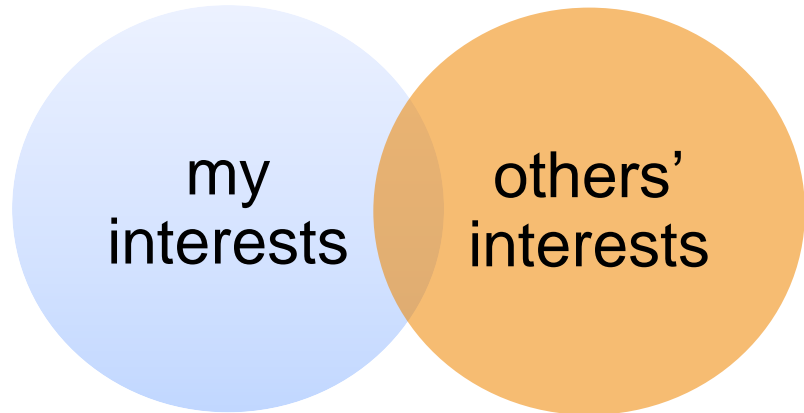
People Vision – Access and Motivation

- **language barriers gone** (technology)
- museums and collections
 - choose my own adventure (motivation)
 - more accessible researchers
 - community science





People Ideas - Effecting Change

- **power** or **status** (or clever strategy)
- moving from ~~projection~~ to intersection



People Ideas – Data Leadership

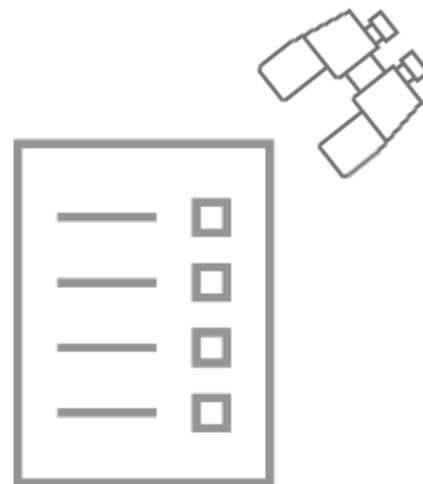
- Do you have this at your institution? If not, **how will your network help you with this?**

	Primary role	Typical career path	Talent market considerations
 Chief Data Officer	Senior-most data strategist for the company; owns data governance, standards, strategy, controls, architecture, tools and technology.	Highly variable, including legal, operations, risk	Hard-to-find talent with combination of senior executive presence and detailed subject matter expertise
 Data Science	Creates the underlying, highly advanced logic that enables complex data products and solutions	Engineering, computer science, mathematicians, statisticians	Must combine deep technical skill sets with business knowledge; capabilities must align with business goals
 Analytics	Integrates and analyzes real-time data from various sources for forward-looking business insights	Functional analytics roles (e.g., marketing, operations, supply chain, finance, risk) and industry-specific roles (such as underwriting); intelligence community	At executive level, these leaders need to have pivoted from their core expertise and be able to think more broadly; should be product focused and concerned with predictive versus historical analytics
 Data Management	Bridges the gap between the data and technology agendas; oversees technical standards and tools to support data initiatives	Technology and operations roles; program management	Ability to translate strategic business goals into technology delivery is key

“Without a seat at the executive committee, the data leader is unlikely to have the mandate, influence or exposure to the business (museum) to advance a real data agenda.”

People Ideas - an institution's collections' survey

- Maslow's Hierarchy of Needs
- capacity development
- data leadership
- missing
 - use cases opportunity
 - **shared knowledge structure**
- need for **new roles**
 - Biodiversity Informatics Managers
 - Community Liaisons
 - Data Scientists
- **cross collections connection opportunities**



Buildings Vision – What's new?

Evolution of Collecting and Data Practices and Use

- plant samples (instead of the entire plant)
- **what will we be collecting, where? digital first?**
 - gaps-based? repetition?
- new kinds of images, 3D, VR
- **lots of eDNA**
- richer (meta)data (e. g. ground / air temperature, traits)
- standards embedded
- identifier mischief managed
- **publishing linked**



Data Vision - search and visualization reinvented!

- artificial intelligence (AI), machine learning (ML), text-mining in regular use!
 - **dwc:verbatimLabel** in use
 - unknown unknowns
 - new data visualization, data quality
 - automated parsing to data standards
 - clustering
 - motivation
 - image AI

Data Vision - power of verbatim text and ai

- the value of **verbatim** and **full text**
 - ai, ml, text-mining power
- dwc:verbatimLabel** in use
 - automated parsing to data standards

DL from this text, please find the state, county, locality, collecting date, collectors, taxon name, specimen count, sex, determined by, determined date, institution, collection name, barcode: [

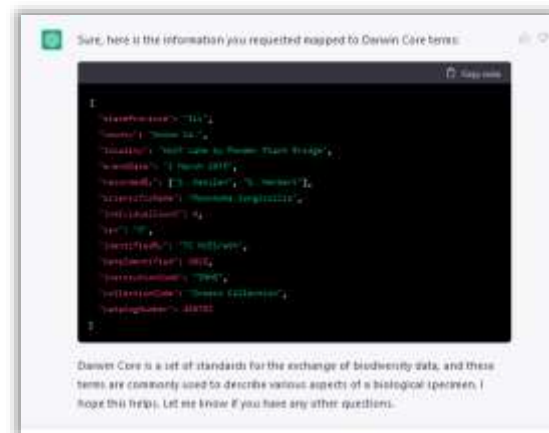
ILL: Union Co.
 Wolf Lake by Powder Plant
 Bridge. 1 March 1975
 Coll. S. Ketzler, S. Herbert

Monotoma
 longicollis 4 ✓
 Det TC McElrath 2018

INHS
 Insect Collection
 456782

] and output mapped to Darwin Core terms please

```
{
  "stateProvince": "ILL",
  "county": "Union Co.",
  "locality": "Wolf Lake by Powder Plant Bridge",
  "eventDate": "1 March 1975",
  "recordedBy": ["S. Ketzler", "S. Herbert"],
  "scientificName": "Monotoma longicollis",
  "individualCount": 4,
  "sex": "♂",
  "identifiedBy": "TC McElrath",
  "dateIdentified": 2018,
  "institutionCode": "INHS",
  "collectionCode": "Insect Collection",
  "catalogNumber": 456782
}
```



Data Ideas

- trending
 - data4good, focus on impact, local-to-global
 - digital first in the context of the bigger picture



From Doug and Deb – your thoughts?

- Doug
 - speed
 - ai
 - compelling business cases
 - seeking financial support
- Deb
 - shared knowledge management
 - AI, ML, text-mining for digitization and discovery and ...
 - what will we collect in 20 years
 - ask me about
 - Cisco PitStop
 - Imagine.One



Acknowledgements

Technical infrastructures are always only as functional and resilient as the social capacity of the communities that build and maintain them. (the socio-technical piece)

- Thank you all, and
- Let's Go DiSSCo!



@debpaul@mastodon.world
@idbdeb tw
dlpaul@illinois.edu



SYNTHESYS+

Synthesis of Systematic Resources

a DiSSCo project



Vanessa Pike
Natural History Museum, London

Opening Plenary **SYNTHESYS: past and present**

Background

- EC promoting “integrated research infrastructures”
- NH consortia developed “SYNTHESYS” led by NHM
- Four iterations, €38.2m funding since FP6 in 2004
- Common themes
 - Access (mechanism to access participating collections & facilities)
 - Networking (unifying best practice, policy & collections assessment)
 - Research (ancient DNA, virtual collections)



Background

- Aligned with DiSSCo ESFRI initiative
- Timelines for the parallel projects:
 - MOBILISE (2018-2023)
 - DiSSCo Prepare (2019-2023)
 - SYNTHESYS 1-4 (2004-2023)
- ICEDIG 2018-2020



How did we get here? FP4 + 5

- It all started during the European Commission's FP4 TMR Programme when natural history collections were recognised as *"Infrastructures"*
- Launch of FP5 featuring a 'Human Potential' Programme (1999-2004) included calls for more access grants
- Our collections-holding community seized these opportunities and applied successfully for funding
- Six countries won contracts during 2000 – 2004, total value over €5m to provide transnational access



How did we get here? e.g. of some FP5 TA projects

- **ABC** *Access to Belgian Collections of interest for biodiversity research* (RBINS)
HPRI-CT-2001-00159 Nov 2001 - Feb 2004 € 325 000
- **BIOD-IBERIA** *Iberian collections of fauna and flora* (CSIC)
HPRI-CT-2001-00165 Nov 2001 - Feb 2004 € 466 613
- **COBICE** *Copenhagen biosystematics centre* (University of Copenhagen)
HPRI-CT-1999-00021 Jan 2000 - Dec 2002 € 1 050 000
- **COLPARSYST** *Paris: access to collections and resources* (MNHN)
HPRI-CT-2001-00151 Nov 2001 - April 2004 € 583 333
- **HIGH LAT** *Access to naturhistoriska riksmuseet: high latitude*
HPRI-CT-2001-00125 Nov 2001 - Jun 2004 € 895 022
- **SYS-RESOURCE** *Increasing access for European researchers to systematics resources and analytical facilities* (NHM, Linnaean Society and RBG, Kew)
HPRI-CT-1999-00062 May 2000 - Apr 2002 € 1 050 000

How did we get here? FP5

FP5 also offered ‘Thematic network’ grants. Our community saw the merit in working together on access problems, not least data sharing issues

ENHSIN *European natural history specimen information network*

HPRI-CT-1999-40010 Jan 2000 - Mar 2003

€200k (Denmark, France, Germany, Netherlands & U.K.)

*“The central aim of the ENHSIN: to enable the development of a shared, interoperable infrastructure of natural history **specimen level databases** in European institutions”*

FP 6 & 7: Step change

- Commission changed its approach, partly through the work of ESRFI (European Strategy Forum on Research Infrastructures, set up in 2002), the case for funding delivery a programme '*Integrated Research Infrastructures*' across Europe was made
- Provided a golden opportunity to increase the physical collections access offer and fund further collaboration on common issues through 'Networking' and 'Research'

SYNTHESYS 1 – 4

- **SYNTHESYS (FP6): 2004 – 2009**
Networking and TA 13M€, 20 Partners (66 months)
- **SYNTHESYS2 (FP7): 2009 – 2013**
JRA, Networking and TA 7.2M€, 20 Partners (48 months)
- **SYNTHESYS3 (FP7): 2013 – 2017**
JRA, Networking and TA 8M€, 21 Partners (48 months)
- **SYNTHESYS+ (H2020): 2019 – 2023**
JRA, Networking and TA & **VA** 10M€, 32 Partners (54 months)

SYNTHESYS+

- 1) Developing infrastructure coupled with comprehensive access programme;
- 2) Develop & deliver support, training & dissemination activities;
- 3) JRA innovating digital/molecular workflows & prioritising collections to digitise;
- 4) Developing common policies, harmonise processes & link out internationally.

Access (€4.8m)

TA1: Physical Access

VA1: Virtual Access

Joint Research Activities (€2.3m)

JRA1: European Loans
+ Visits System (ELViS)

JRA2: Collections on
Demand

JRA3: Specimen Data
Refinery

Networking Activities (€2.9m)

NA1: Management

NA2: Training, Support &
Policy dissemination

NA3: Molecular standards
& processes

NA4: Digital standards &
processes

NA5: Internationalisation

SYNTHESYS+
Synthesis of Systematic Resources

DiSSCo EC-funded project
(Synthesys.info)
(scored: 14.5/15)



Co-funded by the Horizon 2020
Framework Programme of the European Union

4.5 years
(starting
01/02/2019)

Linked with DiSSCo goals & supported by CETAF, GGBN, TDWG & GBIF

Transnational Access:

19 years, 57,000+ User Days

Project	Countries	TA projects funded	TA user days funded
SYNTHESYS 1	11	2,056	29,636
SYNTHESYS 2	10	1,002	10,464
SYNTHESYS 3	11	1,106	11,053
SYNTHESYS +	13	613	6,457
		4,777	57,610

Virtual Access:

- programme providing digitisation-on-demand
- € 840k to 10 projects involving 18 partners digitising **c.270k specimens**



DNA Damage in Plant Herbarium Tissue

Martijn Staats¹, Argelia Cuenca², James E. Richardson^{3,4}, Ria Vrieling-van Ginkel¹, Gitte Petersen², Ole Seberg², Freek T. Bakker^{1*}

1 Biosystematics Group, Wageningen University, Wageningen, The Netherlands, **2** Laboratory of Molecular Systematics, Natural History Museum of Denmark, University of Copenhagen, Copenhagen, Denmark, **3** Tropical Diversity Section, Royal Botanic Garden Edinburgh, Edinburgh, United Kingdom, **4** Laboratorio de Botánica y Sistemática, Universidad de Los Andes, Bogotá, Colombia

Abstract

Dried plant herbarium specimens are potentially a valuable source of DNA. Efforts to obtain genetic information from this source are often hindered by an inability to obtain amplifiable DNA or herbarium DNA is typically highly degraded DNA.

Genomic Treasure Troves: Complete Genome Sequencing of Herbarium and Insect Museum Specimens

Martijn Staats¹, Roy H. J. Erkens^{2,3}, Bart van de Vossenbergh⁴, Jan J. Wieringa^{1,5}, Ken Kraaijeveld⁶, Benjamin Stielow⁷, József Geml⁸, James E. Richardson^{9,10}, Freek T. Bakker^{1*}

1 Biosystematics Group, Wageningen University, Wageningen, The Netherlands, **2** Maastricht Science Program, Maastricht University, Maastricht, The Netherlands, **3** Ecology and Biodiversity Group, Department of Biology, Utrecht University, Utrecht, The Netherlands, **4** Dutch National Plant Protection Organization, National Reference Centre, Wageningen, The Netherlands, **5** Netherlands Centre for Biodiversity Naturalis (section NBN), Herbarium Vindense (WAG), Wageningen University, Wageningen, The Netherlands, **6** Department of Human Genetics/Leiden Genome Technology Center, Leiden University Medical Center, Leiden, The Netherlands, **7** Centraal Bureau voor Schimmelfcultures Fungal Biodiversity Centre (CBS-KNAW), Utrecht, The Netherlands, **8** Naturalis Biodiversity Center, Section National Herbarium of the Netherlands, Leiden, The Netherlands, **9** Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh, United Kingdom, **10** Laboratorio de Botánica y Sistemática, Universidad de Los Andes, Apartado Aéreo 4976, Bogotá, Colombia

Abstract

Unlocking the vast genomic diversity stored in natural history collections would create unprecedented opportunities for genome-scale evolutionary, phylogenetic, domestication and population genomic studies. Many researchers have been discouraged from using historical specimens in molecular studies because of both generally limited success of DNA extraction and the challenges associated with PCR-amplifying highly degraded DNA. In today's next-generation sequencing

How to Open the Treasure Chest? Optimising DNA Extraction from Herbarium Specimens

Tiina Särkinen^{1,2*}, Martijn Staats³, James E. Richardson^{1,4}, Robyn S. Cowan², Freek T. Bakker³

1 Royal Botanic Garden Edinburgh, Inverleith Row, Edinburgh, United Kingdom, **2** Natural History Museum, Cromwell Road, London, United Kingdom, **3** Biosystematics Group, Wageningen University, Wageningen, The Netherlands, **4** Universidad de Los Andes, Apartado Aéreo 4976, Bogotá, Colombia

Jaksch et al. *BMC Res Notes* (2016) 9:348
DOI:10.1186/s13104-016-2147-7

Abstract

Herbarium molecular

RESEARCH ARTICLE

Open Access



DNA analysis of molluscs from a museum wet collection: a comparison of different extraction methods

Katharina Jaksch^{1,2*}, Anita Eschner³, Thomas V. Rintelen⁴ and Elisabeth Haring^{1,2}

Abstract

Background: DNA isolation and PCR amplification from molluscan taxa is considered as problematic because polysaccharides in tissue and mucus presumably co-precipitate with the DNA and inhibit the activity of DNA polymerase. In the present study we tested two common extraction methods on specimens from the mollusc collection of the Natural History Museum Vienna (NHMV). We analysed a broad variety of taxa covering a large temporal span (acquisition years 1877 to 1999), which distinguishes our study from previous ones where mostly fresh material was used. We also took other factors into account: effects of sample age, effects of formaldehyde treatment and taxon-specific problems. We report several primer combinations to amplify amplicons of different lengths of two mitochondrial

↓
TITLE

Focus on DNA extraction techniques

Innovation and development in **imaging**

Segmentation Segment images of multiple specimens, eg whole drawers of insects

3D imaging

State of of natur

2D+ & 3D imaging
Development of tools and



Innovation and development in **data capture**



Innovation and development in **access and sharing**

Digitisation on Demand

Transformation to a digitisation on demand system

Moving

RESEARCH ARTICLE

Insect: Automating the Digitization of Natural History Collections

Lawrence N. Hudson^{1*}, Vladimir Blagoderov¹, Alice Heaton¹, Pieter Holtzhausen², Laurence Livermore¹, Benjamin W. Price¹, Stéfan van der Walt^{2,3}, Vincent S. Smith¹

1 Department of Life Sciences, Natural History Museum, Cromwell Road, London, SW7 5BD, United Kingdom, **2** Stellenbosch University, Stellenbosch 7600, South Africa, **3** University of California, Berkeley, CA, United States of America



Innovation and development in **imaging**

Segmentation Segment images of multiple specimens, eg whole drawers of insects

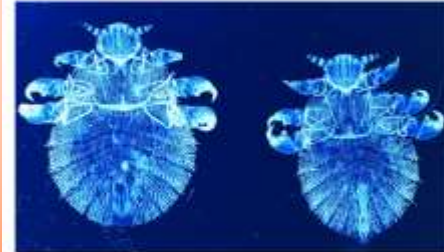
3D imaging State of the art in 3D imaging of natural history specimens

2D+ & 3D imaging Development of tools and protocols to create high quality affordable 2D+ and 3D imaging solutions



Home | Database | Collections | Journals | Members | Live Magazine

Miniature Lives Magnified



Agents for the Smithsonian's Biodiversity Heritage Library are part of the search for biodiversity.

At a glance

Transcribe microscope slide labels.

Type of activity: Online

Who can take part? Adults and students (Key Stage 4+)

When? Any time

How long will it take? Two minutes per slide

Our thanks

Thank you to everyone who helped us transcribe the marine mammal lice microscope slides. We are currently preparing our next Miniature Lives Magnified project.

In the meantime, you can help us to mark up colourful bird specimens to help us understand how such diversity evolved in Nature in [Project Plottage](#)

Project team

- Margaret Gold, Science Community Coordinator
- Laurence Livermore**, Digital Collections Programme Innovation Project Manager
- Faith Brown**, Curator
- Lizanne Allen, Senior Digitaliser
- Olivia Scrimshaw, Digitaliser

Innovation and development in **data capture**

Automating Data Capture Automating the capture of data from specimen labels

Engaging the Crowd Co-development of a crowdsourcing platform for transcription of natural history specimen labels

Innovation and development in **access and sharing**

Digitisation on Demand Transformation to a digitisation on demand system

Access & Sharing Moving to a more formalised system of access and sharing

Innovation and development in **imaging**

Segmentation Segment images of multiple specimens, eg whole drawers of insects

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2D+ & 3D imaging Development of tools and protocols to create high quality

AUTOMATING DATA CAPTURE FROM NATURAL HISTORY SPECIMENS

SYNTHESYS3 WORK PACKAGE 4 (JOINT RESEARCH ACTIVITY)
TASK 1.2 - AUTOMATIC METADATA CAPTURE

Innovation and development in **data capture**

Automating Data Capture
Automating the capture of data from specimen labels

Engaging taxonomists
Co-development of platform for transnational natural history specimens

Innovation and development in **access and sharing**

Digitisation on Demand
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Access & sharing
Moving to a more flexible access and sharing system



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Digitisation on Demand Transformation to a digitisation on demand system

Access & Sharing Moving to a more formalised system of access and sharing

Groundwork for SYNTH+ JRA:

- New digitisation techniques
- AI & machine learning
- Specimen Data Refinery

Micro-computed tomography for natural history specimens:

Handbook of best practice protocols

Authors:

Kleoniki Keklikoglou (HCMR)
Sarah Faulwetter (HCMR)
Eva Chatztrikolaou (HCMR)
Patricia Wils (MNHN)
Christos Arvanitidis (HCMR)

3D imaging
State of the art in 3D imaging
of natural history specimens

2D+ & 3D imaging
Development of tools and
protocols to create high quality
affordable 2D+ and 3D imaging
solutions

SYNTHESYS+
Synthesis of Systematic Resources a DiSSCo project



SYNTHESYS
Synthesis of systematic resources

European Journal of Taxonomy 623: 1–115
<https://doi.org/10.5852/ejt.2020.623>

ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2020 – Brečko J. & Mathys A.

This work is licensed under a Creative Commons Attribution License (CC BY 4.0).

Collection management

urn:lsid:zoobank.org/pub:A2A28A67-9FAE-4716-943E-AF1F7A4F1738



Biodiversity Data Journal 4: e8740
doi: 10.3897/BDJ.4.e8740



Software Description

With contributions from:
Alex Ball (NHM)
Farah Ahmed (NHM)
Laura Tormo (MNHN)
Cristina Paradedla (MNHN)

Handbook of best practice and standards for 2D+ and 3D imaging of natural history collections

Jonathan BRECKO^{1*} & Aurore MATHYS²

¹Royal Belgian Institute of Natural Sciences, Scientific Heritage Service,
Vautierstraat 29, B-1000 Brussels, Belgium.

²Royal Museum for Central Africa, Biological Collections and Data Management,
Leuvensesteenweg 13, B-3080 Toruven, Belgium.

*Corresponding author: jbrecko@naturalsciences.be
†Email: amathys@naturalsciences.be

urn:lsid:zoobank.org/author/7AC9797B-88EB-4844-86B9-C88DF7C06B2E
urn:lsid:zoobank.org/author/0C719566-2901-471D-B88E-CE3EBB476172

With contributions[†] from Bernhard Stöckel, Michael Heethoff, Susan Stephan, Bernhard Schur
Didier VandenSpiegel and Patrick Semal.

Abstract. Digitising a collection is key to make it last even after the physical objects are no longer available. Almost all of the techniques currently available to digitise a natural history collection in 2D+ and 3D are listed herein. The techniques are explained in a way that even one without any knowledge on the subject may understand their principle. The strong and weak points of the techniques are discussed, and an overview of suitable collections and equipment are given for each one of them. Also, plenty of

Micro-CT_{vlab}: A web based virtual gallery of biological specimens using X-ray microtomography (micro-CT)

Kleoniki Keklikoglou[‡], Sarah Faulwetter[‡], Eva Chatztrikolaou[‡], Nikitas Michalakakis[‡], Irene Filippoulou[‡], Nikos Minadakis[‡], Emmanouela Pantari[‡], George Perantinos[‡], Alexandros Gougnoulis[‡], Christos Arvanitidis[‡]

[‡] Hellenic Centre for Marine Research (HCMR), Gouves, Heraklion, Crete, Greece

[§] Institute of Computer Science (IGS), Foundation for Research and Technology – Hellas (FOORTH), Science and Technology Park of Crete, Vassilika Voulas, Heraklion, Greece.

Innovation and
development in
access and sharing

Digitisation on
Transformation to a
demand system

Innovation and development in imaging

Segmentation Segment images of multiple specimens, ...

3D imaging State of the art in 3D imaging of natural history specimens

2D+ & 3D imaging Development of tools and protocols to create high quality affordable 2D+ and 3D imaging solutions



Does digitisation of natural history collections reduce the need for physical access and physical loans?

Report on subtask 3.2.1 under Task 3.2

"Facilitating Access beyond SYNTHESYS3"



Compiled on behalf of SYNTHESYS by
Henrik Engbøll, Natural History Museum of Denmark, hengbo@nhm.ku.dk

Innovation and development in data capture

Digitisation on demand: a report on feasibility of a digitisation on demand service for natural history collections

Authors:
Vincent S. Smith (NHM)
Esopth Haston (RBGE)
Robyn Drinkwater (RBGE)
Laurence Livermore (NHM)
Jennifer Pullar (NHM)
Steffen Kiel (NHM)
Johannes Lundberg (NHM)
Stefan Daume (NHM)
Irene Boag (NHM)
Margaret Gold (NHM)

SYNTHESYS
Synthesis of systematic resources

Innovation and development in access and sharing

Digitisation on Demand

Transformation to a digitisation on demand system



Innovation and development in **imaging**

Segmentation Segment images of multiple specimens, eg whole drawers of insects

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Automating Data Capture
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Digitisation on Demand
Transformation to a digitisation on demand system

Access & Sharing
Moving to a more formalised system of access and sharing

Groundwork for SYNTH+
JRA & VA:

- Virtual Access
- Digitisation as a service
- Imaging on Demand
- Sequencing on Demand

Innovation and development in imaging

Innovation and development in data capture

Innovation and development in access and sharing

The screenshot shows a web browser displaying a Synthesys+ wiki page. The page title is "Recommendations: Management Policy on Digital Collections". The left sidebar contains navigation links such as "Main page", "Community portal", and "Tools". The main content area includes a section "A: About Recommendations: Management Policy on Digital Collections and Supplements" with a sub-section "A 1 Aims and Authors". Below this, there is a paragraph explaining the handbook's purpose and a "back to top" link. Another section "B: Overview: Background and Aims of a Management Policy on Digital Collections" is visible, followed by a paragraph about the MPDC. At the bottom, a section "B 1 Reasons for Developing Management Policies on Digital Collection Data" is partially visible.

Digitisation on Demand

Transformation to a digitisation on demand system

Access & Sharing

Moving to a more formalised system of access and sharing



Groundwork for SYNTH+
JRA & NA:

- Collections aggregators
- ELViS
- Access policies
- Data sharing standards

Development



DISASTER PLAN FOR "NEW COLLECTIONS"

Contents

- 1.-INTRODUCTION
- 2.-PREVENTION
- 2.2.-Evaluation of possible risks
- 2.3.-Reduction of risks

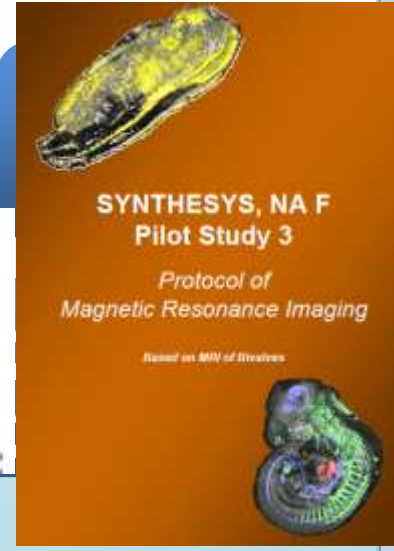
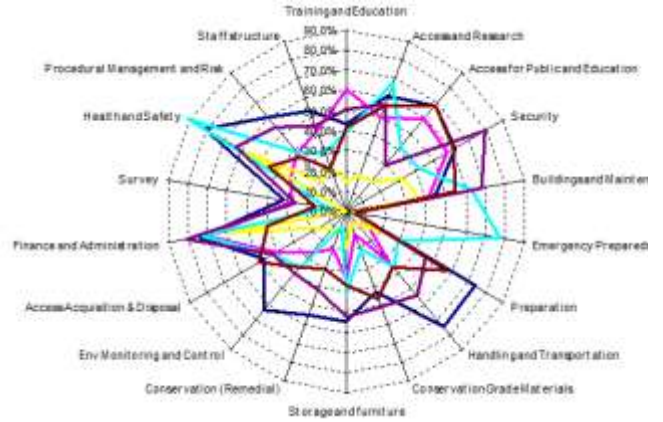


The SYNTHESYS Specimen and Observation Portal

Kelbert, P., Holetschek, J., Güntsch, A., Kusber, W.-H., Zippel, E. & Berendsohn, W.G.
 Freie Universität Berlin, Botanic Garden and Botanical Museum Berlin-Dahlem

exchange
development

Introduction
 International networks a
 legacy of time and space



- Groundwork for SYNTH2:
- increased adoption of common benchmarks, standards & protocols
- enhanced quality and quantity of online collections information to virtual Users

52 Bridging Continents, SPNHC 24th Annual Meeting, 6-11 July 2009, Leiden

SYNTHESYS and EDIT: streamlining and integrating operations in European natural history museums

Leo Kriegsman

Naturalis, Leiden, Netherlands

SYNTHESYS
 Focus on
 development in collections management

3 collections
int, enhancing
ssibility

Performance
Indicators

Assessments
Self-assessment of
collections manage

Annotation Workflow In Natural History Collections

Report for the SYNTHESYS II project
Network Activity 3, Deliverable 3.7

Jörg Holetschek
Botanic Museum & Botanical Garden Berlin-I
Königin-Luise-Str. 6-8
14195 Berlin-Dahlem



Synthesys IA WP5 activity 3.10 - Usability of Specimen access system for taxonomists

Report on, recommendations for, and detailed behavioral specification for an updated BioCASE portal interface.

Diane Smith and Martin Pullan
July 27, 2010

Royal Botanic Garden Edinburgh,
20A Inverleith Row, Edinburgh.



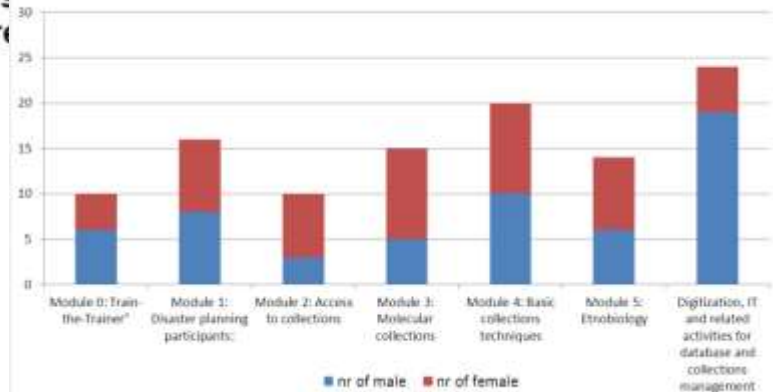
Training
in courses in
priority topics

Approaches for Involving Volunteers into the Process of Metadata Capture from Specimens

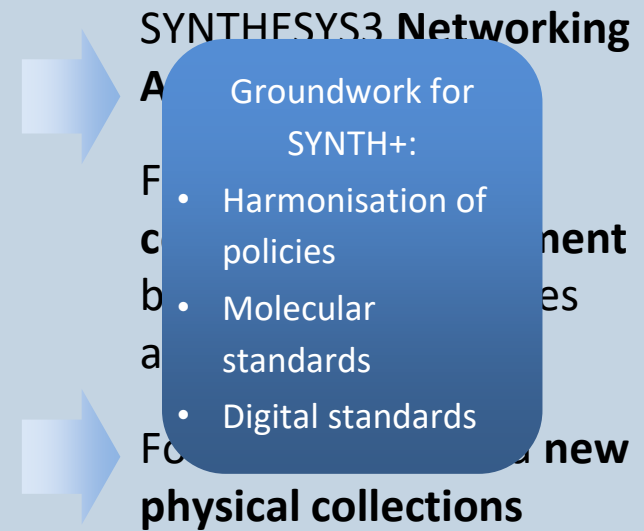
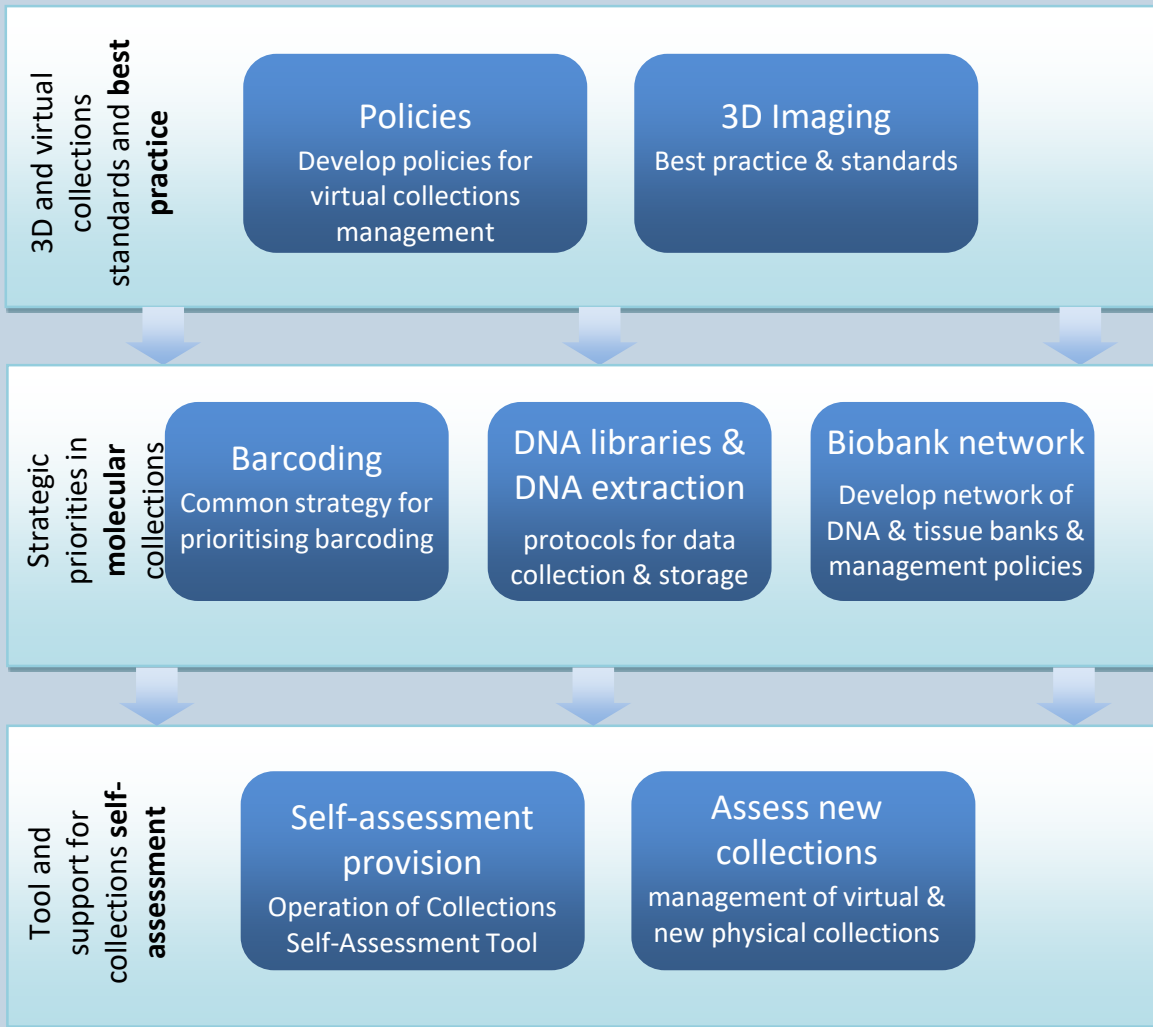
Report for the SYNTHESYS II project
Network Activity 3, Deliverable 3.1

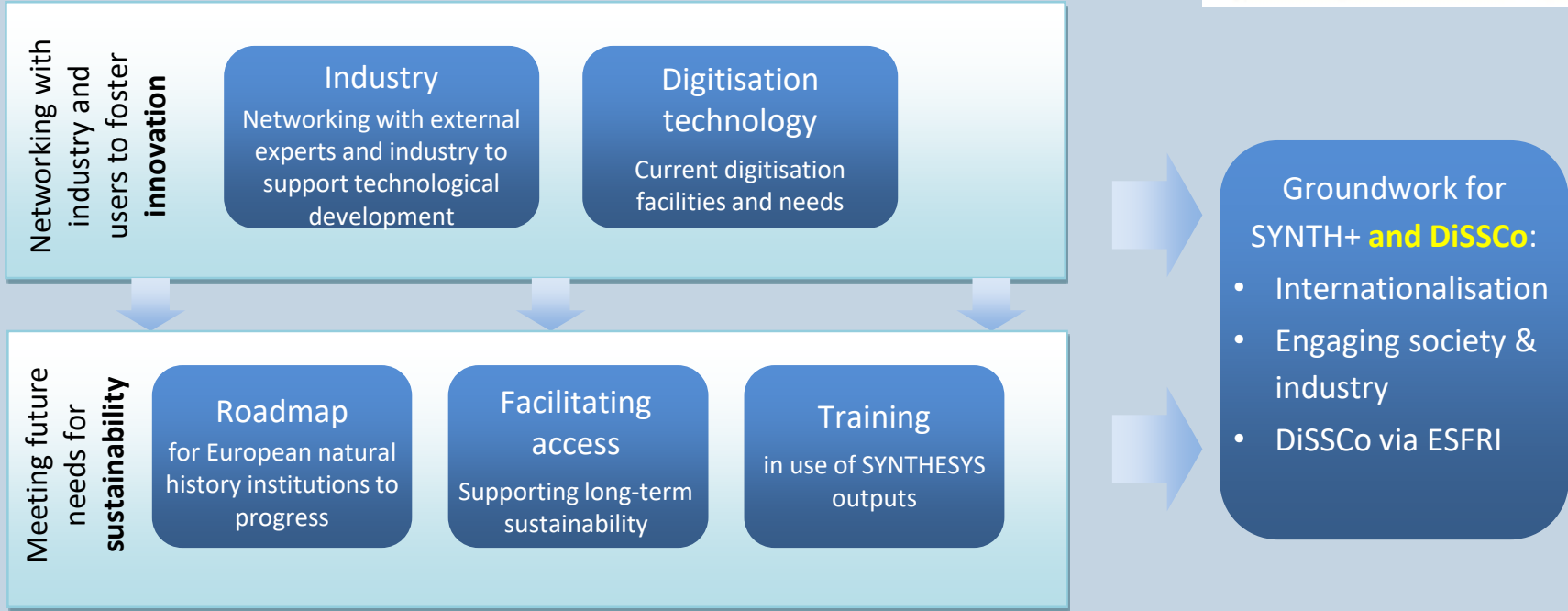
Jörg Holetschek
Botanic Museum & Botanical Garden Berlin-Dahlem
Königin-Luise-Str. 6-8
14195 Berlin-Dahlem
j.holetschek@bgbm.org

No. participants on training course modules



Groundwork for SYNTHESYS II





Further SYNTHESYS3 activities on partnering with industry and external experts, and long-term sustainability which led to the development of DiSSCo.

What comes next?

- ESFRI roadmap is now providing our community with an opportunity to build a more sustainable virtual global collection
- Institutions now have the tools to continue efficient digitisation of their collections
- Through preparation for DiSSCo Construct: there is a game plan to enhance a global distributed infrastructure of scientific collections

SYNTHESYS players present at the meeting today

Work package leaders & co-ordinators:

Vince Smith, Sandy Knapp, Dimitris Koureas, Elspeth Haston, Ana Casino, Eva Häffner, Edmund Schiller, Quentin Groom, Hilary Goodson, Wouter Addink, Eva Chatzinikolaou, Laurence Livermore...and many, many more Access supporters

Most importantly **Krissie Gorman** for holding everything together

Thank you for all your hard work and commitment



THANK YOU

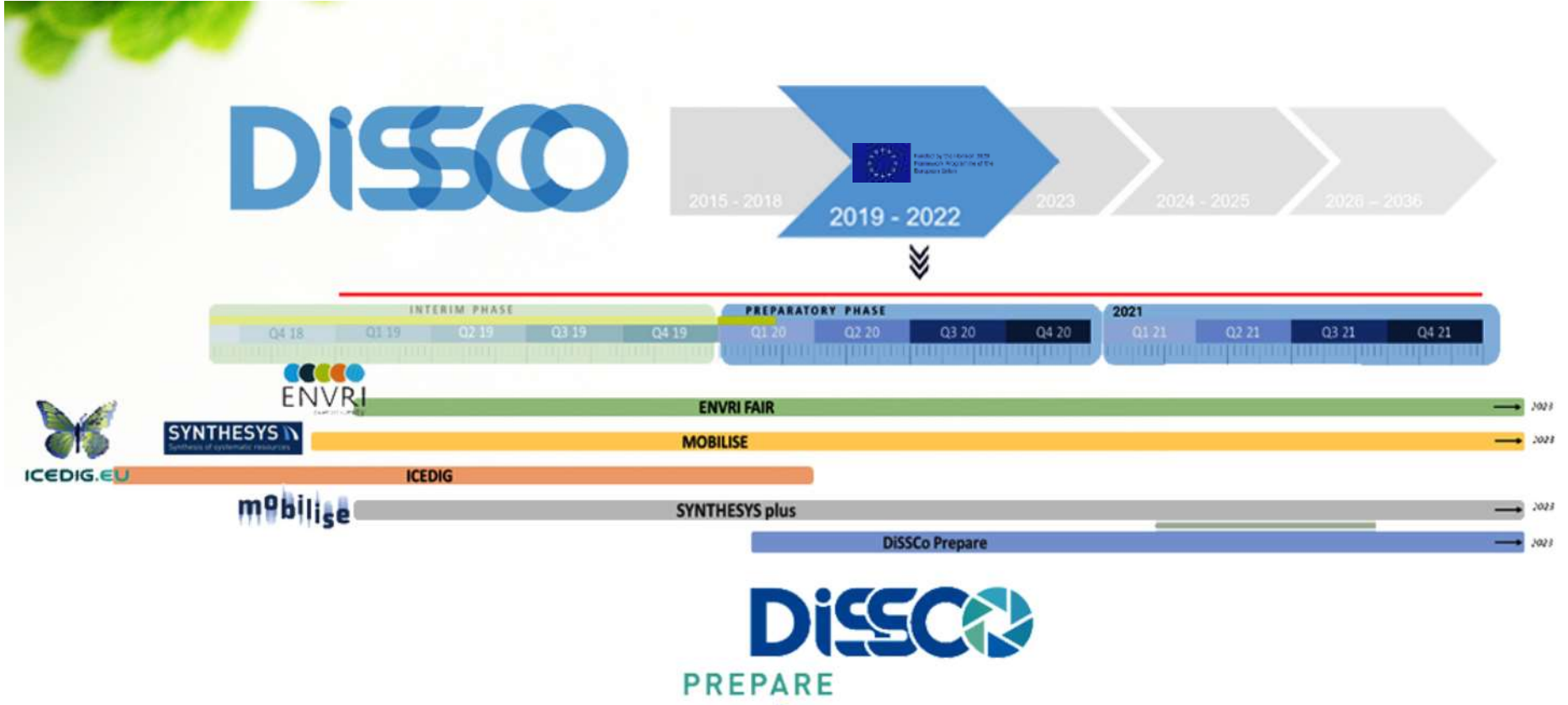


Eva M. Alonso
Naturalis Biodiversity Center

Opening Session
DiSSCo Prepare: preparing to construct

Structure

1. What is DiSSCo Prepare?
2. Structure of the work
3. Managing the consortium
4. Main outcomes
5. Next Steps

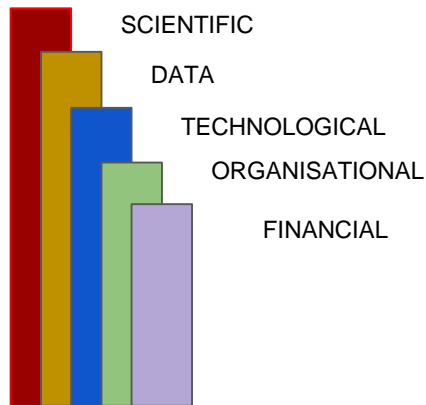


What is DiSSCo Prepare?

Overarching Goal:

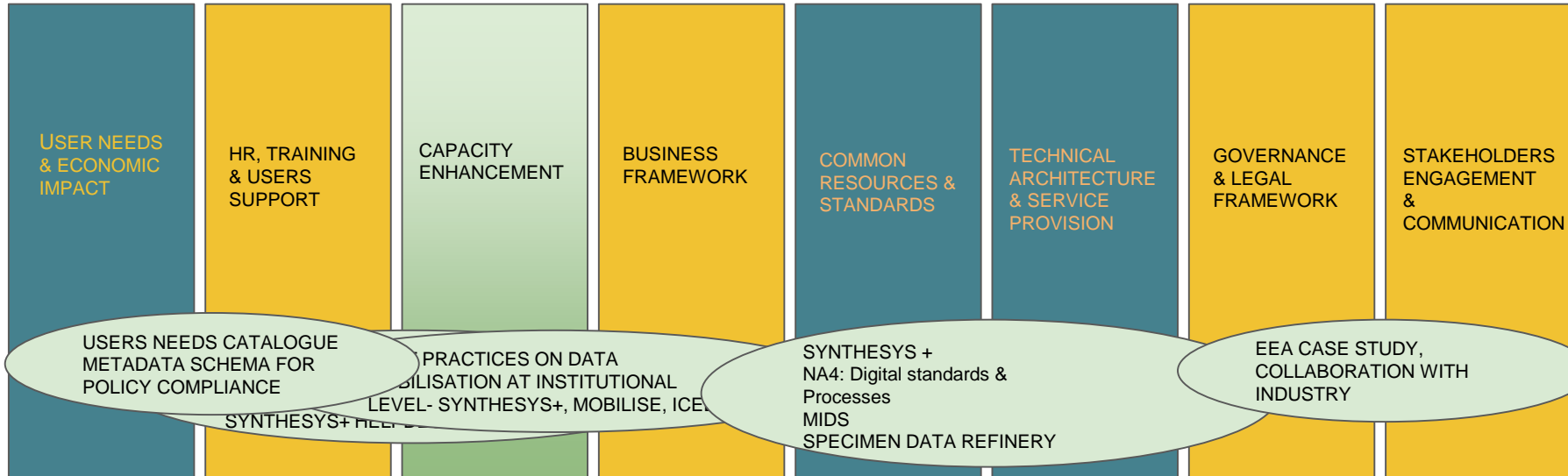
- Improve overall DiSSCo Implementation Readiness Level(IRL)
- Deliver a Construction Master Plan

IRL in 5 dimensions with specific objectives



SCIENTIFIC	SRL	RESPOND & ADJUST TO CURRENT/ANTICIPATED USER NEEDS
DATA	DRL	PRODUCE, MOBILISE AND STEWARD FAIR DATA
TECHNOLOGICAL	TRL	TECHNICAL ARCHITECTURE, KNOWLEDGE BASE, CONSTRUCTION PLANS FOR CORE SERVICES...
ORGANISATIONA L	ORL	FIT FOR PURPOSE LE & GOVERNANCE, STRATEGY AND POLICIES
FINANCIAL	FRL	A COMPREHENSIVE BUSINESS MODEL

Structure of the work, coordination and alignment



WP9 Management - overall coordination and alignment of efforts DPP - Synthesys+ - Mobilise - ENVRI FAIR

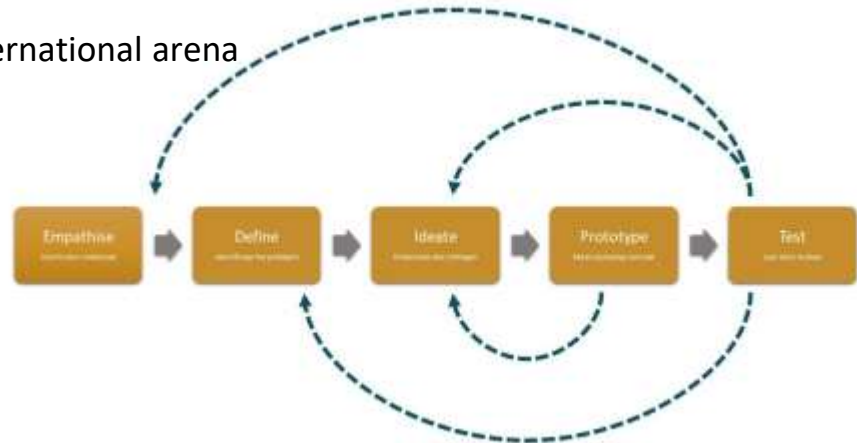
Managing the Consortium

- Project management tools & continuous monitoring
- Sound Governance (clear Consortium Agreement)
- Robust risk & financial management
- Organisation of AHMs, Roundtables & other project meetings
- Clear ownership (Leaders & *deputies* for each WP, milestone & deliverable)
- Robust quality review of deliverables and milestones (incl. SAB,TAB, FF)
- Structured and advanced planning for reporting (biannual internal reports, bilateral meetings)
- Transparent and frequent communication & communication tools (Binnacle, web, newsletter, social media...)



How we work?

- Principles of transparency, inclusiveness, simplicity and robustness
- Engagement of DiSSCo main stakeholders through regular consultations & meetings (National Nodes, DiSSCo Funders Forum, SAB,TAB,iGA)
- Coordination and synchronisation of activities across projects (Synthesys+, ENVRI Fair, Mobilise, BGE, BioDT,..)
- Collaboration with strategic partners (RDA, FDO, GBIF, ENVRI RIs, ERIC Forum, iDigBio, TDWG, etc)
- Technological outcomes trigger use cases at international arena
- Continuous learning process



What is the contribution of DPP towards construction?

Ultimate outcome: Construction Master Plan (CMP) is a design blueprint for the transition, construction and operation of the DiSSCo research infrastructure, structured **to give immediate concrete and practical indications.**

On legal matters: the Legal Entity formation, DiSSCo ERIC Governance model, DiSSCo Statutes and Business Framework (costing, cost recovery and contribution models);

On technology and e-services development: Technical Architecture; Knowledge systems; User needs, MIDS, Core infrastructure services, Helpdesk; Active member at the FAIR Digital Object Forum,

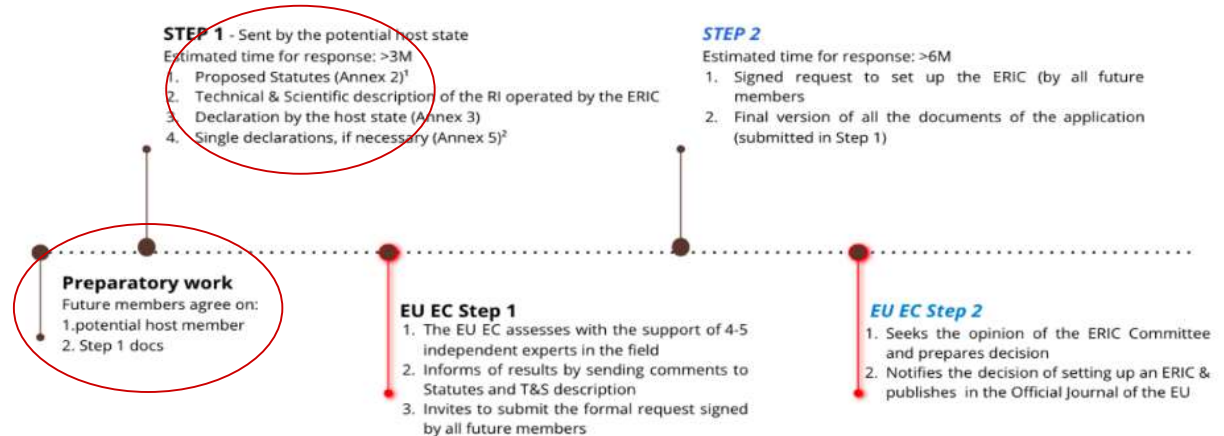
On capacity building: Self-assessment tools for policies and human capacity, Training strategy, HR policy;

On engagement and advocacy: Advocacy Strategy to ensure connectivity and capacity of consortium partners, government ministries and other stakeholders; NNs meetings;

Next steps

1. ERIC roadmap

ERIC Process - What we have to do



1. Core infrastructure services

2. NNs engagement and advocacy

3. Consolidation of collaboration with key RIs (HE work programme)



Opening Plenary
THANK YOU



Ana Casino
CETAF

MOBILISE
Mobilise to link



Mobilise Action

Mobilising Data, Policies and Experts in Scientific Collections

COST, an intergovernmental framework for European Cooperation in Science and Technology

MOBILISE (CA 17106) is a COST Action focused on **networking, consolidation and capacity building** that aims bringing together key actors, leverage on other initiatives in the field of bio and geo-diversity, and contributing to DiSSCo Master Plan.

MOBILISE implies collaborative work towards mobilization

MOBILISE means to organize and encourage (individuals) to take (collective) action in pursuit of a concrete objective

Data, identifying relevant standards to persistently and coherently increase the FAIRness of data related to scientific collections.

Policies, with final recommendations and guidelines published as a baseline for further work.

Experts, by networking among people across Europe, participating in meetings, workshops and training initiatives, and promoting capacity building also through the STSMs

Raising awareness of the digital transformation NSC are going through

Instruments

Working groups (6):

Assessment of existing systems and standards

Development of standards and guidelines for

- Data management in relation to content, curation, quality management, technical framework and documentation
- Data gathering and large-scale digitisation of collection objects
- Data archiving and long/term preservation
- Data publication, including portals and publishers

Education and training, communication and outreach

Short term Scientific Missions (STSM)

Training School (TS)

Grants for Conferences

Virtual Networking tool (VNT)

Big figures:

33 European countries

4.5 years (1 Nov 2018 – 30 April 2023)

Budget of **0.5 M€**

More than **30** Workshops

16 scientific missions, **180** days

4TS (+1 online), **190** trainees

20 publications, papers & conference abstracts

over **2,100** networking exchanges

Website: www.mobilise-action.eu



Contributions

Guidelines as a source for DiSSCo RI

- “Common Standards and Guidelines for Digitisation“
- “20 messages for guiding long-term preservation”
- Best practices for the development of linked data objects in digital collections platforms
- Guidelines for proper citation of data and dataset in scholarly publications

Creation of new tools for the scientific community:

- member wiki in the biowikifarm (<https://costmobilise.biowikifarm.net>) internet resources with standards, format and norms, and a glossary
- addition of two new terms to Darwin Core (recordedByID and identifiedByID)
- addition of person identifiers and disambiguation
- contributed to a collection description standard, Latimer Core (under review)

Collaboration with key stakeholders

Creation of a new TDWG Task Group for Person Identifiers within the Attribution Interest Group

Outreach

Publications over 20 Co-authored publications, *of high quality, and good significance, relevance and quantity*
new types of data related to Digital Specimen (Open DS and MIDS)

Persistent and **unambiguous identification of people**

Mobilisation of digital assets

innovative mechanisms for **large scale digitization**

concepts/infrastructures required for **large scale data management**

Introducing **FAIRness** in data management

Archiving strategies for biodiversity and geodiversity data

Best practices **for publications**

Dissemination and awareness raising



52,000 visitors and 458k visits to the website

36,000 profile visits in Twitter with over 152k tweet impressions



www.mobilise-action.eu

48 posts for news and events

Latest News

PLAZI TAKING CARE OF FREEDOM
 PLAZI – MOBILISE online Training School (TS) Announcement 27-28 Feb 2023
 January 24, 2023
 MOBILISE online Training School (TS) "Biodiversity and Digital Media: linking material citations in publications to specimens" ONLINE (via Google Meet) 27 and 28 February 2023 13:00 -17:00 PM CET MOBILISE COST Action 17106: "Mobilising Data. [...]"

DISCO FUTURE
 DISCO Futures – invitation - Brussels 07-09/02/2023
 January 19, 2023
 Invitation Letter The DISCO community is pleased to invite you to attend DISCO Futures, a three-day conference that will take place in Brussels, Belgium in February 2023, hosted by the Royal Belgian Institute of Natural Sciences, CETAF, Meise [...]

WG4 Workshop: Completing editorial work on the "Guideline for long-term preservation and archiving of data products from scientific collections facilities" in Munich

Twitter feed

MOBILISE Retweeted
DISCO @DISCOeU · Jan 25
 Less than two weeks to DISCO Futures and we close the registration period. Looking forward to seeing you all soon in Brussels!
 #futuresdisco.eu
 @HorizonEU #biodiversity #FAIRdata #openscience #datascience #naturalhistory




[@MobiliseAction](https://twitter.com/MobiliseAction)

114 tweets

Top Tweet retweeted 1,882 impressions
 The [@MobiliseAction](#) workshop on "Machine learning on images of natural history collections" will be hosted by the University of Coimbra, on 8-10th September. Read more here: mobilise-action.eu/2021/09/06/a-workshop-on-machine-learning-on-images-of-natural-history-collections/ [pic.twitter.com/CIHyM3eriv](https://twitter.com/CIHyM3eriv)

WITOL - Mobilising Data, Policies and Experts on Scientific Collections
 Workshop on machine learning on images of natural history collector
 Universidade de Coimbra Da Vida Colégio de S. Bento, Coimbra Portugal
 03/12

Top Tweet retweeted 1,837 impressions
 141 participants from Albania, Austria, Belgium, Bulgaria, Cyprus, Germany, Greece, Poland, Slovakia & Turkey have joined the face-to-face part of the [@MobiliseAction](#) Training School which started today at [@mhencrate](#) in Marakkar, Crete! pic.twitter.com/2y40yMDX1e



Top Tweet retweeted 1,455 impressions
 Apply now for the [@MobiliseAction](#) 4th Training School on "Next step in the digitization process of Natural History collections" (online part on 20 January 2023 & face to face part on 6-7 February 2023, Brussels, Belgium! Deadline: 15 December 2022! See: tinyurl.com/2pikstzt pic.twitter.com/5rY7z5u6.

WITOL 4th International Training School (TS) "Next step in the digitization process of Natural History collections: Publishing biological, geological, palaeontological & zoological data"
 ONLINE PART (20 JANUARY)
 20 January 2023 13:00 - 17:00 PM CET
 FACE TO FACE PART
 06-07 February 2023 in Brussels, BELGIUM
 04/12



Training School

4 TS
1 Online TS
Linked courses

MOBILISE COST Action 17106
THIRD BLENDED TRAINING SCHOOL

"Digitisation and data management challenges in small collections"

Online session
4 May 2022 14:00-17:00 CET, on zoom

Face to face session
17-18 May 2022

Venue:
Natural History Museum of Oslo - 9th floor, Oslo, Norway

MOBILISE COST Action 17106
MOBILISE COST Action 17106, "Mobilising Data, Policies and Experts in Scientific Collections", in cooperation with CDSP (<https://www.cdsp.org>), CETAF-DEST (<https://cdsp.org/en/activities/cetaf-dest>), the Swiss Universities eBioDiv and Arcadia Fund, organises its third blended Training School (TS) on the digitisation and management of biological and geological collections.

Training School Overview
The TS will target the following basic but important steps of the digitisation process of biological and geological collections:

- The data quality issue:** for ensuring the maximum quality when digitising taxonomic, geographical, collection and molecular data, such as specimens and registers, literature data, field work notes, occurrence data, remote sensing data, etc.
- The data cleaning:** in order to further improve the quality of data and make them "fit for use" by defining and addressing error types, search and identify error instances, correct the errors, document error instances and error types and modify data entry guidelines to reduce future errors.
- The data visualisation:** focusing on applying visualisation techniques in data.

According to the program (<https://www.mobilise-action.eu>) the online part will include all the theoretical presentations. The face to face part will be a hands-on learning, dedicated only to exercises on the theoretical topics of the online part. In order to get the TS certificate, the trainees have to attend both sessions, the online as well as the face to face one. However, trainees will have the possibility to bring samples of their institutional biodiversity and geodiversity digital database and register on them.

Who can apply?
The Training School is addressed to employees engaged in biological and geological collections and their data such as Curators and Collections managers, Collections/Owner managers, Collections/Registration managers, librarians, bioinformaticians, Early Career Investigators (scientists who are within a time span of up to 10 years from the date they obtained their PhD/doctorate) or future specialists, Students (PhD candidates, MSc, PhD), technicians of collections. They must be engaged in an official research programme, or employed by, or affiliated to, an institution, organisation or institution, which has within its team a clear expertise with performing research.

Location
The online session of the TS will be on the 4th of May 2022 14:00-17:00 CET, on zoom. Its face to face part will be held in Oslo, Norway, the 17th (evening) - 18th (morning) of May 2022, hosted by the Natural History Museum of Oslo University of Oslo.

Trainees Grants and Certificate
We best apply to the Training School. Trainees will receive a COET. It will amounting to 300 euros for accommodation and travel expenses of the grantee, during the face to face part in Oslo only, plus an amount covering their flight ticket costs to Oslo. The COET Grant will cover the online part (once in <https://www.mobilise-action.eu>). Certificates with ECET 7 points will be provided to trainees.

Registration
Applications need to be submitted at the link found in <https://www.mobilise-action.eu> and filled out with a CV of one page (stating in parallel their experience on the TS topic and a maximum statement of 200 words). The Training School is open to a limited number of trainees. COET positions are gender balanced. Employment of Early Career Investigators and geographical inclusiveness will be followed. **Deadline of applications is the 14th of March 2022.**




MOBILISE online Training School (TS)

"Biodiversity and Digital Media: linking material citations in publications to specimens"

ONLINE (via Google Meet)

27 and 28 February 2023 13:00 - 17:00 PM CET

MOBILISE COST Action 17106: "Mobilising Data, Policies and Experts in Scientific Collections", in cooperation with [Plazi](https://plazi.org) (plazi.org), the Swiss Universities eBioDiv and Arcadia Fund, organises its first online Training School "Biodiversity and Digital Media: linking material citations in publications to specimens" at 27th and 28th of February 2023 (via Google Meet), addressing theoretical and practical activities.

DEST online courses on Biodiversity and Climate change



Impact

Strengthen the network: creating alliances, cross-fertilizing ideas and increasing collaboration across Europe (through examples as: new members of CETAF, participation in DEST and in Bionomia, proposing joint projects, as TETTRIs).

Leverage on other initiatives: several initiatives have started also in the light of the objectives of MOBILISE, with the participation of several actors of the COST Action, as it is the case of DiSSCO Prepare, BiCIKL and BGE at European level and several others at national level.

Get closer to our stakeholders: for the organization of the TS in collaboration with GBIF and iDig Bio, but equally for the content itself, as it is the case of the work undertaken with TDWG for the definition of several standards, and with international collaborators for the identification of a potential Registry Agency for DOIs.

Tool-up and promote building capacity around NSCs with the TS that will continue beyond MOBILISE, thanks to CETAF-DEST.



Open space

Reflection and critical discussion

Multistage for different groups – developers, curators, researchers, policy-related officers

Interdisciplinarity integrating collection facilities, biodiversity and geosciences researchers, archives, libraries and persons representing national, regional as well as international infrastructure and computing facilities together

Embedment in a larger initiative, shared goal, common strategy, **DiSSCo**

MOBILISE: The linking pin



Biodiversity
Information
Standards
T O W S

Supporting the vision

Sustain an open dialogue between science and infrastructure



01



Capacity Enhancement

Ensure long-tail of organisations & scientists benefit equally

05



MOBILISE COST ACTION

Data, Policies and Expertise
in Scientific Collections



02

Building awareness

Reach out to adjacent communities of practice



04

Efficient Coordination

A focal point of coordination between the DiSSCo-linked projects and community activities



03

Leveraging outputs

Strong dissemination and translation of project outputs to industrial and science-policy stakeholders





Opening Plenary
THANK YOU



Dimitris Koureas
Naturalis Biodiversity Center

DiSSCo ESFRI



(We'll be back at 15:30h CET)



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

DIGITISATION: TRANSFORMING COLLECTIONS

Jana Hoffmann

Museum für Naturkunde Berlin

Elspeth Haston

The Royal Botanic Garden Edinburgh



Session:

Digitisation: Transforming Collections

Session structure

Lightning talks “ Gamechanger”

- key events which have driven digitisation forwards over the last two decades or so
- cover game-changing moments in the development of digitisation in Europe
 - technical
 - conceptual
 - skills-based

Video statements “Reflection”

- greetings
- brief statements on the digitisation efforts in European Natural History Collections:
 - what progress has been made
 - which new opportunities have been unlocked
 - what new user groups have been provided with access
 - what scenarios for re-use were enabled



Bruno Giebels
Picturae

Digitisation: Transforming Collections

Video statement by Picturae



PICTURAE



Lyubomir Penev
Pensoft Publishers

Digitisation: Transforming Collections
Video statement by Pensoft Publishers

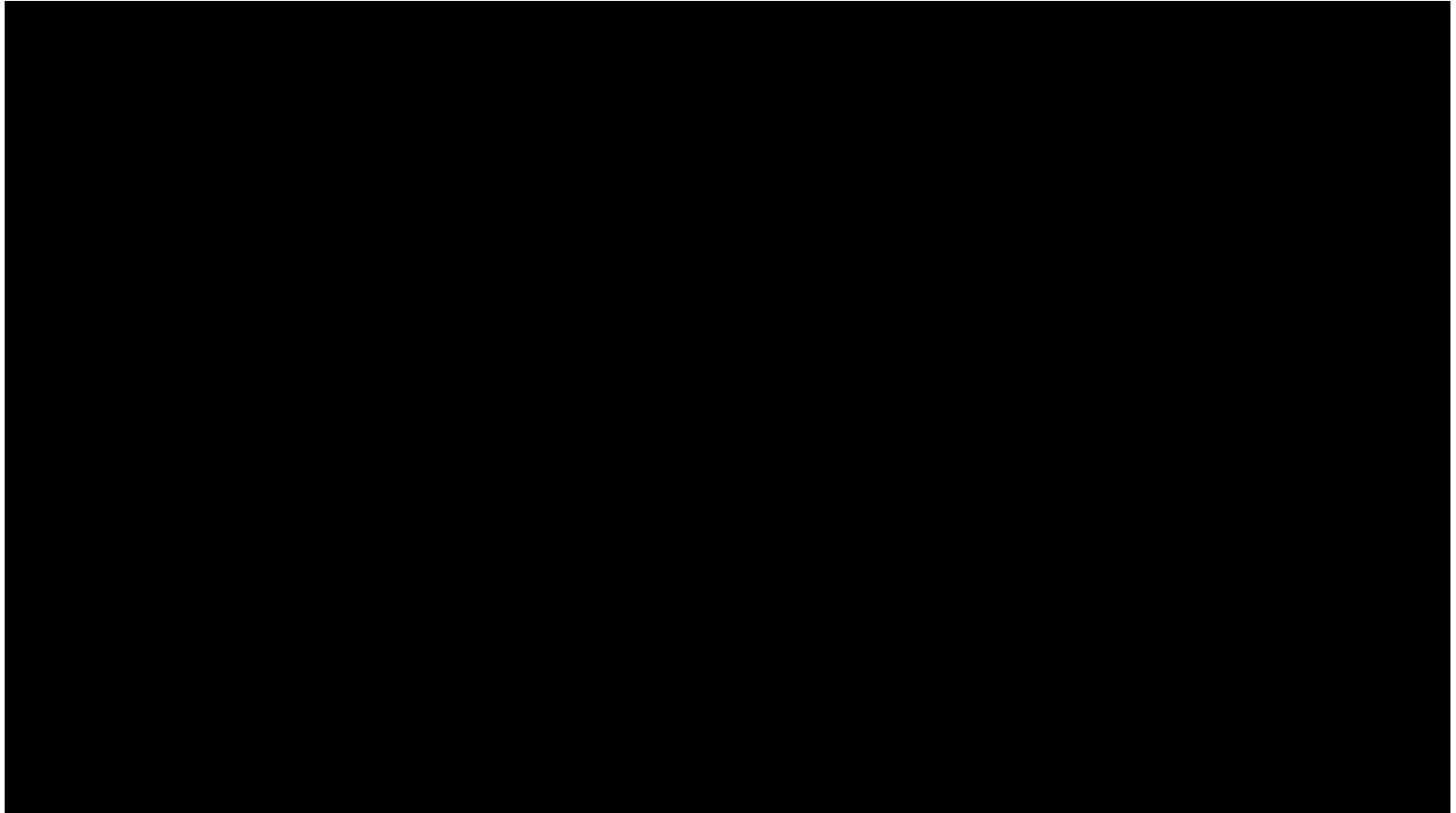




Martin Kalvatovic
Biodiversity Heritage Library (BHL)

Digitisation: Transforming Collections

Video statement by Biodiversity Heritage Library



Pierre-Yves Gagnier
Muséum national d'histoire naturelle
à Paris



Digitisation: Transforming Collections
Paris Herbarium,
the beginning of a digital infrastructure

How it all began :

Assessment of space requirements for the next 30 years

6 million herbarium sheets; 400 years of environmental data



Getting organized

The steps

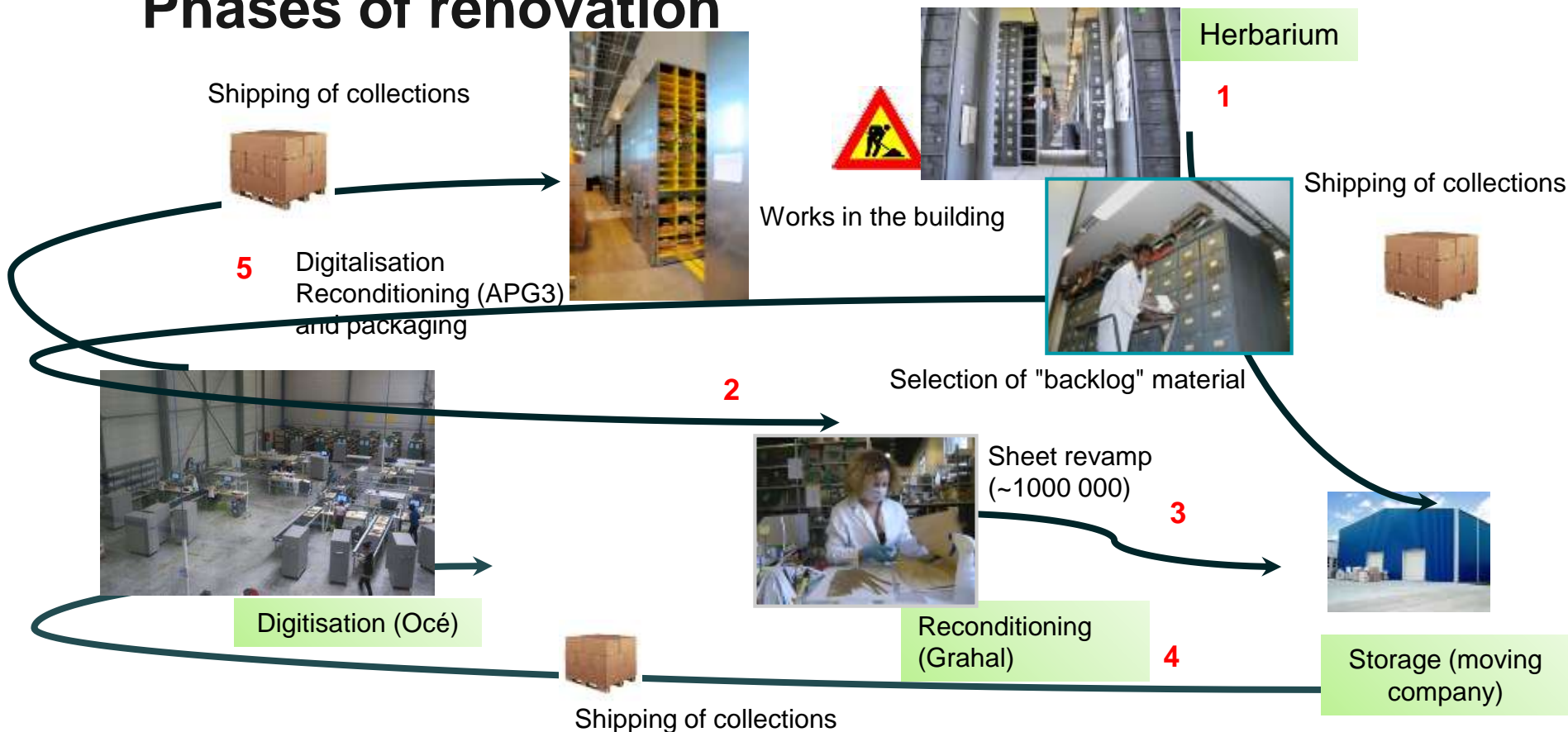
- Pre-Sorting
- Reconditioning
- Removals
- Digitisation
- Reclassification (sorting)

The Team :

- Muséum Technicians (22)
- Muséum Researchers (19)
- Volunteers (50)
- Grahal (22 employees)
- Océ (17 employees)
- CHENUE (5 employees)



Phases of renovation



Mass digitisation

The steps

- Indexation with installation of new barcode
- Reading of the new barcode
- Installation on the line
- Digitisation
- Herbarium sheet back in their folder
- Repackaging for shipment



Digitisation: Transforming collections - Paris Herbarium, the beginning of a digital infrastructure

Pierre-Yves Gagnier



FUTURES
Brussels 07-09/02/2023

Session Digitisation:
Transforming Collections

THANK YOU

Myriam van Walsum
Naturalis Biodiversity Center, NL



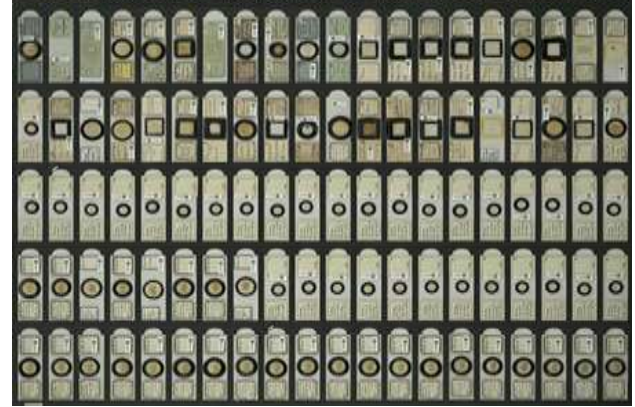
Digitisation: Transforming Collections

Digitising 37 Million specimens in digistreets

Naturalis FCD (2010-2015) digistreet formula

Key is industrial approach

- Strict prioritisation
- Subcollection based, not individual object
- Digistreet per object type
- Process divided into subsequent steps
- Strict scope
- Data (entry) standardisation
- Commercial option when efficient
- Scalability



What good came out of it?

Obtained project goal: 30M objects digitised on higher level, 8M object level



- Sustainable technical infrastructure
 - Many databases → 1 for zoo&geology, 1 for botany
 - Media Library for specimen images
 - Own API for biodiversity data, presented on collection data portal
- Caused development of commercial solution for herbarium sheet digitisation
- Permanent Digitising Infrastructure
- Integration of multiple original collections after fusion





**Session Digitisation:
Transforming Collections**

THANK YOU



Hannu Saarenmaa, CEO
Bioshare Digitization Ltd, Finland



Digitisation: transforming collections
Transformation through industrial approach

"For your project or concept, what was the main transformative aspect for digitisation of collections?"

A short history of mass-digitization

"We need to move from cottage industry to the industrialized age." - Larry Speers @ GBIF, 2002

- GBIF was founded on the idea of digitizing collections. However, 20 years ago the technologies for mass-digitization had not yet been put together. Digitization was left to the countries, and not for GBIF to coordinate centrally. So, fast forward to 2010...
- The Paris Herbarium invented putting scanners over automatic conveyors. This was the game changer. Others soon followed the suit.
- Finland established Digitalium, a center to implement the national digitization strategy, and to develop affordable technology for all collection types, not just herbaria.
- Commercial services spawned out elsewhere, too.

"For your project or concept, what was the main transformative aspect for digitisation of collections?"

Our experience

- LUOMUS Botanical Museum (3.1M samples): *Herbarium generale* (0.7M samples) to which conveyor driven imaging has been applied since 2017 has now been imaged by in-house work to 99%. While out of all the other collections in the Museum only 5% have been imaged. Prioritization, that is, and now the work continues to the other collections.
- LUOMUS Zoological Museum (10.1M samples): East-Fennoscandian Lepidoptera (1.5M samples) to which conveyor driven imaging has been applied since 2016 has now been imaged in-house by one FTE employee to 34%. While out of all the other collections in the Museum only 1% have been imaged.
- Digitalium and its successor Bioshare Digitization Ltd have built and deployed 8 conveyor-driven systems to date (5 for herbaria, 3 for insects). They exist in 4 countries.

"For your project or concept, what was the main transformative aspect for digitisation of collections?"

With digitization we can accelerate species discovery

The world has some 10 million different species. Less than 2M of them are known to science by name. 80% of biodiversity is unknown. Biodiversity loss means that we will lose most of world's biodiversity before we even will know about it. Discovery of species must be accelerated.

The natural history museums of the world are keepers of some 2-3 billion specimens but only about 10% of them are available through open access databases such as GBIF and BOLD-SYSTEMS. 25% of these openly available data contain images (besides textual data).

However, it is certain that the collections are hiding many undescribed species. They must be digitized, too, even without an accurate scientific name.

A wholesale digitization of collections will accelerate scientific discovery and detection of unknown biodiversity. Even while the process still will be playing out over several decades.

"How do you think that this has impacted or led to the development of the concept of DiSSCo as a Distributed System of Scientific Collections?"

Integration of science, technology, people, and businesses

The main driver is the need to address biodiversity loss through economic/social development (stop habitat loss), through science, and with the aid of new and better technology. Also existing technologies can be used if they are integrated in new ways and deployed properly.

People in DiSSCO and the funders now know that mass-digitization actually is possible and potentially useful to science. It just needs to be implemented widely. There we need funding, cooperation, and the permanent DiSSCo Research Infrastructure. The work would never be done only on a project basis because it takes decades to achieve.

It takes cooperation. Individual museums cannot alone figure out how to develop mass-digitization. There must be blueprints and shared knowledge of how to do that. There must be centers of excellence (i.e., factories) that actually show how to do that and that can lead the way. There is a role for industry partners that provide the technology and services.



Bioshare Digitization Ltd
Kappalaisentie 2, ILOMANTSI, 82900 Finland
www.bioshare.com info@bioshare.com
Telephone +358-401750427



**Session Digitisation:
Transforming Collections**

THANK YOU



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Laurence Livermore¹,
Ben Scott¹, Oliver Woolland², Stian
Soiland-Reyes²

¹The Natural History Museum, London

²The University of Manchester

Digitisation: Transforming Collections

Transforming Digitisation Using Automation

Presenter ORCID: [0000-0002-7341-1842](https://orcid.org/0000-0002-7341-1842)

Presentation DOI: [10.6084/m9.figshare.22027988](https://doi.org/10.6084/m9.figshare.22027988)

SYNTHESYS+

Synthesis of Systematic Resources

a DiSSCO project

N NATURAL
HISTORY
MUSEUM

MANCHESTER
1824

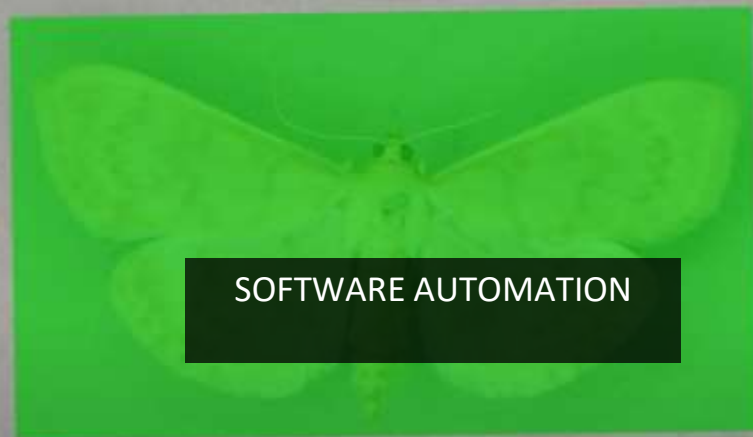
The University of Manchester





PHYSICAL STORAGE /
HARDWARE AUTOMATION

2010-08-08 10:00:00
High-Resolution 1280x720



SOFTWARE AUTOMATION



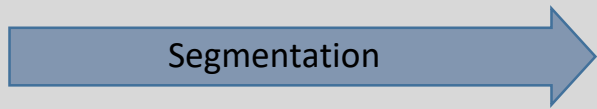
Chandler's Ford.
1967
H. Aslaby.

Christie Coll.
BMNH (E)
2010-82

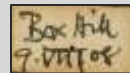




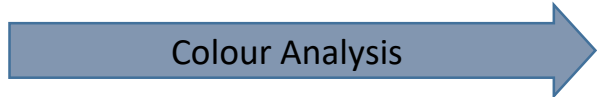
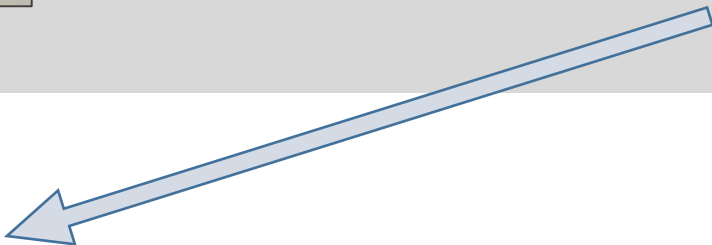
Data: Taxon name, Unique identifier, Location in collection



BMNH(E) # 500606
Photographed
Cockayne-Kettlewell
Coll. B.M. 1047-114.

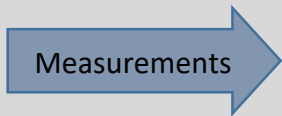
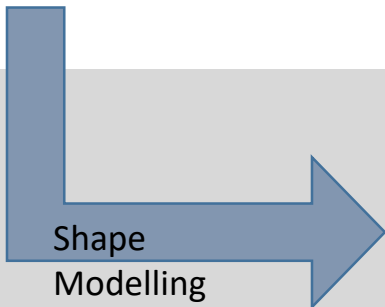


Data: +5 images: segmented specimen (mask) and 3 labels



```
H, G, B, proportion
0 39, 33, 31, 0.327380985312
1 64, 31, 11, 0.158474056184
2 83, 46, 15, 0.138736562865
3 85, 61, 21, 0.119236632154
4 104, 54, 15, 0.117232146873
5 126, 75, 17, 0.11658334980
6 110, 63, 32, 0.111031128422
7 149, 88, 17, 0.0972418618305
8 171, 105, 20, 0.0693607414321
9 143, 116, 51, 0.0417016092412
```

Data: +image, colour data



Data: +images, wing length, body length, wing area

The Specimen Data Refinery (SDR)

Uses computer vision and machine learning tools

Repeatable and configurable workflows

Ability to process specimen images and their labels *en masse*

Creates computable data using a FAIR approach (FDOs) and contemporary data standards.





"text": "SANDWICH ISL.",
"confidence": 0.3399

"text": "Exchanged",
"confidence": 0.4168

"text": "E . W . H . Holdwoodi",
"confidence": 0.3635

SANDWICH ISL.
Exchanged,
E.W.H. Holdwoodi
Eg. at Xylocopa
G.M.H. ENT-1864-8

"text": "NHMUK",
"confidence": 0.6046
"text": "010265364",
"confidence": 0.3713

NHMUK
010265364

Habitat in orig.
description reads:
Sunda Is. This is
wrong, should be
Sandwich Is. (alpha)
The species is identical
with the introduced
< *Taeneipennis* F.
(name: *pennis degeer*)
M.A. Cleftinich SS

"text": "Sandwich) Is . (Fabr .)",
"confidence": 0.3169

"text": "The species is identical",
"confidence": 0.4534

"text": "with the introduced .",
"confidence": 0.4199

"text": "(*Taeneipennis degeer*)",
"confidence": 0.4459

"text": "M . A . Cleftinich SS",
"confidence": 0.2674

DL

from this text, please find the state, county, locality, collecting date, collectors, taxon name, specimen count, sex, determined by, determined date, institution, collection name, barcode: [

ILL: Union Co.
Wolf Lake by Powder Plant
Bridge. 1 March 1975
Coll. S. Ketzler, S. Herbert

Monotoma
longicollis 4 ♂
Det TC McElrath 2018

INHS
Insect Collection
456782

] and output in JSON pretty please?

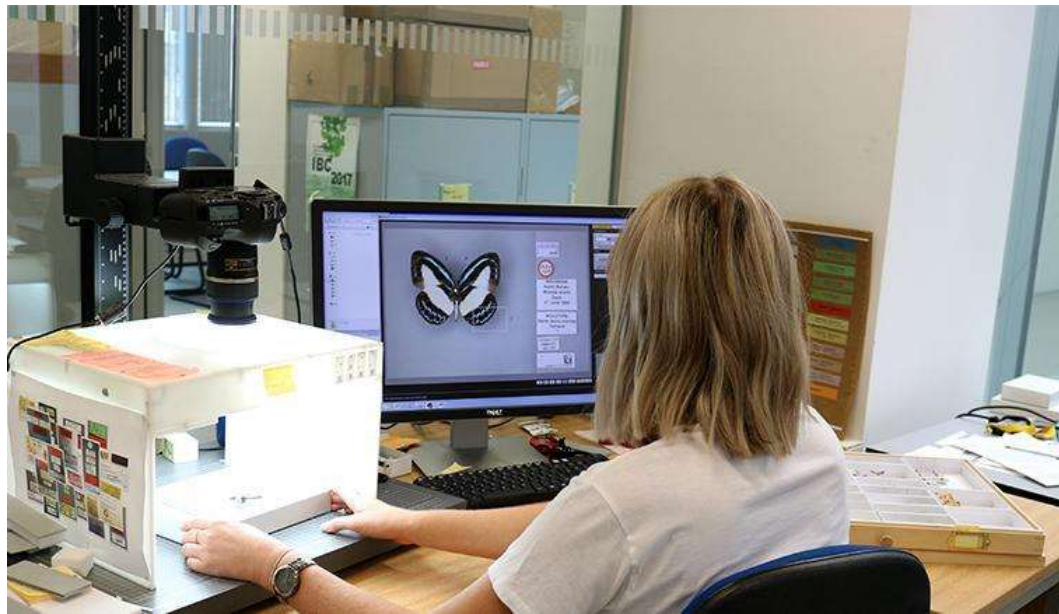


Sure, here is the information you requested in JSON format:



```
{
  "state": "ILL",
  "county": "Union Co.",
  "locality": "Wolf Lake by Powder Plant Bridge",
  "collecting_date": "1 March 1975",
  "collectors": ["S. Ketzler", "S. Herbert"],
  "taxon_name": "Monotoma longicollis",
  "specimen_count": 4,
  "sex": "♂",
  "determined_by": "TC McElrath",
  "determined_date": 2018,
  "institution": "INHS",
  "collection_name": "Insect Collection",
  "barcode": 456782
}
```

I hope this helps. Let me know if you have any other questions.



Acknowledgements



The **WorkflowHub Club**, Bioschemas Community, RO-Crate Community, CWL Community, Galaxy Europe, EOSC-Life and ELIXIR Tools Platform.
<https://about.workflowhub.eu/community/>

WorkflowHub <https://workflowhub.eu/> and <https://workflowhub.org/>
EOSC-Life <https://www.eosc-life.eu/>
ELIXIR <http://elixir-europe.org>
RO-Crate <https://www.researchobject.org/ro-crate/>
Galaxy Europe <https://galaxyproject.eu/>
Bioschemas <https://bioschemas.org>
Common Workflow Language <https://www.commonwl.org/>
WorkflowsRI <https://workflowsri.org/>
Dockstore <https://dockstore.org/>
LifeMonitor <https://lifemonitor.eu/>

Thank you for listening :)

Project Repository: <https://github.com/DiSSCo/SDR>

Completed/published:

Paper: Alex Hardisty, Paul Brack, Carole Goble, Laurence Livermore, Ben Scott, Quentin Groom, Stuart Owen, Stian Soiland-Reyes; The Specimen Data Refinery: A Canonical Workflow Framework and FAIR Digital Object Approach to Speeding up Digital Mobilisation of Natural History Collections. Data Intelligence 2022; https://doi.org/10.1162/dint_a_00134

resentation at TDWG 2021: Scott B, Livermore L (2021) Extracting Data at Scale: Machine learning at the Natural History Museum. Biodiversity Information Science and Standards 5: e74031. <https://doi.org/10.3897/biss.5.74031>

Blog: Bonhomme, Marie-Laurence (April 2021): What is the best export format for handwritten document processing results? <https://tekliia.com/blog/202104-export-formats/>

Presentation: Livermore, Laurence; Scott, Ben; Dillen, Mathias (July 2021): Contemporary and Established Provenance Issues in Natural History Collections. figshare. <https://doi.org/10.6084/m9.figshare.15035370.v1>

Paper: Walton S, Livermore L, Bánki O, Cubey RWN, Drinkwater R, Englund M, Goble C, Groom Q, Kermorvant C, Rey I, Santos CM, Scott B, Williams AR, Wu Z (August 2020) Landscape Analysis for the Specimen Data Refinery. Research Ideas and Outcomes 6: e57602. <https://doi.org/10.3897/rio.6.e57602>

Deliverable 8.2

<https://github.com/DiSSCo/SDR/issues/77>

Deliverable 8.3

<https://github.com/DiSSCo/SDR/issues/78>

Deliverable 8.4

<https://github.com/DiSSCo/SDR/issues/79>

MVP review:

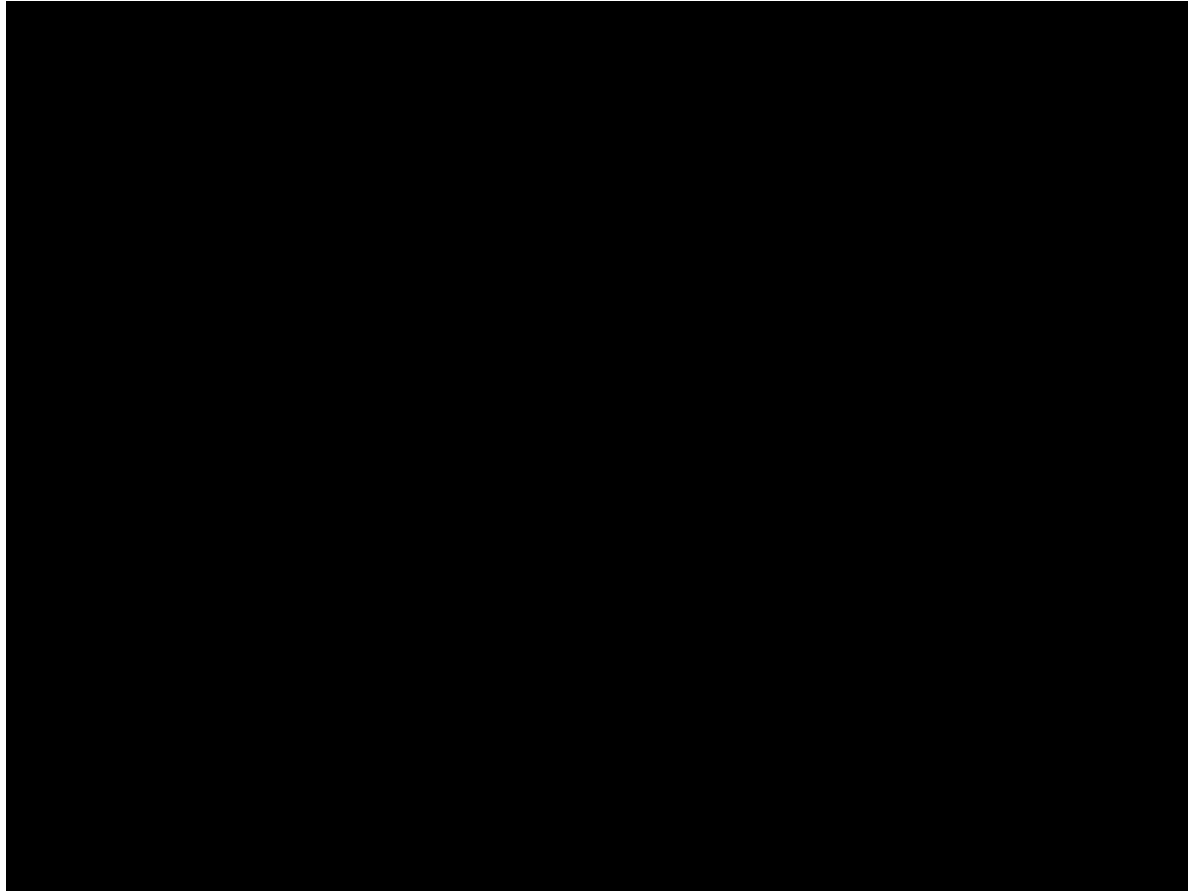
<https://github.com/DiSSCo/SDR/wiki/Minimum-Viable-Product-Review>

Jean Cossi Ganglo
Regional Node GBIF Africa



Digitisation: Transforming Collections

Video statement by Regional Node GBIF Africa

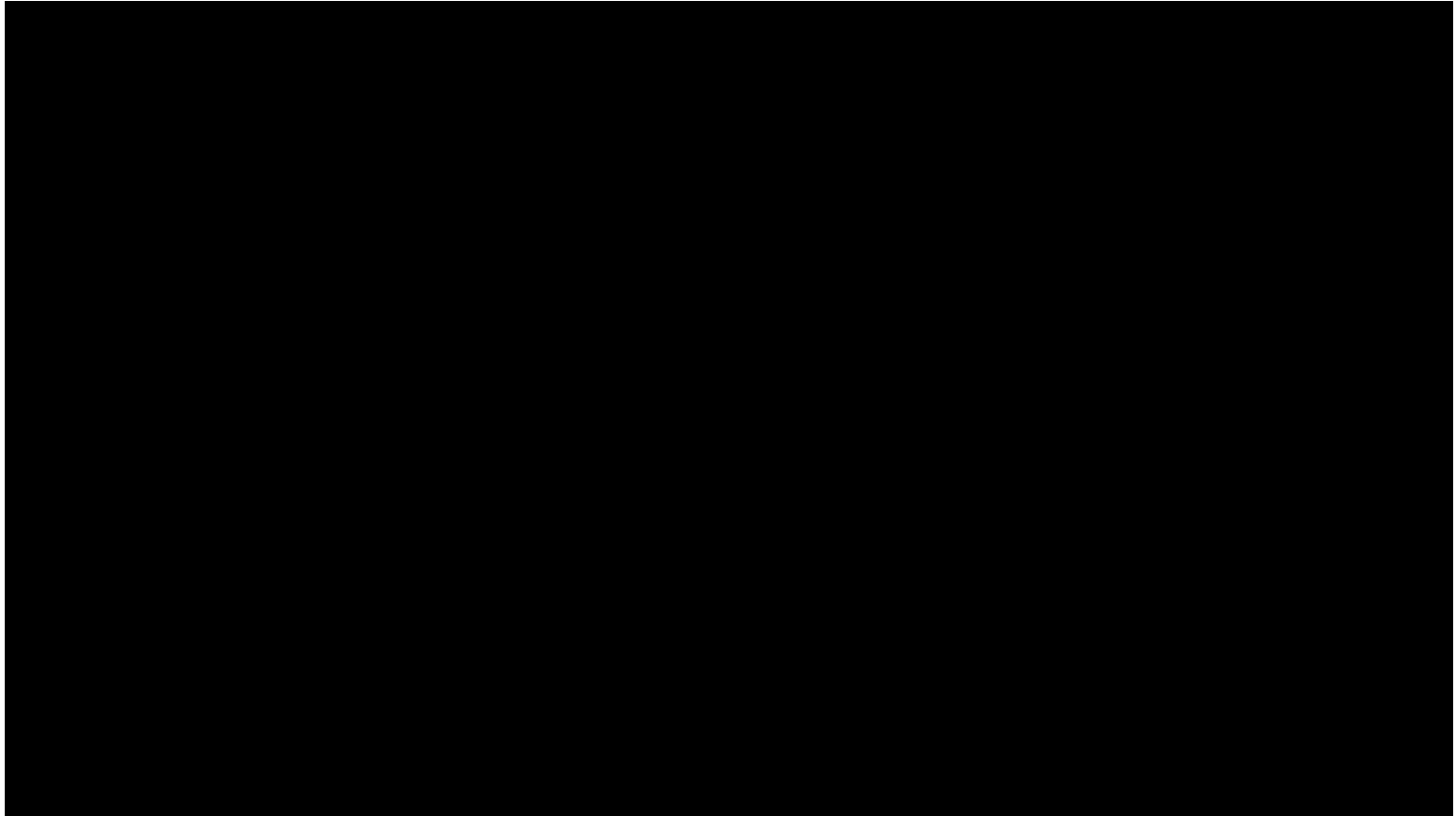




Ely Wallis
Biodiversity Information Standards
(TDWG)

Digitisation: Transforming Collections

Video statement by TDWG





Donat Agosti
Plazi

Digitisation: Transforming Collections

Video statement by Plazi



Mathias Dillen
Meise Botanic Garden



**Meise
Botanic Garden**

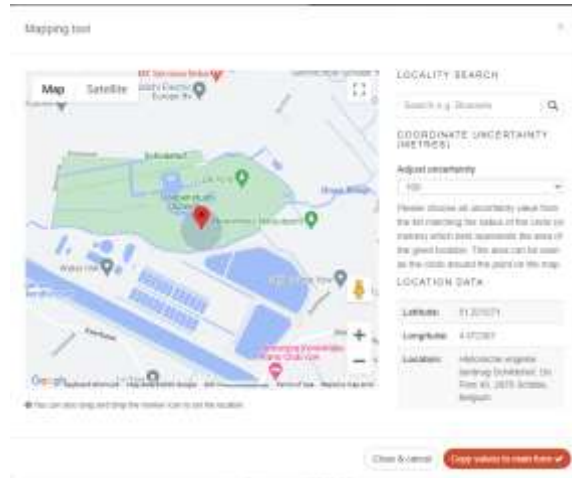


Digitisation: Transforming Collections Crowdsourcing

Outsource tasks openly to a network of volunteers outside of the collection.

Crowdsourcing in digital collections

- Digitize textual (label) data
- Georeferencing
- Taxonomic determinations
- Correcting and validating existing data
- Semantic enrichment



<https://www.doedat.be>

Crowdsourcing in action: •DOE•DAT•••

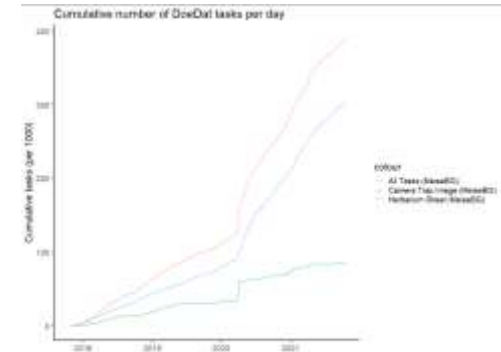
<https://volunteer.ala.org.au>



Transcription platform at Meise Botanic Garden based on ALA's Digivol platform

- Launched in 2018 as part of mass digitization project
- Multilingual: EN, FR, NL, DE
- > 550.000 tasks done, of which > 400.000 herbarium sheets
- Collaborations with > 10 external partners, not just from the natural history collections sector

→ *While requiring commitment in terms of management and outreach, the platform offers many valuable contributions while facilitating access to the collections in a more active way.*





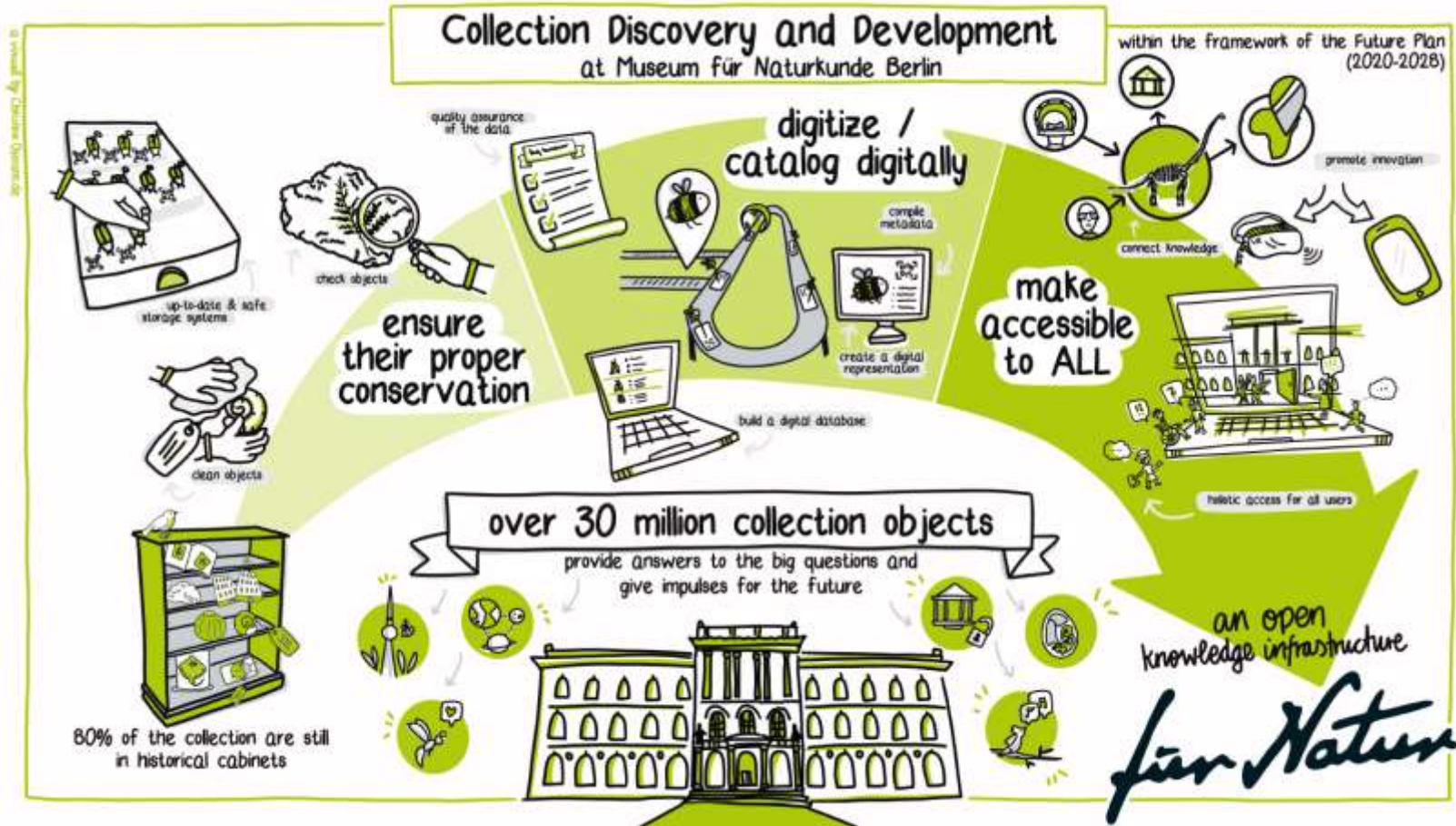
**Session Digitisation:
Transforming Collections**

THANK YOU

Mareike Petersen
Museum für Naturkunde Berlin



Digitisation: Transforming Collections
Setting institutional novelties in collection disclosure
by applying (inter)national standards



The challenge

How can objects of diverse sub-collections be described in a common way?

- important for the description of specimen
- independent of collection management system
- independent of the sub-collection
- incorporation of levels of necessary information for different purposes

The approach: Setting common standards

Standard & international initiatives

- Following the development of the **MIDS** standard (Minimum Information about a Digital Specimen) describing a set of elements for natural science collections and thresholds for information depth (-> *Talk by M. Dillen in Standard Session, 8th Febr.*)
- Agreed terms and vocabularies from collaborative efforts (e.g. “digitisation dashboard”)



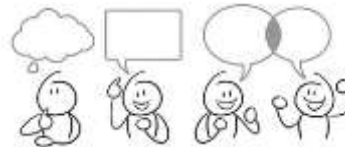
National Policies

- basic dataset German Research Foundation



Institutional demands

- Hands-on workshops
 - to not miss details
 - to increase acceptance



Conclusion

Most transformative aspect:

- One set of terms for the entire holdings of natural science collections (including library and archive) by applying the idea of MIDS and related standards!

Impact on the concepts of DiSSCo:

- Enabling common data portals with increased searchability for various stakeholder groups
- Increasing the comparability among sub-collections of different institutions
- Realising a common information depth for collection disclosure projects in Europe and beyond



Thanks to:

Core Members of the MIDS Task Group (under TDWG)

Project Collaborators from Syn+, DiSSCo Prepare, ICEDIG

Collection heads and collection managers from MfN Berlin



**Session Digitisation:
Transforming Collections**

THANK YOU



Lisa French
Natural History Museum,
London



Digitisation: Transforming Collections

How do we share digitisation best practices?

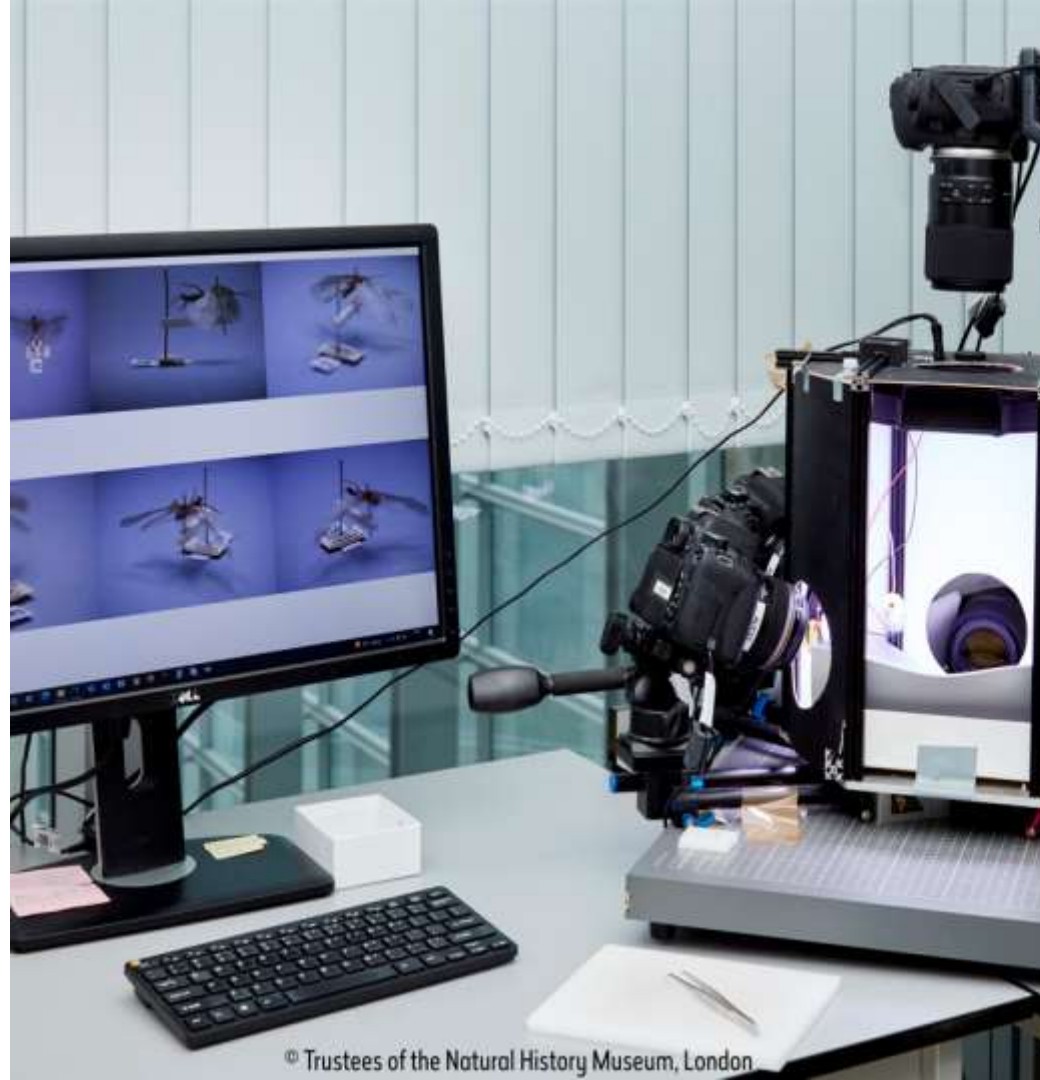
The Task!

We want to **enhance digitisation capacity** in Europe

So:

How do we **promote the reuse and implementation** of digitisation procedures?

How do we **keep this up to date**?



The Solution!

The DiSSCo Digitisation Guides Site

dissco.github.io

- Easy to set up
- Community edited

Overview

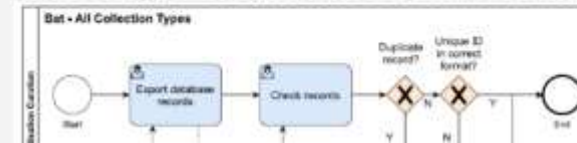
This workflow describes the digitisation of the bat collection at the Natural History Museum (NHM) funded by a SYNTHESIS+ Virtual Access Project. The NHM Bat Collection and specimens preserved in spirit. Some of the collection was already partially digitised. This workflow describes some of the challenges that digitisers can face when dealing with poor data quality from past digitisation efforts. This project did not include image capture.



Workflow

Pre-Digitisation Curation

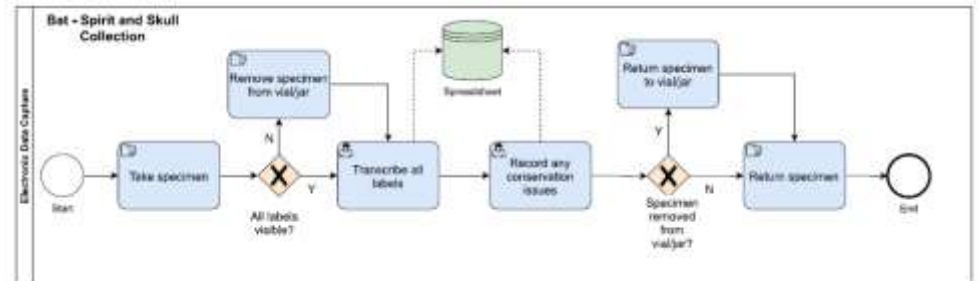
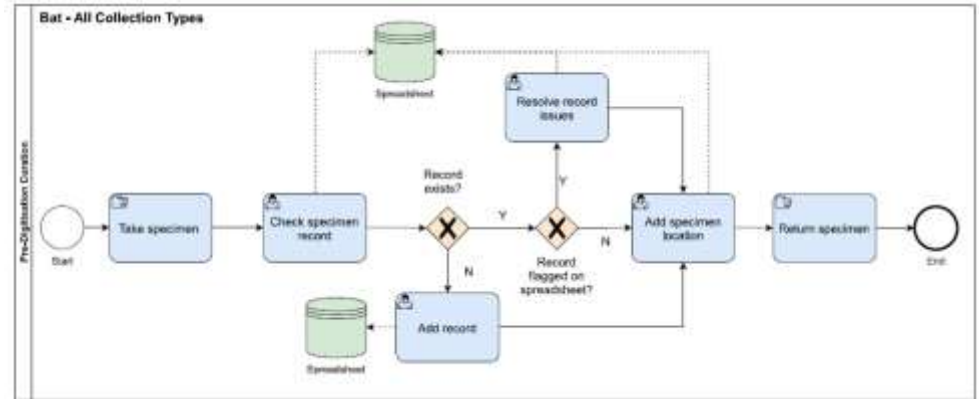
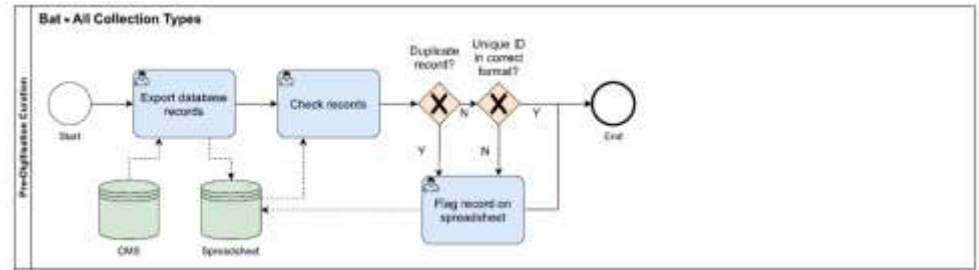
Step 1: A large part of the bat collection already had a digital record in the Museum Management System (CMS), and the first step in this workflow is to export the existing records to a spreadsheet. The digitiser then checks the exported records for any data quality issues, such as duplicate records and whether the unique identifier for the specimen was in the correct format. The records are flagged in the spreadsheet, so they can then be checked against the



The Method!

Standard Operating Procedure Template

Using Business Process Model and Notation (BPMN)



dissco.github.io

**Feedback and Contributions
Welcome!**

lisa.french@nhm.ac.uk

Thanks to:

DiSSCo 3.2 task partners & their digitisation teams
COST Mobilise Working Group 2



Arts and
Humanities
Research Council



**Session Digitisation:
Transforming Collections**

THANK YOU



Digitisation: Transforming Collections

Capacity building - MOBILISE COST Action

Dr. Catherina Voreadou

Natural History Museum

of Crete-University of Crete

Natural
History
Museum
of Crete

UNIVERSITY OF CRETE

General concept

Digitisation is undoubtedly the 21st century “**revolution**” for the Natural Science Collections.

It can't be a reality though, without:

- new e-infrastructures, based on DISSCo Research System
- sufficiently equipped researchers, a new generation of IT-literate scientists who will use the new e-infrastructures

Capacity building of scientists is one of the major key for the digitisation process

MOBILISE COST Action enabled us to implement

Four (4) Training schools in Sofia, Warsaw, Crete, Brussels on the:

“Digitisation and Data Management challenges of small Collections”

“Digitisation process of Natural History collections: Publishing of biological, geological, palaeontological & mineralogical data”

With **11 expert trainers** in total



MOBILISE COST Action 17106
SECOND TRAINING SCHOOL
13-14 February 2020
Warsaw, Poland

Digitisation and data management challenges in small collections

MOBILISE COST Action 17106

MOBILISE COST Action 17106: "Mobilising Data, Policies and Experts in Scientific Collections", in cooperation with EBH, Histo.ch, and GEF, is organising its second Training School (TS) on the digitisation and management of biological and geological collections and the development of digital data strategies & Plans.

Training School Overview

The TS will support the following basic but important steps of the digitisation process of biological and geological collections:

- **The data quality issue:** by ensuring the maximum quality when digitising specimens, specimens and associated data, such as specimens and materials, labels on slides, herbarium notes, accession lists, archival drawings, etc.
- **The data cleaning:** in order to further improve the quality of data and make them "fit for use" by defining and implementing an in-house, search and identify error correction workflow, document label extraction and error types and modify data entry procedures to reduce future errors.
- **The data identification:** focusing on applying classification schemes to clean data.

The TS will be a hands-on experience, aimed most of the TS is dedicated to exercises on data quality, cleaning and identification while group work will ensure an effective interaction between trainers and trainees and formal lunch discussions. Moreover, trainees will have the possibility to bring samples of all their scientific collections and specimens' digital acquisition and access on-site. **Presentations of the TS in English.**

Who can apply

The Training School is addressed to everyone engaged in biological and geological collections and their data such as Curators and Collections Managers, Researcher-Scientists, Collections Digitalisation managers/Officers, Students on site or geo-information, Field Curator-Scientists (individuals who are within a three-year of up to 5 years from the date they obtained their PhD diploma (a full-time requirement), Students (PhD graduates, MSc, PhD), Volunteers of collections. They must be engaged in an official research programme, or employed by or affiliated to, an institution, organisation or legal entity, which has within its remit a clear association with archiving research.

Locations

The two-days TS will be held in Warsaw, Poland on 13th and 14th of February 2020, hosted by the University of Warsaw.

Trainers Grants and Certificate

We have applied to the Training School. Trainees will receive a fixed COST Grant amounting to 840 euros. Contributions with IDNET points will be provided to trainers.

Registration

Applicants need to register at the link: <https://forms.uniformu.com/00181315980036> and upload a CV of one page and a motivation statement of 200 words. The Training School is limited to 30 trainees. COST guidelines: gender balance, involvement of Early Career Researchers, and geographical inclusiveness will be followed. **Deadline of applications is the 1st of December 2019.**



Transfer knowledge, skills, capacities & behaviors to:

165

- Curators, Collections' managers, Technicians
- Directors/Senior managers
- Scientists on bio- or geo informatics
- Early Career Investigators
- Students (Post graduates, MSc, PhD)

From 17 countries worldwide and giving priority in ITC countries and to scientists coming from institutions of small or medium capacity

MOBILISE COST Action 17106
THIRD BLENDED TRAINING SCHOOL

"Digitisation and data management challenges in small collections"

Online session
4 May 2022 to 18 May 2022

Face to face session
17-18 May 2022

Venue:
Muséum National d'Histoire Naturelle, Paris, France

MOBILISE COST Action 17106
MOBILISE COST Action 17106, "Mobilising Data, Professions and Expertise in Scientific Collections", in cooperation with COST Action 17106, "Digitisation and Data Management in Small Collections", is a joint effort of the European Commission and the COST Association. The project is funded by the European Union and the COST Association. The project is a joint effort of the European Commission and the COST Association. The project is a joint effort of the European Commission and the COST Association.

Training School Overview
The TS will target the following basic but important areas of the digitisation process of biological and geological collections:

- **The data quality assurance**, for ensuring the maximum quality when digitising taxonomic, geographic, collection and descriptive data, such as specimens and materials, literature data, field notes, accession data, species names data, etc.
- **The data cleaning** in order to further improve the quality of data and make them "fit for use" by adding and detecting and/or fixing, search and identify error instances, correct the errors, document error instances and error types and modify data sets accordingly to reduce future errors.
- **The data visualization** focusing on applying visualization techniques to clean data.

According to the program (see <https://www.mobilise-action.eu/>) and the online part will include all the theoretical presentations. The face-to-face part will be a hands-on training, dedicated to the exercises on the theoretical topics of the online part. In order to get the TS certificate, the attendees have to attend both sessions, the online as well as the face-to-face one. Moreover, attendees will have the possibility of being awarded if their institutional sustainability and previously digital resources and exercises are shared.

Who can apply?
The Training School is addressed to everyone engaged in biological and geological collections and their data such as University and Collections' managers, Directors/Section managers, Volunteers, Postgraduate students/Masters, scientists, curators, geo-informaticians, Early Career Investigators (individuals who go within a time span of up to 8 years from the date they obtained their PhD/degree) in full-time employment, Postdoc (Post-graduate), MSc, PhD, researchers of collections. They must be engaged in an official research programme, or employed by, or affiliated to an academic organization or legal entity which has either its own or other activities with participation.

Locations
The online session of the TS will be on the 4th of May 2022 (18:00-19:00 CET, via zoom). Its face-to-face part will be held in Paris, France, on the 17th (9:00am - 4:00pm) and 18th (9:00am - 4:00pm) of May 2022, hosted by the Natural History Museum of the University of Paris. <https://www.mnhn.fr/>

Trainees' Grants and Certificates
We have applied to the Training School. Trainees will receive a COST grant amounting to 500 euros for accommodation and local expenses of the journey, during the face-to-face part in Paris only, plus an amount covering their flight travel costs to Paris. The COST Grant will cover the entire stay, see <https://www.mobilise-action.eu/>. Certificates will be provided to trainees.

Registration
Applications are invited to register on the link found in <https://www.mobilise-action.eu/> and upload a CV of one page, showing the candidate's experience in the ITC field and a motivation letter of 250 words. The Training School will open in a limited number of instances. COST positions are granted following the evaluation of Early Career Investigators and geographic information systems will be followed. Deadline of applications is the 14th of March 2022.

Build a network of collaborating entities for capacity building



MOBILISE COST Action:

"Mobilising Data, Policies and Experts in Scientific Collections" in cooperation with GBIF, <https://www.gbif.org>, iDigBio <https://www.idigbio.org> and DISSCo <https://discco.eu/>, organised its first Training School (TS) on the digitisation and management of biological and geological collections and the development of Digitisation Strategies & Plans.

Training School Overview

The TS will target a basic but important part of the digitisation procedures of biological and geological collections and will include the following topics:

- origins of data (taxonomic data, specimens and materials, literature data, field work notes, occurrence data, herbaria sampling data etc)
- data quality ensuring the maximum quality when digitising taxonomic, geographical, collection and descriptive data
- data cleaning in order to improve the quality of data and make them "bio4ever".

Most of the TS is dedicated to exercises on data quality and cleaning (with group work) and include and moderate interaction between trainers and trainees and foster lively discussions. Moreover, trainees will have the possibility to bring samples of their institutional (diversity and) biodiversity digital databases and exercises on them. Formal language of the TS is English.

Who could attend?

The Training School "Digitisation and data management challenges in small collections" is addressed to everyone who is engaged in biological and geological collections and their data such as Curators and Collections Managers, Trainers/Service managers, Collections Digitizers, Managers/Officers, Scientists on loan or non-scientists, Early Career Researchers (students who are within a time span of up to 8 years from the date they obtained their PhD/doctorate or full-time equivalent), Students (Post-graduates, MSc, PhD), Technicians of collections. They must be engaged in an official research programme, or employed by or affiliated to, an institution, organization or legal entity, which has either to rent a class/assessment with participating researchers.

Location

The Training School will be held in Sofia, Bulgaria, from 14th to 15th of March 2019. It will be hosted by the Institute of Botany and Forestry Research and the National Museum of Natural History - Sofia, both units of the Bulgarian Academy of Sciences.

Trainers, Students and Trainees

No fees apply to the Training School. Trainers will receive a fixed COST Grant amounting to 600 Euros. Contributions with 2000€ points will be provided to trainees.

Applications

Applications need to specify: <https://form.pdfforms.com/2019/03/14/2019> and submit a CV of one page and a motivation statement of 200 words. The Training School is limited to 200 places. COST policies on gender balance, involvement of Early Career Researchers, and geographical inclusiveness will be followed. Deadline of applications is the 19th of February 2019.

1. DISSCo
2. CETF-DEST
3. GBIF
4. iDigBio
5. National Museum of Natural History – Sofia
6. Bulgarian Academy of Sciences
7. University of Warsaw
8. University of Crete
9. Natural History Museum of Crete



Capacity building achievements

Build the basis of this new generation of IT-literate scientists being able to:

- efficiently use new e-infrastructures
- embed bio and geo informatics' tools and services into their collections using clear and practical tools and standards under a bottom-up approach
- strengthen capacity building in their own institutions, driving their business forward
- ensure sustainability of research data and compliance and consistency of data providers
- translate of strategies into clear guidelines for bio- and geodiversity data owners, decision makers, tool developers, crucial key stakeholders and citizens at global, European, national, and local scales.



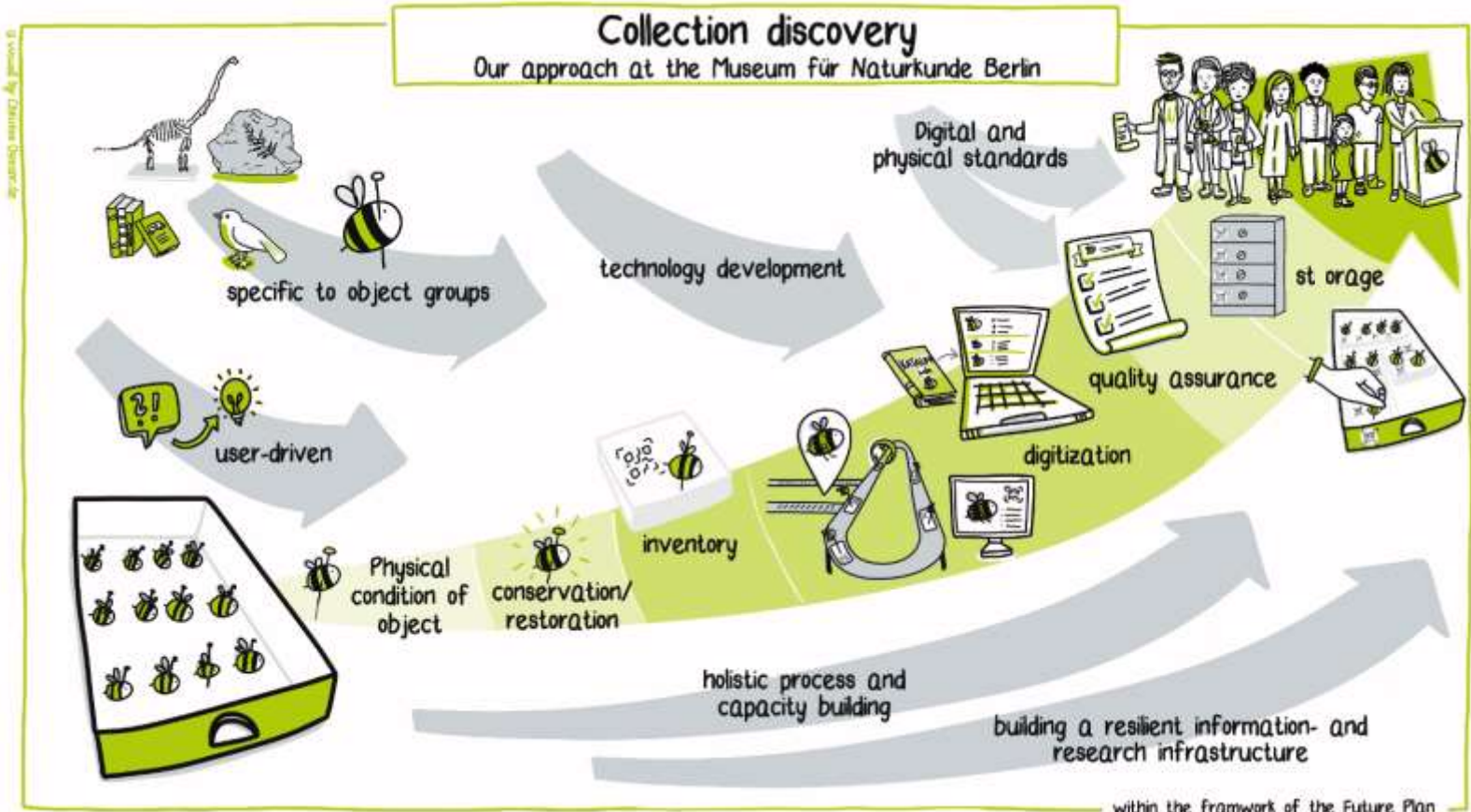
**Session Digitisation:
Transforming Collections**

THANK YOU

Jana Hoffmann
Museum für Naturkunde Berlin



Digitisation: Collection transformation Collection discovery - a process goes public

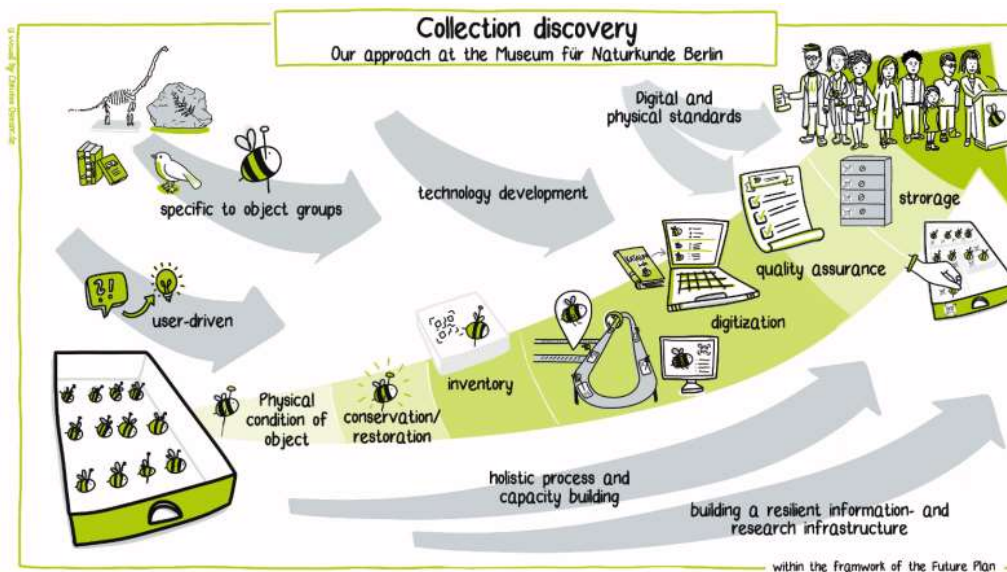


<https://doi.org/10.7479/ryd4-p845>






Collection Discovery as a process


Main principles:

- Authentic
- Process-oriented
- Illustrative
- Low-treshhold
- Adaptable








Suchen     





Zukunft der Sammlung


Museum für Naturkunde Berlin


19 Videos · 135 Aufrufe · Zuletzt am 22.11.2022...


  


 **Alle ansehen**  Zufallsmix


Wie gestalten wir die Sammlung der Zukunft?
Wie machen wir Wissen für alle zugänglich und schaffen wir Zugänge für möglichst viele Perspektiven? Fragen wie diesen begegnen wir in unserem Forschungsbereich "Zukunft der Sammlung": <https://bit.ly/zukunft-der-sammlung>


- 

Objekte, Daten, Wissen: Das Datenportal des Museums für Naturkunde Berlin
Museum für Naturkunde Berlin · 411 Aufrufe · vor 4 Monaten
- 

Zukunft der Sammlung (Teil 1): Was ist ein Forschungsmuseum?
Museum für Naturkunde Berlin · 183 Aufrufe · vor 4 Monaten
- 

Das Museum der Zukunft - Exponate jetzt digital?! | Galileo | ProSieben |
Galileo · 35.159 Aufrufe · vor 1 Jahr
- 

Zukunft der Sammlung (Teil 2): Wie wir unsere Sammlung erschließen
Museum für Naturkunde Berlin · 188 Aufrufe · vor 4 Monaten
- 

Wie sahen Dinosaurier wirklich aus? – Digitale Welten im Museum. Live aus dem MFN!
Breaking Lab · 178.010 Aufrufe · vor 4 Monaten gestreamt
- 

Zukunft der Sammlung (Teil 3): Wie auch ihr unsere Sammlung nutzen könnt
Museum für Naturkunde Berlin · 169 Aufrufe · vor 4 Monaten



How can the Museum für Naturkunde Berlin make its collection more accessible and usable for research?

<https://doi.org/10.7479/tqvn-t638>

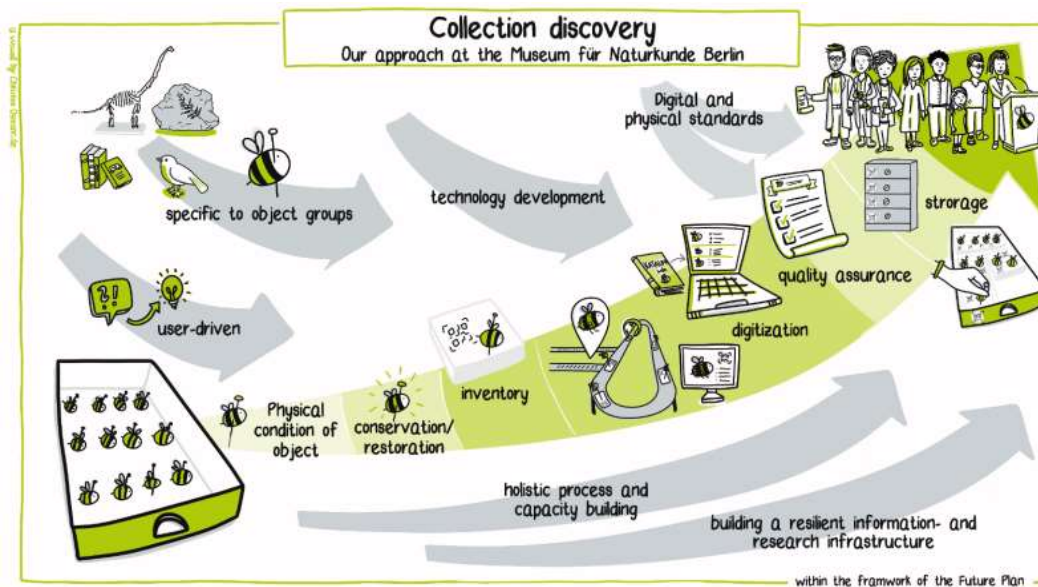
Collection Discovery – a process goes public

Requirements:

- Joint effort
- Negotiation
- Positive error culture
- Expectation management

Impact & Benefits:

- Creates awareness
- Broadcasts required skills
- Attracts new/ other stakeholders and funding





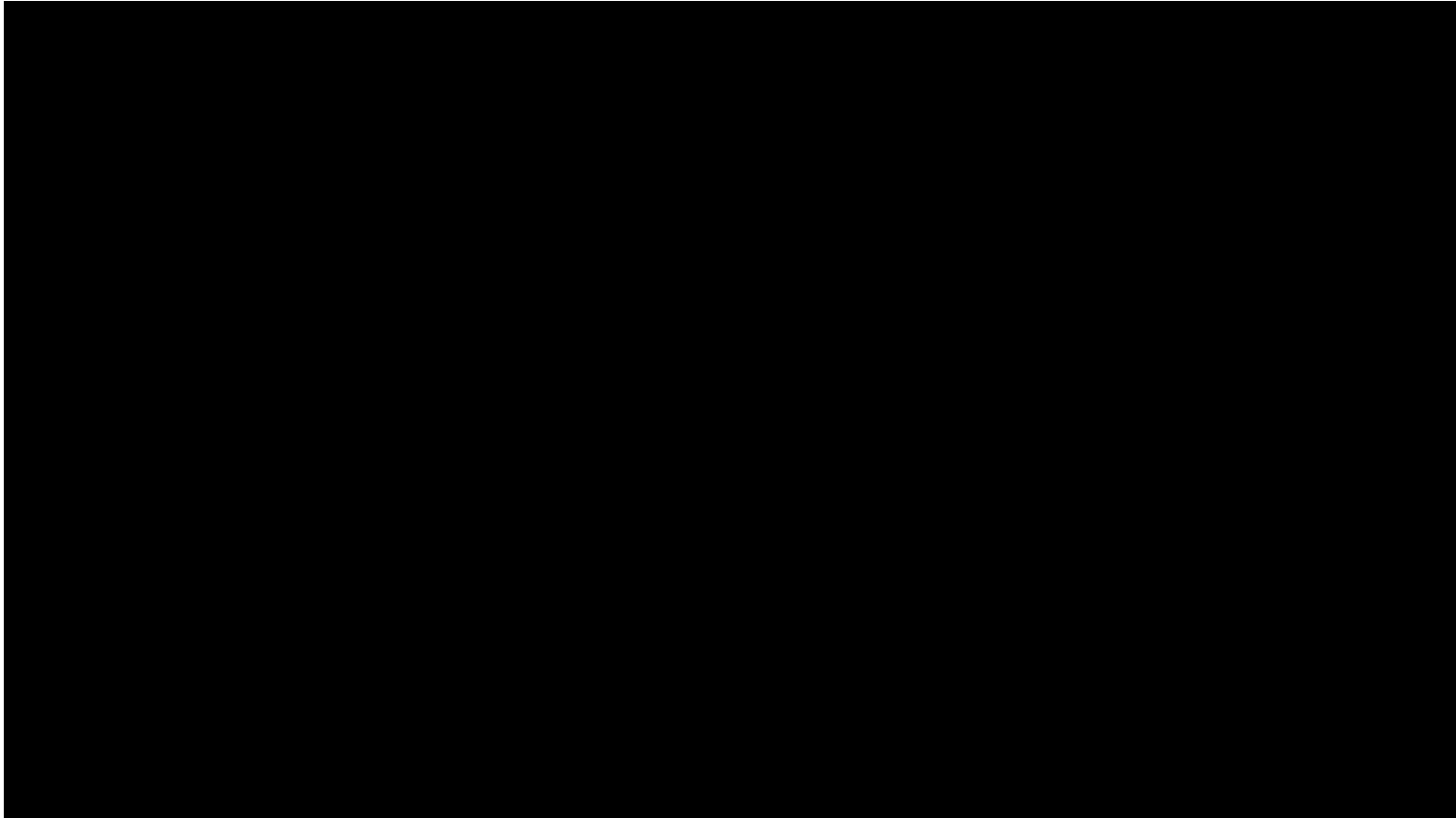
**Session Digitisation:
Transforming Collections**

THANK YOU



Andre Zerger
Atlas of Living Australia (ALA)

Digitisation: Transforming Collections
Video statement by Atlas of Living Australia



Adrien ROUBENS
Street artist



Reception
with concert



Lighted Hula-Hoop

DiSSCo

Distributed System of Scientific Collections



FUTURES

Brussels 07-09/02/2023

and DiSSCo DJ !



DiSSCo Futures

Brussels 07-09-02-2023


museum
NATURALSCIENCES.BE

 CETAF AFRICA


Meise
Botanic Garden

Thank you!

End of sessions for Day 1



DiSSCo Futures

Brussels 07-09-02-2023

Day 2
WELCOME



(Starts at 09:00h CET)



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Session:

VIRTUAL ACCESS

SYNTHESYS+

Synthesis of Systematic Resources

a DiSSCo project



Sandra Knapp
Natural History Museum, London

Virtual Access

Virtual Access the SYNTH+ way

Virtual Access in SYNTHESIS+

4th iteration of the SYNTHESIS programme

Conditional on transitioning to “virtual” access

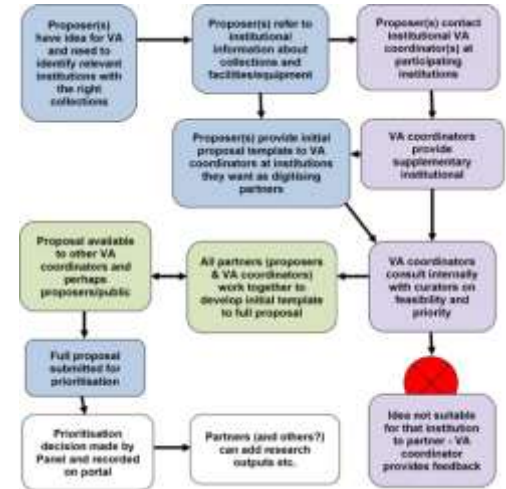
Underpinning transition to ESFRI infrastructure (DiSSCo)

What is Virtual Access?

Providing free and open access to natural history collections resources to address scientific and societal priorities.

Potentially include images of specimens (2D and 3D), molecular sequence data and chemical or analytical data.

Based on priorities of research communities.



Testing the concept - Hardy et al. (2020) <https://riojournal.com/article/50354/>

Virtual Access in SYNTHESIS+

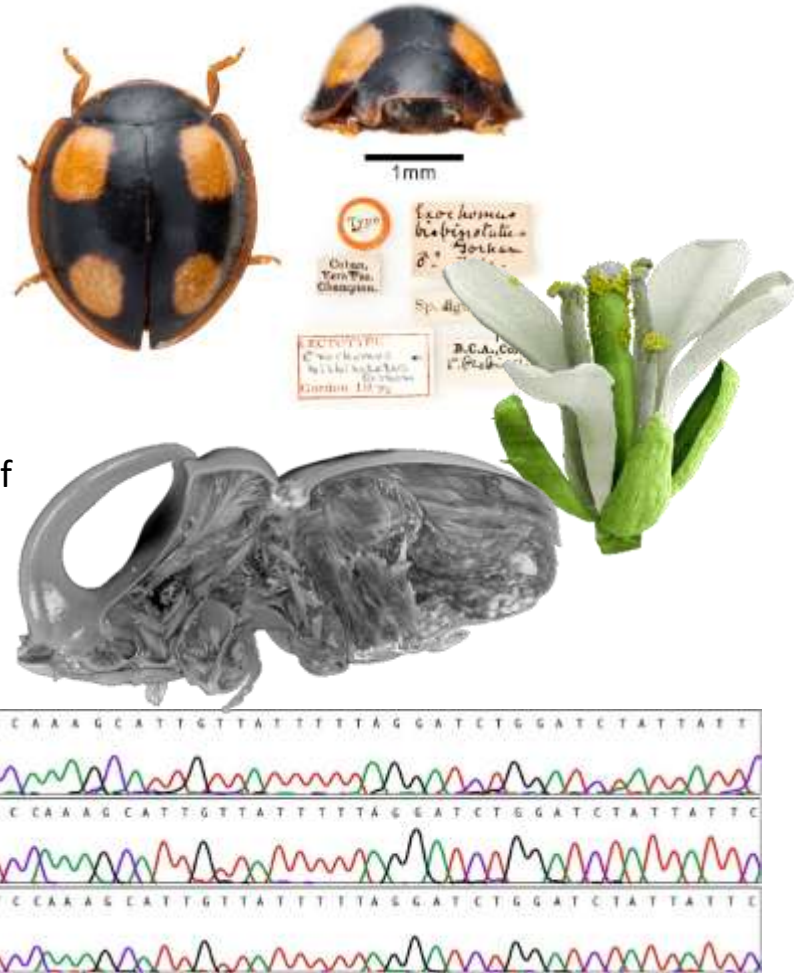
The big differences.....

Requests for access not based on institutional priorities, but on research questions generated by a community of scientists....

Requests were (with a single exception) for digitisation of specimens from multiple participating institutions

Virtual access as imagined was not just digitisation of specimens, but provision of digital data of all kinds

Funds went not to the requester, but to the digitising institutions....



Prioritisation of requests by research consortia



- Prioritisation Panel scored and ranked requests
- Panel composed of experts not participating in the Calls
- Seven criteria scored, upweighting community buy-in & impact
- Top 10 priority sent to EB of SYNTH+
- Requests funded within budget of €500K/call
- Total funding allocated across both calls €836,784 (not incl. VA Coordinator time)
- All participating beneficiaries received some funding in Call 1, most received funding in Call 2

Criterion	Weighting
Scientific / cultural merit	x 1
Scientific / cultural excellence	x 1
Community buy-in	x 3
Impact	x 2
Expected Outputs / Gains	x 1
Societal Challenge	x 1
Data availability	x 1

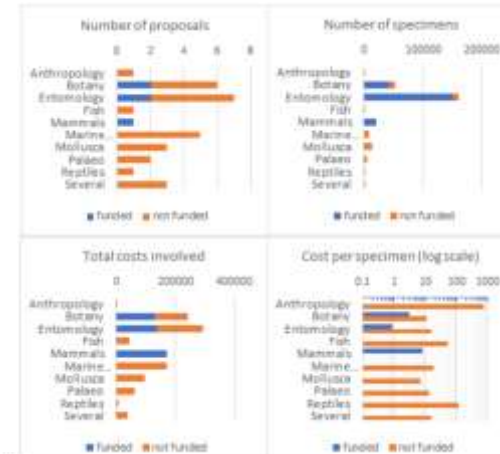
Assessment of the activity

External Review Panel

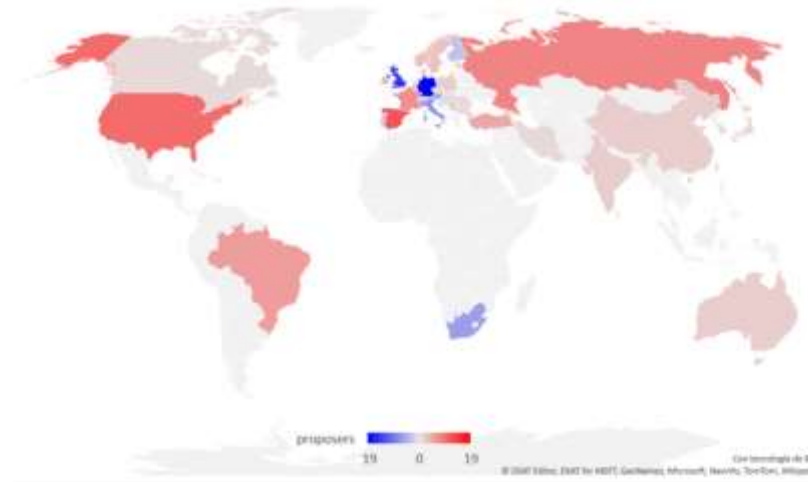
Met after Call 1 was well underway
 Will review entire programme in Q2 of 2023
 Recommendations and suggestions

- Cost-book templates
- Better use of success stories
- Adapt as ELVIS improves
- Consider different sorts of calls – geographic, taxonomic etc.
- Suggestions for DiSSCo in future passed on

Arturo H. Ariño
 Joseph T. Miller
 Pamela S. Soltis



Involved researchers (blue: with successful bids)



The SYNTH+ Virtual Access projects

Call 1

Data mobilisation for IUCN conservation assessments of global freshwater bioindicators

Digitisation of wild bees (Hymenoptera: Anthophila) in Finnish Museum of Natural History

COVID-19 chiropteran knowledge base

Digitisation of *Dianthus* collections

Digitisation of Greenlandic peat moss (*Sphagnum*) collections

Call 2

Wheat through the ages: digitising crop wild relatives and wheat herbarium samples

Bryozoa Identification Tool: SEM images of bryozoa linked on a world map

Krantz material: machine readable compilation of Krantz fossils

Xenopus frogs: monitoring climate change, pressure on biodiversity & invasiveness

Accelerating taxonomic progress on the large rainforest genus *Cyrtandra*



Virtual Access in SYNTHESIS+

Some things we learned....

There is great demand for virtual access to these kinds of data (requests more than doubled the amount we had to allocate!)

Research groups need time to coalesce

Coordination across multiple institutions is hard

Staffing issues are complicated when hiring short-term posts for digitisation based on uncertain request outcomes

Need mechanism for institutional leaders for each effort

Digitisation by demand of research community more expensive than “digitisation for discovery” in the short term, but perhaps more impactful?





Gábor CSORBA
Hungarian Natural History Museum

Roberto PORTELA MIQUEZ
Natural History Museum, London

Phaedra KOKKINI
Natural History Museum, London



Virtual access

Fight future pandemics – Digitising bat collections
for the Covid-19 Chiropteran Knowledge Base

Coronaviridae: the most similar virus to the one which causes the recent pandemic was found in a common Southeast Asian horseshoe bat species, *Rhinolophus affinis*

The goal

- understanding how bats maintain a virus within a population to predict spillover transmission events
- museum collections contribute to uncover these patterns

The plan

Experts of the CETAF's COVID-19 Taskforce:

- accumulate our present knowledge on the distribution, viral information, and basic ecological demands of the horseshoe bats and closely related families
- to know if material currently preserved in mammal collections can be useful to study infectious diseases

The vision

- fields of the database should contain information not typically included in mammal databases
- this feature can help planning future field work and collection development
- new era of bat-related field studies

The workflow

- database fields built upon the „extended specimen concept”
- taxonomic and habitat info, associated samples, biotic interactions
- „Darwin Core” terms used



UTILISATION OF
EXISTING
RECORDS



WORKING IN
COLLECTIONS



TYPES IMAGING



SHARING OUR
DATA



Some of the 50,000 specimens at the Natural History Museum | ©NHM/ NHM

Could clues to the pandemic's origins have been lurking in the Natural History Museum all along?

The museum has unearthed thousands of bat skulls and pickled specimens which may yield new details on the origins of Covid-19

Abos · E-Paper · Magazine

WIENER ZEITUNG

Anmelden / Registrieren

MENU POLITIK KULTUR WIRTSCHAFT AMTSBLATT DOSSIERS MEINUNG

Was suchen Sie?

Startseite · Wissen · Natur

CORONAVIRUS

Museen erfassen Fledermäuse für Virenstudien

- Mehr als 200 neue Coronaviren wurden bisher bei Fledermäusen gefunden, und rund 35 Prozent des bisher in Fledermäusen sequenzierten Virenerbogs stammt von Coronaviren.

von 12.10.2020, 11:57 Uhr | Update: 12.10.2020, 13:10 Uhr

Beifügen 2 · Kommentieren · Teilen

ohne Bild

Ein tierischer Ursprung des Coronavirus SARS-CoV-2 gilt als wahrscheinlich, die genaue Herkunft ist aber noch ein Rätsel. Weil Fledermäuse als bedeutendes Viren-Reservoir gelten, sollen für weiterführende Studien nun Fledermäuse aus den Sammlungen von neun Naturkundemuseen in Europa – darunter das Naturhistorische Museum Wien (NHM) – in einer Datenbank erfasst werden. Im Rahmen des EU-Projekts "Synthesys" arbeitet das NHM an zwei weiteren Digitalisierungsvorhaben.

ohne Bild

The media

Journal | Science in focus

Battling pandemics

Nearly two years after the first known case, COVID-19 is still causing huge changes to our daily lives. Digital Collections Communication Manager **Jon Pullar** reveals how digitising the Museum's bats could help prevent future pandemics



Bats account for around 20 per cent of all mammal species, and are an essential part of the ecosystems in which we live.

COVID-19 comes from the Greek words 'covid' and 'pneumonia', which means 'hot and wing', thanks to the fact that bat forams are adapted for flight.

Bats help control populations of crop-damaging insects, pollinate low-growing plants, and are an essential part of the ecosystems in which we live.

About 75 percent of all emerging infectious diseases are zoonotic, which means that they are transferred from animals to humans.



The pandemic highlights the lack of information about bats, needed for research into COVID-19, and illustrated the importance of digitising natural history collections.

The Museum has a collection of over 30,000 bats, each specimen is labelled with information about what species it is and where and when it was collected. These details help us understand how many species exist and where, and how populations have changed over time. By sharing this information online, we hope to help researchers understand the origins of COVID-19 – and predict future pandemics. Though scientists aren't yet certain which species passed on the pathogen that causes COVID-19 to humans, genome sequences of the virus from the start of the pandemic are 99 per cent identical to that of a bat coronavirus found

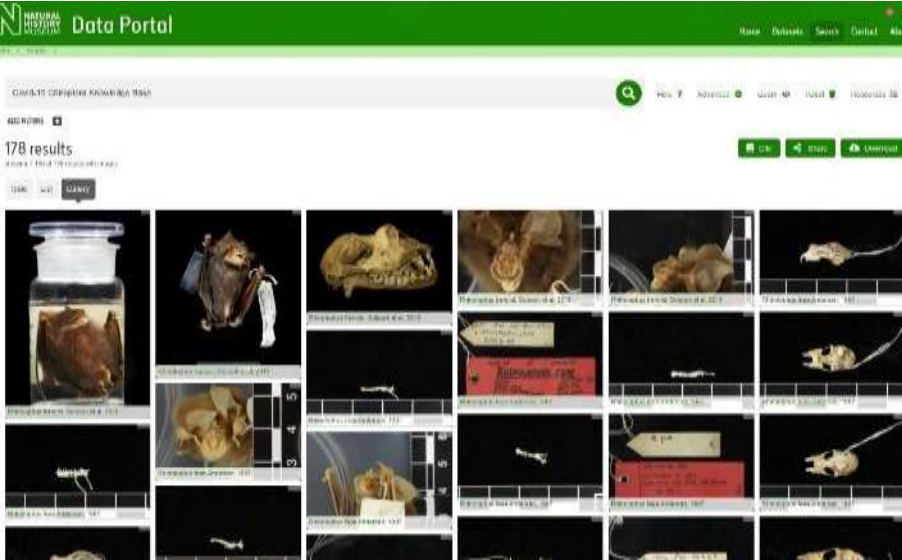
"Unless we study and protect nature, we will experience more spillover events"

In populations of the intermediate horseshoe bat, *Rhinolophus affinis* – which is common in southeast Asia. The Digital Collections Programme is part of an international project to gather all the information held in natural history collections on around 8,000 bats across three families of bats: the horseshoe bats (*Rhinolophidae*) and their close relatives the old-world

leaf-nosed bats (*Myotis*) and trident bats (*Idionycteridae*). Gabor Csorba, a Senior Researcher and bat expert at the Hungarian Natural History Museum, is one of the project leads. "We were caught unprepared by the COVID lockdown," he says. "In many cases the information we needed lay in personal notes, unpublished datasets or isolated collections. We have to make databases that are openly accessible and usable for the whole scientific community." But why bats? When flying, bats have increased metabolism and a higher body temperature. Animals with a high metabolic rate often die young because of the cellular damage this can cause, but some bat species live for up to 40 years.

The results

- 21,375 records from the nine institutions
- taxonomy updated
- verbatim and interpreted data combined
- typos, errors and duplications corrected



data are/will be publicly available via institutional portals, GBIF, RIO Journal

The context



Contents lists available at [ScienceDirect](#)

One Health

journal homepage: www.elsevier.com/locate/onehl



Biodiversity data supports research on human infectious diseases: Global trends, challenges, and opportunities

Francisca Astorga^{a, *}, Quentin Groom^b, Paloma Helena Fernandes Shimabukuro^c,
Sylvie Manguin^d, Daniel Noesgaard^e, Thomas Orrell^f, Marianne Sinka^g, Tim Hirsch^e,
Dmitry Schigel^e

- GBIF presented an unpaired contribution for facilitating data related to vectors and hosts/reservoirs species – but not for pathogens
- the Chiropteran Knowledge Base can partly fill this gap also serving as source for investigable museum holdings for pathogen studies

SENCKENBERG
museum frankfurt



NATURKUNDE
MUSEUM
STUTTART



NÁRODNÍ
MUZEUM



Ana Casino, CETAF COVID-19 Taskforce, Cristiane Bastos-Silveira, Louise Allan, Maria Marschler, Heimo Rainer, Frank Zachos, Arnaud Henrard, Jiri Frank, Petr Benda, Frederik Berger, Eileen Westwig, Joachim Holstein, Pierre-Yves Gagnier, Cécile Callou, Jean-Marc Pons, Bernadett Döme, Tamás Plesó, Julianna Szapu, Joachim Holstein, Tobias Schneck



Anthops ornatus, Asellia tridens, Aselliscus stoliczkanus, Clootis percivali, Coelops robinsoni, Doryrhina cyclops, Hipposideros khaokhuayensis, Macronycteris gigas, Paratriaenops furculus, Rhinolophus euryale, Rhinonicteris aurantinus, Triaenops menamena



Anne Koivunen

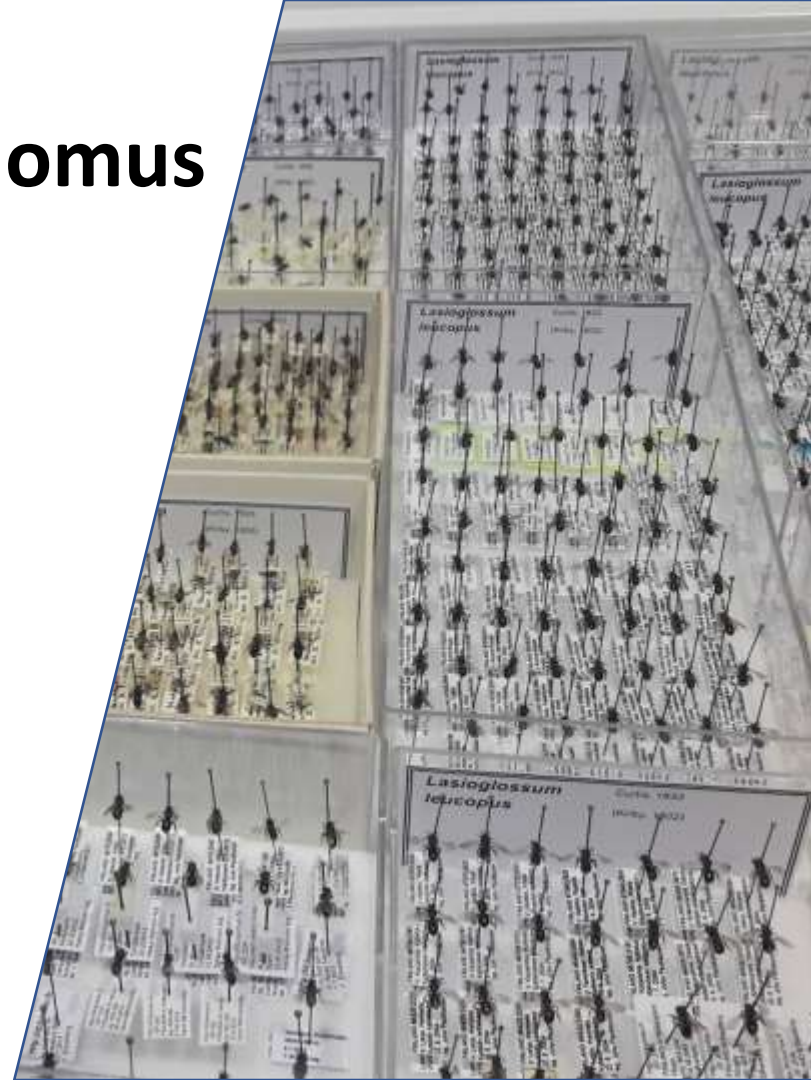
**Finnish Museum of Natural
History, Luomus**

Virtual access

Digitising wild bees for ecological study

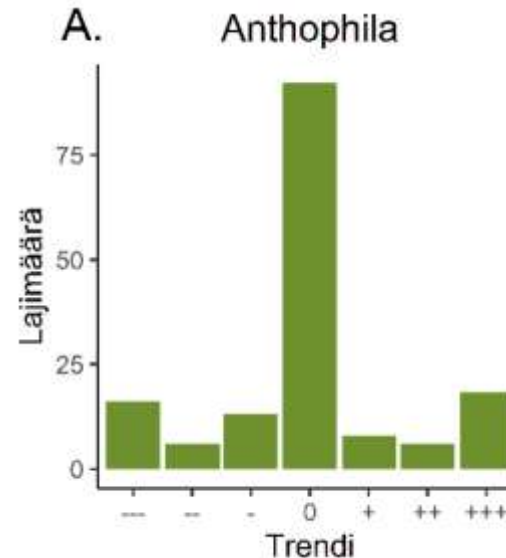
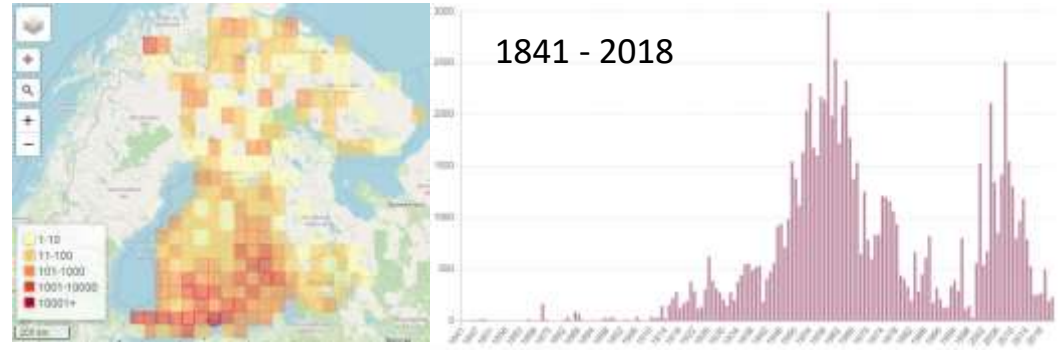
Bee Digitisation project in Luomus

- Digitisation on demand (DOD) request from the **Finnish Environment Institute (Syke)**
 - Research on status and monitoring of pollinator populations
- Digitising was done in 2020-2021 ca. 55 000 specimens
- All label data were entered in the Kotka Collection management system
- Selected specimens of each species were imaged



Results

- The collection consisted of 246 species.
- Main results:
 - 30% declining and increasing species
 - 40% stable
 - The abundance of southern species had increased more frequently than the northern species
- Bonus findings
 - 27 type specimens
 - 3 species new to Finland
- All data openly available at FinBIF (Laji.fi)
 - <http://tun.fi/GX.15155>



Impact

- The digitised data added significantly to the knowledge of the state of pollinators in Finland
- The results were used as input for the National Pollinator Strategy and its background study
 - Scientific article and data paper are in preparation



Acknowledgements

- Synthesys+ VA call
(Horizon2020-EU)
- All the digitisers in Luomus
- Finnish Environment Institute

Thank you for your attention!



Accelerating taxonomic progress on the large rainforest genus *Cyrtandra*

Abdulrokhman Kartonegoro, Jay Olivar, Hannah Atkins & Gemma
Bramley
Presented by Alan Paton

Synthesys partners

RBG Kew: Sarah Phillips

RBG Edinburgh: Elspeth Haston

Naturhistorisches Museum Wien: Maria Marschler

Natural History Museum of Denmark: Natasha de Vere



Royal
Botanic Garden
Edinburgh



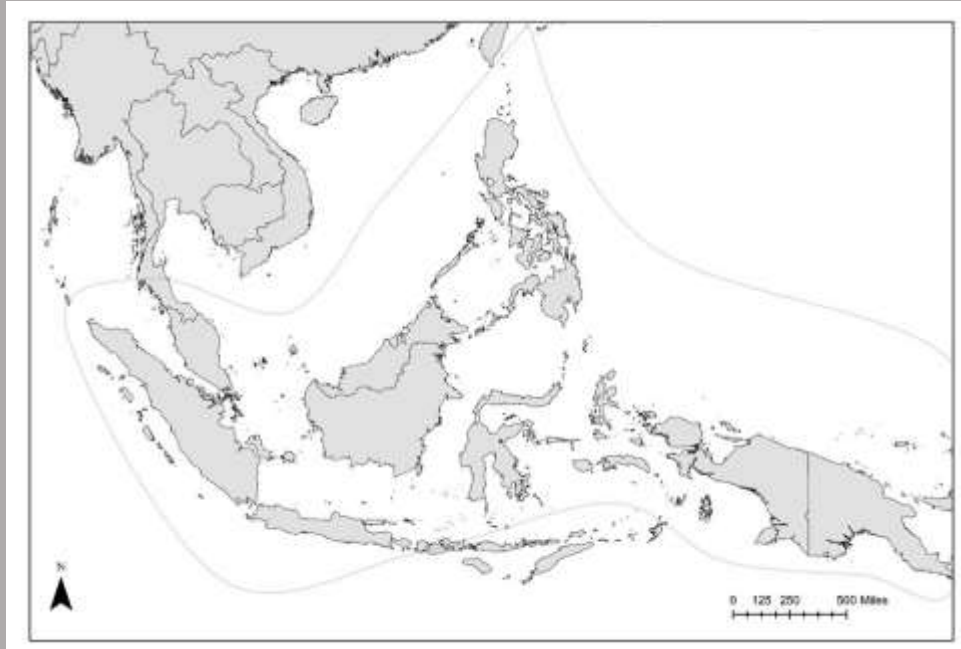
UNIVERSITÄT
LEIPZIG



naturhistorisches
museum wien



Cyrtandra
a



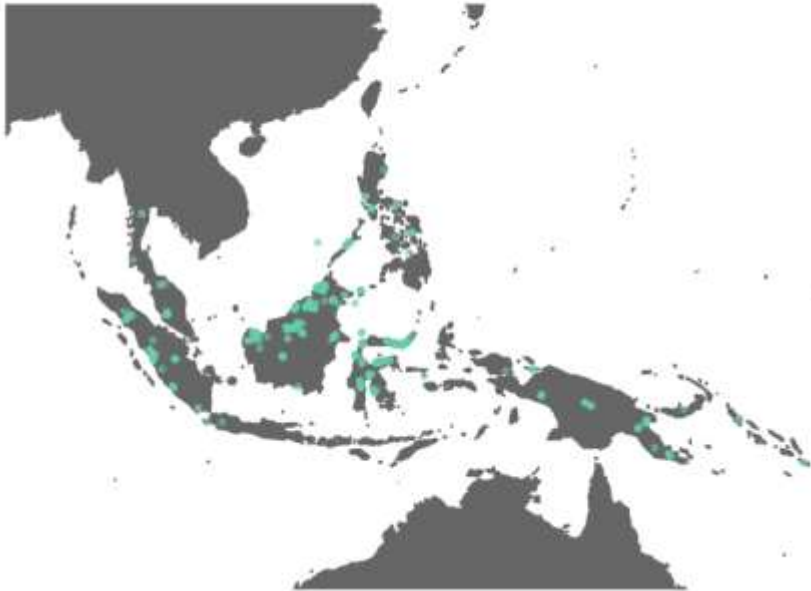
Distribution in southeast
Asia



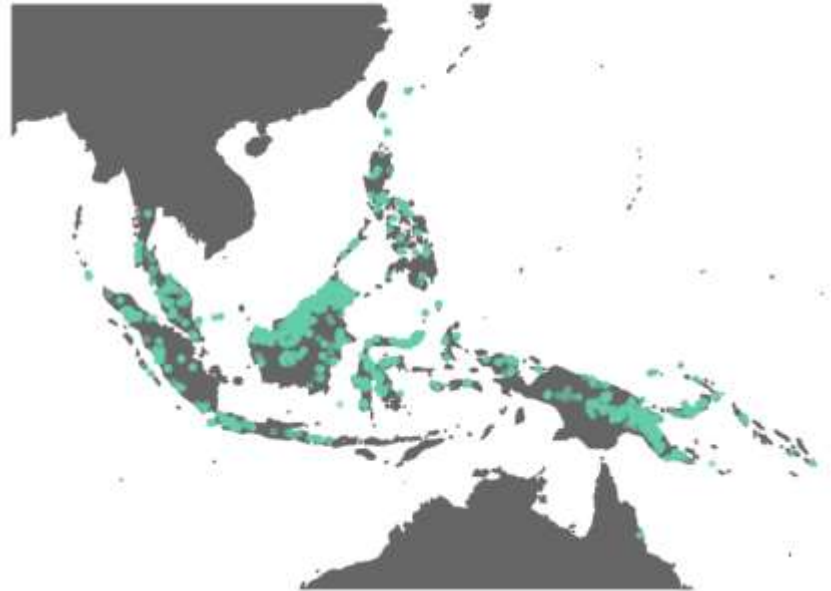
Herbarium	Images	Where available
Kew	4263	GBIF then Cyrtandra Resource Centre (CRC)
Edinburgh	3193	RBGE website and GBIF, CRC
Vienna	198	JACQ website and GBIF
Copenhagen	140	Specify and then GBIF



Before



After



Cyrtandra

Current page: Welcome

[Skip to main content](#)

[Welcome](#)

[Image browser](#)

[Checklist builder](#)

[Specimen mapping](#)

[Browse specimens](#)

[Site map](#)

Welcome to the Cyrtandra resource centre

This website provides information to researchers interested in the large genus *Cyrtandra*.

It includes information on specimens, many of which are georeferenced and with images. Some species also have field photographs. If you would like to contribute any field images or specimen records, please contact us.

Please bear with us while we carry out updates and feel free to contact us with errors, omissions and suggestions.



Search for specimens

Collector

Collector number

Locality

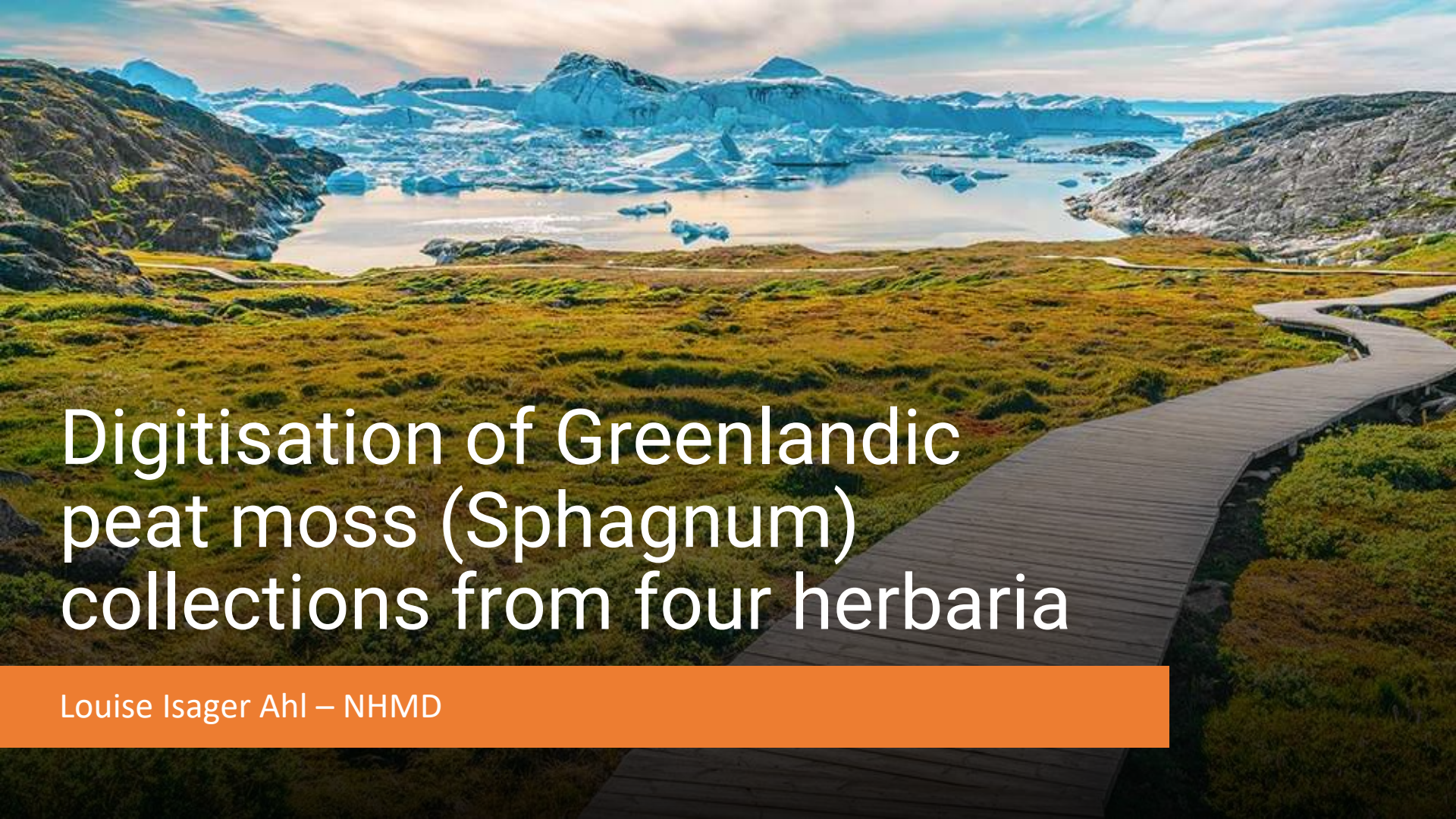
Species

Herbarium

Impacts to date

- Strengthened *Cyrtandra* collaboration between UK-Indonesia-Philippines
- Current research focused in Brunei, Philippines, Malaysia, Papua New Guinea, Indonesia
- Support development of novel research: PhD project with CENTA DTP on use of AI for *Cyrtandra* ID



A wide-angle landscape photograph of a fjord in Greenland. In the foreground, a dark wooden boardwalk winds through a lush, green and yellow tundra. The middle ground shows a calm body of water reflecting the sky, with several icebergs floating. In the background, a large glacier flows down a rocky mountain range under a bright, slightly cloudy sky.

Digitisation of Greenlandic peat moss (*Sphagnum*) collections from four herbaria

Louise Isager Ahl – NHMD

Background - Sphagnum

- Peat mosses play a key role in polar tundra and wetland ecosystems
- The peat-forming Sphagnum wetlands are of global importance as the largest carbon sinks on land.
- Most studies investigating changes in the Arctic flora focus on Greenland's vascular flora, despite the importance of bryophytes in the Arctic ecosystem.

The VA project

Digitisation of the labels of about 4450 Greenlandic Sphagnum moss collections (~26 species) from four herbaria:

- Copenhagen (C, c. 4200 specimens)
- Vienna (W, c. 150)
- Meise (BR, c. 50)
- Leiden (L, c. 50)

This effort would lead to a more than 3.5 times global increase in digitised Greenlandic Sphagnum specimens.

Digitisation output

- Copenhagen: 3546 specimens digitised
- Vienna: 157 specimens digitised
- Meise: 20-25 specimens digitised
- Leiden: 23 (6 duplicates from Copenhagen)

All data available through GBIF portal



Scientific output

- Collections have been made accessible and visible
- Data has not yet been used in scientific publications, but it will be in the coming years



Contacts

Synthesys+ TA/VA at
Natural History Museum of Denmark

Martin V. Sørensen (coordinator)
mvsorensen@snm.ku.dk

Louise Isager Ahl (administrator)
Louise.ahl@snm.ku.dk



Jonathan Brecko
Royal Belgian Institute of Natural
Sciences
Royal Museum for Central Africa



Virtual Access

Monitoring Climate Change, Environmental Pressure on biodiversity and Invasiveness using *Xenopus* as a model system

Partner institutions



Royal Belgian Institute of Natural Sciences



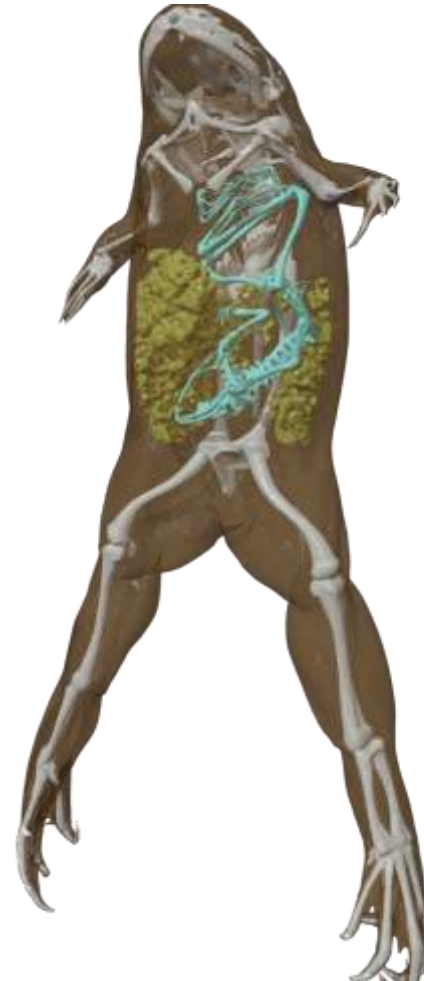
Why Xenopus?

- Invasive on four continents
- Generalist
- Cryptic species
- Life history data lacking



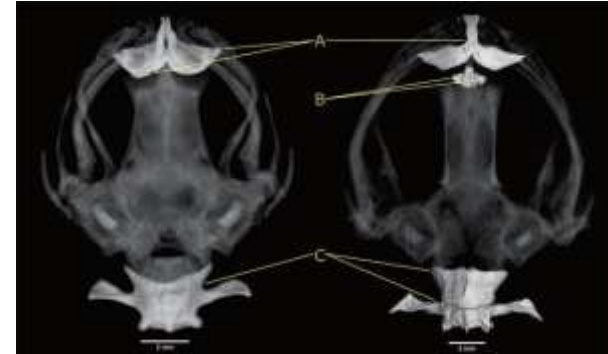
Why Xenopus?

Eats what fits in their mouth
Huge environmental pressure
Up to 13 sp/m²

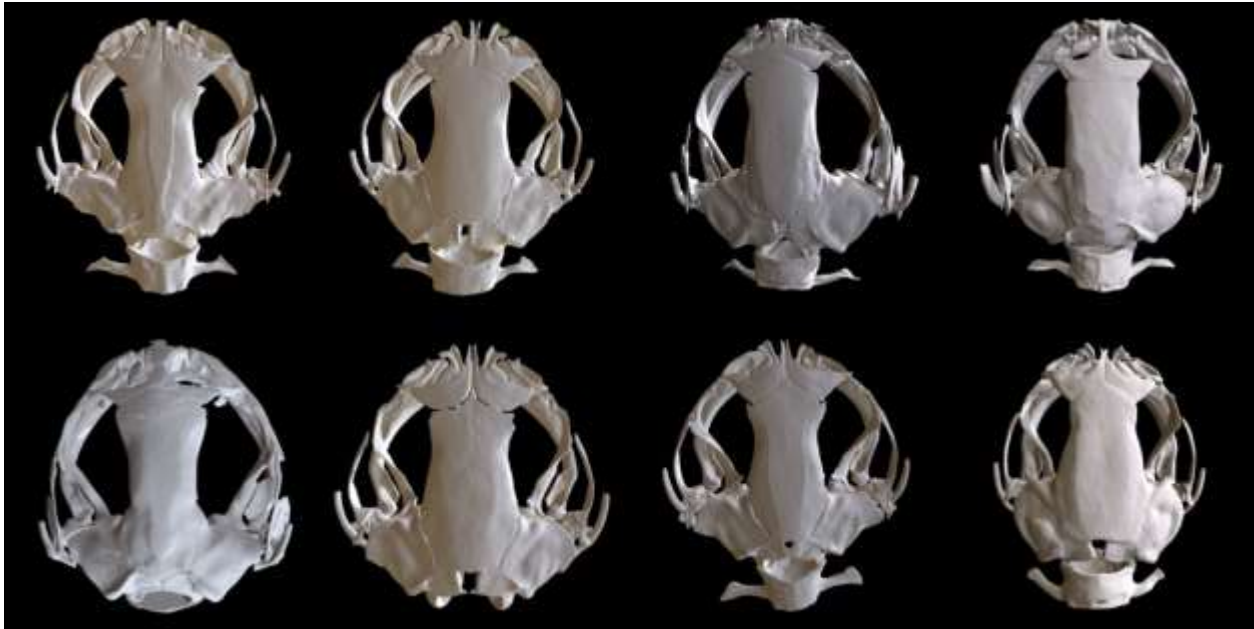


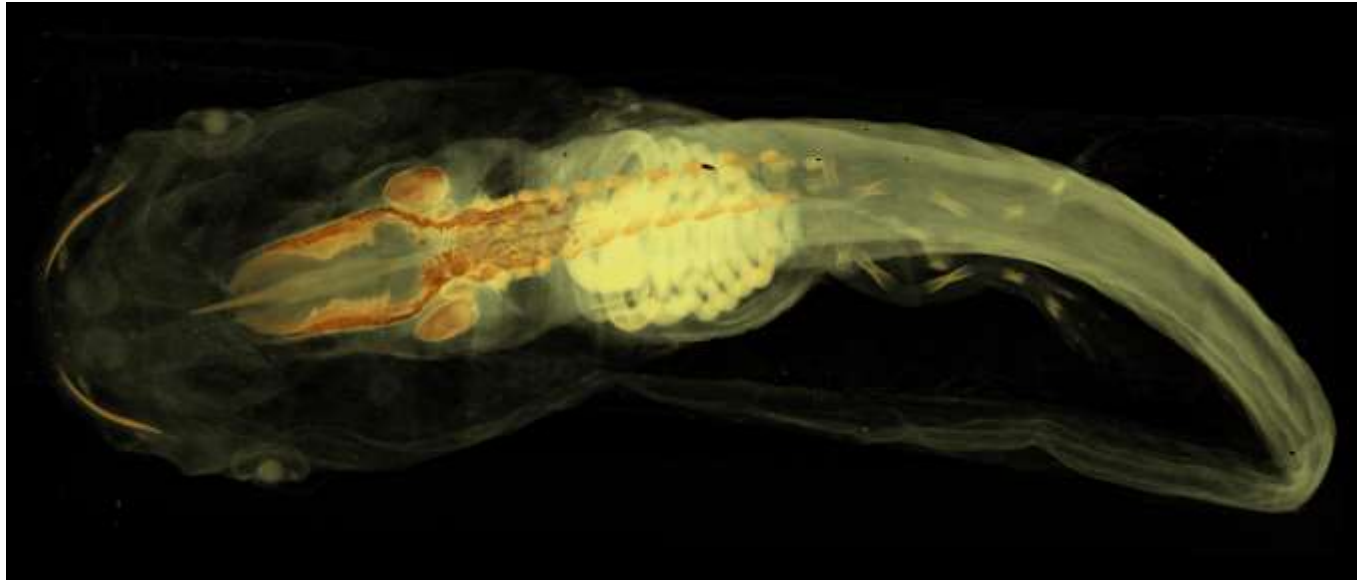
Why Xenopus?

Internal morphology needed



Goodman et al., 2021





THANK YOU



Kate Holub-Young

Natural History Museum London

Virtual Access

Digitising freshwater insects – Mobilising data for IUCN conservation assessments



DIGITISING FRESHWATER INSECTS



- Mobilise data for IUCN redlisting assessments
- Freshwater bioindicator species; Mayflies, Stoneflies & Caddisflies
- Focus on occurrence and distribution data
- Natural History Museum London, Museum für Naturkunde and Royal Museum for Central Africa



OUTPUTS

- 103,000+ records in total
- Majority imaged and transcribed

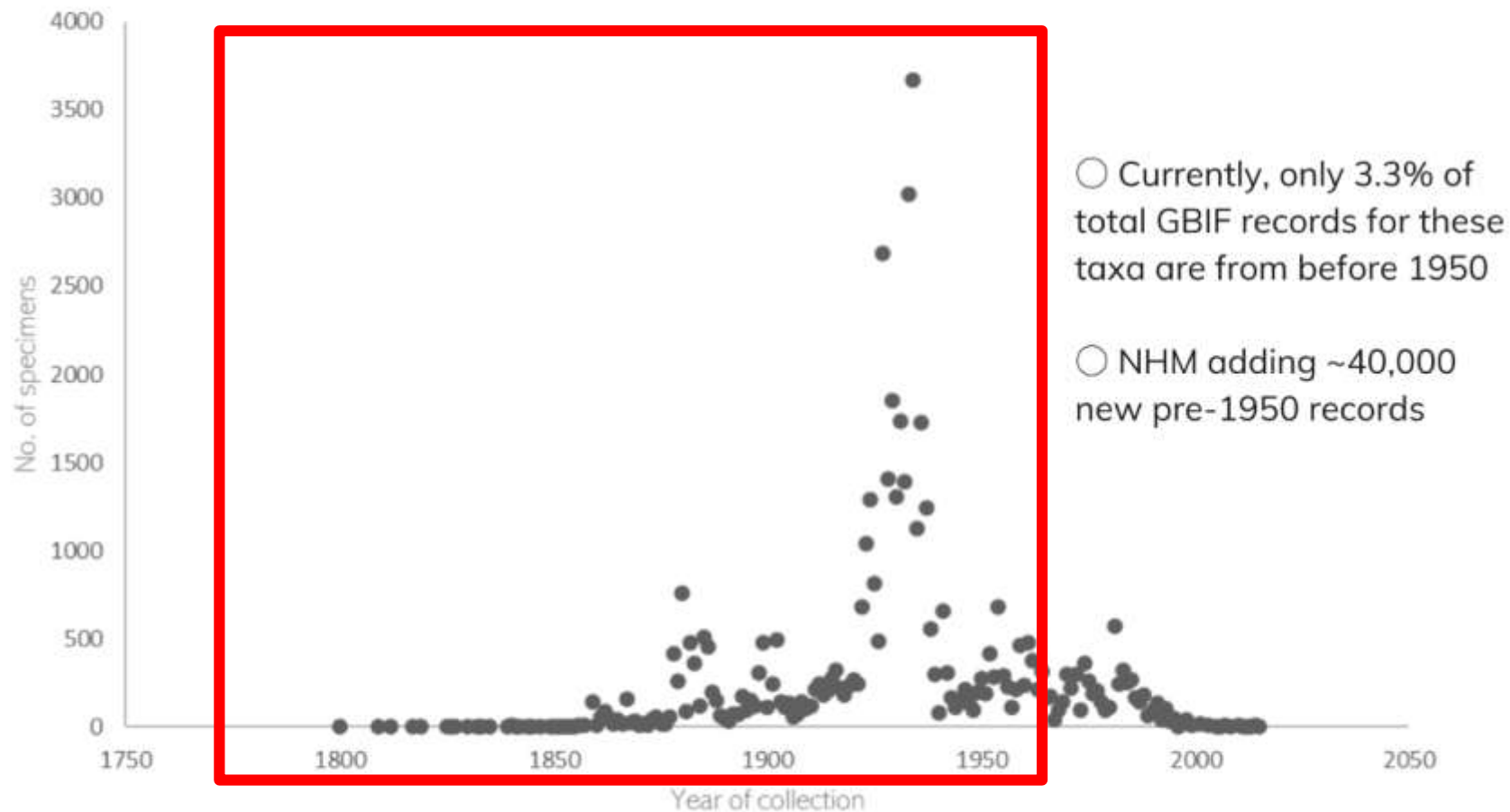
From the NHM (80,000+ records):

- 3,646 species from 186 countries
- More gaps filled by RMCA & Berlin

Spans almost 200 years...



Year of Collection (NHM only)



IMPACTS

Collections

- Increased accessibility, discoverability
- Digitisation workflow development and testing
- Improved long-term storage





IMPACTS

Research

- Increase in requests for diagnostic imaging
- Horizon funded biodiversity genomics work utilising collections data
- Directing future survey locations and target species in Scotland
- IUCN redlisting assessments expected to be fast

Acknowledgements

IUCN SSC Specialist Group for Mayflies, Stoneflies and Caddisflies.

- Craig McAdam
- Lyndall Pereira da Conceicao

NHM

- Ben Price
- Robyn Crowther
- Louise Allan
- DCP team
- DMT

RMCA

- Arnaud Henrard
- Larissa Smirnova

Museum für Naturkunde

- Elena Grigoryeva
- Frederik Berger



Carnation digitized – the incarnation of a best practice VA project

SYNTHESYS
Synthesis of systematic resources



Maarten Trekels (MeiseBG)

(Jean-Pol GRANDMONT, CC-BY-3.0)





Plantentuin Meise



**NATIONAL
MUSEUM**

naturhistorisches
museum wien

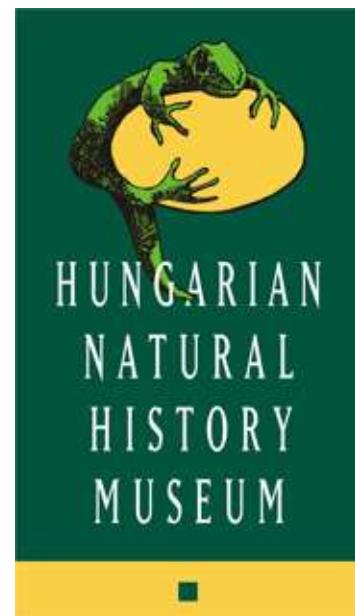


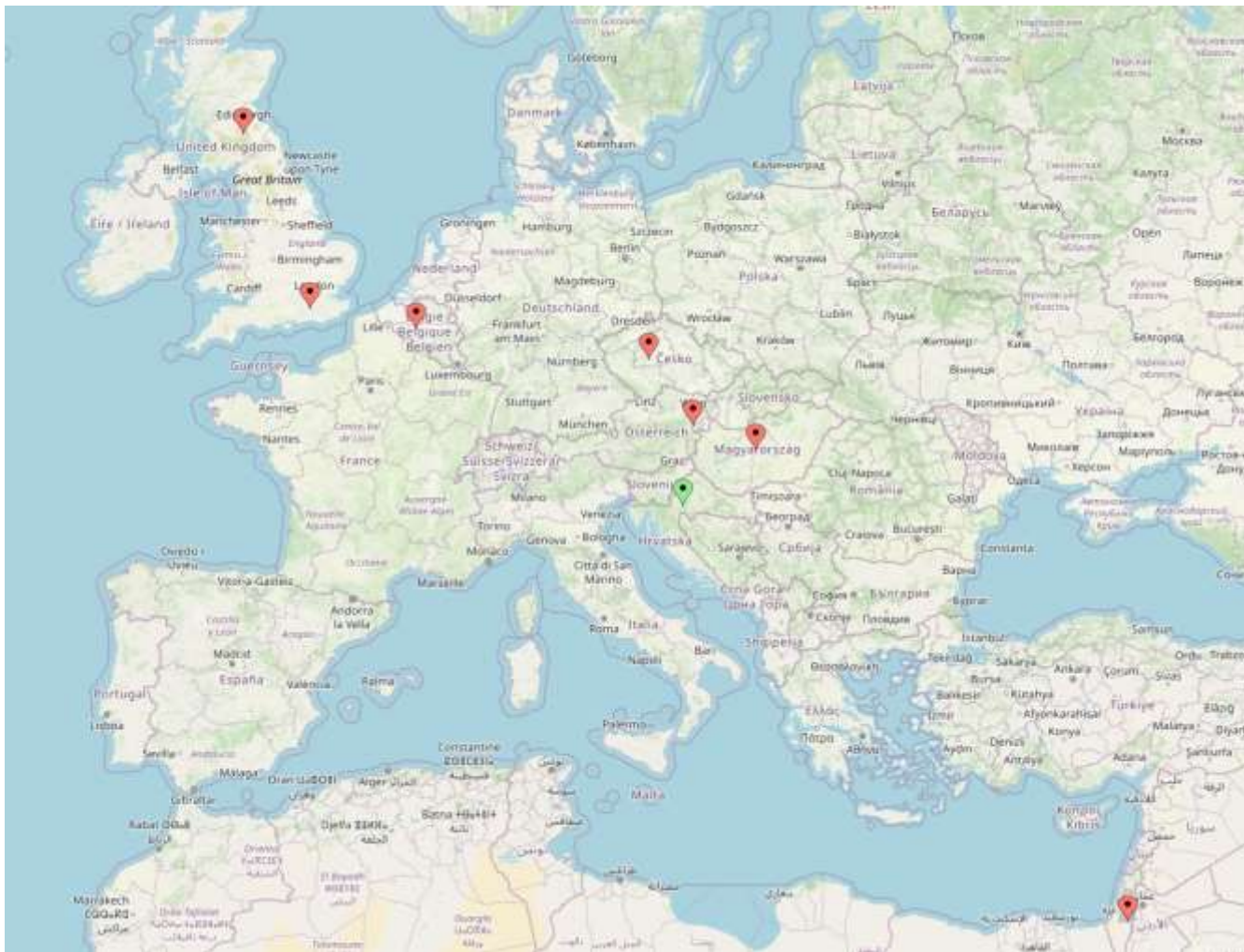
**Royal
Botanic Garden
Edinburgh**

Royal
Botanic
Gardens **Kew**



האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM





Request submitted by the
University of Zagreb

(Ana Terlević)

Digitization of Dianthus specimens

Dianthus is the second most important cut-flower crop in the World (crop-wild relatives)

One of the largest genera in Eurasia BUT no resolved phylogenetic or evolutionary hypothesis is currently available

Lack of an overview of herbarium collections of Dianthus

Need for a comprehensive and detailed taxonomic revision!!



(A. Omer Karamollaoglu CC-BY-2.0)

(Penarc, CC-BY-3.0)



(Suzie Tremmel, CC-BY-3.0)



Impressions of the digitization process



האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

Botanical Collections
Herbarium of the Hebrew University of Jerusalem

Dianthus glabellus L.

Specimens

Plantashel Museum

Image

Identification

Associated material



(© Meise Botanic Garden, reproduced with permission)

Dianthus tripunctatus Sm.
This specimen was drawn to
the "Flora palestina"
(Zohary, 1966)



Dianthus superbus L., 1835



Dianthus cyri Fisch. & Mey.
(extinct in Israel). In the 1950s
and 1960s it was collected in the
Hula Valley from Kfar Szold in the
north to the Hula area but was
never found again.



Lessons learnt



Collaboration between institutes on the digitization process

Lack of staff and infrastructure

Budget for equipment

Established workflows

Time restrictions

Even improve further on cross-communication during digitization

Highly motivated staff members

Estimating the collection size

Useful cost books

Interference with other digitization projects: delays

Karin Wiltschke-Schrotta
Natural History Museum Vienna
Maria Marschler
Natural History Museum Vienna



Virtual Access

Tiny Animals – Big Pictures: The Bryozoa Project

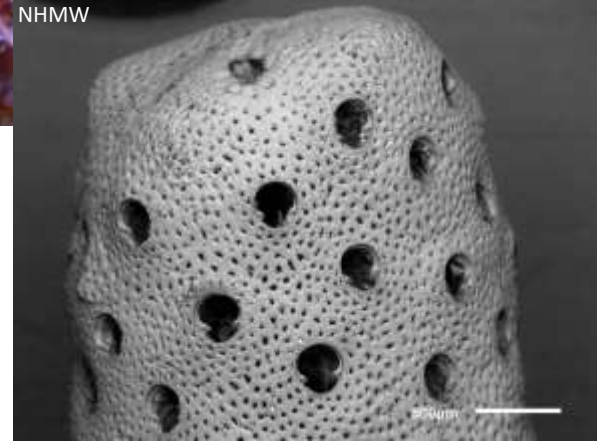
What are Bryozoa?

- aquatic invertebrates
 - sedentary colonies
 - colony often calcified
 - size of zoid: ca. 0.5 mm
-
- good indicators in (palaeo-) environmental research
 - valuable in investigating climate change



Myriapora truncata

NHMW



Bryozoa Identification Tool (BIT) For Quaternary and Recent Mediterranean And North Atlantic Bryozoans

Requester: Consuelo Sendino, NHM

Aim of the project:

To record, on a worldwide map with SEM photographs, all of the Quaternary and Recent Mediterranean and North Atlantic bryozoan taxa kept in museums in order to help with bryozoan taxonomic identification.

6 institutions

7560 specimens

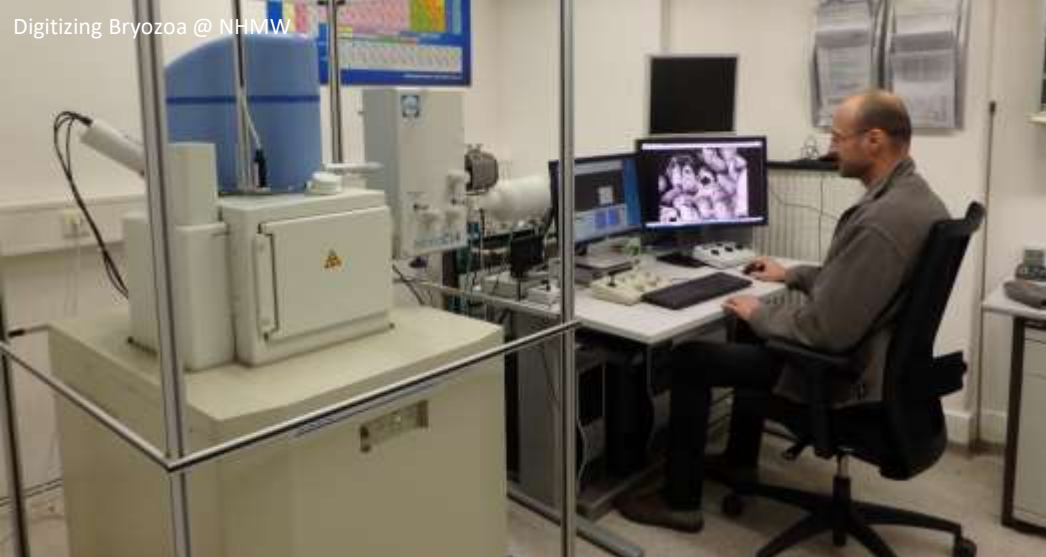
1137 SEM images

Work in progress



extant Bryozoa in NHMW

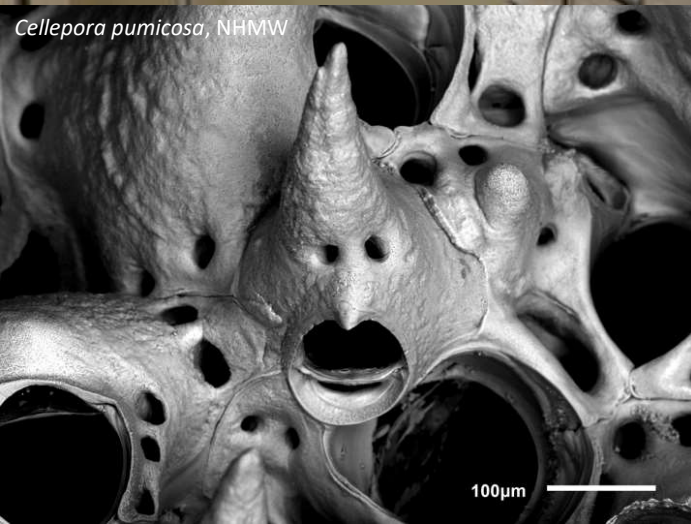




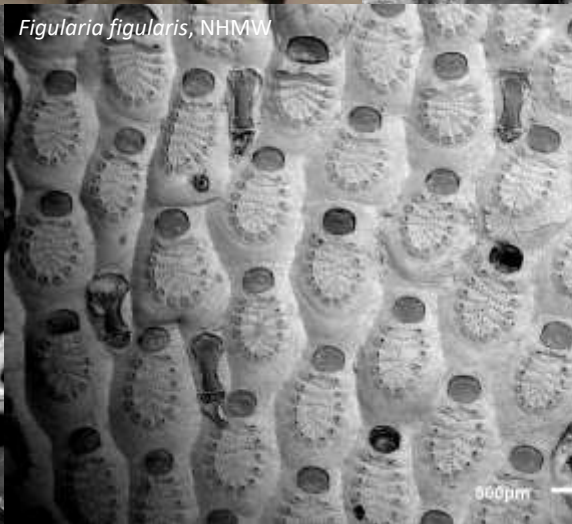
Adeonella pallasii; NHMW



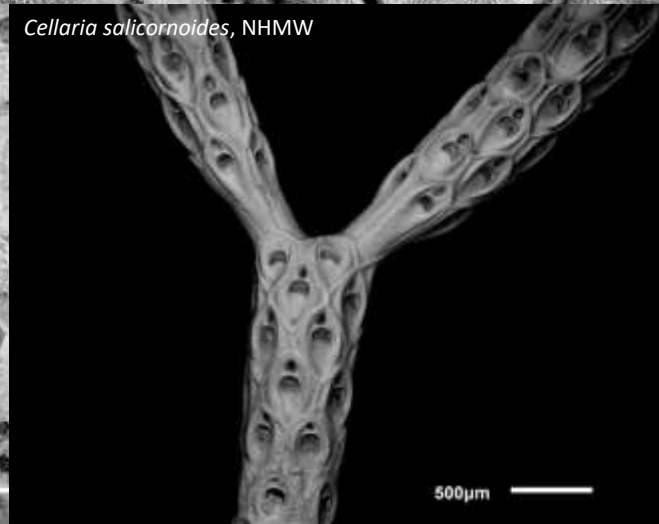
Cellepora pumicosa, NHMW



Figularia figularis, NHMW



Cellaria salicornoides, NHMW



Impact

- cataloguing and identification/revision of the specimens
- high quality data
- implement the knowledge of some groups that are not well known or developed in the collections
- visibility of collections
- scientific cooperations

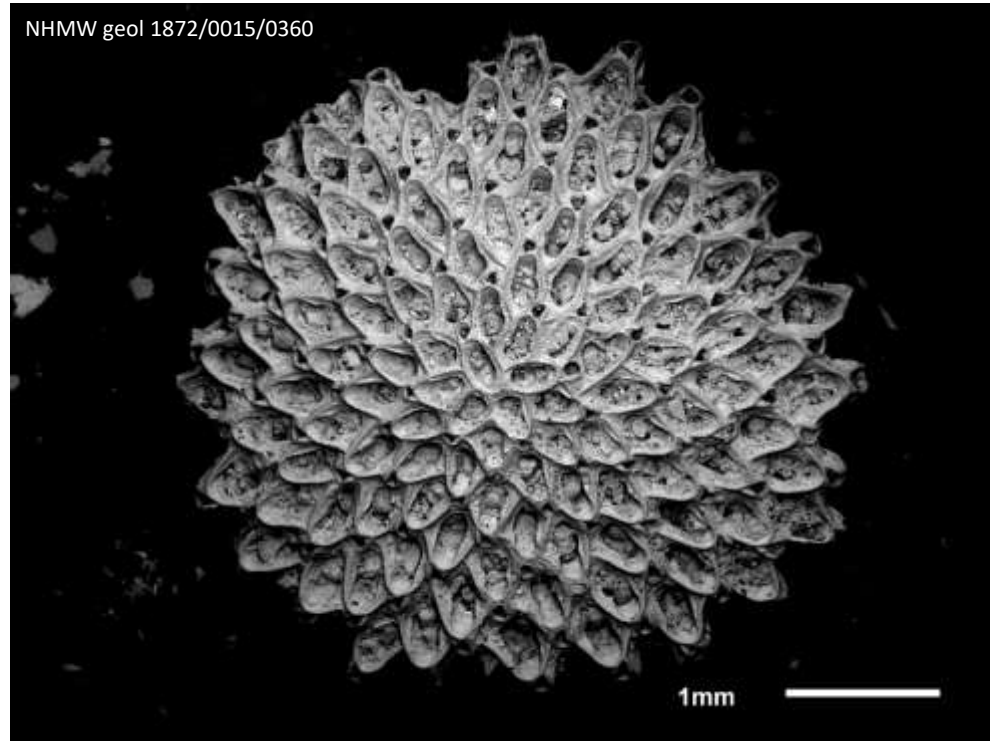


Bollettino della Società Paleontologica Italiana, 61 (3), 2022, 249-268, Modena

Systematic revision and scanning electron microscopic study
of some critical cheilostome bryozoan species of Arthur Waters
from the Pleistocene of Brucoli (Siracusa, Sicily)

Emanuela DI MARTINO*, Antonietta Rosso & Oleg MANDIC

E. Di Martino, Natural History Museum, University of Oslo, Blindern, PO Box 1172, 0518 Oslo, Norway; e.d.martino@nhm.uio.no (corresponding author)
A. Rosso, Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università degli Studi di Catania, Corso Italia 57, I-95129 Catania, Italy;
ca@nsm.unict.it
O. Mandic, Geological-Paleontological Department, Natural History Museum Vienna, Burggasse 7/A, 10100 Vienna, Austria; oleg.mandic@nhm-wien.ac.at

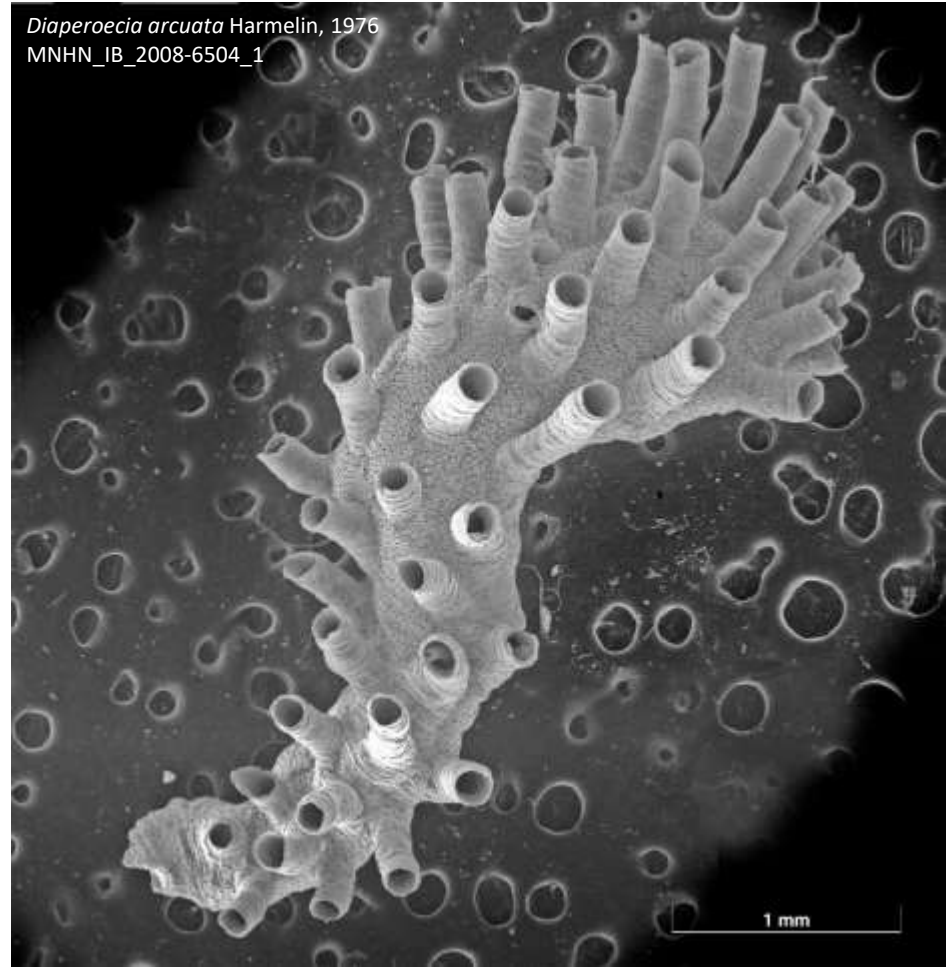


Discoporella umbellata (Defrance, 1823)
Monte Mario / Roma (IT) - lower Calabrian (middle Pleistocene)

Challenges

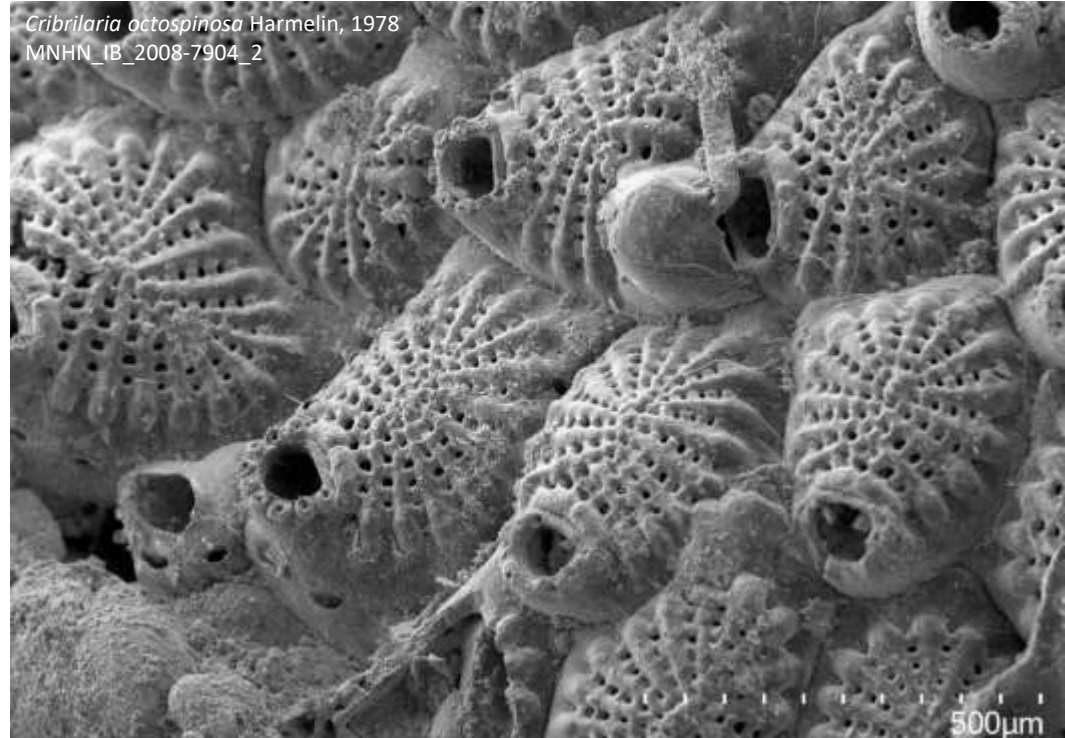
- **general:**
problems allocating resources and staff
technical issues
- **scientific:**
identification/final taxonomic verification
- **practical:**
unclear workflow
difficult pre-digitisation preparation (fragile and differently packaged specimens)
preparation of recent specimens for SEM
very small / badly preserved samples
samples with multiple species
- **lack of a bryozoan expert!**

Diaperoecia arcuata Harmelin, 1976
MNHN_IB_2008-6504_1



What we learned from this project

- Cooperation with the requesters is essential in special groups like the Bryozoa!
- make the required procedure clear from the beginning of the project
- use synergies in establishing a digitization workflow
- publication of workflow in an open knowledge base
- The Bryozoa project is a good example how institutions can join forces to digitise special groups.



Consuelo Sendino



Begoña Sánchez Chillón



Rivka Rabinovich



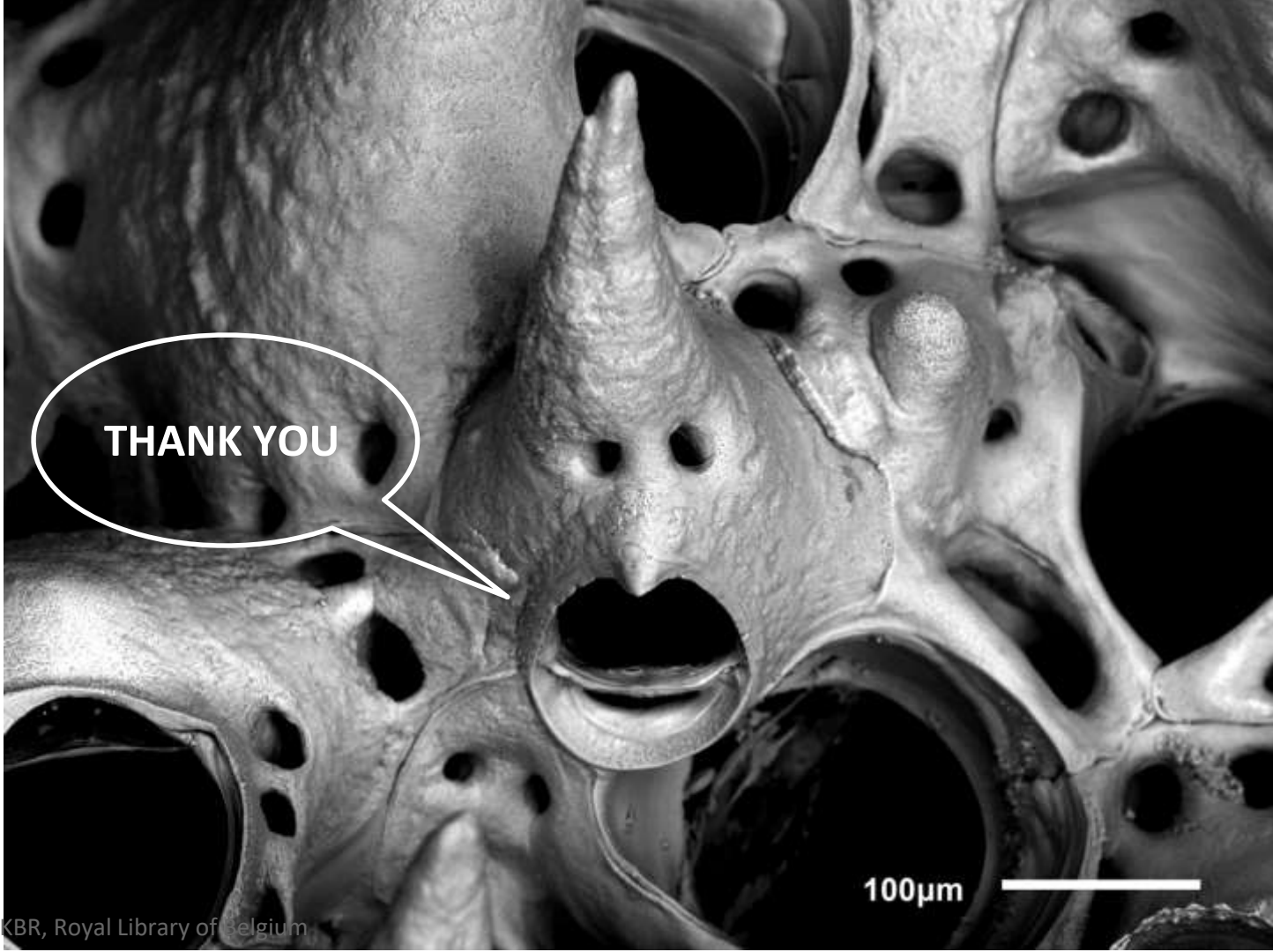
Jonathan Blettery



Frederik Berger,
Nora Lentge-Maaß



Maria Marschler



100µm

The Krantz Project – a diversity challenge

Steffen Kiel & Björn Kröger



LUOMUS
FINNISH MUSEUM OF NATURAL HISTORY

SWEDISH MUSEUM OF
NATURAL HISTORY



für Natur
MUSEUM FÜR
NATURKUNDE
BERLIN

N NATURAL
HISTORY
MUSEUM

NATURAL HISTORY
MUSEUM
STUTTART



NÁRODNÍ
MUZEUM

phm
naturhistorisches
museum wien

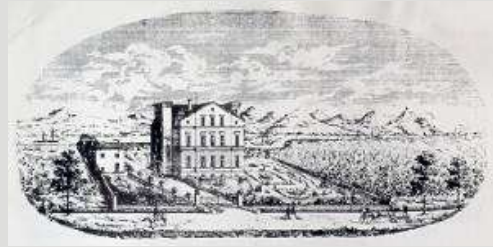
mncn
museonacionalcienciasnaturales



National Natural History
Collections
المجموعات الوطنية للعلوم الطبيعية
The Hebrew University of Jerusalem

Krantz, Rheinisches Mineralien-Kontor

- Founded as 'mineral shop' in 1833 in Freiberg, Germany,
- moved to Berlin in 1837, then to Bonn in 1850



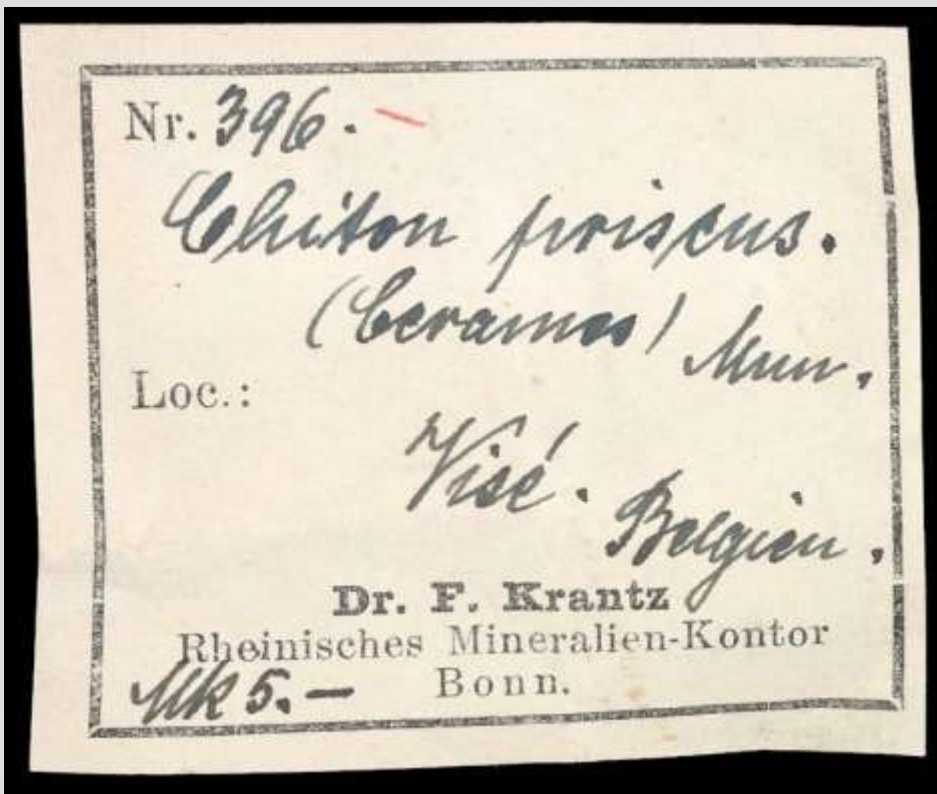
August Krantz
1808-1872

Teaching and stratigraphic reference collections:

- acquired from renowned scientists world-wide

Aims

- Digitize the Krantz material of 10 museums around Europe & Israel
- Make available through GeoCAsE
- harmonize taxonomic, locality, and stratigraphic information



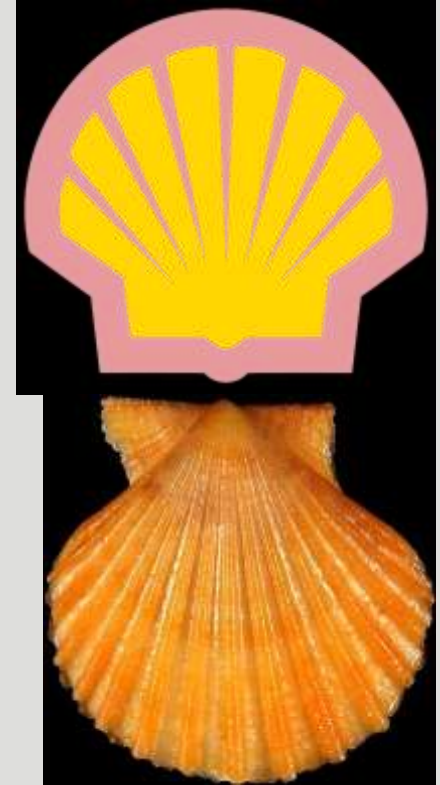
Impact – I

Revealed shortcomings

- digitization/imaging infrastructure & knowledge ('how to photograph specimens')
- Collection Management System issues ('verbatim field'; data standards)
- Data publication

Increased communication

- across departments re staff, protocols, best practices, IT issues



Impact – II

Spotlight on value of historical collections

- Fossil collections sites are temporary!
- Many are lost or presently inaccessible





Sandra Knapp
Natural History Museum, London

Virtual Access Wheat through the Ages

Wheat

The crop

One of the “big four” calorie providers for human population – up to 20% in some areas

Locally adapted to many parts of the world – grown everywhere



The wheat breeding community

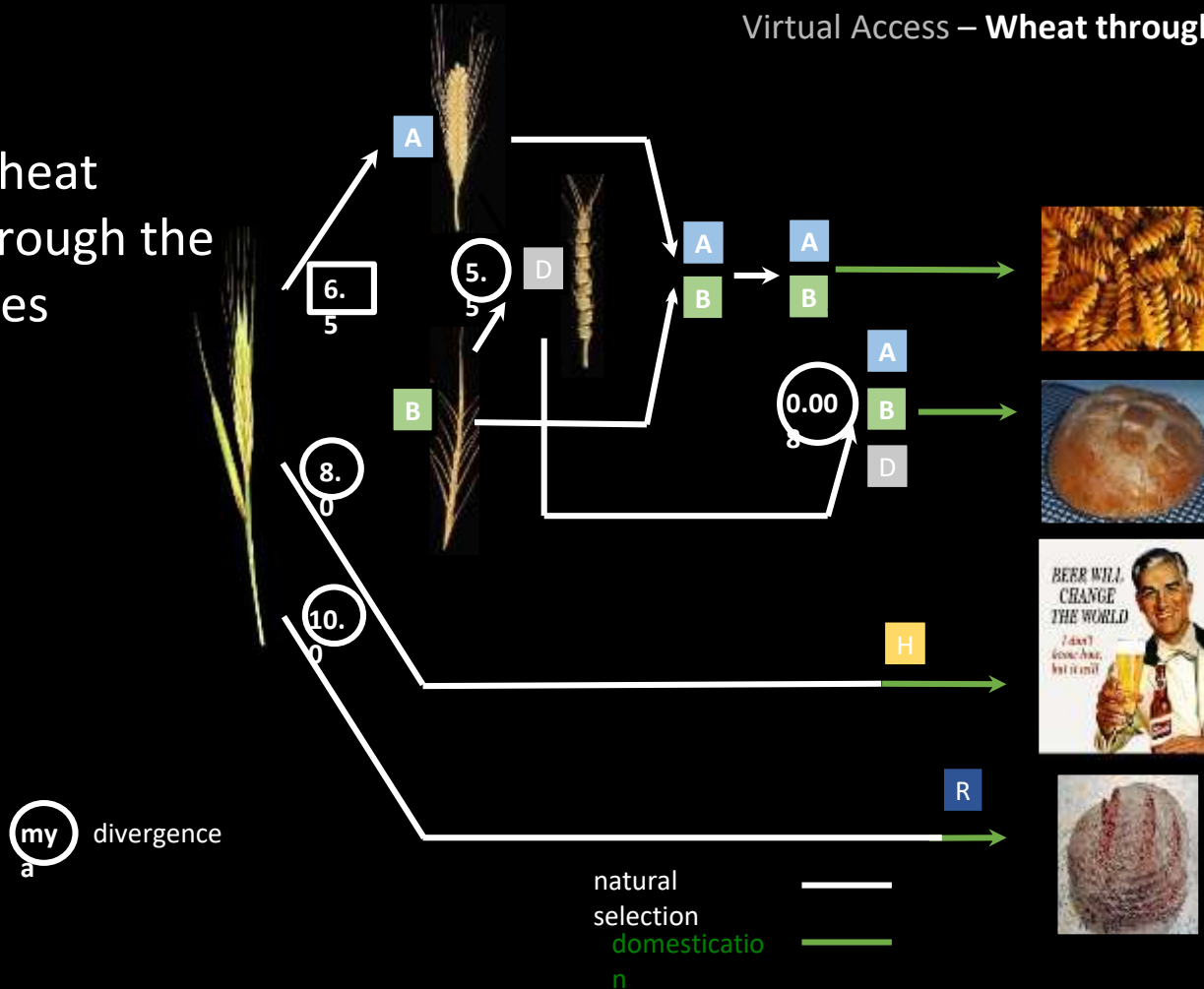
International body of scientists (James Cockram NIAB, Cristobal Uay JIC led this request)

Use much the same material – elite lines, a few landraces

Desire to augment resources for breeding for climate and environmental change



Wheat through the ages



The data

Specimens and sequences

All members of wheat tribe Triticeae from the three institutions

The Percival collection of wheat “ears” from NHM

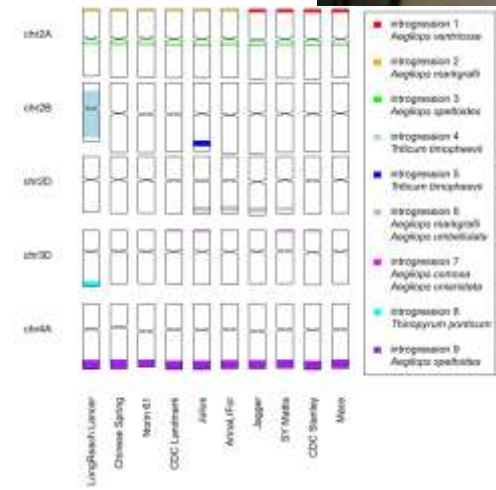
Sequences from key specimens across time and space





Impact of the virtual access to data for wheat breeders

- Document changes in morphology of landraces and CWR through time with changing agronomic practices
- Identify unexplored wild relatives to test of genome integration
- Complement landrace collection being grown in the field to assess local adaptation – gap filling



The future of VA in DiSSCo - challenges and opportunities

30MIN
BREAK

DiSSCo
Distributed System of Scientific Collections

FUTURES
SYNLAB's 07-09/02/2023

(We'll be back at 11:00h CET)



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Session:

PHYSICAL ACCESS

Kristina Gorman

Natural History Museum, London, UK

Irit Zohar

Oranim Academic College of
Education and Steinhardt Museum of
Natural History, Israel

Olivier Lambert

Royal Belgian Institute of Natural
Sciences, Belgium

Alex Ball

Natural History Museum, London, UK

Marieke Willems

ELIXIR Hub, Cambridge, UK

Agnès Robin

European Commission, DG Research
& Innovation



Physical Access

**Convenors: Carole Paleco (RBINS) & Kristina Gorman
(NHM)**

SYNTHESYS+

Synthesis of Systematic Resources

a DiSSCo project



Kristina Gorman
Natural History Museum, London

Physical Access

Two decades of SYNTHESYS Transnational Access

Transnational Access (TA) in SYNTHESYS

SYNTHESYS1 2004 – 2009: 9 TA Calls

SYNTHESYS2 2009 – 2013: 4 TA Calls

SYNTHESYS3 2013 – 2017: 4 TA Calls

SYNTHESYS+ 2019 – 2023: 4 TA Calls

SYNTHESYS offers unique research opportunities to scientists worldwide. Transnational Access is provided to:

- European collections comprising more than half of the world's natural history specimens
- World class libraries
- State-of-the-art facilities including imaging, chemical, and molecular laboratories
- Support from in-house scientists, including researchers, facilities staff, and collections managers

SYNTHESYS will provide finance for:

- Research costs
- International travel and accommodation
- Per diem contribution towards living costs
- Logistical support at the host institution

AT-TAF: Naturhistorisches
Museum Wien, Vienna

BE-TAF: Royal Belgian
Museum of Natural
History, Brussels; Royal
Museum of Art and
History, Brussels; Royal
Museum of the History of
Science, Technology and
Industry, Brussels; Royal
Museum of the Army and
Military History, Brussels

CZ-TAF: Národní muzeum, Prague

DE-TAF: Botanischer Garten
und Botanisches Museum
Berlin-Dahlem, Berlin;
Museum für Naturkunde,
Berlin; Senckenberg
Gesellschaft für
Naturforschung, Frankfurt;
Museum für Naturkunde,
Dresden; Leibniz Institute
for the Analysis of
Biodiversity Change (LIB),
Müncheberg; Staatliches
Museum für Naturkunde,
Tübingen; Staatliches
Museum für Naturkunde,
Stuttgart; Staatliches
Museum für Naturkunde,
Bonn

DK-TAF: University of
Copenhagen, Copenhagen

DE-TAF: Botanischer Garten und Botanisches
Museum Berlin-Dahlem, Berlin; Museum für
Naturkunde, Berlin; Senckenberg Gesellschaft für
Naturforschung, Frankfurt, Dresden, Görlitz,
Müncheberg, Tübingen and Wilhelmshaven;
Staatliches Museum für Naturkunde, Stuttgart;

Leibniz Institute for the Analysis of Biodiversity
Change (LIB), Müncheberg and Museum of
Nature Hamburg

DK-TAF: University of Copenhagen

Botanic Gardens, Kew; Royal Botanic Garden,
Edinburgh

HU-TAF: Hungarian Natural History Museum,
Budapest

IL-TAF: National Natural History Collections of the
Hebrew University of Jerusalem

NL-TAF: Naturalis Biodiversity Center, Leiden

SE-TAF: Naturhistoriska riksmuseet, Stockholm

Contact SYNTHESYS for details
Web address: www.synthesys.org
Email: synthesys@nhm.ac.uk
Annual Calls for proposals
Visits in 2021 will be scheduled
A separate Virtual Access

Eligibility & limitations:

- **User group leader and the majority of the users must work in a country other than the country where the TAF is located.**
- **Must be able to disseminate results.**
- **SYNTHESYS+ only: Max. 20% of awarded user days can be to users based outside European Member States and Associated States.**

Consortium-agreed limitations:

- **Max. 15% of awarded projects can be to researchers based with the consortium**
- **Max. 10% of awarded user days to researchers who have already visited that TAF with project funds**

Call

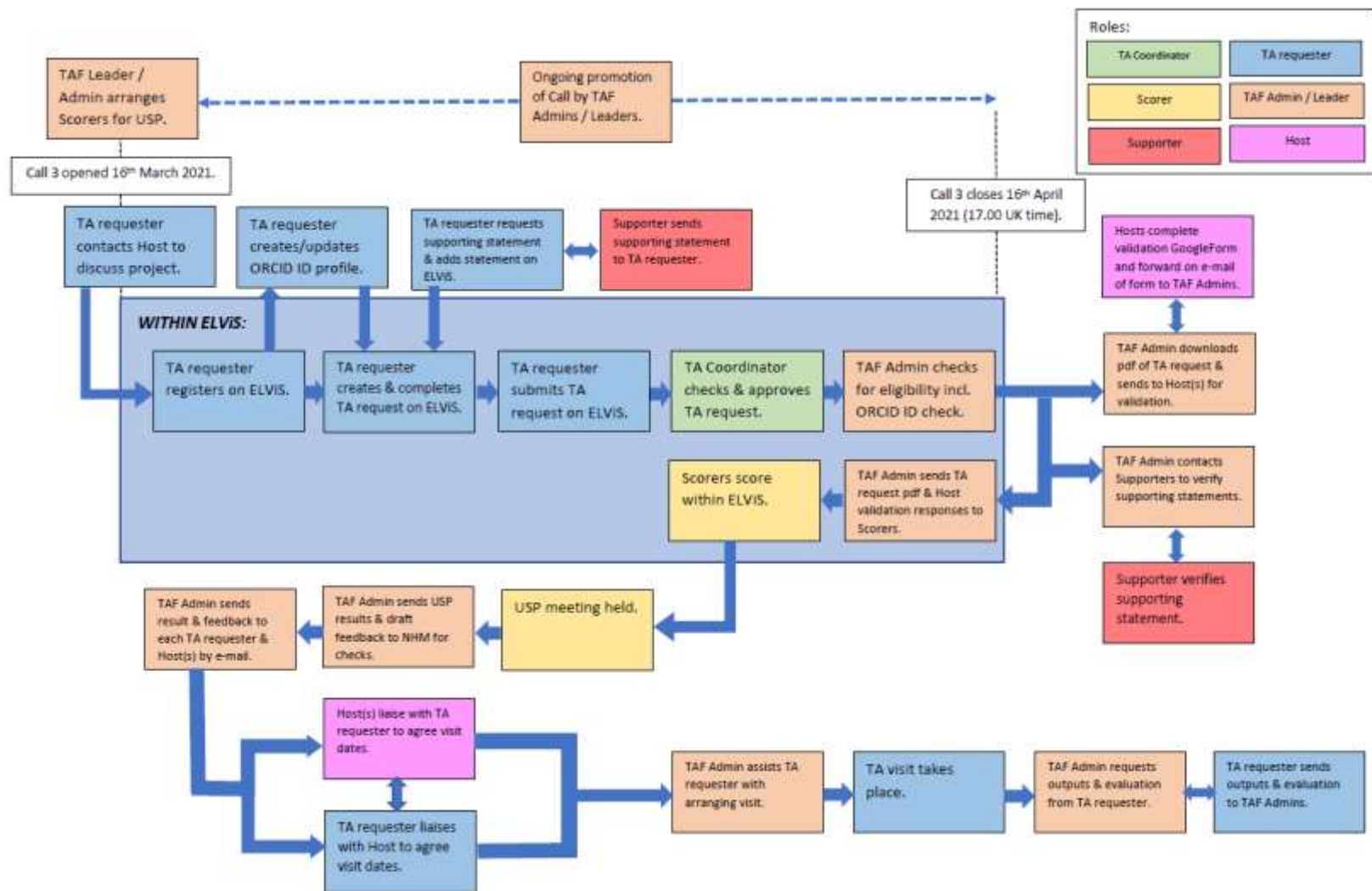
- Publicity
- User applications
- Host comments
- Eligibility checks
- Budget allocation to TAFs

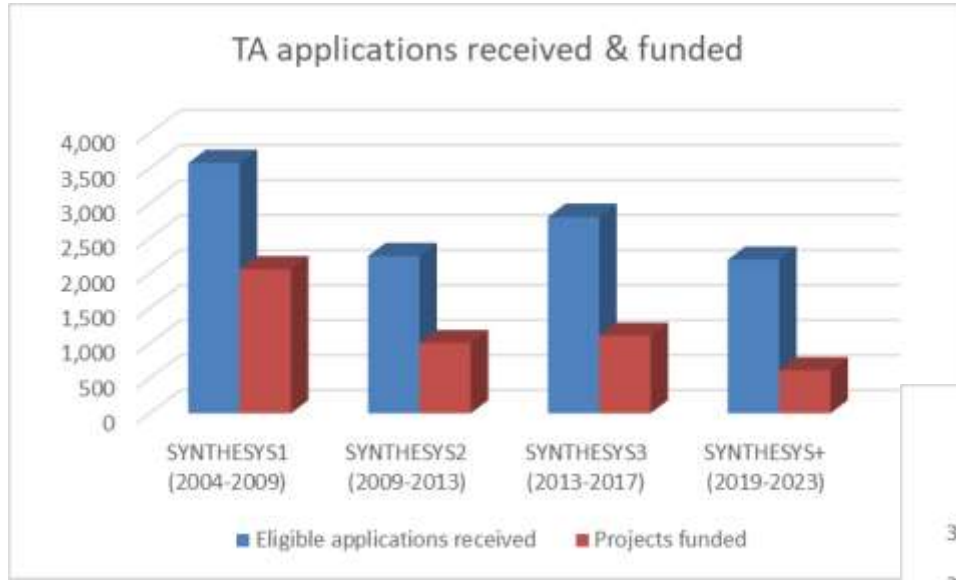
Review

- User Selection Panel reads & scores
- USP meeting
- Compliance checks
- Feedback to applicants

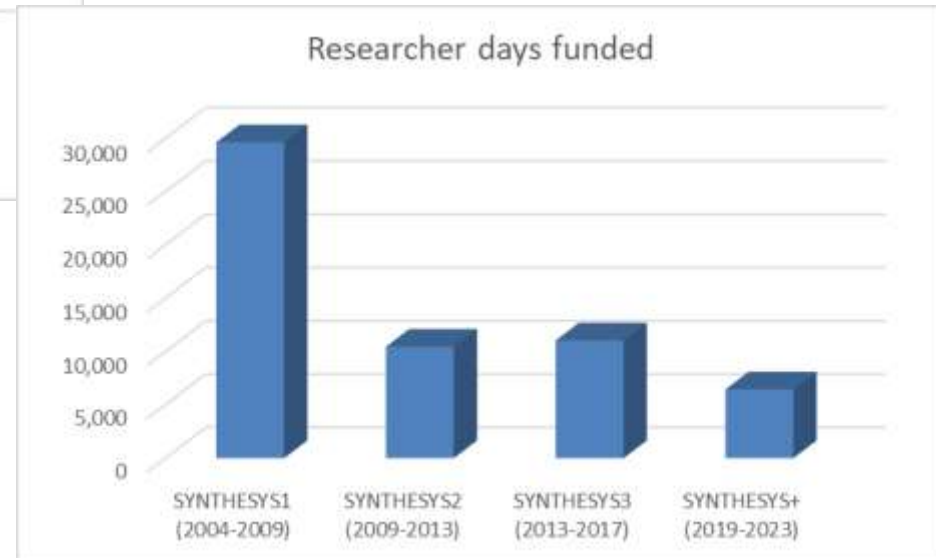
Visit

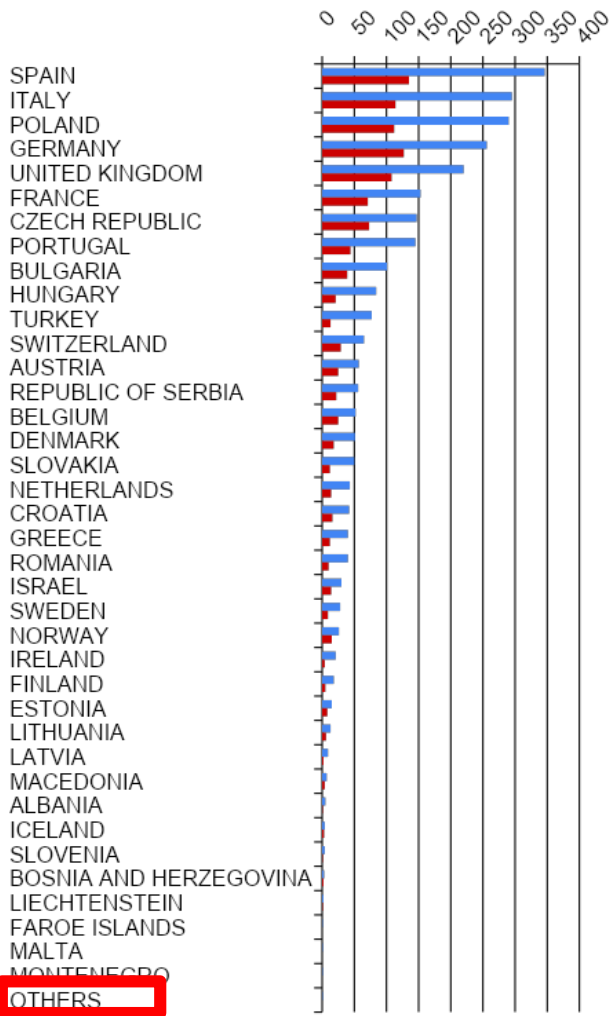
- TAF administrators assist with T+S
- Presentations by users
- User evaluations
- Outputs





To date: 4,777 projects and 57,610 working days have been funded.





Home institution

SYNTHESYS3

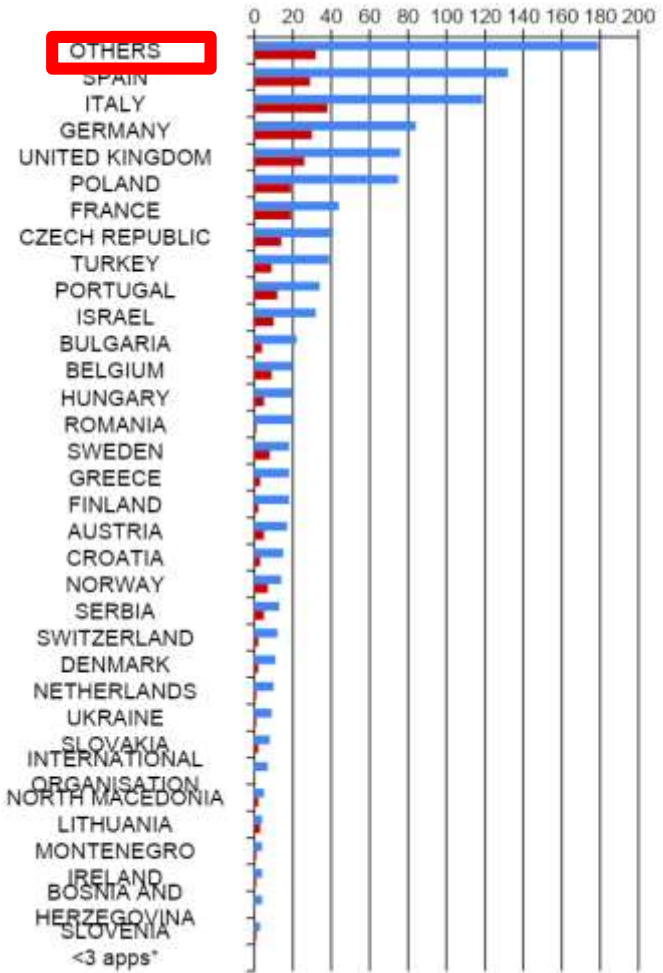


SYNTHESYS+

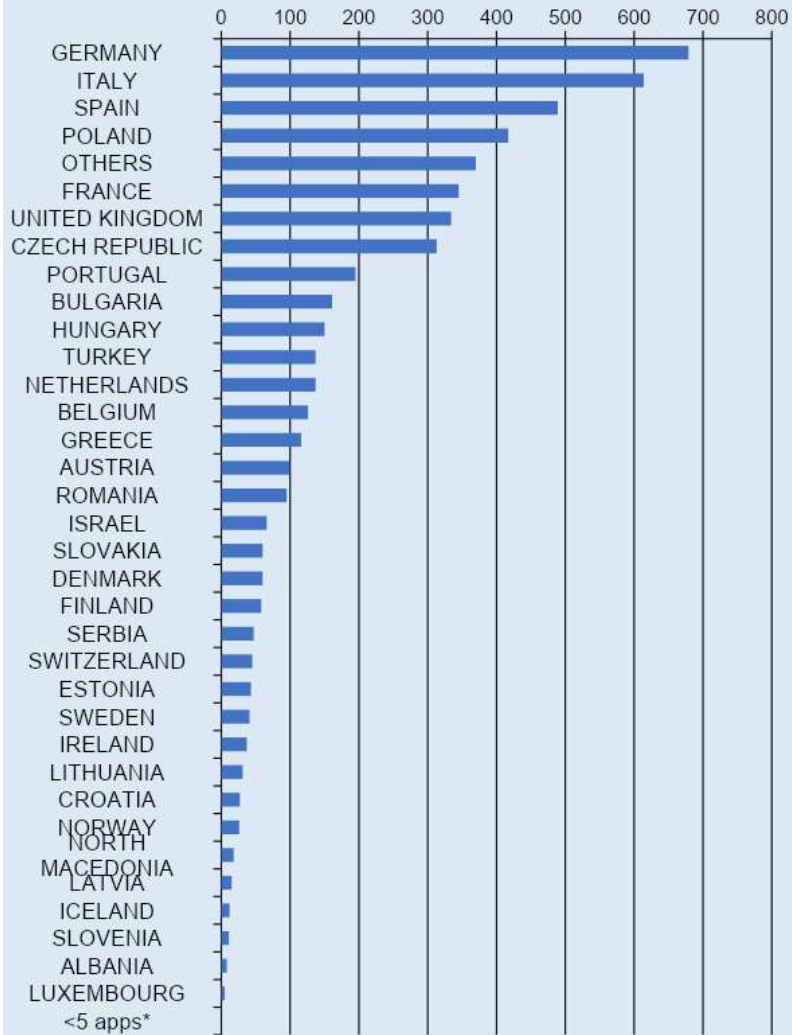


■ Total Eligible
■ Total Accepted

'Others' (in the database = non-Europe) a sign that TA is now being engaged with globally.



*<3 apps: Estonia (2 apps, 2 accepted), Moldova (2,0), Tunisia (2,0), Latvia (1,1), Albania (1,0), Armenia (1,1), Georgia (2,0).

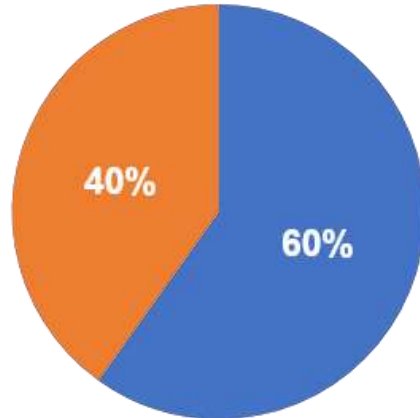


Nationality of accepted applicants

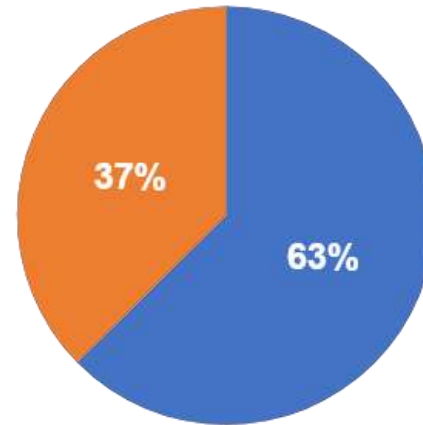
<5 applicants: Bosnia and Herzegovina, Montenegro, Malta, Ukraine, Liechtenstein, Armenia, Cyprus

Gender monitoring

All Calls, all applicants



All Calls, successful applicants

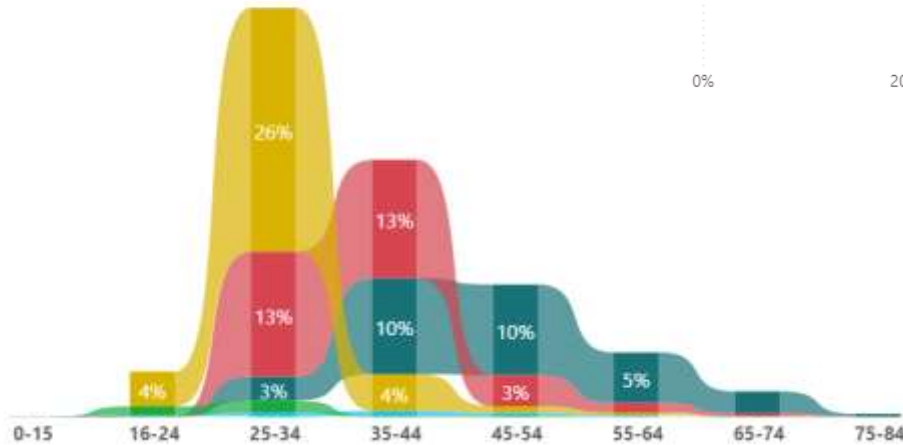


■ Male
■ Female

Researcher status

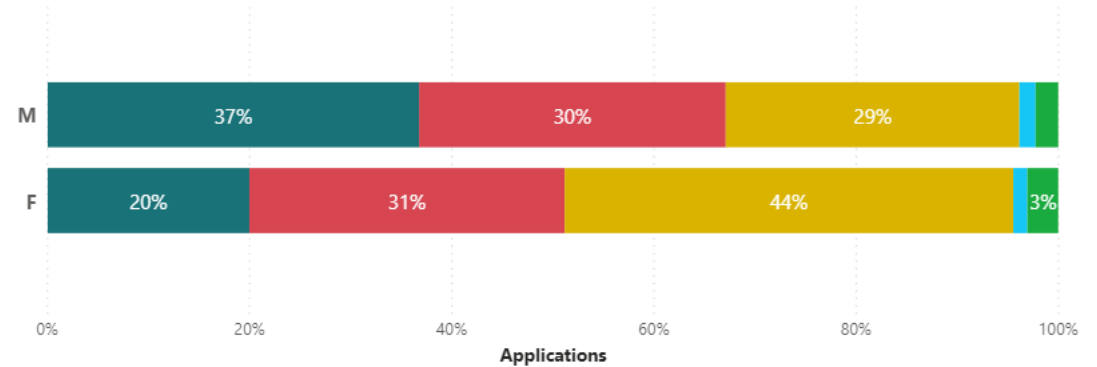
Applications by age and researcher status

● Experienced ● Postdoctorate ● Postgraduate ● Technical ● Undergraduate

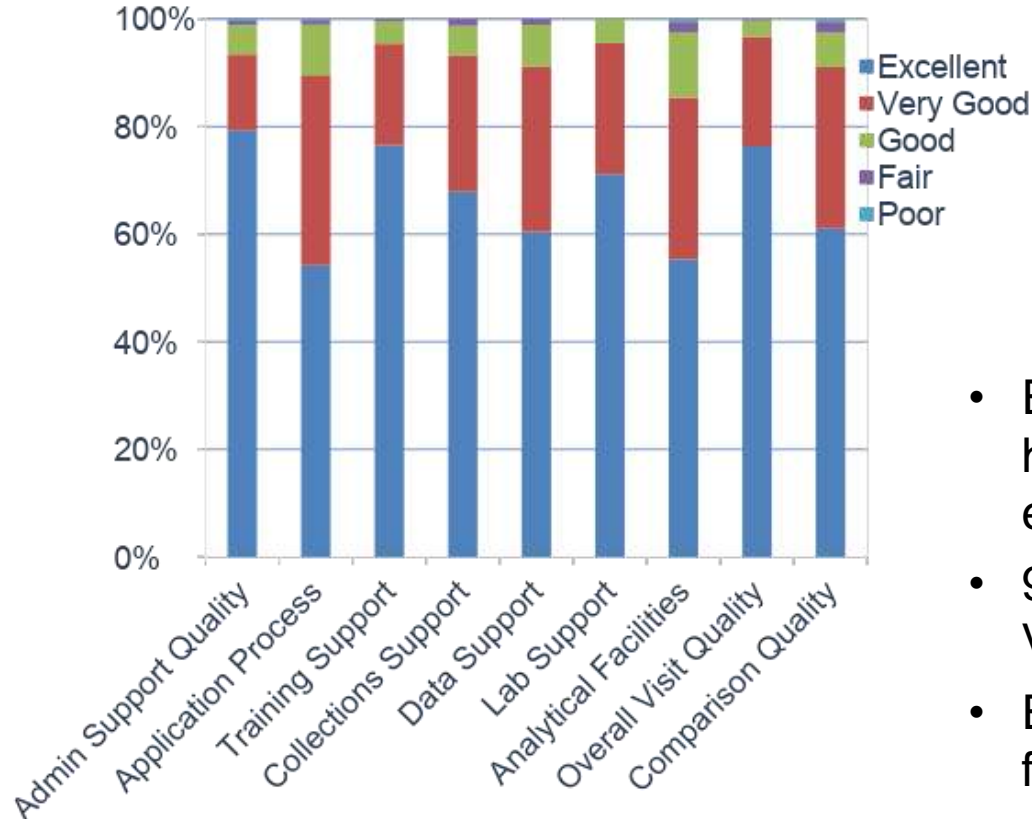


Applications by gender and researcher status

● Experienced ● Postdoctorate ● Postgraduate ● Technical ● Undergraduate



User evaluations



- Exit survey for all Users: used to help improve User experience with each Call.
- 99% of all evaluations rated Good, Very Good or Excellent.
- EC has its own confidential feedback survey.

Outputs

- SYNTHESYS 1-4: **>8,000*** recorded research outputs.
- **>4,600*** of which Accepted, In press or Published.

	Total Records
SYNTHESYS 1**	3,664
SYNTHESYS 2**	2,100
SYNTHESYS 3	2,488
SYNTHESYS +	504
Total	8,756

SYNTHESYS1-4	Accepted	In press	Published	Total
Book/Monograph	21	28	123	172
Database, CD or DVD	3	3	51	57
Non Peer Reviewed	109	38	644	791
Peer Reviewed	247	335	2,830	3,412
Thesis	36	6	133	175
Training	1	0	3	4
Total	417	410	3,784	4,611

*Underestimate: relies on Users to update outputs on SYNTHESYS portal.

**SYNTHESYS 1 & 2 databases last updated 1 year after the end of the projects.

Science

Current Issue First release papers Archive About

Submit man

HOME > SCIENCE > VOL. 347, NO. 6207 > THE GROWTH PATTERNS OF NEANDERTALS, RECONSTRUCTED FROM A JUVENILE SKELETON FROM EL SIDRÓN (SPAIN)

REPORT

The growth pattern of Neandertals, reconstructed from a juvenile skeleton from El Sidrón (Spain)

PLOS ONE

RESEARCH ARTICLE

Turning Up the Heat on a Hotspot: DNA Barcodes Reveal 80% More Species of Geometrid Moths along an Andean Elevational Gradient

SpringerLink

Published: 09 June 2022

Morphological stability of rural populations supports their use as controls in urban ecology studies

Tania Regacho & Javier delBarco-Trillo

PROCEEDINGS B

royalsocietypublishing.org/journal/rspb

Grouping behaviour impacts on the parasitic pressure and squamation of sharks

Humberto G. Fernn^{1,2} and Jose F. Palacios-Abella¹

¹Cavanilles Institute for Biodiversity and Evolutionary Biology, University of Valencia, Calle Catedra

Systematic Entomology Taxon

Environmental and climatic reconstruction of MIS 3 in northwestern Europe using the small-mammal assemblage from Caverne Marie-Jeanne

BIOLOGICAL REVIEWS

Cambridge Philosophical Society

Original Article

Towards a 'Sea-Level Sensitive' dynamic model: impact of island ontogeny and glacio-eustasy on global patterns of marine island biogeography

Science

Current Issue First release papers Archive About

Submit man

HOME > SCIENCE > VOL. 342, NO. 6420 > 1.9-MILLION- AND 2.4-MILLION-YEAR-OLD ARTIFACTS AND STONE TOOL-CUTMARKED BONES FROM AIN BOUCHERIT...

REPORT

1.9-million- and 2.4-million-year-old artifacts and stone tool-cutmarked bones from Ain Boucherit,

nature COMMUNICATIONS

ARTICLE

Feather moult and bird appearance are correlated with global warming over the last 200 years

Y. Kuri¹, Y. Votman² & N. Sapir¹

tion	2
ean Society	17
	11
Anthropology	9
	12
	1
	20
	1
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	3
	12
	9

THANK YOU!

Hosts and facility / laboratory / collections staff

Scorers + USP Chairs

Vanessa, Vince, Sandy, James and Tom

Wim, Wouter and the SYNTH+ JRA1 team

Jose and Ela for the video compilation today

Most of all: all the TAF administrators!!!

Feedback

My host really understands what the function of a great collection manager should be, that is, oriented towards scientists and visitors of the collection.

This synthesys project was a very positive experience for me and I can only encourage other scientists to apply for this excellent instrument to perform short term projects and to enhance scientific exchange!

Synthesys is a unique and excellent initiative and I hope new calls will come for years to come.

This sort of positive interaction with staff is stimulating.

Member

Vertebrate

advice

great

view

These

summ

aven

contacts

and

plans

for

the

next

trip!

I thank the people who set this project up and give a chance to older disciplines and the use of the old collections to show their value. I was dwelling in them and was sad to leave as there are still so many hidden treasures to be found.

My experience with Synthesys was flawless.



FUTURES
Brussels 07-09/02/2023

THANK YOU

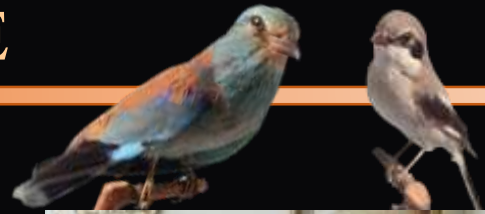
REVEALING SECRETS FROM THE ACHEULIAN CUISINE: THE APPLICATION OF X-RAY POWDER DIFFRACTION (XRD) TECHNIQUE TO IDENTIFY HEAT INDUCED CHANGES IN FISH REMAINS

Irit Zohar

SYNTHEYS+ Transitional Access Research Grant with
Dr. Jens Najorka, Core Research X Ray Lab, NHM London



A FEW WORDS ABOUT ME



I am the curator of biological collections housed at Oranim Academic College of Education.

In my research I specialize in the study of fish remains from archaeological sites (inland, coastal, waterlogged, underwater etc.).



Taxonomic identification of fish remains requires the use of diverse reference collections with skeleton of fish collected from a wide range of habitats, examining the osteological characteristic of each species.

For my research I use:

Local reference collection housed at the Steinhardt Museum of Natural History (SMNH), Tel Aviv University

Fish collections (wet and dry/skeletons) from various habitats, housed in NHM's worldwide.



SYNTHESYS+

During one of my visits to the ichthyological (wet and skeleton) collections at the NHM London I contacted Dr. Jens Najorka the head of the Core Research X Ray Lab.

I first heard about SYNTHESYS+ from the announcements boards at the NHM in London (and later from e-mail announcements).



SYNTHESYS+
Synthesis of Systematic Resources a DiSSCo project

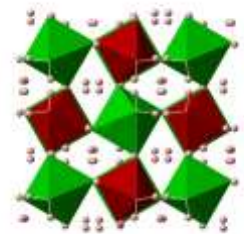


THE X-RAY DIFFRACTION TECHNIQUE

Dr. Jens Najorka is the XRD lab manager at the NHM in London. He is a mineralogist with crystallographic background.

Most of Jens research focus on minerals, and other crystalline materials.

Jens identifies and characterizes minerals that are new to science, and investigate minerals with potential technological importance.



Jens also examines the behavior of minerals at higher temperatures and pressures.



Bridgesite-(Ce), a new rare earth element sulfate, with a unique crystal structure, from Tynebottom Mine, Cumbria, United Kingdom

Part of: Minerals, crystal structures and geochemistry: Peter Williams special issue

Published online by Cambridge University Press: 27 April 2022

RESEARCH ARTICLE | DECEMBER 01, 2022

The new mineral tomiolloite, $\text{Al}_{12}(\text{Te}_{4+}\text{O}_3)_5[(\text{SO}_3)_{0.5}(\text{SO}_4)_{0.5}](\text{OH})_{24}$: A unique microporous tellurite structure

Owen P. Missen ; Stuart J. Mills; Michael S. Rumsey; John Spratt; Jens Najorka; Anthony R. Kampf; Brent Thorne

American Mineralogist (2022) 107 (12): 2167–2175.

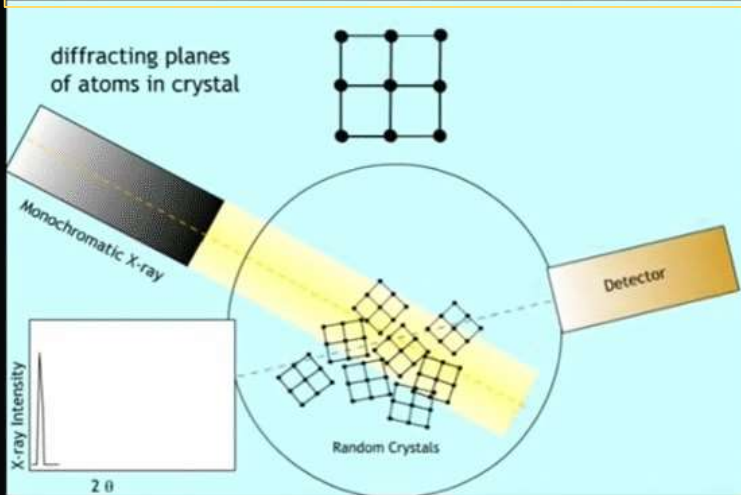
As the XRD lab manager, Jens provides XRD training and supports for researchers (like me).

THE X-RAY DIFFRACTION TECHNIQUE

Vertebrates bone and teeth main component is hydroxylapatite (HA), which is made of tiny nano crystals

The XRD technique allows investigation of changes in the bioapatite crystal size.

Studies showed that these crystals are subjected to growth change when stimulated by the temperatures of fire.



Tooth enamel

Tooth enamel

Enamel rod

After Lei et al, 2020

HA nano-fiber



a new fishy idea

Investigate changes in fish teeth bioapatite crystal size.

HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

Following preliminary study with Jens I applied to SYNTHESYS+ (physical access).

I have succeeded in my second application, and was granted **20** working days at the XRD lab in the NHM, London.

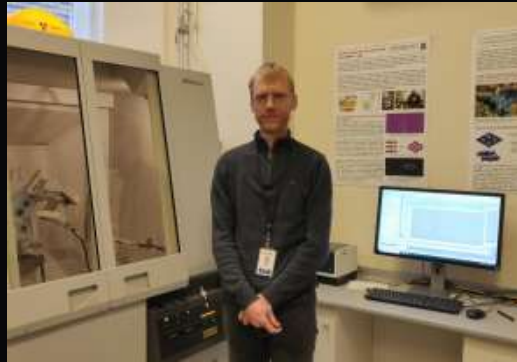


HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

20 working days at the XRD lab in the NHM, London.

Sample
preparation

1 - 2 hours per a
single sample



HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

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Sample
preparation

1 - 2 hours per a
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XRD analysis

3 - 4 hours
per sample



HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

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Sample
preparation

1 - 2 hours per a
single sample

XRD analysis

3 - 4 hours
per sample

4 samples per
day



> 80 XRD in 20 days



HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

20 working days at the XRD lab in the NHM, London.

Sample preparation

1 - 2 hours per a single sample

Staying at the Queens Gate lodge, allowed me to start my XRD analyses early in the morning, and finish late at night.

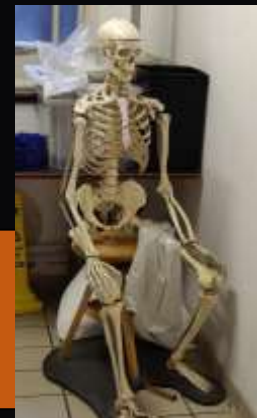
XRD analysis

3 - 4 hours per sample



4 samples per day

> 80 XRD in 20 days

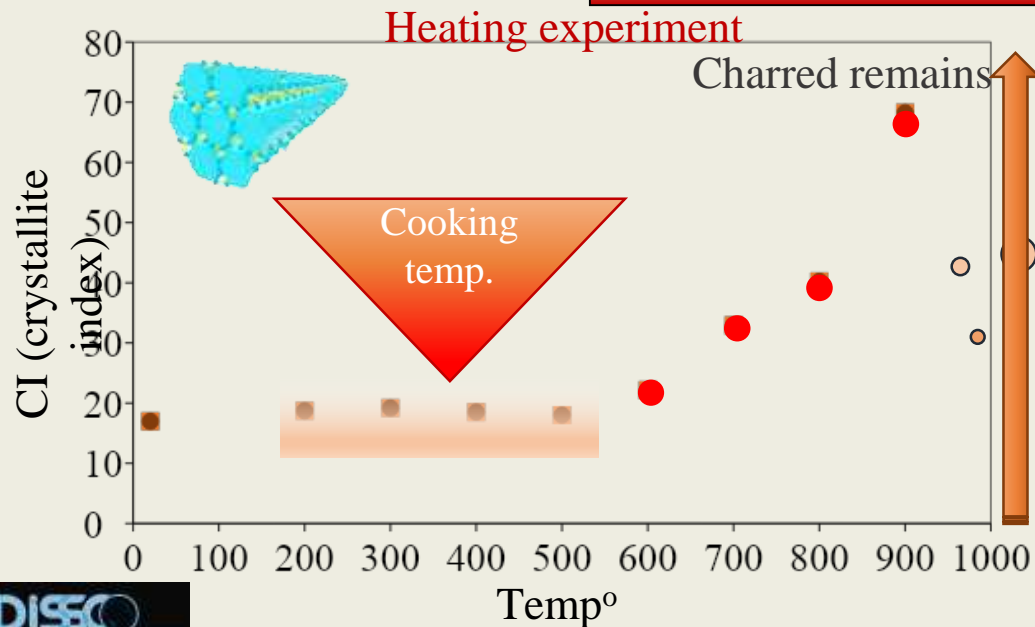


HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

The tooth enameloid hydroxyapatite (HA) crystals structure is sensitive to heat.

XRD technique (NHM, UK) allowed to identify changes in tooth enameloid crystallite size (CI) due to heat exposure.

Dramatic increase in teeth enameloid CI appears above 600°C



Q.1 Can we identify changes in enameloid CS within the “cooking temperatures”?

Q.2 How does natural diagenesis affect enameloid CS?

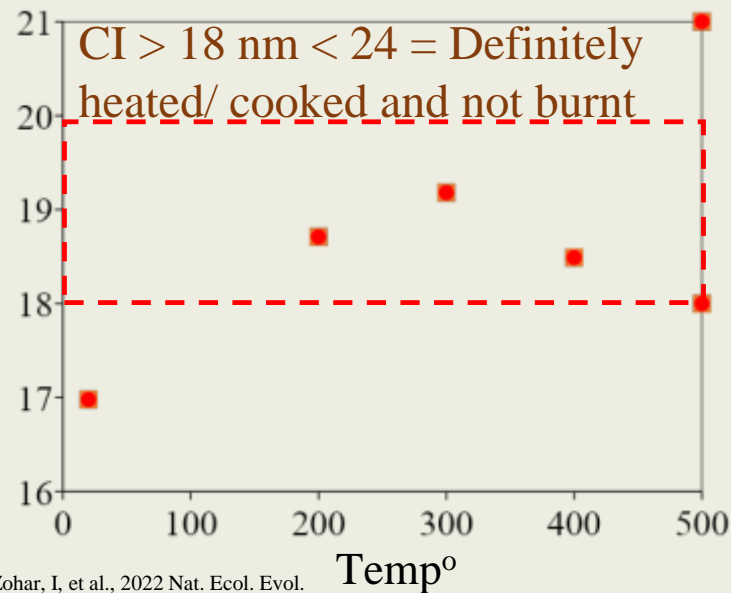
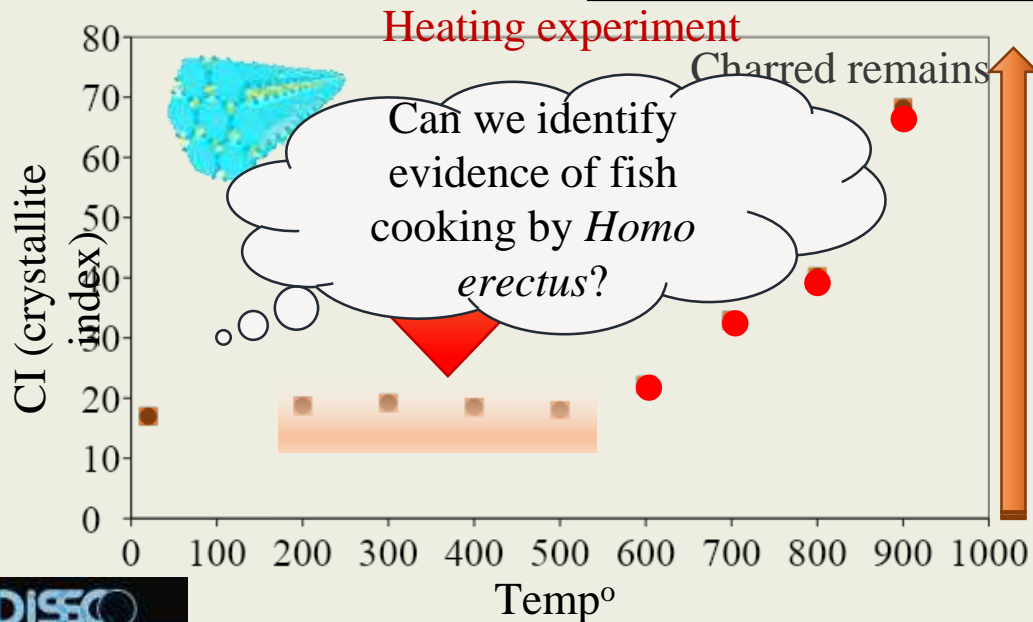
Interpreting changes in crystal structure requires close collaboration in lab work.

HEAT EFFECT ON TOOTH ENAMELOID MICROSTRUCTURE: EXPERIMENT

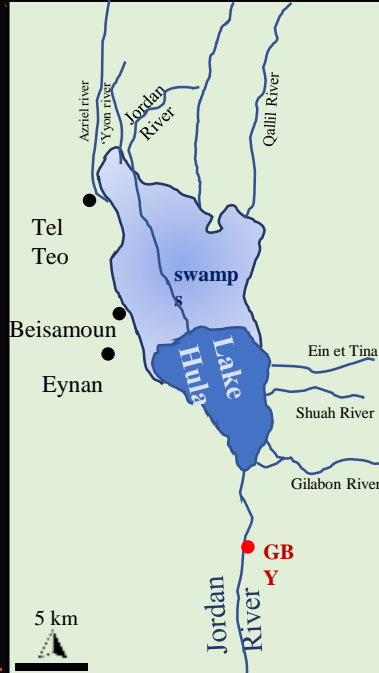
The tooth enameloid hydroxyapatite (HA) crystals structure is sensitive to heat.

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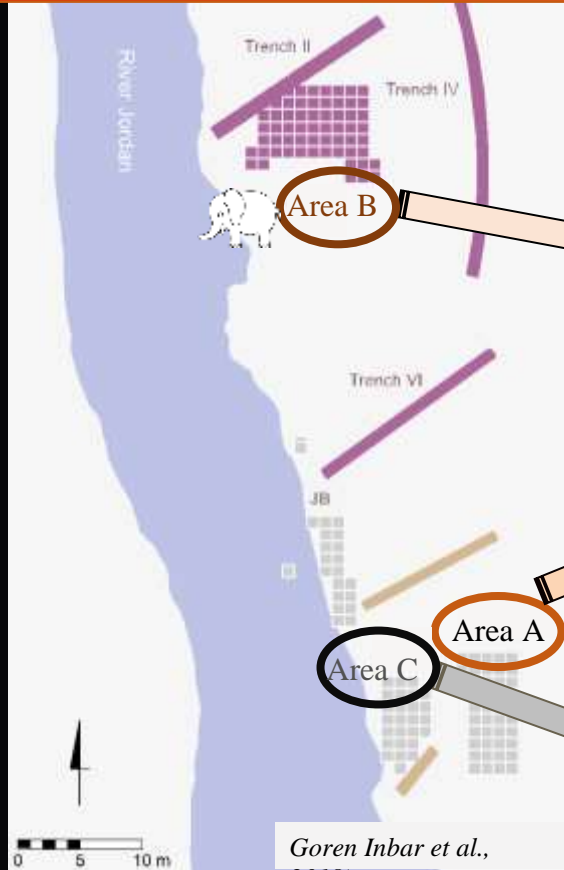
MY RESEARCH: GESHER BENOT YA`AQOV (GBY) ACHEULIAN SITE (0.8 MYA) IN THE JORDAN RIFT VALLY, ISRAEL



Lake Hula 1951, prior to drainage operations

Water-logged site

THE CASE STUDY: GBY ACHEULIAN SITE (0.8 MYA)



More than **43,000 fish remains** were recovered and analyzed from: **three** excavation areas and 14 archaeological horizons (AH) (the most common vertebrate recovered)

Area B

Area B: Fish NISP = 31,3404
11 AH's



Area C

Area A: Fish NISP = 10,513
2 AH's;
No living floors
(Zohar & Biton, 2011 JHE 60)



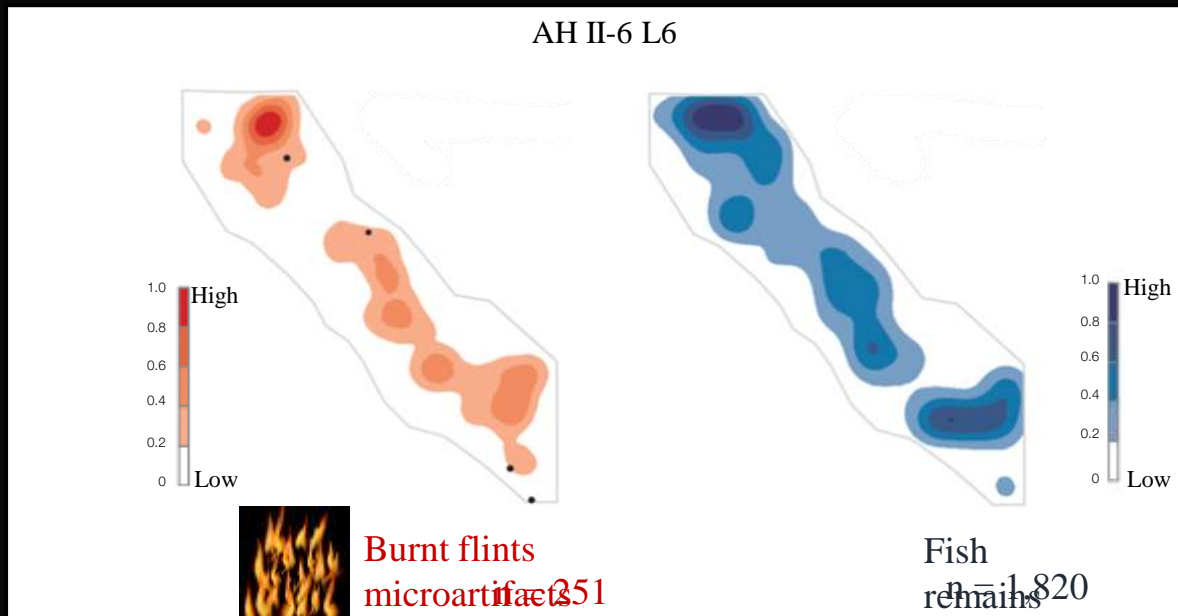
Area A

Area C: Fish NISP= 2,860
2 AH's;
Rich in lithic and mammals
(Rabinovich and Biton, 2011, JHE 60)



EVIDENCE FOR CONTROLLED USE OF FIRE AT GBY AND THE SPATIAL RELATIONSHIP WITH THE PHARYNGEAL TEETH

Can we correlate between the absence of fish bones, the preponderance of Cyprinidae pharyngeal teeth and the evidence for intentional use of fire at GBY?

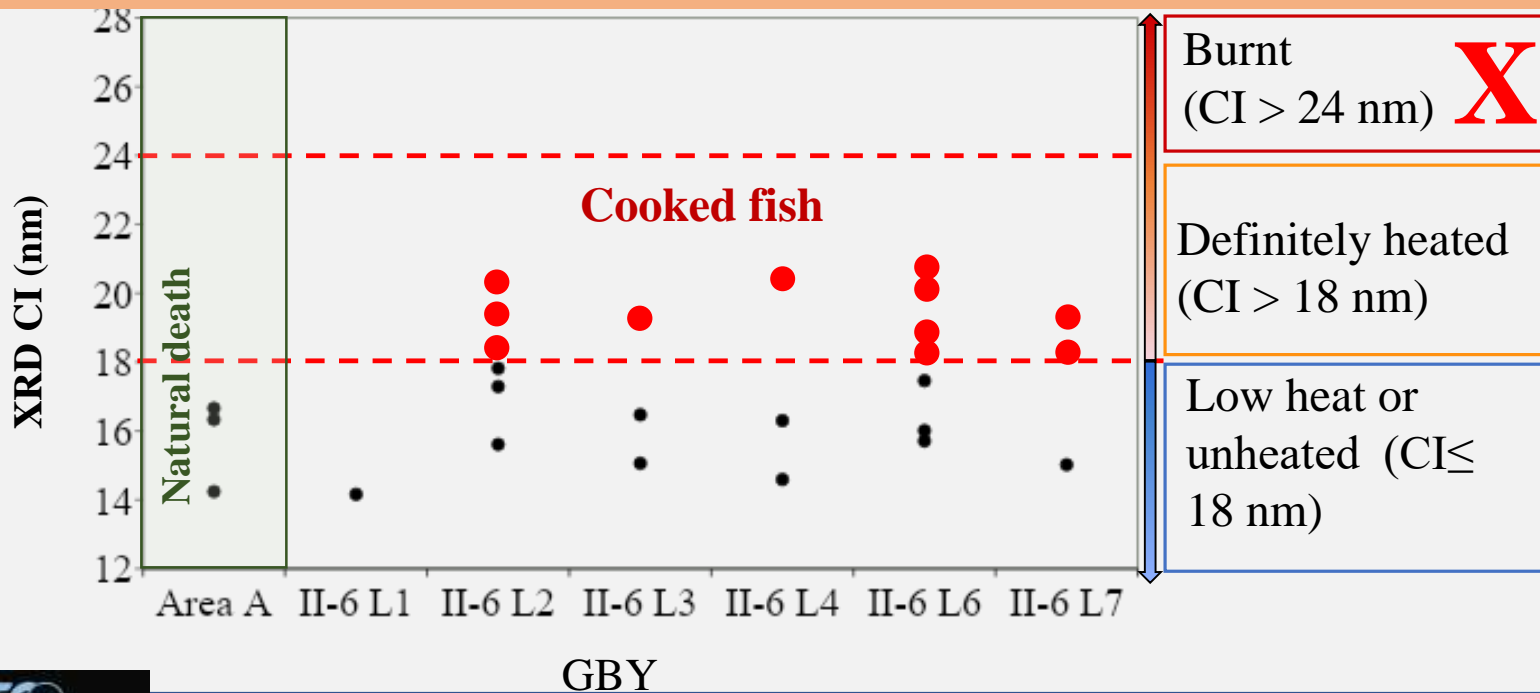


In Area B fish bones were absent and fish teeth spatial distribution accord with that of **burnt flint microartifacts (hearths)**.

TEETH ENAMELOID MICROSTRUCTURE AT GBY ACHEULIAN

In GBY Area B AH's II-6 L 1-7 none of the teeth showed evidence of exposure to high heat

Changes in CI are relatively small and correlate with the exposure to low to medium heat (= cooking).
If natural diagenesis appear through time, than it will decrease CI.



REVEALING SECRETS FROM THE ACHEULIAN CUISINE: THE APPLICATION OF X-RAY POWDER DIFFRACTION (XRD) TECHNIQUE TO IDENTIFY HEAT INDUCED CHANGES IN FISH REMAINS

nature ecology & evolution

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Article | [Published: 14 November 2022](#)

Evidence for the cooking of fish 780,000 years ago at Gesher Benot Ya'aqov, Israel

[Irit Zohar](#) , [Nira Alperson-Afil](#), [Naama Goren-Inbar](#), [Marion Prévost](#), [Thomas Tütken](#), [Guy Sisma-Ventura](#), [Israel Hershkovitz](#) & [Jens Najorka](#)

[Nature Ecology & Evolution](#) **6**, 2016–2028 (2022) | [Cite this article](#)

2837 Accesses | **2614** Altmetric | [Metrics](#)



FROM THE MEDIA - WORLD WIDE: THE EARLIEST EVIDENCE OF COOKING

News | Archaeology

Earliest Evidence of Cooking Found in 780,000-year-old Barbecued Fish

Hominins living at Gesher Benot Ya'akov controlled fire and cooked tasty fish, suggesting a key step in our evolution happened much earlier than previously thought



NEWS

Ancient fish teeth reveal earliest sign of cooking



By Paul Slings

NATURE WORLD NEWS

Discovery of Fish Fossil Made Scientists Assume Cooking Started 600,000 Years Earlier than Previously Thought

By Pam Hunter Nov 16, 2022 11:09 AM EST



Earliest Evidence of Cooking

The Guardian

Fish fossils show first cooking may have been 600,000 years earlier than thought



SCIENCE | GLOBAL ISSUES

Evidence of cooking 780,000 years ago rewrites human history

By Steve Delaney

It shows that early humans were making much further head in history than previously



Tech | Human Tech

YABADABA-TUNA Cavemen cooked fish suppers half a million years earlier than previously thought, scientists reveal

Sam Blewett

Published 21:00 14 Nov 2022



Scientists at the London Natural History Museum are still working out how the fish were cooked on a fire Credit: Getty

Clues at ancient lake site reveal earliest known cooked meal

By Katie Hunt

Published 2:00 PM EST, Nov 14, 2022

This research succeeded mainly due to the amazing opportunity to conduct the XRD analysis at the NHM, in collaboration with Dr. Najorka.

The personal connection and the ability to analyse the data together with Jens, have been the key for our scientific accomplishment.



FUTURES
Brussels 07-09/02/2023

THANK YOU



Abubakar Bello

**Umaru Musa Yar'adua University,
Katsina, Nigeria**

Elliot Gardner

**Florida International University,
Miami, USA**

Ricardo Miguel Godinho

**Universidade do Algarve, Faro,
Portugal**

Luca Pandolfi

University of Basilicata, Potenza, Italy

Thien-Tam Luong

University of Turku, Turku, Finland

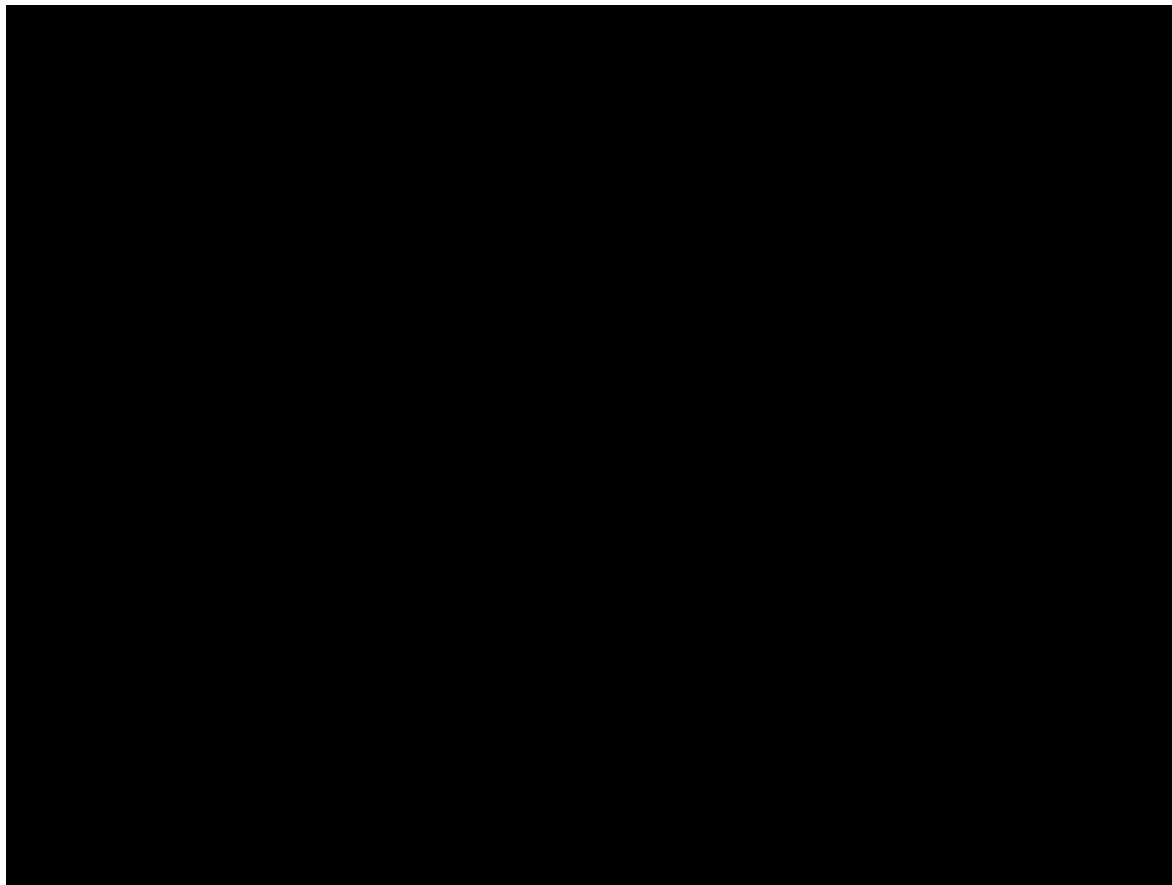
Marcin Raś

**Museum and Institute of Zoology
Polish Academy of Sciences, Warsaw,
Poland**



Physical Access

Video compilation of SYNTHESYS user experiences



Dr Olivier Lambert, Palaeontologist
Royal Belgian Institute of Natural
Sciences



Physical Access - Host Perspective (with a palaeontology bias...)

Physical Access – Host Perspective (with a palaeontology bias...)

Introduction: Research in palaeontology and collections

- Fossils are central to research in palaeontology
- Digitization programs => growing amount of visual data (photos, 3D models) available
- Increased travel costs, ecological questions, time constraints, funding issues...
- Can we perform good-quality, collection-based research in palaeontology without, or with less physical visits to collections?

Fossils (and other natural history specimens) are complex physical objects

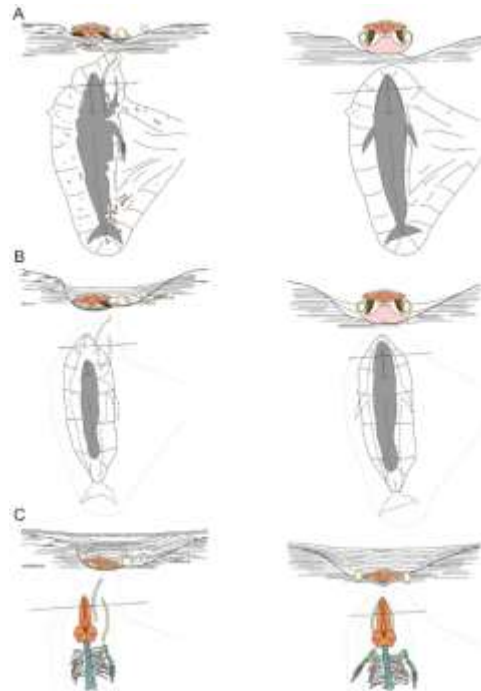
- Long history between death of an organism and entrance of the fossil in collection
- Final object very different from the original individual
- Detailed observations (with the fossil in hand) can help reconstructing this history and distinguishing between genuine anatomical features and post-mortem damage

Fossils (and other natural history specimens) are complex physical objects

Living animal



Burial and fossilization



Excavation



Bosio et al. 2021

T. Hubin (RBINS)

Fossils (and other natural history specimens) are complex physical objects

Preparation



Entrance in collection



T. Hubin (RBINS)

Fossils (and other natural history specimens) can be extremely rare and precious

- Long distance loans as an alternative to visits
- Risks associated with the sending of specimens
- Types and figured specimens are often not allowed to travel abroad (Heritage service regulations)



Long-forgotten specimens

- Unpublished material
- Lost / misclassified fossils
- Loss of local expertise



[Palaeontology, Vol. 56, Part 1, 2013, pp. 95–127]

TAXONOMIC REVISION OF *ISOCETUS DEPAUWI* (MAMMALIA, CETACEA, MYSTICETI) AND THE PHYLOGENETIC RELATIONSHIPS OF ARCHAIC 'CETOTHERE' MYSTICETES

by MICHELANGELO BISCONTI¹, OLIVIER LAMBERT^{2,3} and
MARK BOSSELAERS^{3,4*}

¹Museo di Storia Naturale del Mediterraneo, via Roma 234, 57100 Livorno, Italia; e-mail: zoologia@museo.diprovincialivorno.it

²Département Histoire de la Terre, Muséum National d'Histoire Naturelle, Rue Buffon 8, 75005 Paris, France

³Royal Belgian Institute of Natural Sciences, Rue Vautier 29, 1000 Brussels, Belgium

⁴Zaandam Royal Society of Sciences, Middelburg, The Netherlands

*Corresponding author.



Zoological Journal of the Linnean Society, 2016, 177, 450–474. With 14 figures

Fragilicetus velponi: a new mysticete genus and species and its implications for the origin of Balaenopteridae (Mammalia, Cetacea, Mysticeti)

MICHELANGELO BISCONTI^{1*} and MARK BOSSELAERS²

¹San Diego Natural History Museum, 1788 El Prado, California 92101, USA

²Royal Belgian Institute of Natural Sciences, 29 Vautierstraat, 1000, Brussels, Belgium

Fossils as objects for discussion

- Fossil interpretations
- Discussion with fossils in hands => connections and future collaborations
- Highly valuable meetings with foreign experts for local Master and PhD students (and vice versa), incl. Synthesys seminars



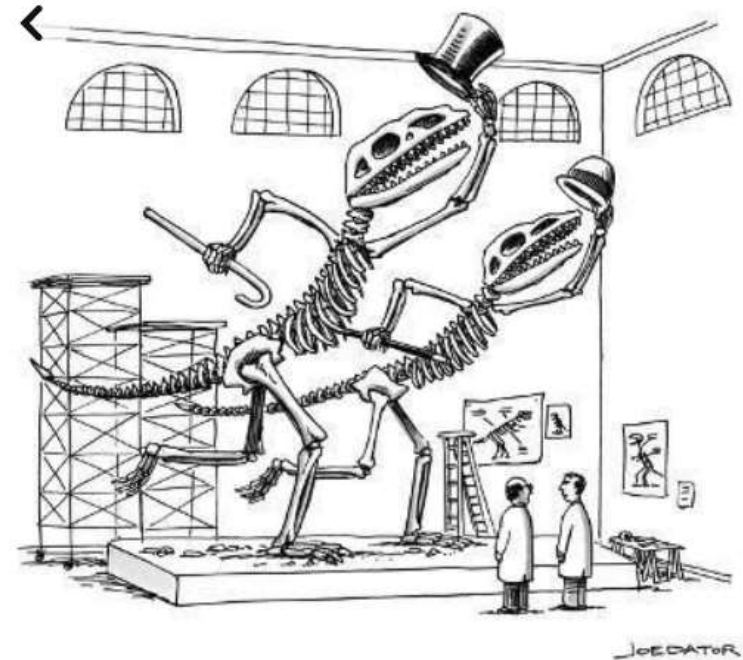
SYNTHESYS
EUROPEAN STRATEGIC INFRASTRUCTURE FACILITY

"Brain evolution in baleen whales"

by Dr Michelangelo Bisconti
Università degli Studi di Torino
Italy

Thursday July 7th 2022 at 14:00
Small Auditorium
Royal Belgian Institute of Natural Sciences
28 Rue Vautour/Vautourstraat 1550 Brussels

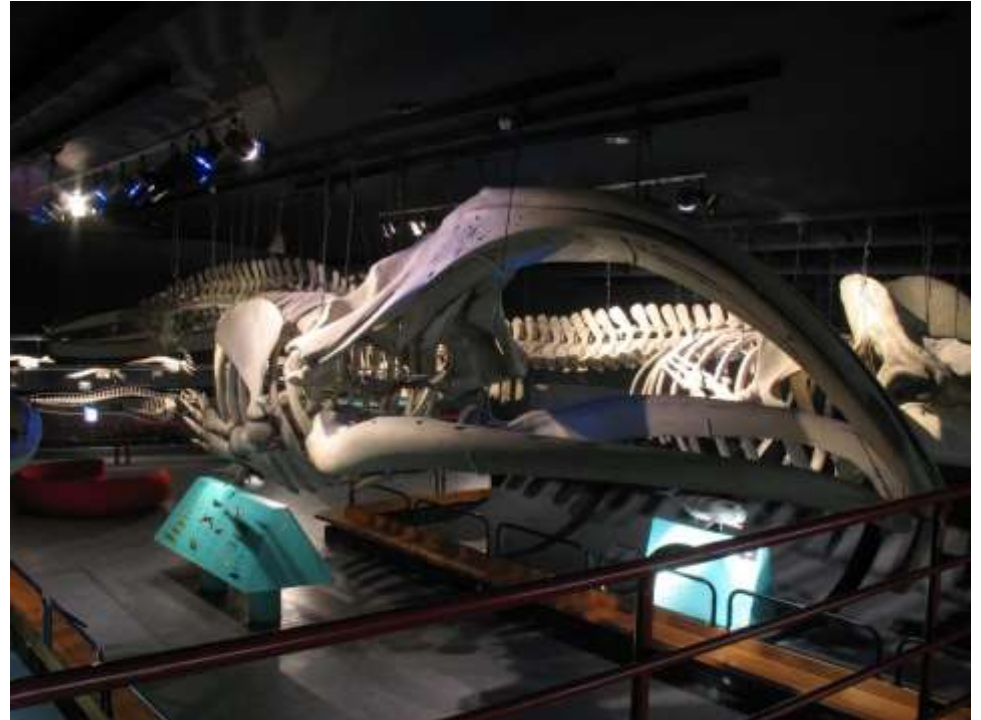
SYNTHESYS



"This particular species is believed to have travelled in troupes."

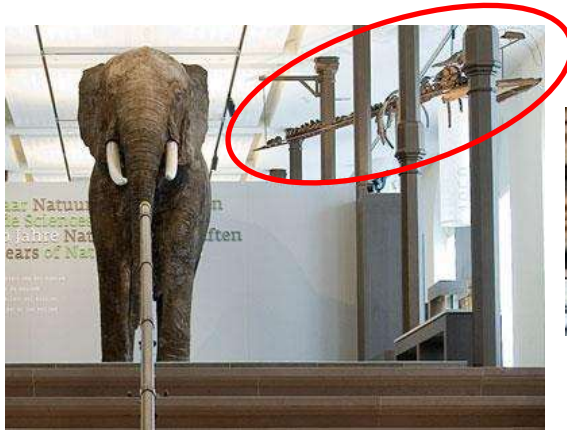
Bridge to other RBINS collections

- e.g., link with modern vertebrate collection
- Any other part of our collections for which digitization is less advanced

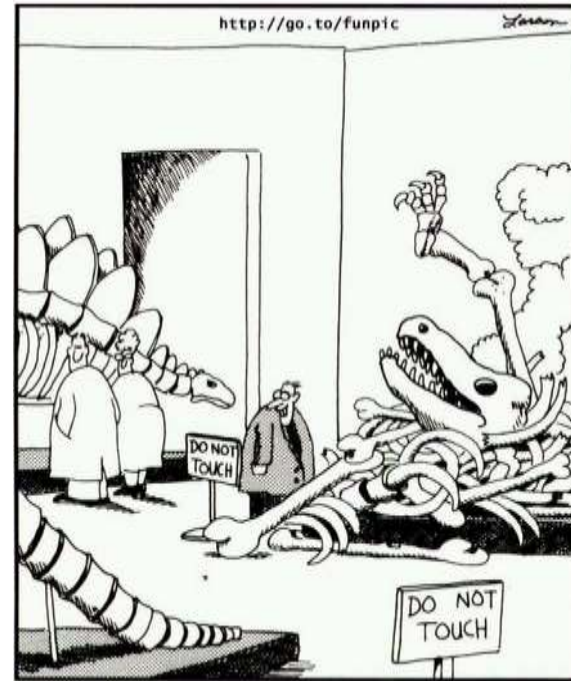


Scientific visitors for the monitoring of collections

- Fossils with preservation problems
- Need for further preparation/consolidation
- Identification of priorities for digitization (micro CT, SEM...)



M. Buono,
Puerto Madryn,
Argentina



Unequal access to scientific collections

- General decrease of financial support for physical visits
- Colleagues with more limited means will be asked to rely more heavily on digital data
- Others with more funding will keep traveling, and benefit from different (though complementary) datasets
- Increased gap for access to collections, facilities and local expertise?

=> support for physical visits should be maintained (or even strengthened?)



THANK YOU

Beáta Papp

**Hungarian Natural History Museum,
Budapest, Hungary**

Guillaume Billet

**Muséum national d'Histoire
naturelle, Paris, France**

David Williams

Natural History Museum, London, UK

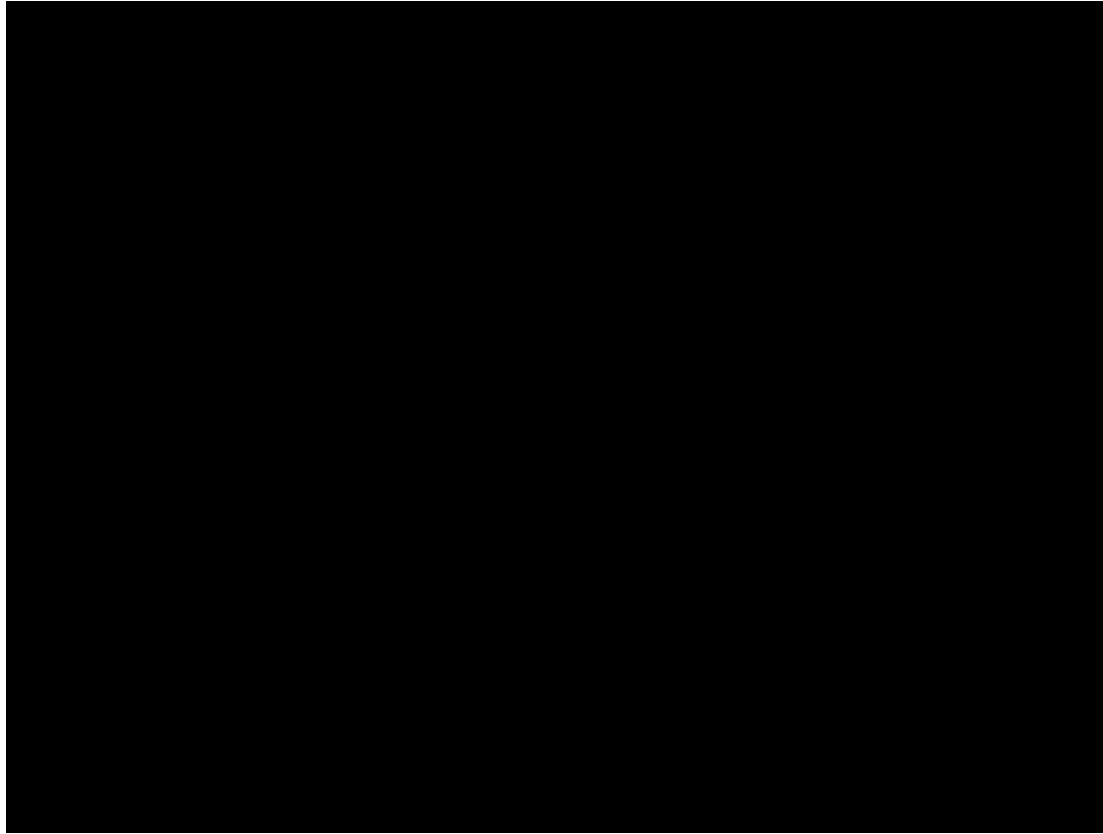
Nour-Eddine Jalil

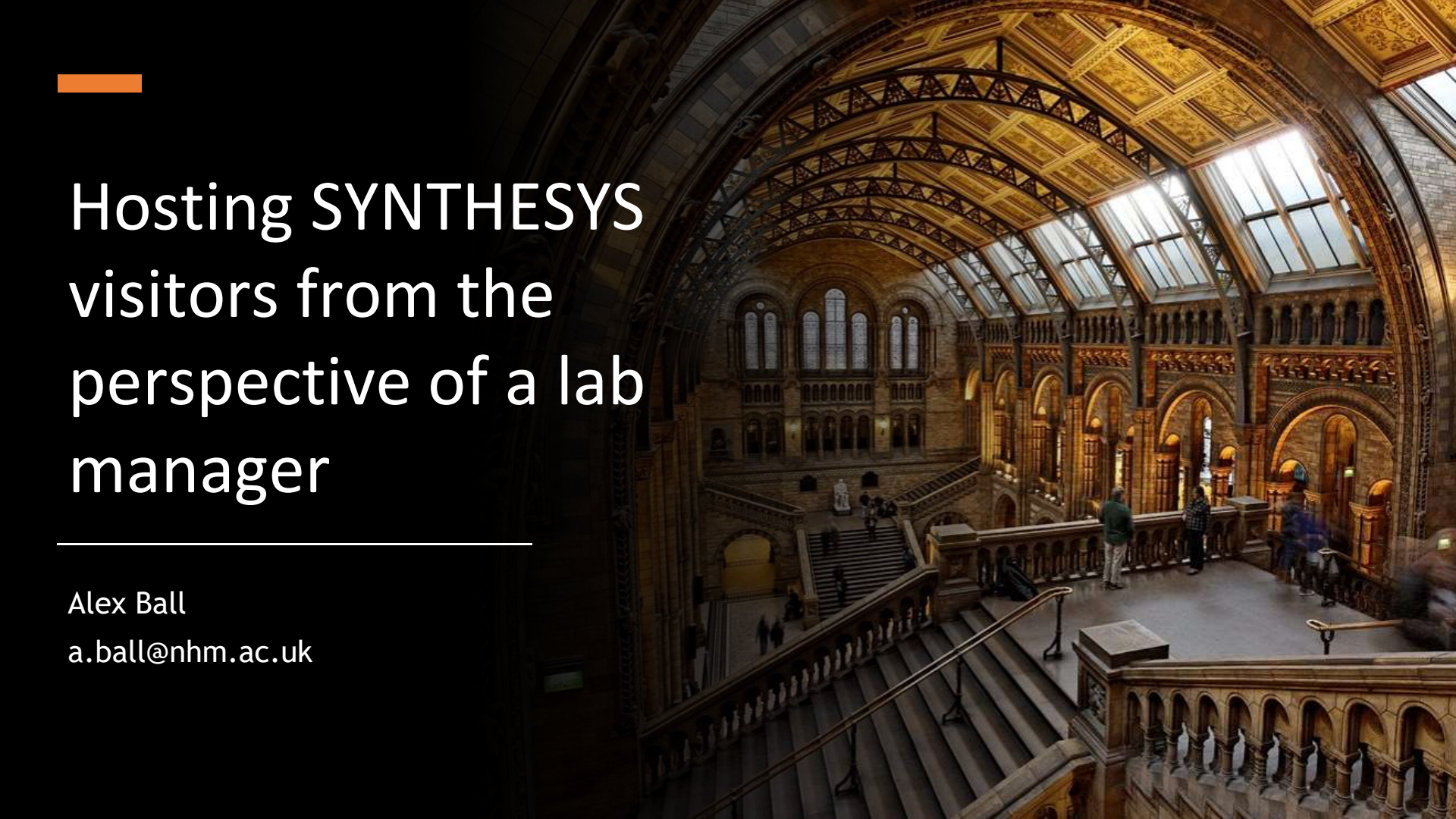
**Muséum national d'Histoire
naturelle, Paris, France**



Physical Access

Video compilation of SYNTHESYS host experiences





Hosting SYNTHESYS
visitors from the
perspective of a lab
manager

Alex Ball

a.ball@nhm.ac.uk

A long history
of laboratory-
based research

A history of Innovation in Imaging and Analysis

Chemical analytical labs set up in 1867 - Mervyn Herbert Nevil Story Maskelyne.

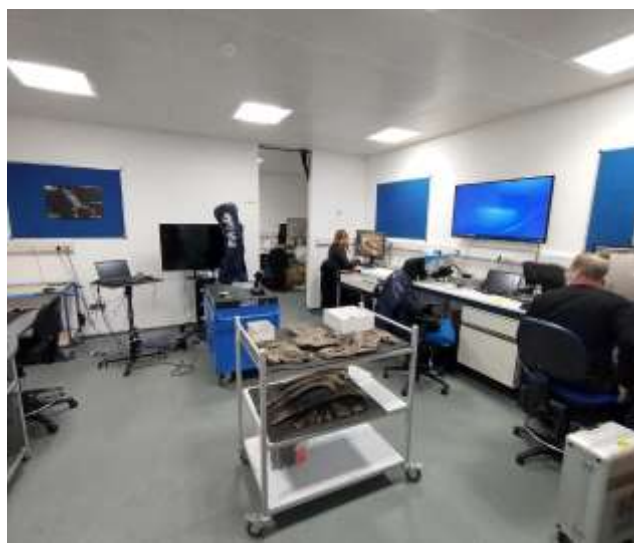
New labs built at the South Kensington site in 1881 were in use until the late 1990s when the labs moved to their current location.

X-ray diffraction labs were set up in the 1930s

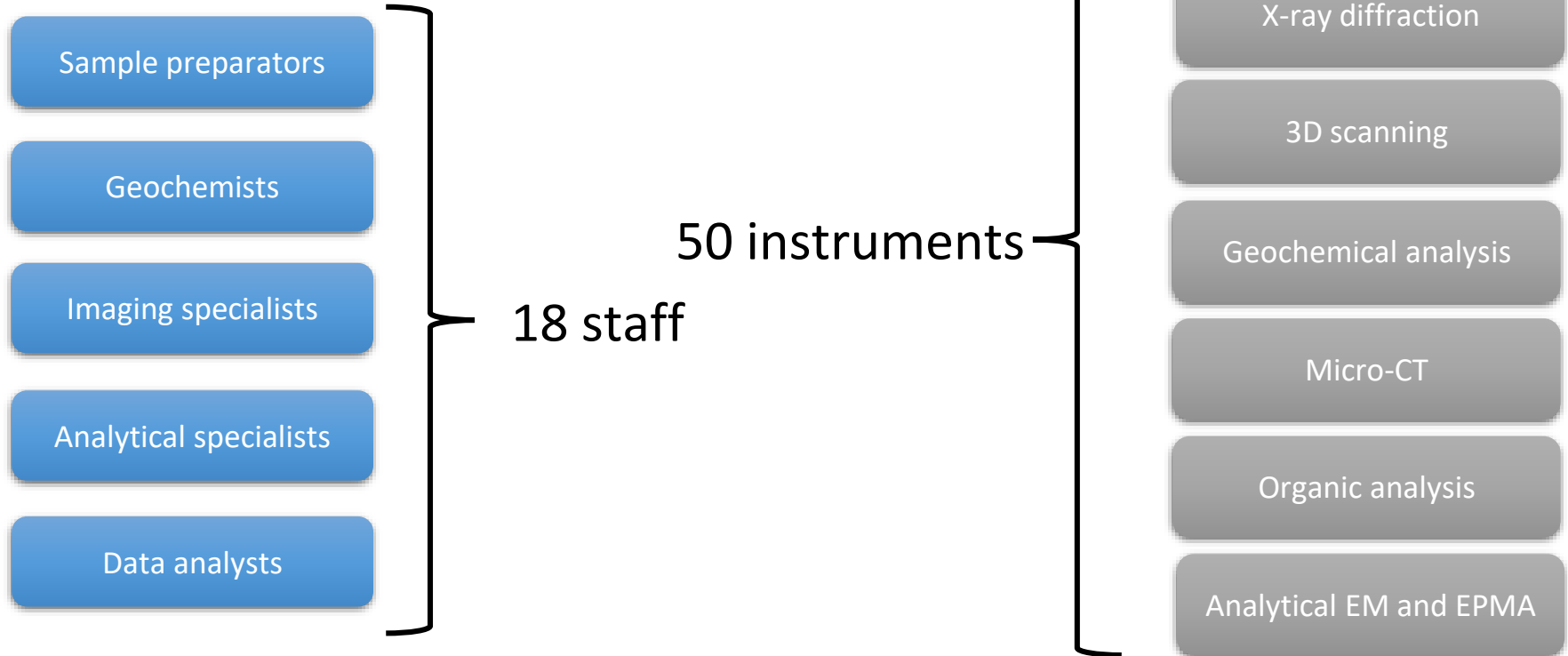
SEM and electron micro-probe labs established in the mid 1960s.

Micro-CT scanning started in the early 2000s alongside laser ablation ICP-MS.

Most recent developments in 3D scanning, 3D printing and visualization.



NHM provides an unrivalled range of instrumentation and skilled operators with experience in working with a wide variety of materials.



Afrotropical Pteromalidae (Hymenoptera: Chalcidoidea): new genera in the collections of the Natural History Museum London

Type of request

Visit

Request title

Afrotropical Pteromalidae (Hymenoptera: Chalcidoidea): new genera in the collections of the Natural History Museum London

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Natalie Dale-Clark

Request details

Proposed start date

2022-10-24

Proposed end date

2022-10-26

Proposed length of visit
3 days

Observation and typification of freshwater Nitzschia and Stauroneis species

Type of request

Visit

Request title

Observation and typification of freshwater Nitzschia and Stauroneis species

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Dr. Sarah H. Wilson

Request details

Proposed start date

2023-11-07

Proposed end date

2023-11-16

Proposed length of visit (number of working days)
8 days

Comparative research on exo-erythrocytic development of wildlife haemosporidian parasites

Type of request

-

Request title

Comparative research on exo-erythrocytic development of wildlife haemosporidian parasites

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Elena Shestak

Request details

Proposed start date

2022-13-09

Proposed end date

2022-10-25

Proposed length of visit (number of working days)
15 days

Integrated approach to constraining microbial diversity in Precambrian stromatolites

Type of request

Visit

Request title

Integrated approach to constraining microbial diversity in Precambrian stromatolites

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Peta Hight

Request details

Proposed start date

2023-10-18

Proposed end date

-

Proposed length of visit (number of working days)

8 days

Prehensile tail among small mammals: an overview of osteological and tegumentary variation among three small mammal radiations (Murinae, Sigmodontinae and Didelphidae)

Type of request

Visit

Request title

Prehensile tail among small mammals: an overview of osteological and tegumentary variation among three small mammal radiations (Murinae, Sigmodontinae and Didelphidae)

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Roberto Portillo-Miguez

Request details

Proposed start date

2022-01-09

Proposed end date

2022-01-20

Proposed length of visit (number of working days)
12 days

Adaptation and integration in muscle moment arms of caviomorph rodents

Type of request

Visit

Request title

Adaptation and integration in muscle moment arms of caviomorph rodents

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Rafael Portillo-Quintero & Brett Clark

Request details

Proposed start date

2022-12-05

Proposed end date

2022-12-08

Proposed length of visit (number of working days)
3 days

Employing historical helminth collections to assess aquatic pollution via developmental malformations in fish tapeworms

Type of request

Visit

Request title

Employing historical helminth collections to assess aquatic pollution via developmental malformations in fish tapeworms

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Loren Hedges

Request details

Proposed start date

-

Proposed end date

-

Proposed length of visit (number of working days)

1 day

Study of the intra-puparial development of forensically important muscid *Synthesiomyia* infections using micro-computed tomography

Type of request

Visit

Request title

Study of the intra-puparial development of forensically important muscid *Synthesiomyia* infections using micro-computed tomography

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Dr. Brett Clark

Request details

Proposed start date

2023-09-08

Proposed end date

2023-05-25

Proposed length of visit (number of working days)
15 days

Systematics, biogeography and color pattern evolution of the subfamily Chalcosiinae (Lepidoptera, Zygaenidae)

Type of request

Visit

Request title

Systematics, biogeography and color pattern evolution of the subfamily Chalcosiinae (Lepidoptera, Zygaenidae)

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Loren Hedges

Proposed start date

2023-09-07

Proposed end date

2023-09-07

Proposed length of visit (number of working days)
1 day

Sea stars link micro to macro: how osiacle morphology can help to unravel phylogenetic relationships within the class Asterozoa

Type of request

Visit

Request title

Sea stars link micro to macro: how osiacle morphology can help to unravel phylogenetic relationships within the class Asterozoa

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Loren Hedges (lhedges@nhm.ac.uk)

Request details

Proposed start date

2022-01-16

Proposed end date

2023-03-27

Proposed length of visit (number of working days)
15 days

Phylogenetic affinities of an enigmatic lineage of fossil pancrustaceans: Thylacocephala

Type of request

-

Request title

Phylogenetic affinities of an enigmatic lineage of fossil pancrustaceans: Thylacocephala

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Liz Stevens

Request details

Proposed start date

2022-06-11

Proposed end date

2023-06-21

Proposed length of visit (number of working days)
3 days

Rare Earth Elements (REEs) mineralogy and deportment within calcite/dolomite and fluorite in Late/Post Hercynian fluorite veins: comparison between several European mining districts

Type of request

Visit

Request title

Rare Earth Elements (REEs) mineralogy and deportment within calcite/dolomite and fluorite in Late/Post Hercynian fluorite veins: comparison between several European mining districts

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Richard Stroniger

Proposed start date

2023-09-07

Proposed end date

2023-09-07

Proposed length of visit (number of working days)
1 day

A spiny problem: phylogenetic analysis, taxonomic review, and species delimitation in the Microthenga triangularis-pinnosa group (Araneae: Araneidae)

Type of request

Visit

Request title

A spiny problem: phylogenetic analysis, taxonomic review, and species delimitation in the Microthenga triangularis-pinnosa group (Araneae: Araneidae)

Which institution do you propose to visit:
Natural History Museum London

Host for institution: Natural History Museum London
Loren Hedges

Proposed start date

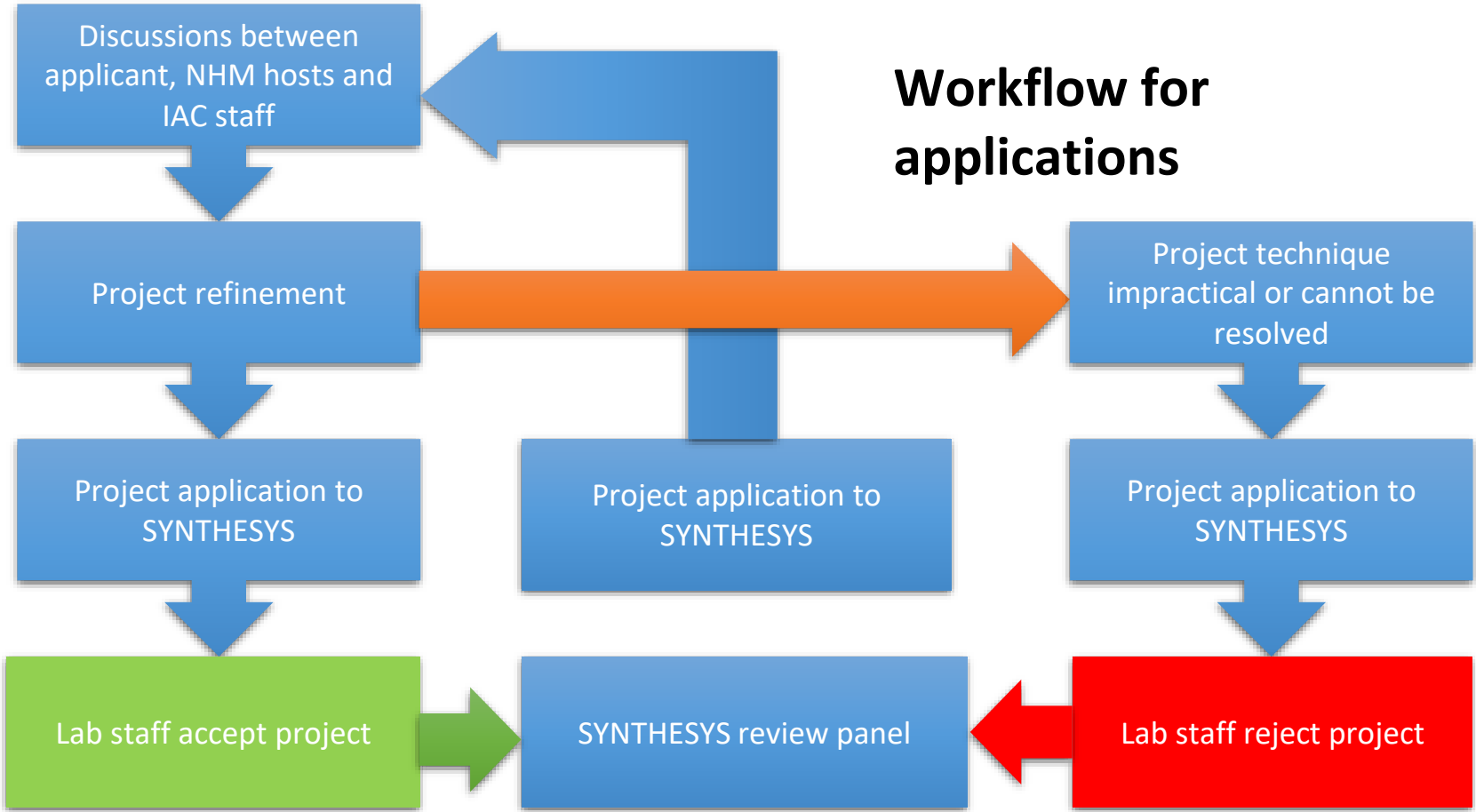
2022-11-09

Proposed end date

2023-11-28

Proposed length of visit (number of working days)
1 day

Workflow for applications



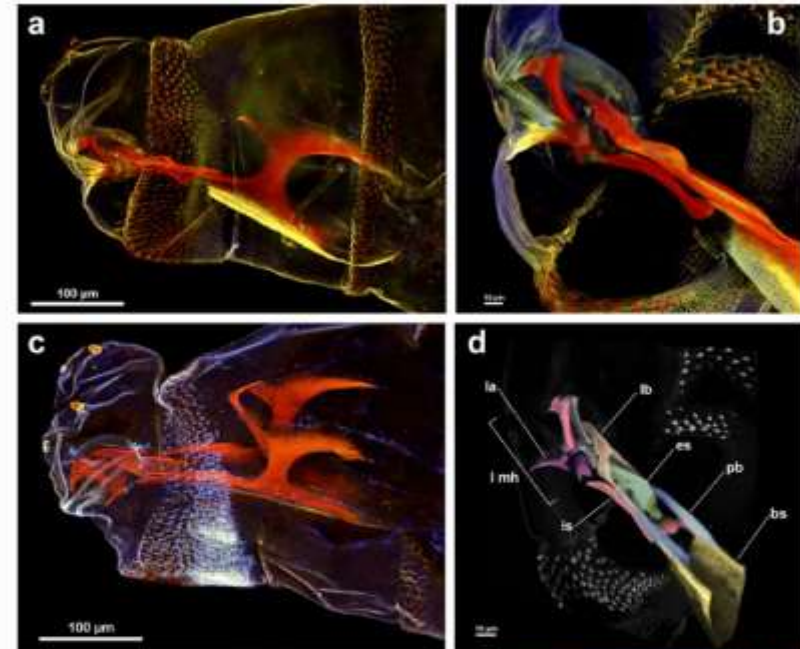
Training and Development



Innovation and technical development

In conclusion, CLSM and 3D reconstruction (Fig. 1d) are excellent techniques for visualizing fine, complex, autofluorescent structures of Dipteran larvae, if appropriate clearing techniques are first used. CLSM application can be an invaluable source of data for studies of larval morphology of Cyclorrhapha by way of taxonomic diagnoses, character identification and improvement in characters homologization. We recommend application of 10 % KOH for 24–48 h (depending on pigmentation intensity) and subsequent mounting in Euparal. CLSM could have a profound impact on the quality of information compared to more traditional methods of imaging. Cephaloskeleton details in the first instars of Cyclorrhapha have been recently recognized as valuable for taxonomic purposes (e.g., Szpila et al. 2013, 2014). However, their size and position relative to other sclerites obscure detailed descriptions. Thus, we recommend examination of cephaloskeleton of the first instar of other cyclorrhaphan Diptera with CLSM, because as it has been show herein, this method better reveals the shapes and positions of individual structures and particularly their interconnections, as compared to standard light microscopy. In the successive larval instars, despite relatively bigger size of the cephaloskeleton sclerites, observation of borders between closely apposed sclerites (see Grzywacz and Pape 2014) can still cause problems. Thus, also for the second and third instars, CLSM and especially 3D reconstruction are highly recommended for better understanding of cephaloskeleton details.

Fig. 1



Confocal laser scanning microscopy as a valuable tool in Diptera larval morphology studies

Andrzej Grzywacz, Tomasz Góral, Krzysztof Szpila, Martin J R Hall

Affiliations + expand

PMID: 25231077 PMID: PMC4200345 DOI: 10.1007/s00436-014-4125-0

Free PMC article

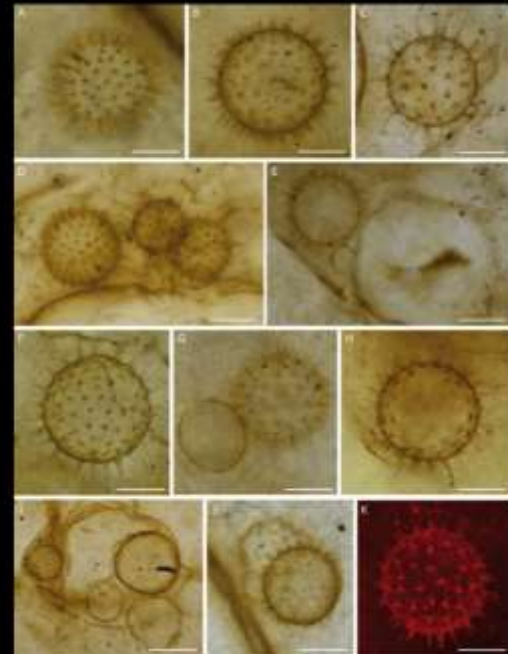
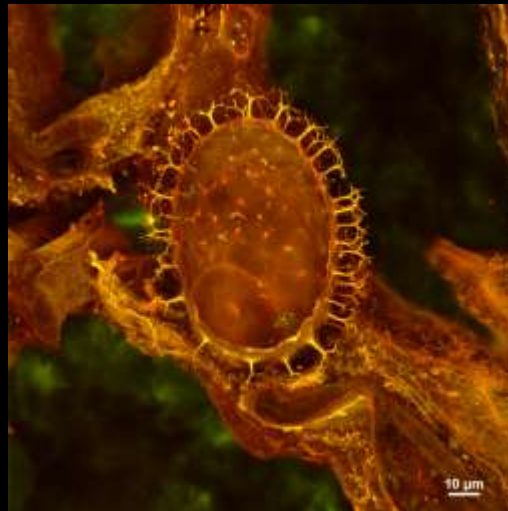
A New Chytridiomycete Fungus Intermixed with Crustacean Resting Eggs in a 407-Million-Year-Old Continental Freshwater Environment

Christine Strullu-Derrien ¹, Tomasz Goral ², Joyce E Longcore ³, Jürgen Olesen ⁴, Paul Kenrick ⁵, Gregory D Edgecombe ¹

Affiliations + expand

PMID: 27973602 PMCID: PMC5156353 DOI: 10.1371/journal.pone.0167301

[Free PMC article](#)



Outcomes for SYNTHESYS visitors

- Introduction to new equipment and techniques
- Development of new methodologies and ways of working
- Joint publications with NHM staff and laboratory staff
- Joint grant applications and fellowships
- PhD studentships based on new methodologies
- Long-term collaborations with NHM staff
- Post-doctoral appointments at the NHM
- Staff positions at the NHM

Key take-home message

- Excellent support from the NHM SYNTHESYS office
- Clear guidelines and expectations
- Fast response times and good communications between lab staff, NHM hosts and applicants
- Good planning within labs to meet user demands
- Flexibility from NHM staff researchers to accommodate visitor demands
- Expert lab staff can flexibly accommodate visitor demands
- New workflows or techniques developed and implemented in response to user demands contribute to NHM research excellence

Marieke Willems
Project manager
Elixir Hub



ELIXIR and BiCIKL: Advancing research in Biodiversity

ELIXIR Europe

ELIXIR is an intergovernmental organisation that brings together life science resources such as

- databases
- software tools
- training materials
- interoperability resources
- compute resources
- data management support

The goal of ELIXIR is to **coordinate bioinformatics resources from across Europe so they form a single infrastructure.**



ELIXIR – what do we do

We build life science informatics **capacity and infrastructure** in Europe, connect and develop a **network of experts** and provide hundreds of high quality **services and resources** available to all



Databases



Training materials



Software tools



Data standards



Compute resources



Scientific experts



ELIXIR – why we are needed



Managing and sustaining the important biological data, software and digital objects generated across Europe is highly complex, and not a task for a single country or institution



Long-term transnational coordination is required to coordinate funding submissions to ensure the longevity of bioinformatics resources



ELIXIR provides the coordination to connect national life sciences data infrastructures into a single infrastructure that supports data and knowledge exchange and collaborations



National data infrastructures, brought together through ELIXIR Nodes, run hundreds of services and resources available free of charge to the worldwide life science community



What are research and innovation infrastructures?



Infrastructures are not only large physical structures, such as buildings and transport networks, but also services and collections of resources



Research infrastructures are the facilities, resources and services that enable research and innovation



Research infrastructures take a long time to plan and build and most need to have long operational lifespans



Supporting research and innovation infrastructures **enables the next generation of researchers and innovators**

How we work

ELIXIR brings together **groups of experts** from different **technological areas, scientific domains** and **ELIXIR Nodes**

Cutting edge **internal projects** are funded to further encourage collaborations

Technical and training coordinators based in the Nodes support different groups of experts to work together

Platforms



The five ELIXIR Platforms develop and coordinate cross-domain services across ELIXIR.

Communities



ELIXIR Communities work in a particular life science domain and give feedback on the Platform services.

Focus Groups



Focus Groups are informal groups that look at emerging areas of interest in life science. Most are open to non-ELIXIR members.

Internal projects



Internal projects fund the Platforms and Communities to develop resources, and encourage collaboration across the Nodes.

Coordinators



Technical and Training Coordinators advise the Platforms and promote collaboration between the Platforms and the Nodes.



ELIXIR Communities – connecting infrastructure & life science experts



Formed around domain experts in ELIXIR Nodes (including non-ELIXIR partners)



Provide a mechanism for long-term collaborations with other ESFRIs and large-scale initiatives



Drive service developments in the ELIXIR Platforms



Provide a framework to develop and maintain community standards



The [ELIXIR Communities Handbook](#) tells you what a Community is, who can join, what the benefits are, and how Communities are structured.



ELIXIR's key stakeholders



ELIXIR Nodes

23 ELIXIR Nodes
220+ institutes
800+ scientists



Users

Bioinformaticians
500,000+ life science researchers
Users in industry



Funders & decision makers

European Union
National funding agencies
ESFRI delegates
ELIXIR Board members



Collaborators

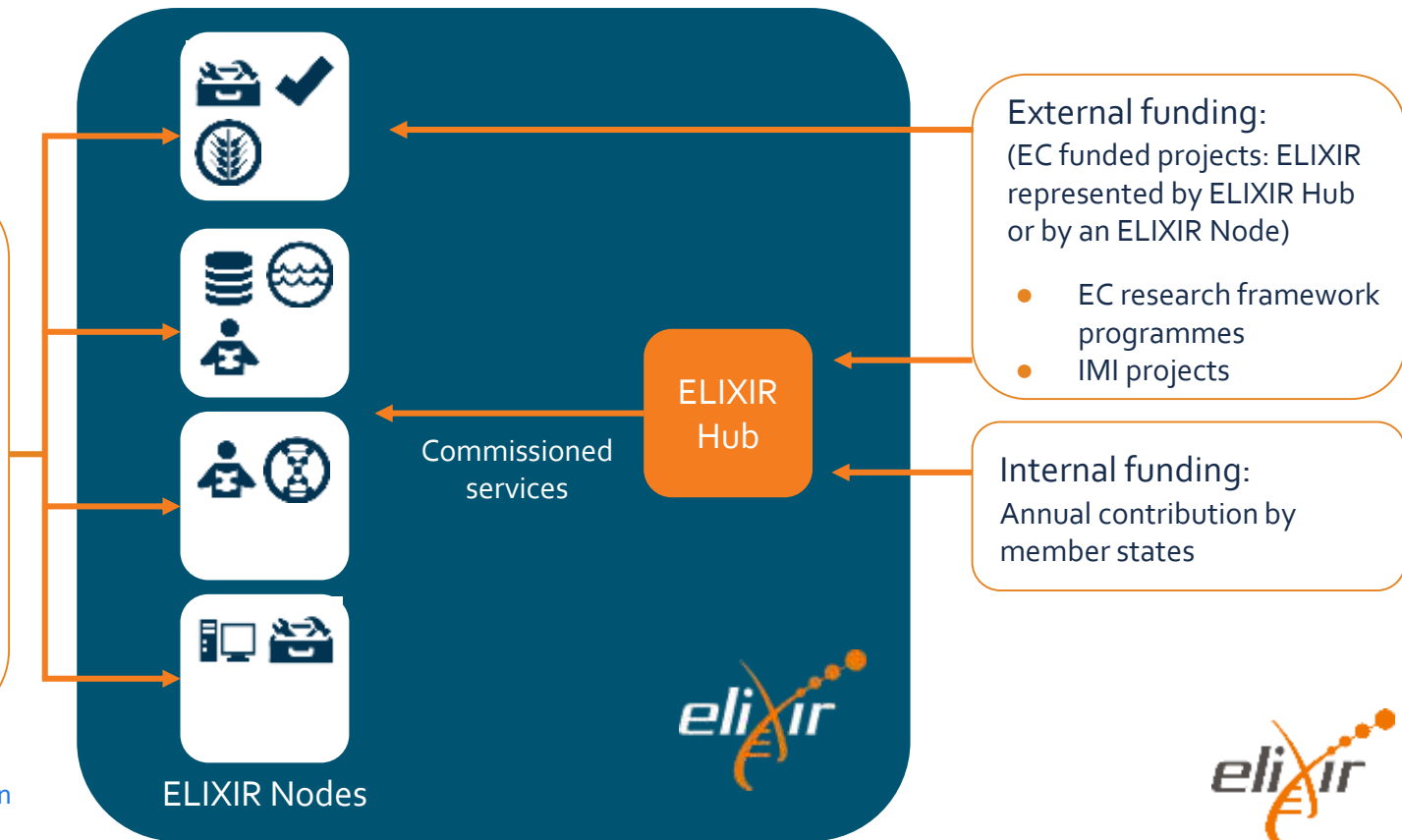
ESFRI RIs
Global initiatives (GA4GH,
Galaxy)
National initiatives (Australian
BioCommons, NIH)

ELIXIR's funding model

Node funding:

- National roadmap funding
- Competitive research grants
- EU Structural Funds or Recovery and Resilience Facility (RRF)
- Trusts and foundations
- Industry collaboration

<https://elixir-europe.org/about-us/how-funded/sustainability-plan>



ELIXIR flagship events

BioHackathon Europe

- Bringing together bioinformaticians for **five days of hacking**
- **Five successful annual events** since 2018
- Projects to advance **open source infrastructure** for data integration to accelerate scientific innovation
- Supporting operations across ELIXIR Platforms, Communities and Focus Groups through technology implementations (e.g. **FAIR, identifiers, metadata standards, ontologies and metadata catalogues**)



Innovation and SME Forums

- Approximately **two one-day** events per year
- Providing **Small to Medium Sized Enterprises** (SMEs) the opportunity to present their innovative ideas
- Enabling companies to learn more about **current and emerging ELIXIR services**
- Forging strong links with the **local ELIXIR Node representatives** running ELIXIR services



ELIXIR Bioinformatics Industry Forum (EBIF)

- **One-day** annual event
- Discussions with industry experts around **visionary ideas, bottlenecks and solutions** to major challenges in the data-driven life science sector
- A forum for **knowledge exchange and collaboration** in the pre-competitive space
- **Networking** opportunities with bioinformatics opinion leaders, academic experts in ELIXIR and the commercial sector



BiCIKL

Advancing research in
Biodiversity

*Zooming in on calls for trans-
national access to biodiversity
infrastructure and services*



••••• The three realms of biodiversity data



**Primary biodiversity
data**



**Molecular
data**



Literature

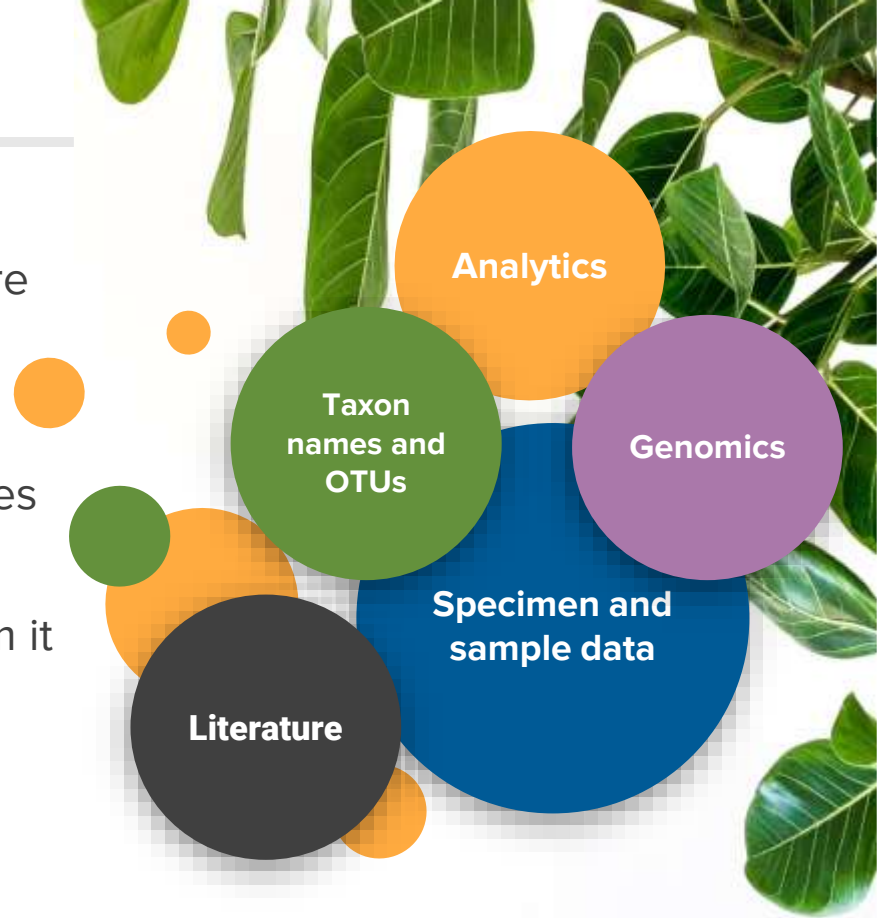


Catalogue of Life



The problem

- Biodiversity **data deluge**:
 - 500 million pages of published literature
 - 2 billion specimens in collections
 - 1.8 million species described
 - X billions of gene sequences & genomes
- The **precious data** in the legacy literature:
How do we extract and re-use it to transform it **into actionable knowledge**?
- How do we **link digital objects together**?
- Where and how do we **store, annotate, manage and use links** between data?



••••• The BiCIKL Pillars

Holistic targeted assembly of interlinked, machine-readable
FAIR biodiversity data

**Networking
Activities**



**Trans-national and
Virtual Access**



**Joint Research
Activities**



••••• 2 open calls for transnational access to biodiversity infrastructure and services

Specifically the open calls aim to:



Enable trans-national access to data and services provided by leading research infrastructures to named users who have submitted a defined use case via a project call process.



Attract users to the new community and help establish BiCIKL as an enabling function for Biodiversity specialists across Europe.



Address specific scientific or technical biodiversity data challenges presented by the applicants and,



Understand how the BiCIKL Community can better support the scientific questions that arise from across the biodiversity world in the future.

Connect and stay up to date with the ELIXIR activities

Twitter

Follow our Twitter for daily updates of upcoming ELIXIR events and ELIXIR-related research outcomes.

@ELIXIREurope

LinkedIn

Follow our LinkedIn for event informations and new job vacancies in ELIXIR Hub.

[company/elixir-europe](https://www.linkedin.com/company/elixir-europe)

YouTube

Follow our YouTube channel for recordings of ELIXIR webinars and workshops.

ELIXIR Europe

Webinars & events

Check out ELIXIR's event page for upcoming webinars and events.

<https://elixir-europe.org/events>



THANK YOU

European Commission's perspectives on transnational access to research infrastructures



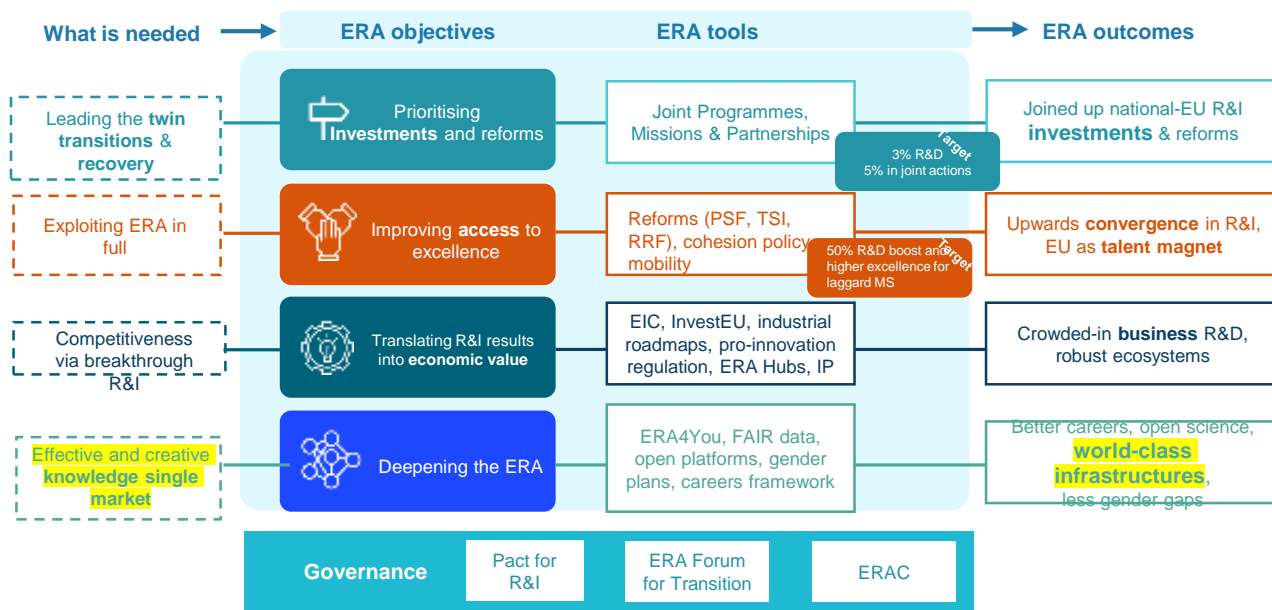
Agnès Robin
Head of Sector
DG Research & Innovation
European Commission

DiSSCo Futures 8 February 2023

Content

- Policy context: European Research Area and broader EU priorities
- Achievements
- Transnational access under Horizon Europe
- Challenges – perspectives
 - Crises (Covid-19, resources incl. energy)
 - Green transition, environmental footprint
 - Digital transition

A stronger European Research Area (ERA) for the future



Focus of RI policy in the ERA

From a fragmented,
un-coordinated
Research
Infrastructures
landscape



To an integrated,
interconnected
Research
Infrastructures
ecosystem

European Research Area 2000



*European Research
Infrastructures Policy*

*Pooling resources (ESFRI
Roadmap, ERIC framework);
coordination; **open access**;
connections between facilities;
exchange of best practice;
connecting research communities*

New European Research Area 2021



*European Research
Infrastructures Policy*

*RI sustainability; consolidation
of the landscape; strengthening
RI services; **broader access**;
innovation and technology
development; increasing impact*

ERA Policy Agenda: Research Infrastructures (1)

Deepening a truly functioning internal market for knowledge



Action 8 - Strengthen sustainability, accessibility and resilience of research infrastructures in the ERA

Set of foreseen activities

- Strategic analysis of the European Research Infrastructure landscape;
- **Broader and more sustainable access for all countries to European research infrastructures and their services and revision of the European Charter of Access to Research Infrastructures;**
- Update of the ESFRI Roadmap and implementation of the research infrastructures performance monitoring framework;
- Report on the ERIC Framework;
- Increased cooperation between research infrastructures, e-infrastructures and stakeholders, including through EOSC:

ERA Policy Agenda: Research Infrastructures (2)

Challenges to be addressed

Ensuring new investments and sustainable funding for existing research infrastructures

Increasing the impact of research infrastructures investments on economy and society

Equal access to services provided by European research infrastructures

A more targeted priority setting focused on scientific and political needs

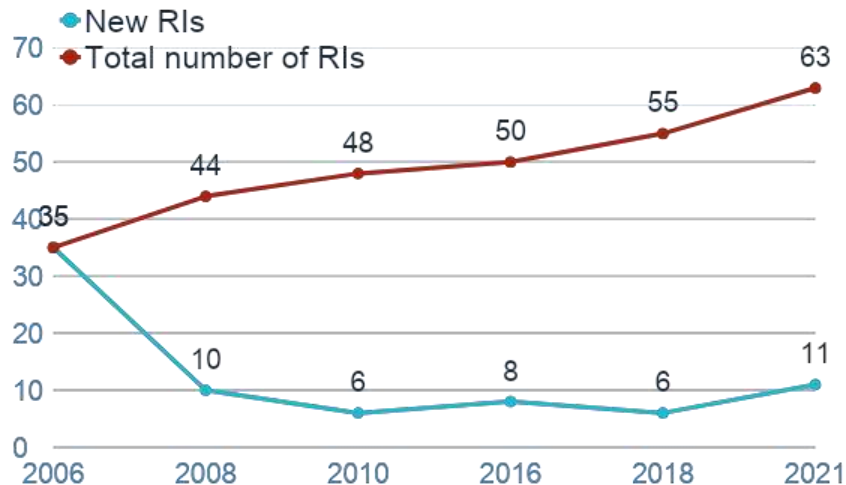
These challenges are also acknowledged by ESFRI in the Strategy Report of the Roadmap 2021

Open access to RIs in the ERA - what have we done?

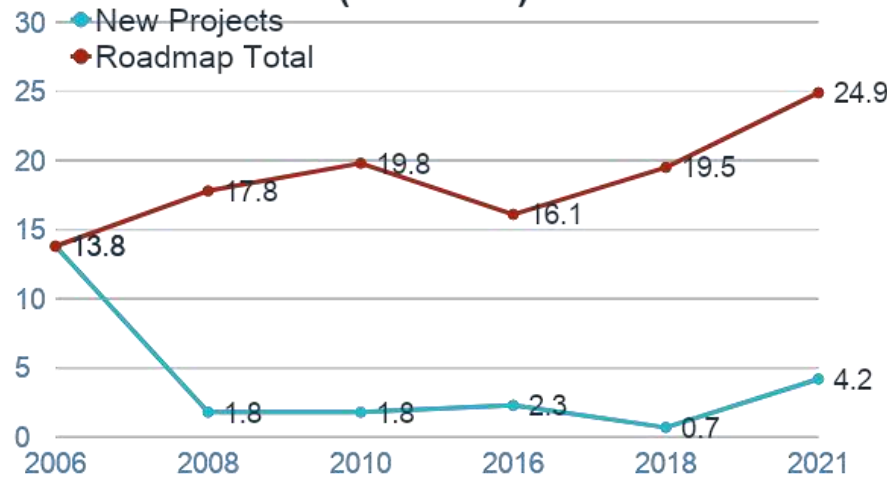
- **Developing Pan-European RIs operating under excellence-based open access principle**
 - **ESFRI Roadmap** – RI incubator (41+22=63), 6 broad thematic areas, single-sited and distributed – preparation and implementation supported by the EU, investments financed by national governments and EU regional development and cohesion funds (around EUR 25 billion)
 - **European Research Infrastructure Consortium (ERIC)** - legal framework (implementation), special legal entity for RIs, members – countries and international organisations, 25 ERICs
- **European RI networks** – set up through EU research programme (joint research activities, networking, access provision) opening up national RIs, common access programmes, **H2020 – 90 networks, 37.000 researchers supported, open to international members and users**
- **European Charter for Access to Research Infrastructures (2016)**

ESFRI Roadmap – ambitious investment agenda

RIs on the ESFRI Roadmap



Investments in the ESFRI Roadmap (mld EUR)



ESFRI RIs become more inclusive – significant membership growth in Landmarks (important role of ERICs) + increasing political support for new Projects

ESFRI Roadmap 2021

22 ESFRI Projects (11 new)

41 ESFRI Landmarks (4 new)

ENE	ENV	HF	PSE	SCI	e-RI
	DANUBIUS-RI	EMPHASIS	EST KM3NeT 2.0	E-RIHS	
IFMIF-DONES	DiSSCo eLTER	EU-IBISBA METROFOOD-RI		EHRI	
MARINERG-i		EIRENE RI	ET EuPRAXIA	GGP GUIDE OPERAS RESILIENCE	EBRAINS SLICES SoBigData++
					2016 2018 2021

ENE	ENV	HF	PSE	SCI	e-RI
JHR	EMSO ERIC EUOARGO ERIC IAGOS ICOS ERIC LIFEWATCH ERIC	BBMRI ERIC EATRIS ERIC ECRIN ERIC ELIXIR INFRA FRONTIER INSTRUCT ERIC	E-ELT ELI Eur. Spallation Source ERIC EU-XFEL FAIR ILL SKA SPIRAL2	CESSDA ERIC CLARIN ERIC DARIAH ERIC ESS ERIC SHARE ERIC	PRACE
ECCSEL ERIC	EISCAT-3D EPOS ERIC	EMBRC ERIC EU-OPEN Screen ERIC ERINHA EuroBio Imaging ERIC	EMFL CTA		
EU SOLARIS		AnaEE MIRRI			
	ACTRIS		ESRF-EBS* HL-LHC		
					2006 2008 2010 2016

The current ERIC landscape

Health and Food

AnaEE-ERIC
BBMRI-ERIC
EATRIS ERIC
ECRIN-ERIC
EMBRC ERIC
EU-OPENSREEN
ERIC
Euro-Biolmaging ERIC
Instruct-ERIC
MIRRI-ERIC

Physical Sciences and Engineering

CERIC-ERIC
ELI ERIC
European Spallation
Source ERIC
JIV-ERIC

Social and Cultural Innovation

CESSDA ERIC
CLARIN ERIC
DARIAH ERIC
ESS ERIC
SHARE-ERIC

Environment

EMSO ERIC
EPOS ERIC
Euro-Argo ERIC
ICOS ERIC
LifeWatch ERIC

Energy

ECCSEL ERIC
EU-SOLARIS ERIC

Highlight on recent ERICs and ERIC applications

Year	ERIC (lead country)	Field	Description
2022 New ERICs (Commission Decision)	AnaEE (FR)	Health & Food / Environment	Analysis and Experimentation on Ecosystems (<i>Commission Decision adopted on 22nd February</i>)
	MIRRI (PT)	Health & Food	Microbial Resource Research Infrastructure (<i>Commission Decision adopted on 17th June</i>)
	EU-SOLARIS (ES)	Energy	European Solar Research Infrastructure for Concentrated Solar Power (<i>Commission Decision adopted on 19th October</i>)
2023 Step 2 under examination	ACTRIS (FI)	Environment	Aerosol, Clouds and Trace Gases Research Infrastructure
	CTAO (IT)	Physical Sciences	Cherenkov Telescope Array (+100 telescopes - very high-energy gamma-ray astronomy)
	INFRAFRONTIER (DE)	Health & Food	European Research Infrastructure for the generation, phenotyping, archiving and distribution of mouse disease models
	LOFAR (NL)	Physical Sciences	Low-Frequency Array (radio telescope)
	E-RIHS (IT)	Social and Cultural Heritage	European Research Infrastructure for Heritage Science
	DANUBIUS RI (RO)	Environment	International Centre for Advanced Studies on River-Sea Systems
2023+ Step 1 expected	EHRI (NL)	Social and Cultural Innovation	European Holocaust Research Infrastructure

Horizon Europe structure

Pillar 1 Excellent Science

European Research Council

Marie Skłodowska-Curie Actions

Research Infrastructures
EUR 2,4 bn

Pillar 2 Global Challenges and European Industrial Competitiveness

- Clusters
- Health
 - Culture, Creativity and Inclusive Society
 - Civil Security for Society
 - Digital, Industry and Space
 - Climate, Energy and Mobility
 - Food, Bioeconomy, Natural Resources, Agriculture and Environment

Joint Research Centre

Pillar 3 Innovative Europe

European Innovation Council

European innovation
ecosystems

European Institute of Innovation
and Technology

Widening Participation and Strengthening the European Research Area

Widening participation and spreading excellence

Reforming and Enhancing the European R&I system

Research Infrastructures in HE Specific Programme

Four Intervention Areas:

**Consolidating and
Developing the Landscape
of European Research
Infrastructures**

Including EOSC and GEANT

**Opening, Integrating and
Interconnecting Research
Infrastructures**

**The innovation potential of
European Research
Infrastructures and
activities for Innovation &
Training**

**Reinforcing European
Research Infrastructure
policy and International
Cooperation**

Strategic orientations 2021-2024

- **Consolidate and enhance** the EU research infrastructures **landscape**
- Support **Open Science and data-driven research** through the European Open Science Cloud (EOSC) and high capacity network
- Enable and drive the green and digital transformation through **research infrastructure services**
- Push the limits of **frontier research**
- Develop **cutting-edge technologies** for RIs and foster innovation
- Enhance the **international dimension** of RIs

RIs from H2020 to HE – Main novelties

- A new **challenge-driven approach** will join the science-driven one
- Emphasis on **customization and integration** of (different) **RI services** to better support research addressing global challenges and political priorities
- IA instrument discontinued: support to **access provision** and **higher levels of integration** separated from research for the next generation of instrumentation
- (2023) Pilot **co-fund** of access provision
- New efforts to **consolidate** the existing landscape of European RI

RIs in HE – Five destinations

- **Destination 1:** Developing, consolidating and optimising European RIs landscape, maintaining global leadership
- **Destination 2:** Enabling an operational, open and FAIR EOSC ecosystem
- **Destination 3:** RI services to support health research, accelerate the green and digital transformation, and advance frontier knowledge
- **Destination 4:** Next generation of scientific instruments, tools and methods and advanced digital solutions
- **Destination 5:** Network connectivity - enabler for collaboration without boundaries

Key targets in 2023-2024: access

- ✓ Topics to be supported under the **challenge driven** and the **curiosity driven** approaches identified through **MAPS** (Multi Annual Priority Setting) plan, taking stock of the results of previous calls and the analysis in the context of ESFRI and ERICs on how to better **complete and optimise the service offering of the RI landscape**
- ✓ **integration**, under same projects, of different types of research infrastructures, breaking barriers between networks of similar or complementary RIs
challenge: defining the appropriate consortia of beneficiaries and the involvement of third parties;
- **co-fund of access provision** as identified gap from the Specific Programme
- Limited **development of new relevant services** is possible, including joint/cross-RI services, provided that the resulting services are opened and offered already under the actions (short term R&D) and that the long term sustainability of such services can be ensured by the participant RIs.

Open access to RIs in the ERA – remaining challenges (1)

- **Sustainable, international access programmes exist only in some communities** (analytical facilities, astronomy)
- **National funds have difficulties crossing borders** – limited access to RIs in other countries through national funding: many communities rely in EU-funded transnational access programmes
- **Limited EU funding available for RI networks:**
 - FP7 – around EUR 800 mln for Integrating Activities out of EUR 1,8 bln
 - H2020 – around EUR 750 mln for Integrating Activities out of EUR 2,4 bln
 - Horizon Europe – EUR 320 mln for access provision calls (INFRASERV) in 2021-2024, possibly around EUR 500-550 mln out of 2,4 bln during the entire programme
- **Few distributed RIs (incl. ERICs) have central access programmes integrated into operational budgets**

Open access to RIs in the ERA – remaining challenges (2)

- **Need to find sustainable models for ensuring transnational access to RIs:**
 - Stimulating the creation of permanent access programmes at pan-European RIs
 - Formalising networks of national RIs providing access
 - Opening up national funding programmes
 - Reflecting on the role of EU funding – funding priorities, co-funding of access programmes, making a case for a broad European access programme
- **Evolving access models and user requirements** – increased remote and virtual access, broadening of the user base, including less-expert users (eg. industry)

Open access to RIs in the ERA – planned activities

- **ESFRI group on RI access** – analytical work, stakeholder consultations, comprehensive report at the end of 2023
- Revision of the **European Charter for Access to Research Infrastructures** – proposal for consultation by the end of 2023
- Second **Strategic Plan for Horizon Europe 2025-27** – lessons learnt from 2021-24 (mid-term review), possible revision of approach to access funding
 - **Broad stakeholder consultations ongoing** – contribution to H2020 final evaluation, HE mid-term review and orientations for the next Strategic Plan (deadline end of February)
- Reflections on the **next Framework Programme**



For more info:

- Commission's website on Research Infrastructures:
https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/our-digital-future/european-research-infrastructures_en
- Horizon Europe:
https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en
- European Strategy Forum on Research Infrastructures:
www.esfri.eu

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Thank you!



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Session:
PHYSICAL ACCESS

**Discussion (panel &
audience):**

**The future of
Transnational Access:
does it really matter?**





LUNCH BREAK (60min)

(We'll be back at 13:30h CET)



Distributed System of Scientific Collections

FUTURES
Brussels 07-09/02/2023

Session:

**DIGITAL
INFRASTRUCTURE**



Sharif Islam

Naturalis Biodiversity Center

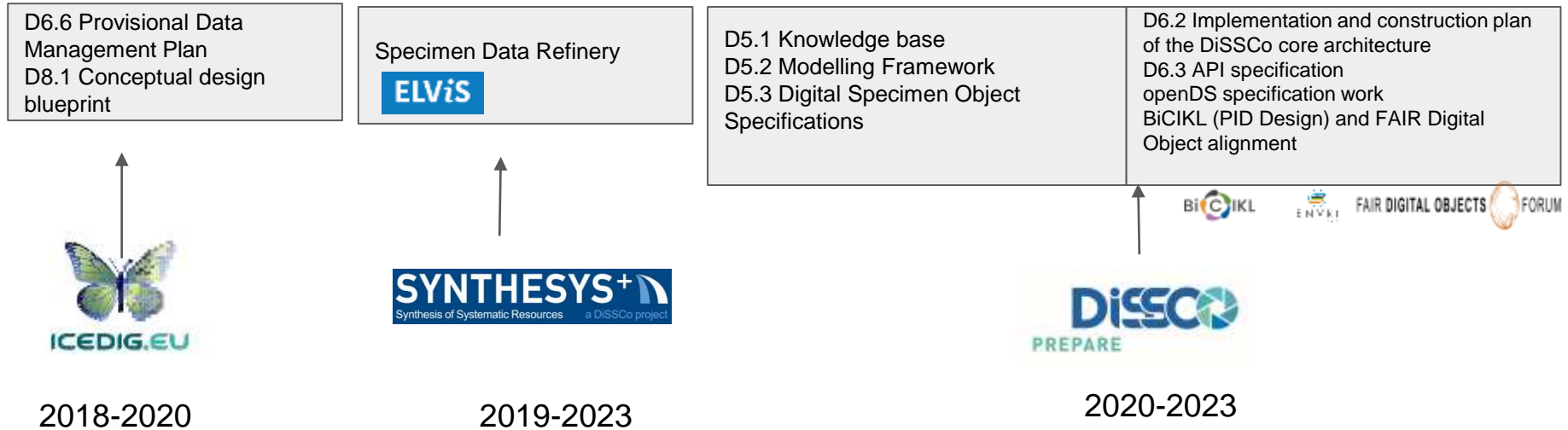
Anne Koivunen

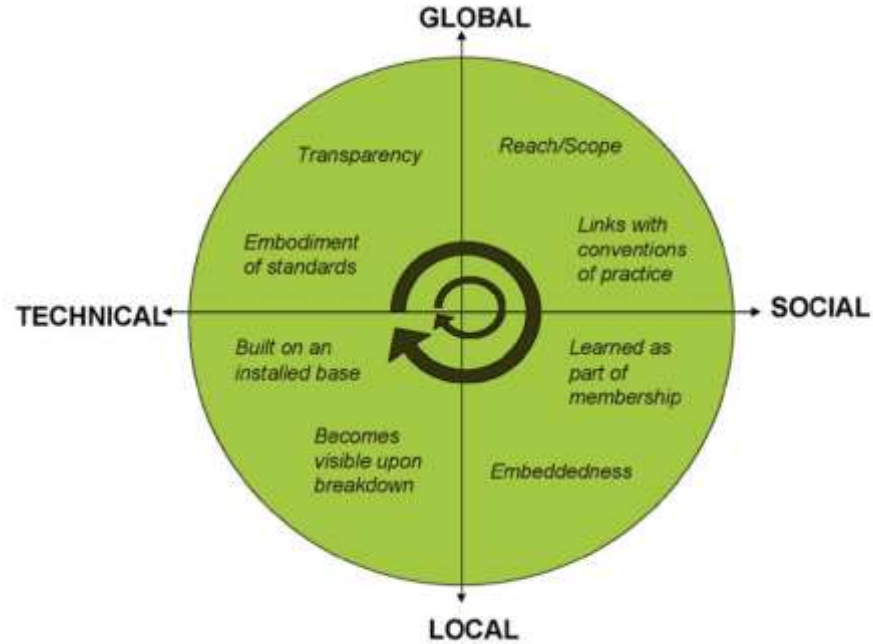
LUOMUS

Digital Infrastructure

Welcome

1. Welcome
2. Keynote: “Digital infrastructures: **context & future**” by **Dr Nicky Nicolson**, Royal Botanic Gardens, Kew
3. Preparing for the future: A **Machine Actionable Digital Infrastructure**: **Wouter Addink**, Naturalis Biodiversity Center
4. **DiSSCovering** DiSSCo Digital Infrastructure: **Sam Leeflang and Sou Theocharides**, Naturalis Biodiversity Center.
5. Specimen **Data Refinery**: **Laurence Livermore**, Natural History Museum, London.
6. Leveraging **Machine Learning for Biodiversity** FAIR Digital Objects: **Jonas Grieb and Claus Weiland**, Senckenberg Society for Nature Research
7. Discussion and Q&A





Cyberinfrastructure as *distributions* along technical/social & global/local axes

Image source:

Bowker, G.C., Baker, K., Millerand, F. and Ribes, D., 2009. Toward information infrastructure studies: Ways of knowing in a networked environment. In *International handbook of internet research* (pp. 97-117). Springer, Dordrecht.



[Dr Nicky Nicolson](#)
Royal Botanic Gardens, Kew



Digital Infrastructure: Keynote
Digital infrastructures: context & future

Digital infrastructures: context & future

Nicky Nicolson

Intelligent Data Analysis, RBG Kew



DISCO futures

Royal Library of Belgium, 7-9 February 2023

- Current status of global biodiversity data infrastructure
- Future directions for data driven research
- Focussing on discussions around Digital Extended Specimens and FAIR ideas

Context:

DISSCO research infrastructure: not only about *bringing data together* but also about *transforming the data and the ways scientists work with it*

Context: personal & institutional

- Transitioned from software development into research
- Open science, take-up & how we design & build for participation
- How we can use software development practices in research:
 - Reuse
 - Automation
 - Version control
 - Dependency management
 - Continuous integration
- Also processes about communication, design & inclusion



Where we are today: botanical collections online

- Specimens online (Tracheophyta)
 - 88 million metadata records
 - 38 million images
- Comprehensive taxonomies with distribution
- Born digital and digitised literature provides context
- Experiments with application of machine learning to images
- Better awareness of different activities involved with specimen research & curation
- Bring your idea to the data – compute available online



- Skills development (Carpentries)
- Awareness of different roles in research
 - recognition of the research software engineer role
- Recognition of different activities required for successful research
- Open science: **open data**
- Online & remote collaboration



We're still learning how to move activities online

- COVID made us move *everything* online
- We learned a lot about how we:
 - think
 - work
 - Interact
- Diversity element in terms of how we think & conceptualise data/information/knowledge





Firefox

Search with Google or enter address



kewnet.kew



outlook.office



twitter



github



mail.google



gbif



ipni



scholar.google

FAIR in a physical resource



Institutional scale: Comprehensive digitisation

- Institutional change
- Collections management system
- Specimen metadata
- Image storage

Royal Botanic Gardens
Kew

Kew Digitisation Project

Target outcomes by 31 March 2023

Digitising this treasure trove of information will ensure that it is accessible to scientists and the public across the globe.

At Kew Gardens we house over 8 million plant and fungal specimens, with some dating back 250 years – including specimens collected by Charles Darwin.

This project to digitise the world's largest collection of plant and fungal specimens will improve climate change research and help protect biodiversity for generations to come.

Monthly outcomes delivered by Max	Target for 31 March 2023	Date	Achieved
Specimen images captured	1,098,000	27-01-23	506,108
Specimen data transcribed	728,000	27-01-23	301,867

Monthly outcomes delivered by Kew's palms and orchids team	Target for 31 March 2023	Date	Achieved
Specimen images captured	55,400	27-01-23	44,387!

Monthly outcomes delivered by Kew's Fungarium team	Target for 31 March 2023	Date	Achieved
Specimen images captured	53,000	27-01-23	11,021

Researcher scale: prototyping tools

- Access of relevant data
 - Specimens (GBIF)
 - Names (International Plant Names Index)
 - Collections (Global Registry of Scientific Collections)
 - People (Bionomia)
 - Literature (crossref)
- Creation of links, spatial and network exploration
- Citation in new work
- Open science working practices

echinopscis.github.io



echinopscis

Home Team Blog Project

echinopscis

An extensible notebook for open science

"echinopscis" is an experiment in creating an "extensible notebook for open science" - a working environment that allows researchers to write, access data and create links between literature, specimens, names, institutions, people, traits etc.

Key principles:

- **Control of your data:** as a researcher, you remain in control of your data. The data is stored in text format, on your local machine. Text files are an open format, they will always be accessible without any need for specialised software.
- **Open to choose your working practices:** we've provided small pieces of functionality that can be combined in many different ways, enabling researchers to be "open to choose" how to organise their work.
- **Re-usable skills:** any skills necessary to work with this toolkit should be transferable to other open science tools and practices. If you invest in time exploring this prototype software, the things you learn (markdown formatting, bibliography / citation management, document production etc) could also be applied elsewhere in your work, or in other working environments.
- **Open science:** All code and documentation (and this project site) are managed on [github](#) - contributions are welcome.

Specimen comparison

Steyermark 527055 - 1982 (NY)



Species a

Archer 11513 - 1930 (US)



Cuatrecasas 11471 - 1940 (US)

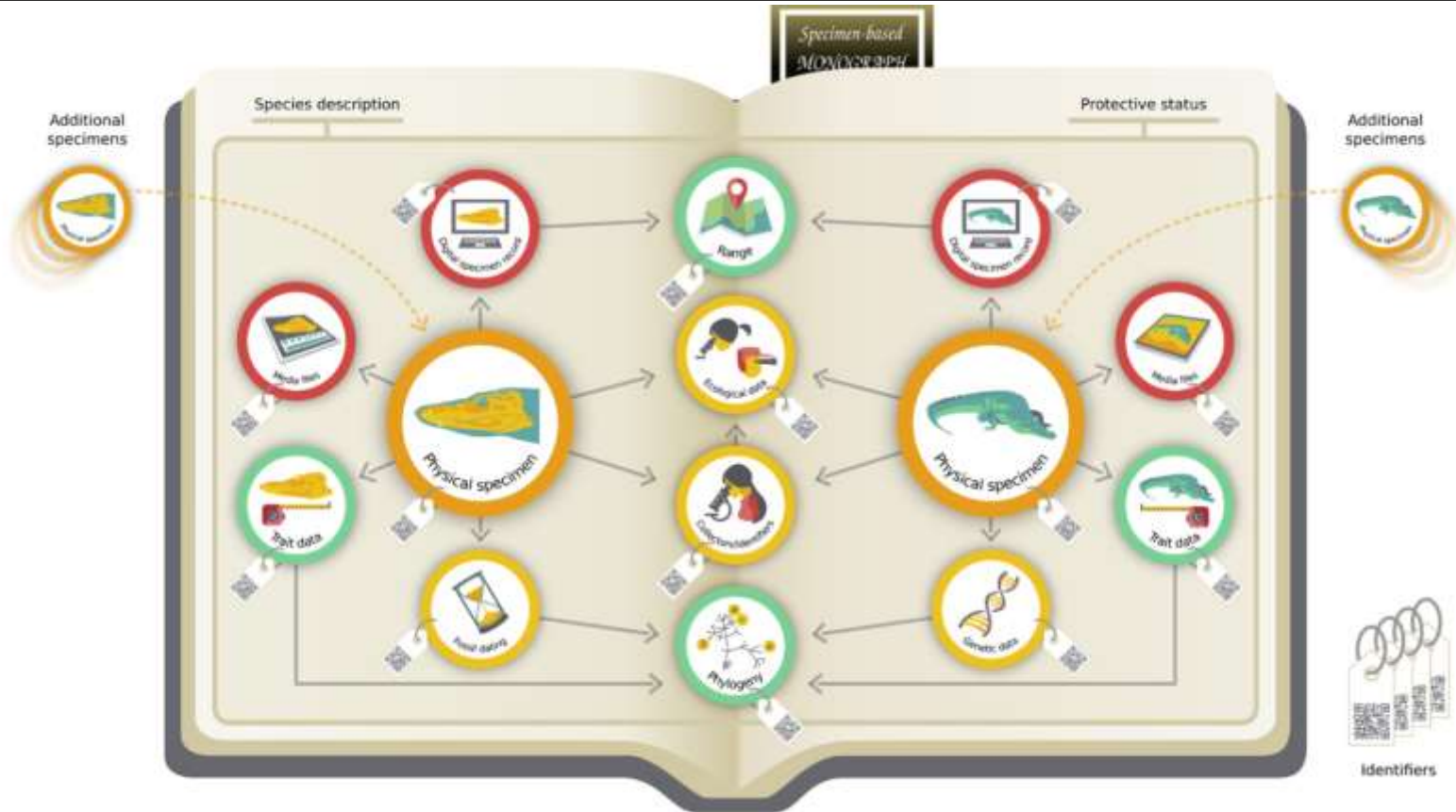


Species b

Condit 5201 - 1944 (US)



An aim: Digital extended specimen (DES)



Getting to our DESTination...



EVOLVING TOWARDS AN
ERA OF
OPEN RESEARCH

- Global biodiversity data infrastructure:
 - Infrastructure is people, working environment, data, results
- Future directions for data driven research
 - Think about how we do research and who is involved
- Digital Extended Specimens and FAIR ideas
 - Include people where they are now, show a relevant path to destination

n.nicolson@kew.org / [@nickynicolson](https://twitter.com/nickynicolson) / [@nickynicolson@mastodon.social](https://mastodon.social/@nickynicolson)

<https://www.kew.org/science>



THANK YOU

[Wouter Addink](#)
DiSSCo CSO, [Naturalis](#)
[CC BY 4.0](#)

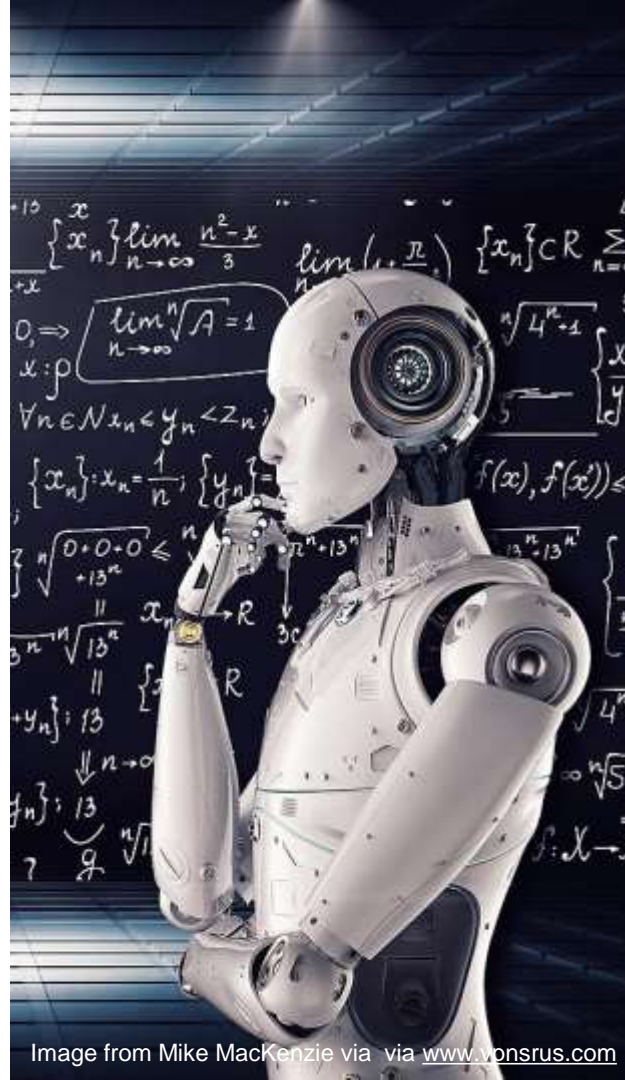


Digital Infrastructure

Preparing for the future: a machine actionable digital infrastructure (about openDS, FDO, and DiSSCo)

A machine actionable digital infrastructure - *why?*

- Too much data to handle by humans
- Machines can facilitate the automatization of data handling and validation
- AI driven machines can speed up digitisation, generate new data and discover new relationships in the data



A machine actionable digital infrastructure - *what is needed for this?*

- Machine readable **metadata** to discover relevant data and services
- A machine readable description of supported **operations** for a data object
- Qualified **references** to resources that relate to the same topic or entity

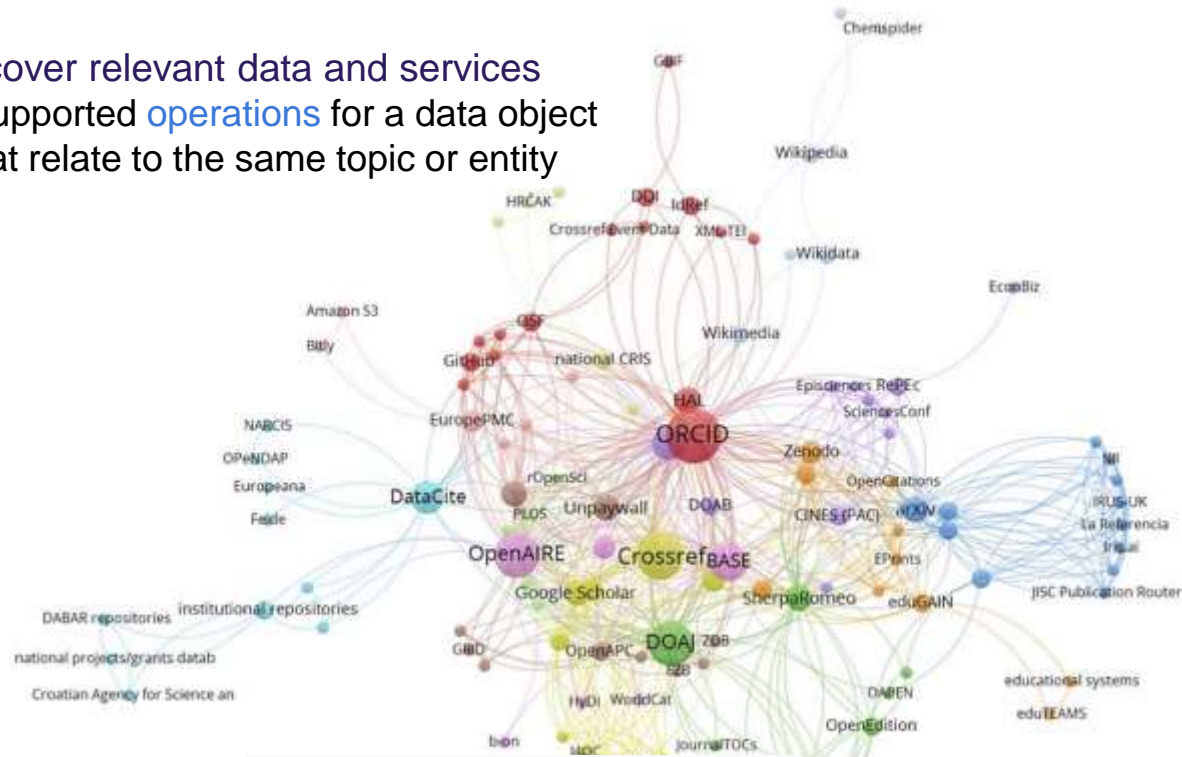


Figure from: SPARC Europe / Victoria Ficarra, Mattia Foschi, Andrea Chiarelli, Bianca Kramer, Vanessa Proudman, ICN knowledge base (Abes)

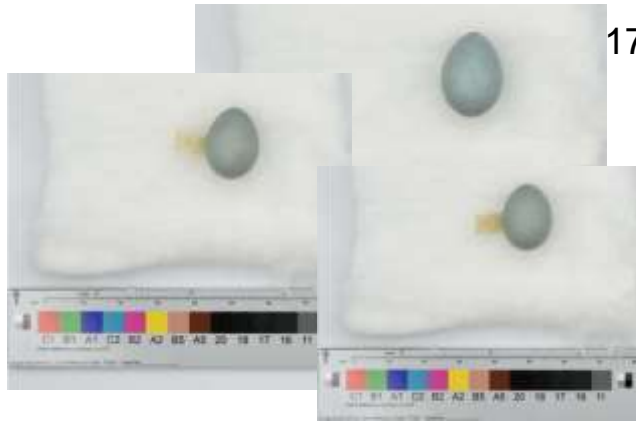
The story of machine actionable identifiers for specimens

An example bird egg collection:



ave.vogel.141a

242
242d
ave.ei.242d



Prunella modularis
Heggemus

1744

242e



Falco subbuteo
Boomvalk

92
92a
ave.ei.92a

The story of machine actionable identifiers for specimens

Naturalis
Biodiversity Center



image from: Hay Cranen

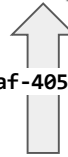
ave.ei.242d



Prunella modularis
Heggemus



GUID: 80376f63-63af-405d-89a4-d46f3f1a747f



Natuurmuseum
Rotterdam



image from: G.Lanting



ave.ei.242d

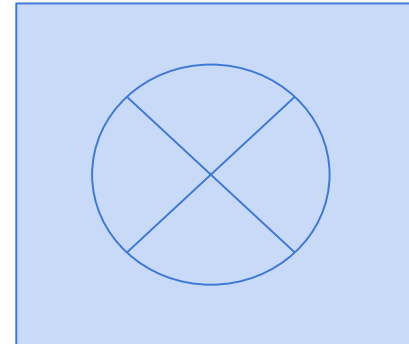
Casuaris spec.

The story of machine actionable identifiers for specimens

80376f63-63af-405d-89a4-d46f3f1a747f OR 80376f63-63af-405d-89a4-d46f3f1a747 ?

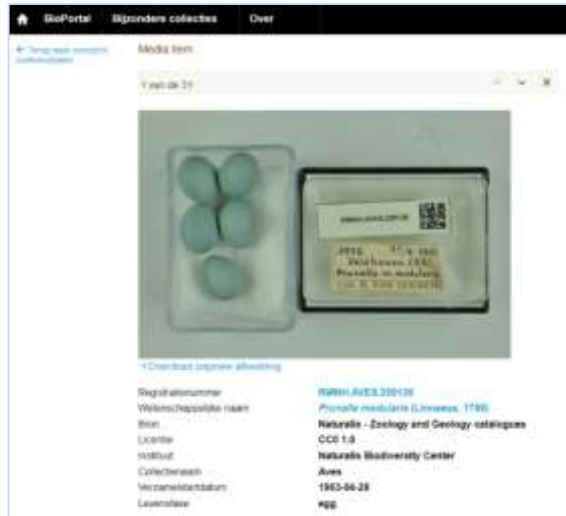


Prunella modularis
Heggenus



The story of machine actionable identifiers for specimens

<https://hdl.handle.net/20.5000.1025/763-X5F-LQP>
https://bioportal.naturalis.nl/multimedia/RMNH.AVES.259136_1



Prunella modularis
Heggemus

Naturalis
Biodiversity Center

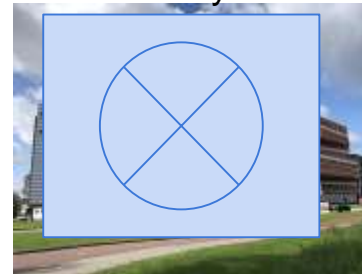


image from: Hay Cranen

The story of machine actionable identifiers for specimens

DOI: 10.22/763-X5F-LQP



<https://hdl.handle.net/20.5000.1025/763-X5F-LQP>



<https://hdl.handle.net/api/handles/20.5000.1025/763-X5F-LQP>

<https://sandbox.dissco.tech/ds/20.5000.1025/763-X5F-LQP>



<https://bioportal.naturalis.nl/multimedia/RMNH.AVES.260238>

<https://www.gbif.org/occurrence/3352977331>

https://www.gbif.org/tools/zoom/simple.html?src=//api.gbif.org/v1/image/unsafe/https%3A%2F%2Fmedialib.naturalis.nl%2Ffile%2Fid%2FRMNH.AVES.260238_egg%2Fformat%2Flarge

Prunella modularis
Heggemus

RMNH.AVES.260238

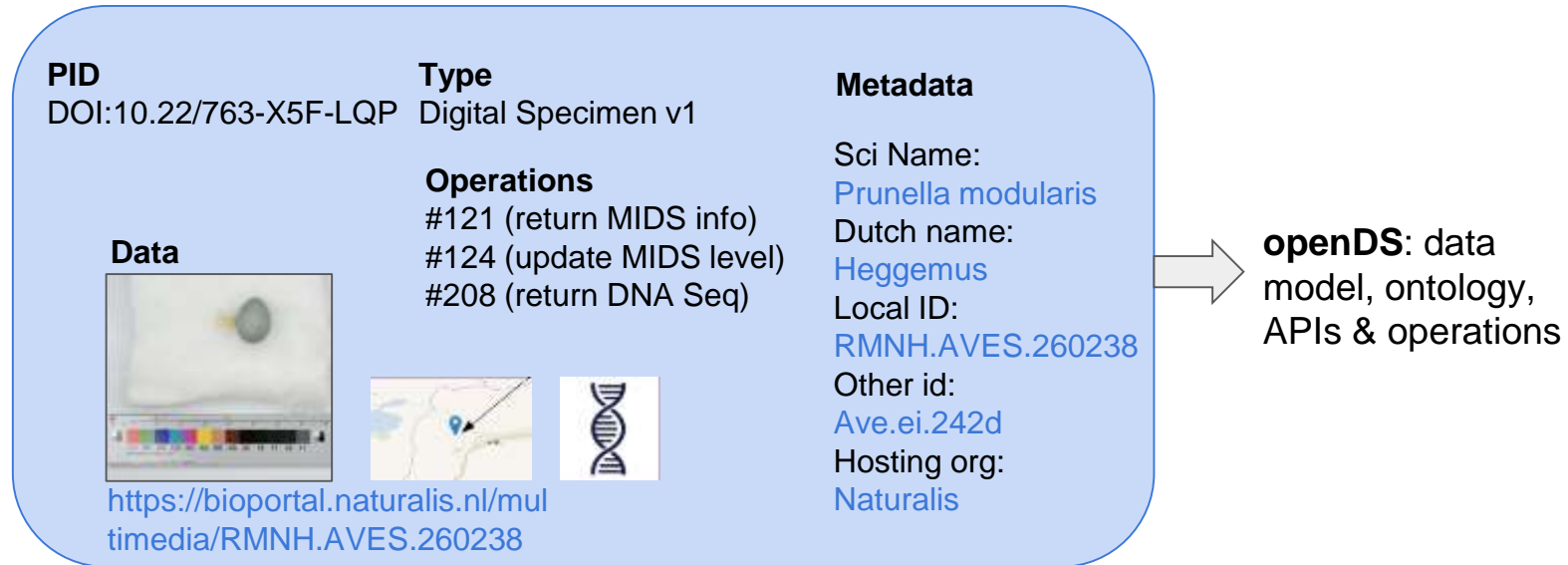


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    }
  },
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  data: {
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href='https://sandbox.dissco.tech/api/v1/specimens/20.5000.1025/763-X5F-LQP' id='0' weight='0'/></locations>"
  },
}
```



Machine readable description of metadata and **operations**

A Digital Specimen as a *machine actionable Fair Digital Object*





THANK YOU



Sam Leeflang
Naturalis Biodiversity Center
Soulaine Theocharides
Naturalis Biodiversity Center

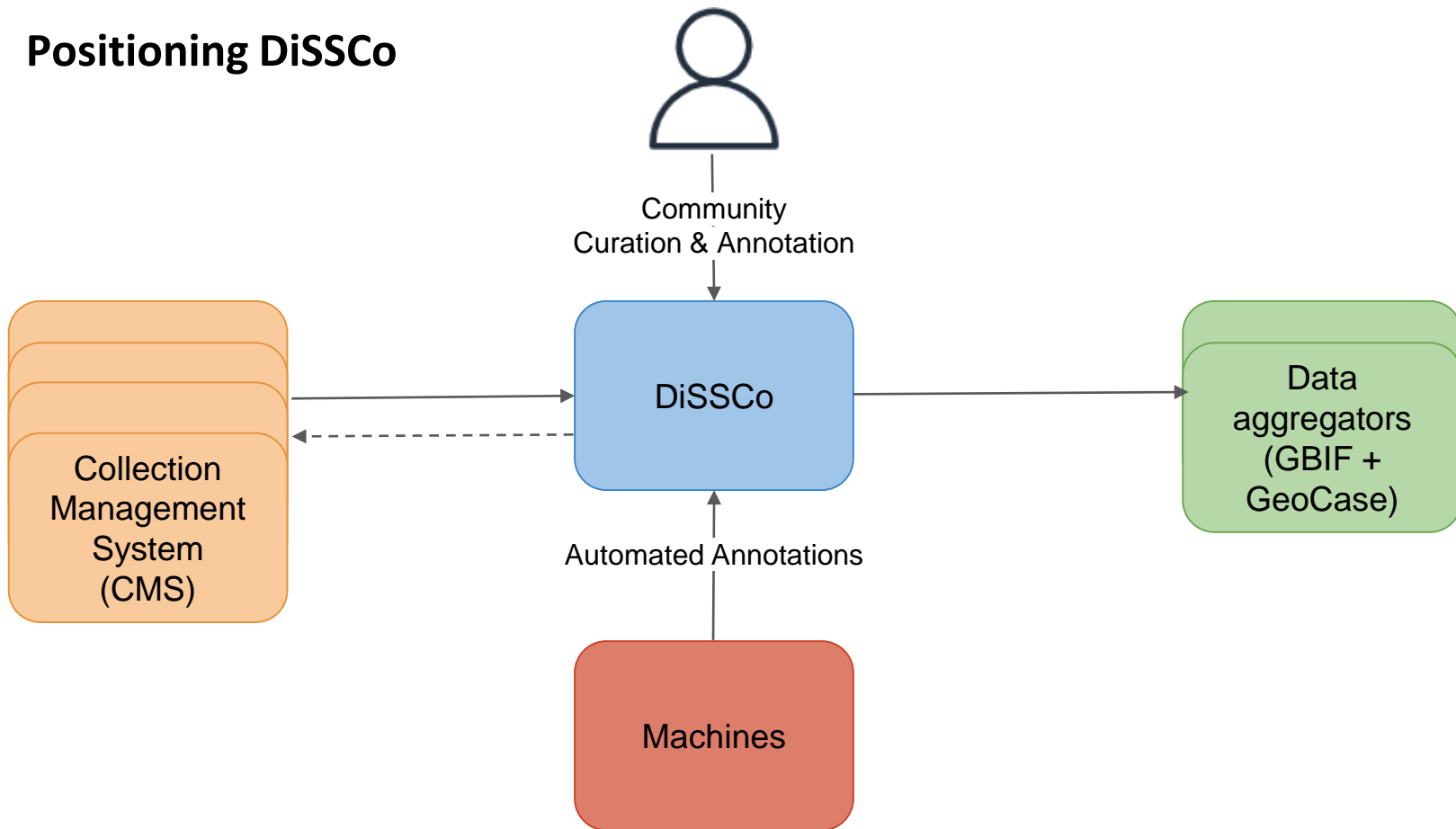
Digital Infrastructure

DiSSCovering the DiSSCo Digital Infrastructure

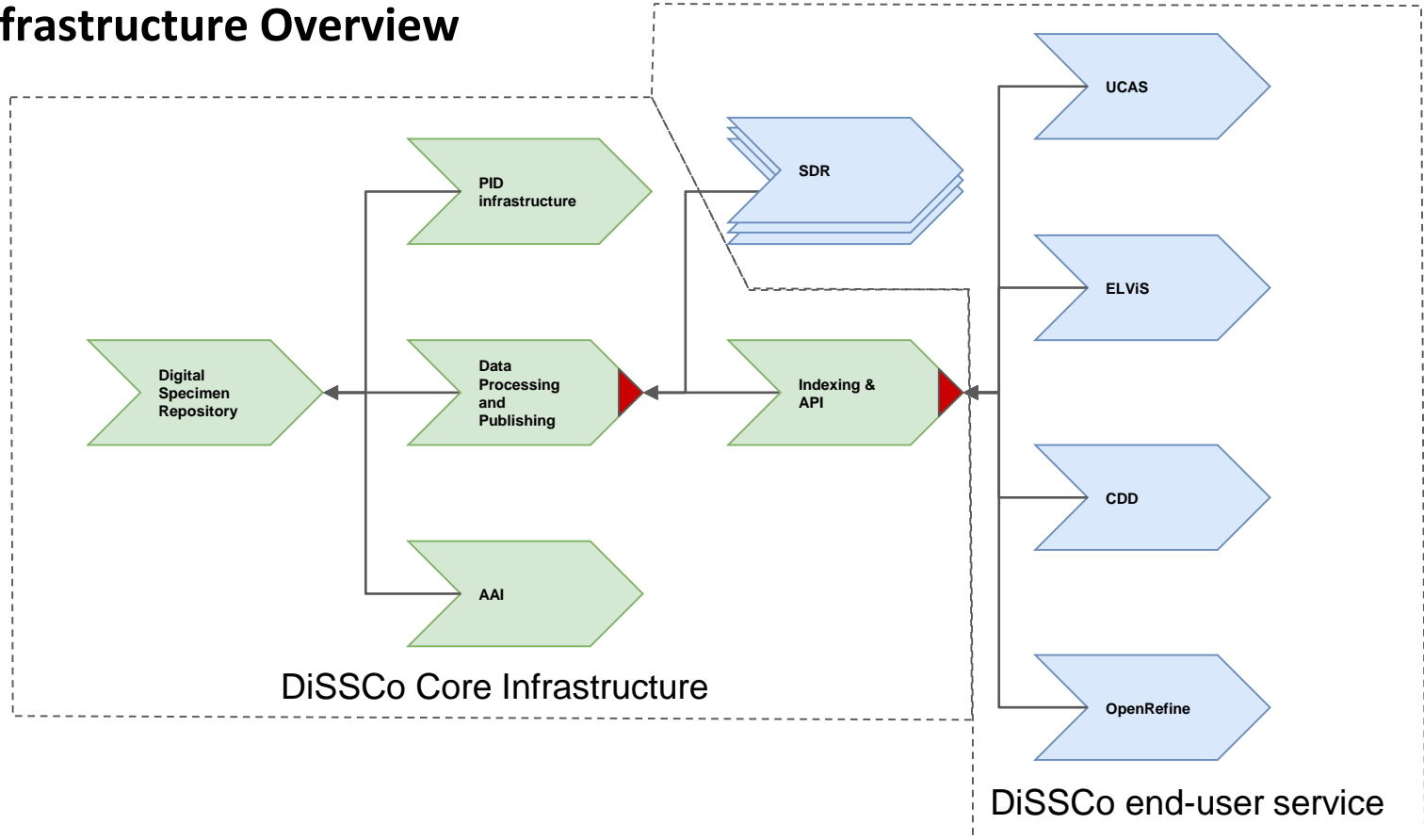
Agenda

1. Positioning DiSSCo
2. Infrastructure overview
3. Persistent Identifier Infrastructure
4. Demo
5. What's next

Positioning DiSSCo

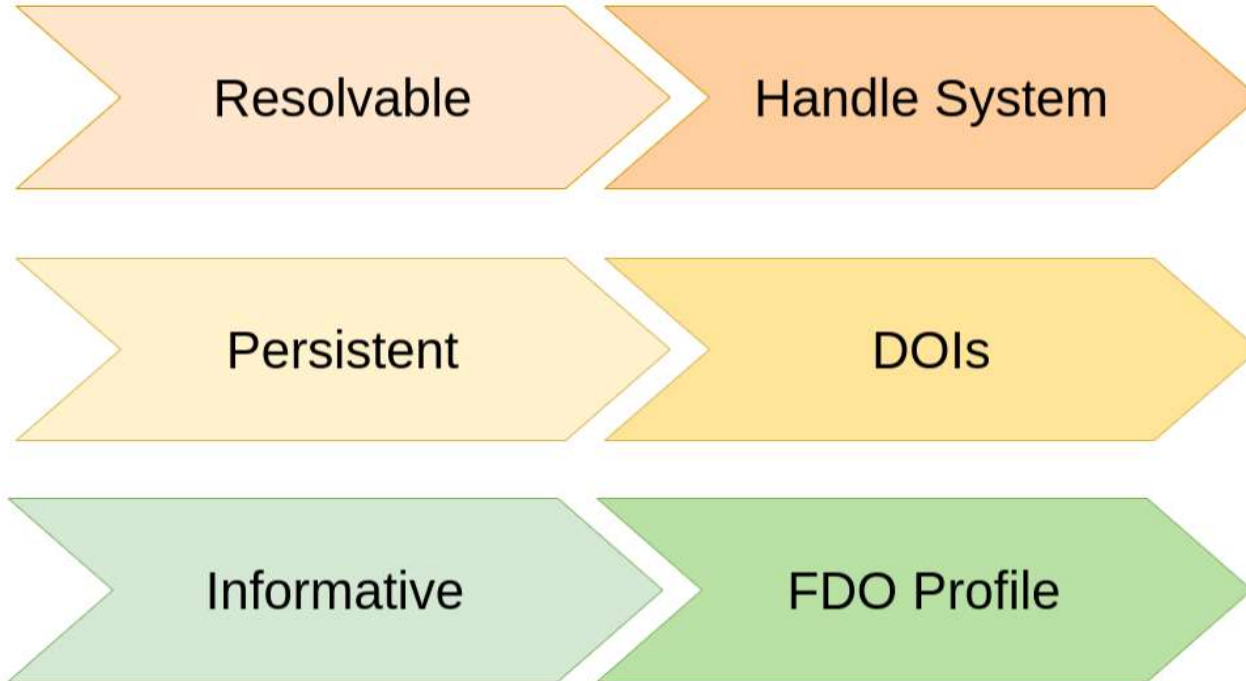


Infrastructure Overview

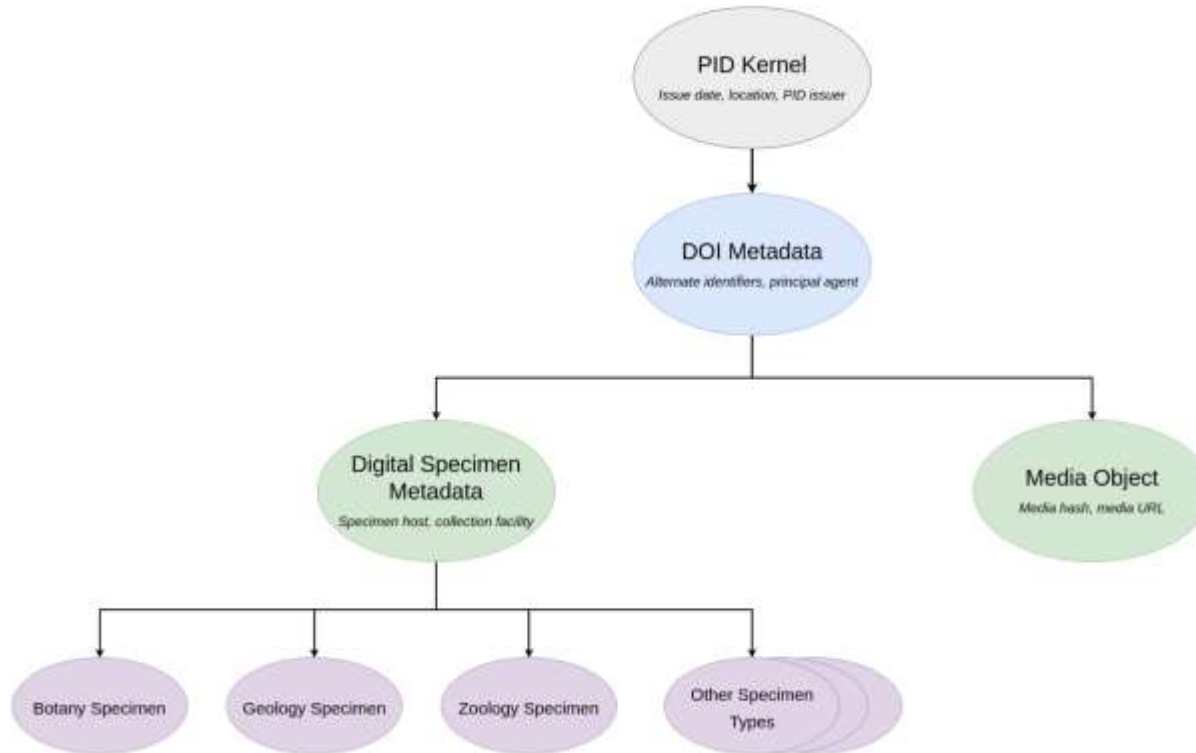


Persistent Identifier Infrastructure

Every object gets a PID that needs to be...



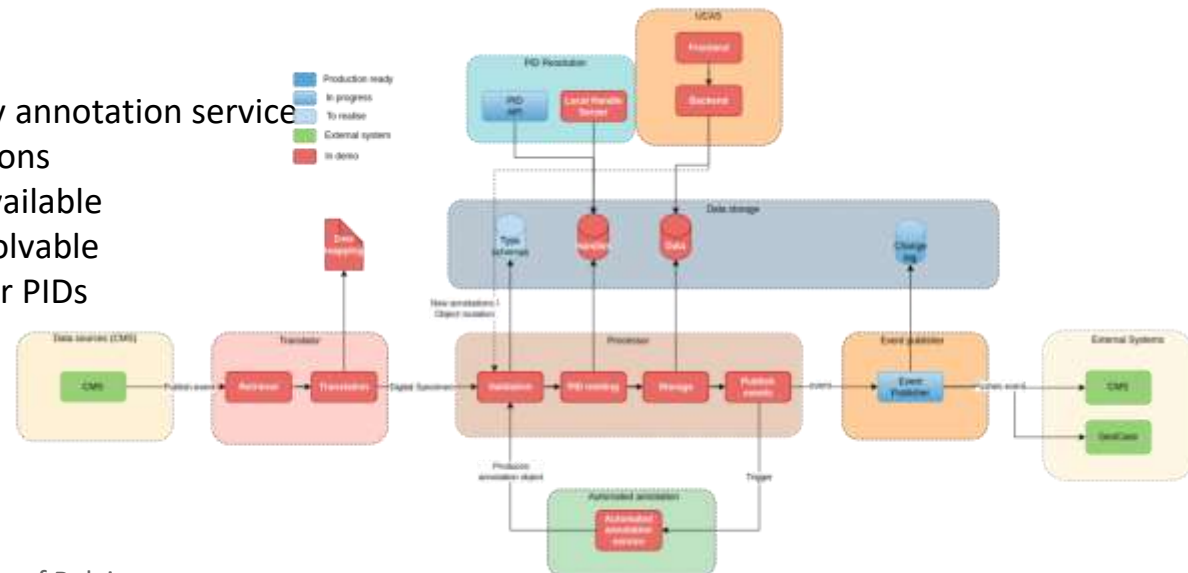
Different Object Types Contain Different Attributes

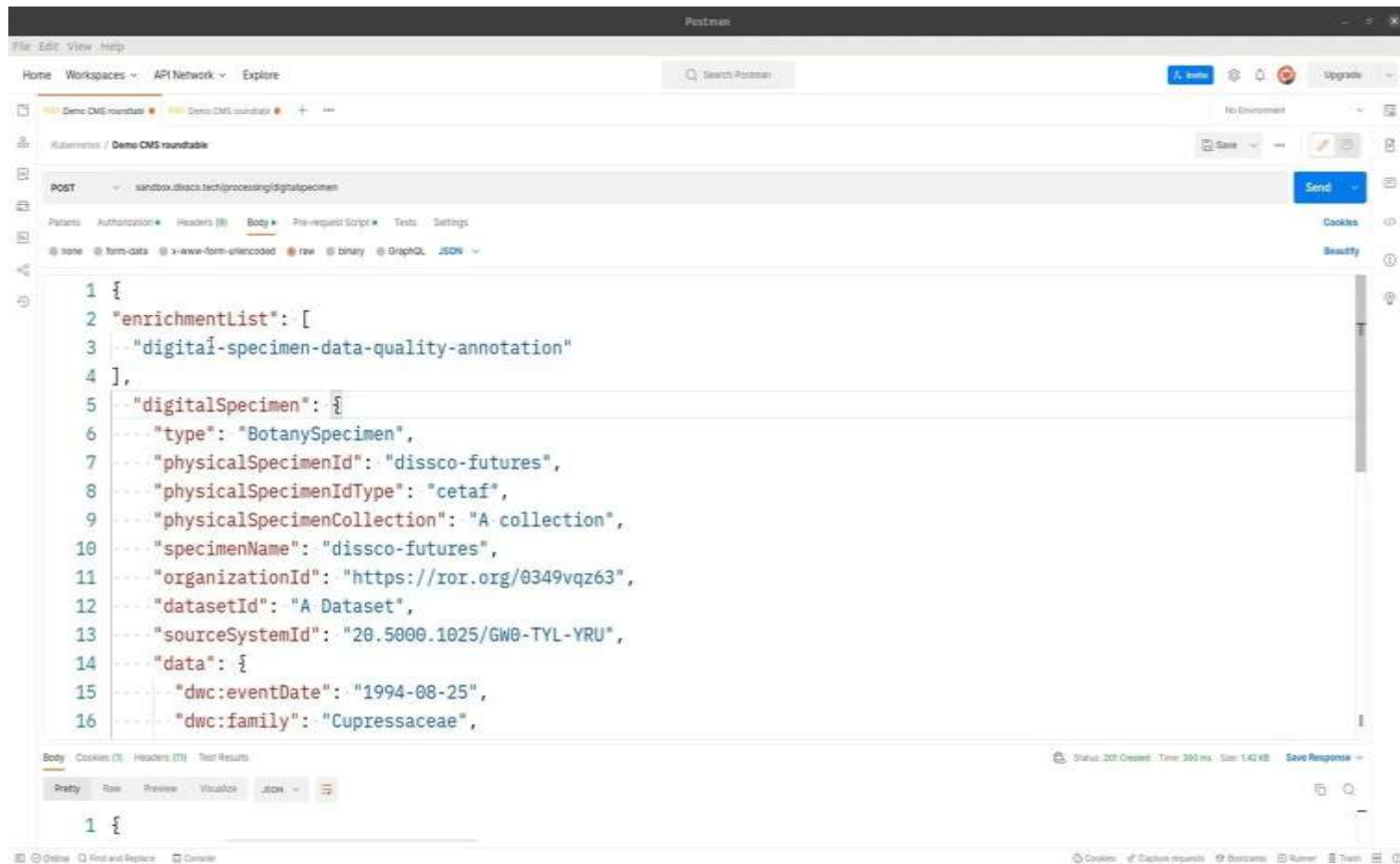


Short demo

Ingest a new Digital Specimen and create some annotations

- Insert new Digital Specimen
 - Create PID for DS
- Trigger automated data quality annotation service
 - Create PIDS for annotations
- Prove that we the DS is now available
 - Show that the PID is resolvable
- Show the annotations and their PIDs
- Add a new annotation
 - Another PID is created







What's next?

- Redesign of UCAS
 - External UX agency is helping
 - Rename UCAS to DiSSCover
- MIDS Calculation (0, 1, 2)
- Connect SDR services
- FDO types/profiles
 - Pilot with DataCite for DOI's for specimen
- Provenance storage



Thanks!

Feel free to contact us for more information

- sam.leeflang@naturalis.nl
- soulaine.theocharides@naturalis.nl





Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Laurence Livermore¹,
Ben Scott¹, Oliver Woolland², Stian
Soiland-Reyes²

¹The Natural History Museum, London

²The University of Manchester

Session: Digital Infrastructure

Specimen Data Refinery Showcase

DiSSCo Futures 8th February 2023 KBR, Royal Library of Belgium

Presenter ORCID: [0000-0002-7341-1842](https://orcid.org/0000-0002-7341-1842)

Presentation DOI: [10.6084/m9.figshare.22040348](https://doi.org/10.6084/m9.figshare.22040348)

SYNTHESYS+

Synthesis of Systematic Resources

a DiSSCo project

Funder: European Commission | Project code: [823827](https://ec.europa.eu/info/funding-opportunities-and-grants-opportunities/european-commission-programme-research-and-innovation/infrastructure-programme/infrastructure-programme-2018-2020) | Call for proposal: H2020-INFRAIA-2018-1

MANCHESTER
1824

The University of Manchester

N NATURAL
HISTORY
MUSEUM

Solution?

A Workflows (and FAIR Digital
Objects) approach

Workflow = “a series of tools and dataset actions that run in sequence as a batch operation.”

- Definition from: <https://galaxyproject.org/learn/advanced-workflow/>

Why use workflows?

Abstraction

Automation

Provenance

Scaling



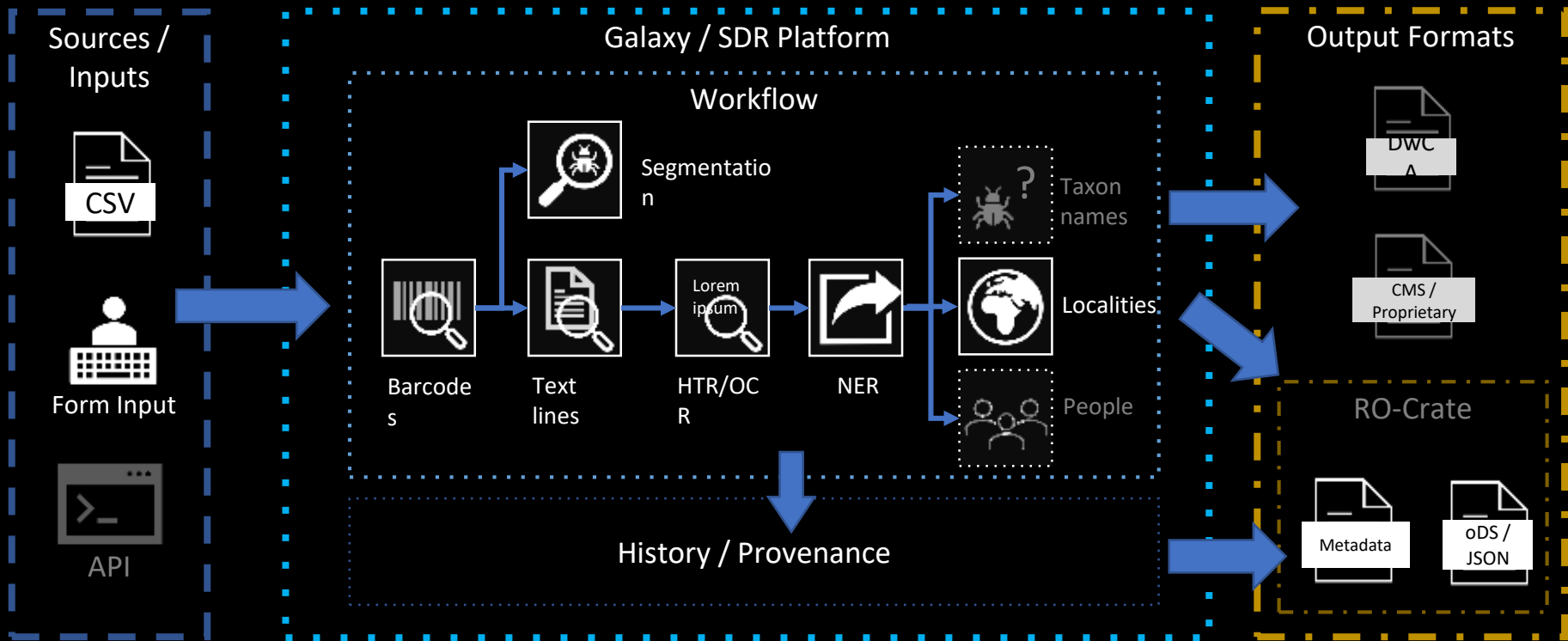
Findable

Accessible

Interoperable

Reusable

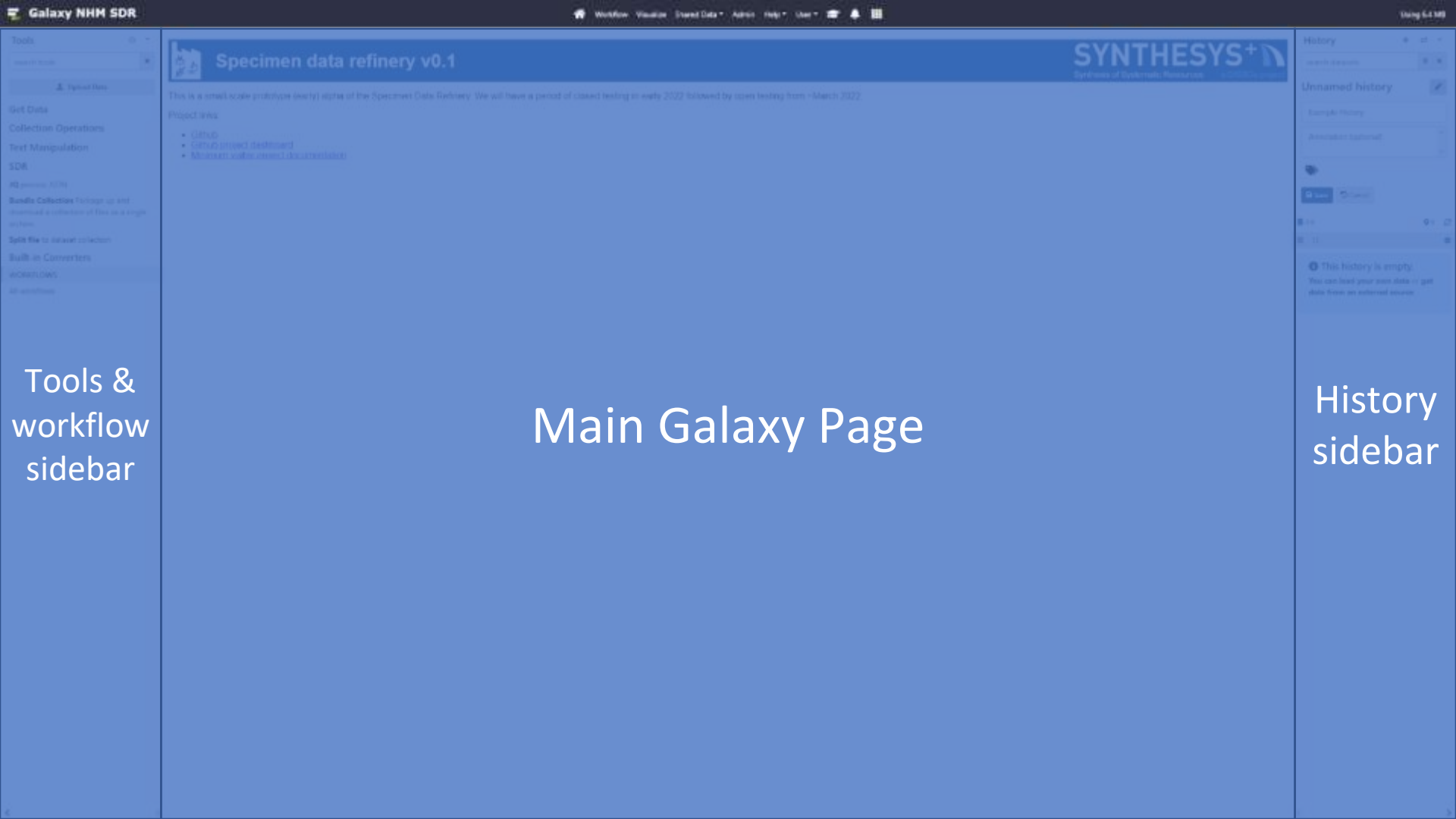
(reproducible)



White text = implemented

Grey text/icons = planned

What does the SDR look like
and how does it work for a
user?



Tools & workflow sidebar

Main Galaxy Page

History sidebar

Tools

search tools

Typical flow

Get Data

Collection Operations

Text Manipulation

SDR

All previous SDRs

Bundle Collections Package up and download a collection of files as a single archive

Split file to dataset collection

Built-in Converters

WORKFLOWS

All workflows

Search workflows

+ Create Import

Name	Tags	Updated	Marking	Bookmarked
Copy of SRA-Collections-test Minimal stable workflow for testing Galaxy's SRA (sequencing) test. Supports multiple specimens via job file input and user collections.	Default job file Multi-specimen input Collections Workflow 2022-06-26	5 days ago		☆ ▶
De novo Collections-test Example de novo digitisation composed of three Galaxy tools that output regions of interest, test files, OCL and NER. Supports multiple specimens via job file input and user collections.	Default job file Multi-specimen input Collections Workflow 2022-06-26	2 months ago	●	☆ ▶
SRA-Collections-test Minimal stable workflow for testing Galaxy's SRA (sequencing) test. Supports multiple specimens via job file input and user collections.	Default job file Multi-specimen input Collections Workflow 2022-06-26	2 months ago	●	☆ ▶
HTS-Collections-test Example de novo digitisation composed of three Galaxy tools that output test files and OCL. Supports multiple specimens via job file input and user collections.	Default job file Multi-specimen input Collections Workflow 2022-06-26	3 months ago	●	☆ ▶
De novo digitisation (imported from updated file) Minimal stable workflow for performing de novo digitisation.	Default job file	4 months ago		☆ ▶
Imported: De novo digitisation Minimal stable workflow for performing de novo digitisation.	Default job file	4 months ago		☆ ▶
De novo digitisation-test Example de novo digitisation composed of three Galaxy tools that output regions of interest, test files, OCL and NER.	Single specimen Job file Workflow 2022-06-26 Default job file	4 months ago		☆ ▶
SRA-test Minimal stable workflow for testing Galaxy's SRA (sequencing) test. Supports single specimen submission using a form.	Default job file Job file Specimens Workflow 2022-06-26	4 months ago		☆ ▶
HTS-test Minimal stable workflow for testing Galaxy's HTS (Shotgun/tilt/OCL) test. Supports single specimen submission using a form.	Default job file Job file Specimens Workflow 2022-06-26	4 months ago		☆ ▶
De novo digitisation Simple analysis de novo digitisation composed of three Galaxy tools that output regions of interest, test files, OCL and NER. Supports multiple specimens via job file input and user collections.	Formal Default job file Multi-specimen input Collections Workflow 2022-06-26	1 day ago	●	☆ ▶

History

search history

Unnamed history

Example history

Annotation optional

This history is empty.
You can load your own data or get data from an external source.

Name	Type	Updated	Marking	Bookmarked
• Copy of DLA-Collections-test	Workflow	3 days ago		
• De novo Collections-test	Workflow	3 months ago		

DLA-Collections-test

Minimal viable workflow for testing Teklia's DLA segmentation tool. Supports multiple specimens via csv file input and uses collections.

default-sdr x

multi-specimen-input x

collections x

validated-2022-06-29 x

3 months ago

⌕

☆

▶

History

Search history

Unnamed history

Example history

Annotation captured

▶

▶

▶

This history is empty.

You can load your own data or get data from an external source.

- Tools
- Inputs
- Get Data
- Collection Operations
- Text Manipulation
- SDE
- RD process EON
- Bundle Collection Package up and download a collection of files in a single archive
- Split file to dataset collection
- Built-in Converters
- Workflows



1) Input file processing/FDO creation

2) Tools (some with prerequisites)

3) RO-Crate output

Name: Copy of De novo RO-Crate output shared by user oswol

Version: 1.0.0 (2024-03-22, 11:00 AM)

Author(s):

These nodes will be visible when this workflow is viewed.

License: Specify a license for this workflow.

Creator: Oliver Abojona

Add a new creator - either a person or an organization.

Tags:

Apply tags to make it easy to search for and find items with the same tag.

What is the overall technical approach?

Technical Approach



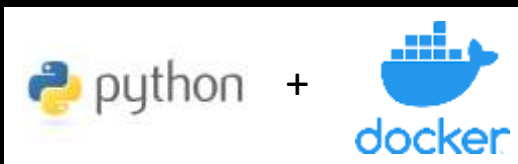
Workflow web platform



Workflow registry



Deployment



Tools

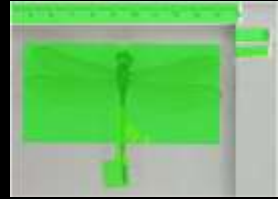
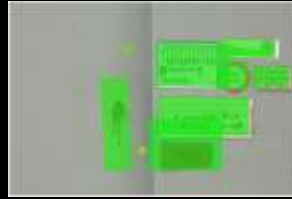
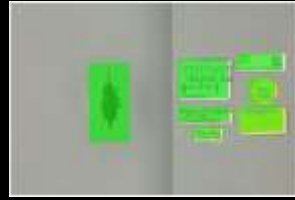
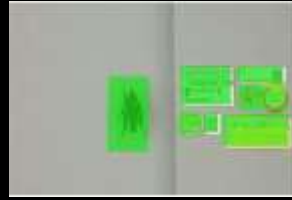


Packaging outputs

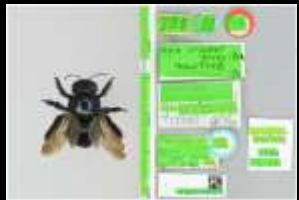
See: Woolland O, Brack P, Soiland-Reyes S, Scott B, Livermore L (2022) Incrementally building FAIR Digital Objects with Specimen Data Refinery workflows. Research Ideas and Outcomes 8: e94349. <https://doi.org/10.3897/rio.8.e94349>
Also: <https://s11.no/2022/phd/>

How have we done?

SEGMENTATION



TEXT LINE DETECTION





"text": "SANDWICH ISL:",
"confidence": 0.3399

"text": "Exchanged",
"confidence": 0.4168

"text": "E. W. H. Holdwood",
"confidence": 0.3635

SANDWICH ISL.
Exchanged,
E.W.H. Holdwood
Bee, as Xylocopa
B.M.N.H. ENT-1264-8

"text": "NHMUK",
"confidence": 0.6046

"text": "010265364",
"confidence": 0.3713

NHMUK
010265364

Habited in orig.
description reads:
Sandwich Is. This is
wrong, should be
Sandwich Is. (alpha)
The species is identical
with the introduced
X. longicollis de Geer.
(name printed in green)
M.A. Cleftinck SS

"text": "Sandwich) Is. (Fabr.)",
"confidence": 0.3169

"text": "The species in identical",
"confidence": 0.4534

"text": "with the introduced .",
"confidence": 0.4199

"text": "(Taeneipennis degeer)",
"confidence": 0.4459

"text": "M . A . Cleftinck SS",
"confidence": 0.2674

See also:

Scott B (2022) Cloud AI: A comparison of specimen
image data extraction processes.

<https://doi.org/10.3897/biss.6.90951>

Cloud evaluation: text clustering



K-means clustering

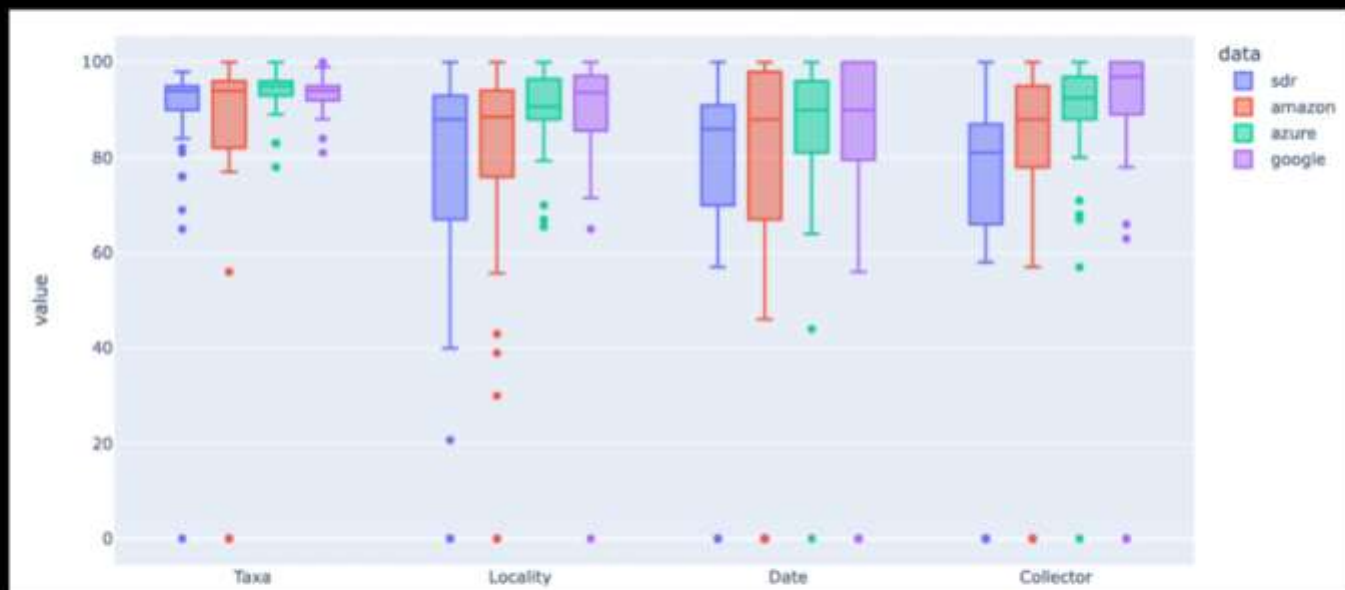


Substitution — *Ficus scheferiana* Kiing

Insertion — *Ficus schefferiana* Kiing

Deletion — *Ficus schefferiana* King

Cloud comparison



Amazon First 1 million images: \$0.00116 per image

Azure 0-1M transactions: \$0.0015 per image

Google £5000 for 250,000 images

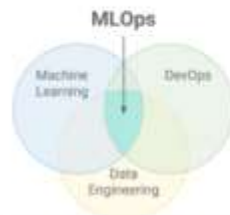
Integrating cloud?

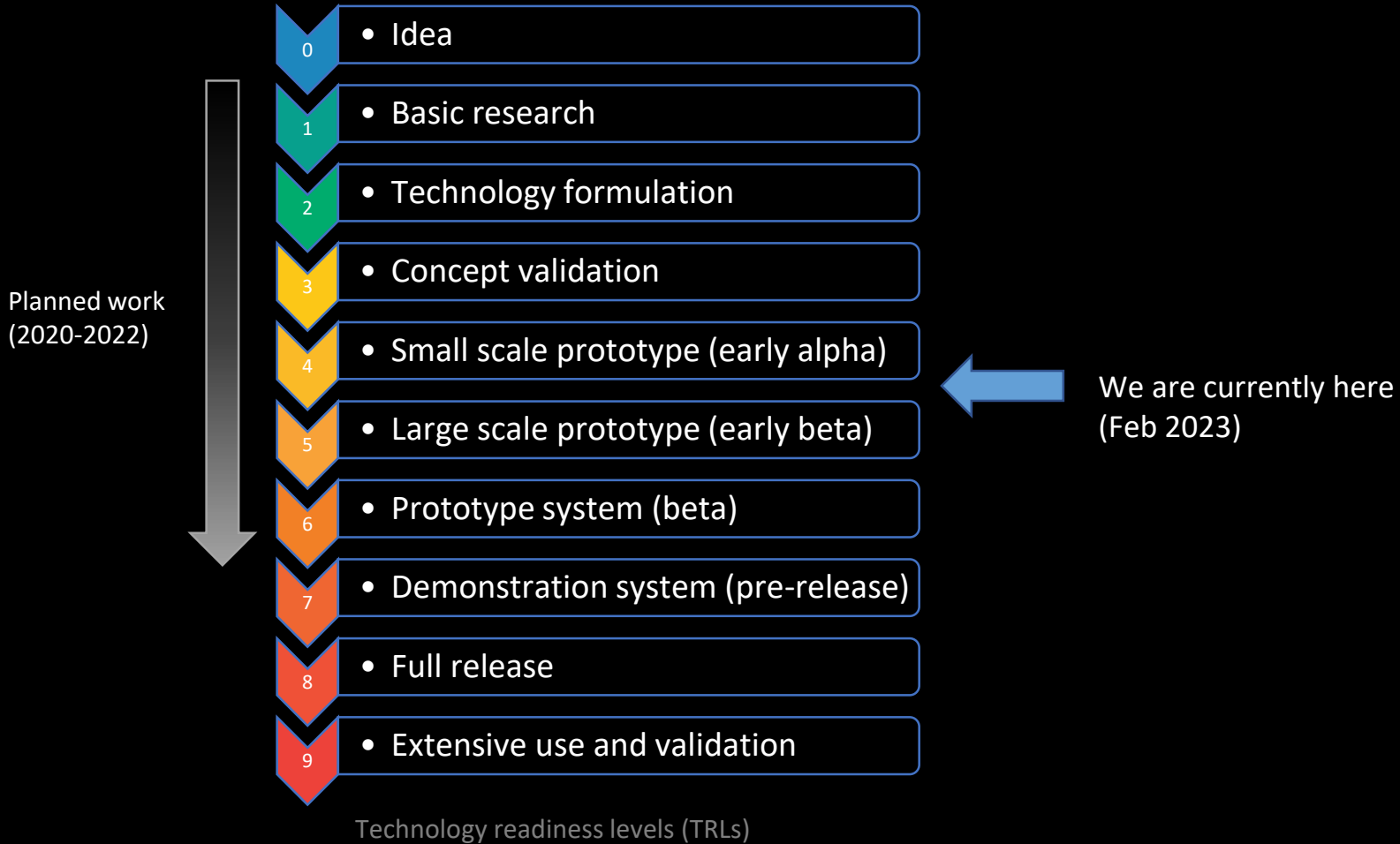


Modular

Cloud ecosystem?

ML Ops?





Acknowledgements



The **WorkflowHub Club**, Bioschemas Community, RO-Crate Community, CWL Community, Galaxy Europe, EOSC-Life and ELIXIR Tools Platform.

<https://about.workflowhub.eu/community/>

WorkflowHub <https://workflowhub.eu/> and <https://workflowhub.org/>

EOSC-Life <https://www.eosc-life.eu/>

ELIXIR <http://elixir-europe.org>

RO-Crate <https://www.researchobject.org/ro-crate/>

Galaxy Europe <https://galaxyproject.eu/>

Bioschemas <https://bioschemas.org>

Common Workflow Language <https://www.commonwl.org/>

WorkflowsRI <https://workflowsri.org/>

Dockstore <https://dockstore.org/>

LifeMonitor <https://lifemonitor.eu/>



Thank you for listening :)

Project Repository: <https://github.com/DiSSCo/SDR>

Completed/published:

- **Paper:** Alex Hardisty, Paul Brack, Carole Goble, Laurence Livermore, Ben Scott, Quentin Groom, Stuart Owen, Stian Soiland-Reyes; The Specimen Data Refinery: A Canonical Workflow Framework and FAIR Digital Object Approach to Speeding up Digital Mobilisation of Natural History Collections. Data Intelligence 2022; https://doi.org/10.1162/dint_a_00134
- **Presentation at TDWG 2021:** Scott B, Livermore L (2021) Extracting Data at Scale: Machine learning at the Natural History Museum. Biodiversity Information Science and Standards 5: e74031. <https://doi.org/10.3897/biss.5.74031>
- **Blog:** Bonhomme, Marie-Laurence (April 2021): What is the best export format for handwritten document processing results? <https://tekliia.com/blog/202104-export-formats/>
- **Presentation:** Livermore, Laurence; Scott, Ben; Dillen, Mathias (July 2021): Contemporary and Established Provenance Issues in Natural History Collections. figshare. <https://doi.org/10.6084/m9.figshare.15035370.v1>
- **Paper:** Walton S, Livermore L, Bánki O, Cubey RWN, Drinkwater R, Englund M, Goble C, Groom Q, Kermorvant C, Rey I, Santos CM, Scott B, Williams AR, Wu Z (August 2020) Landscape Analysis for the Specimen Data Refinery. Research Ideas and Outcomes 6: e57602. <https://doi.org/10.3897/rio.6.e57602>

Deliverable 8.2

<https://github.com/DiSSCo/SDR/issues/77>

Deliverable 8.3

<https://github.com/DiSSCo/SDR/issues/78>

Deliverable 8.4

<https://github.com/DiSSCo/SDR/issues/79>

MVP review:

<https://github.com/DiSSCo/SDR/wiki/Minimum-Viable-Product-Review>



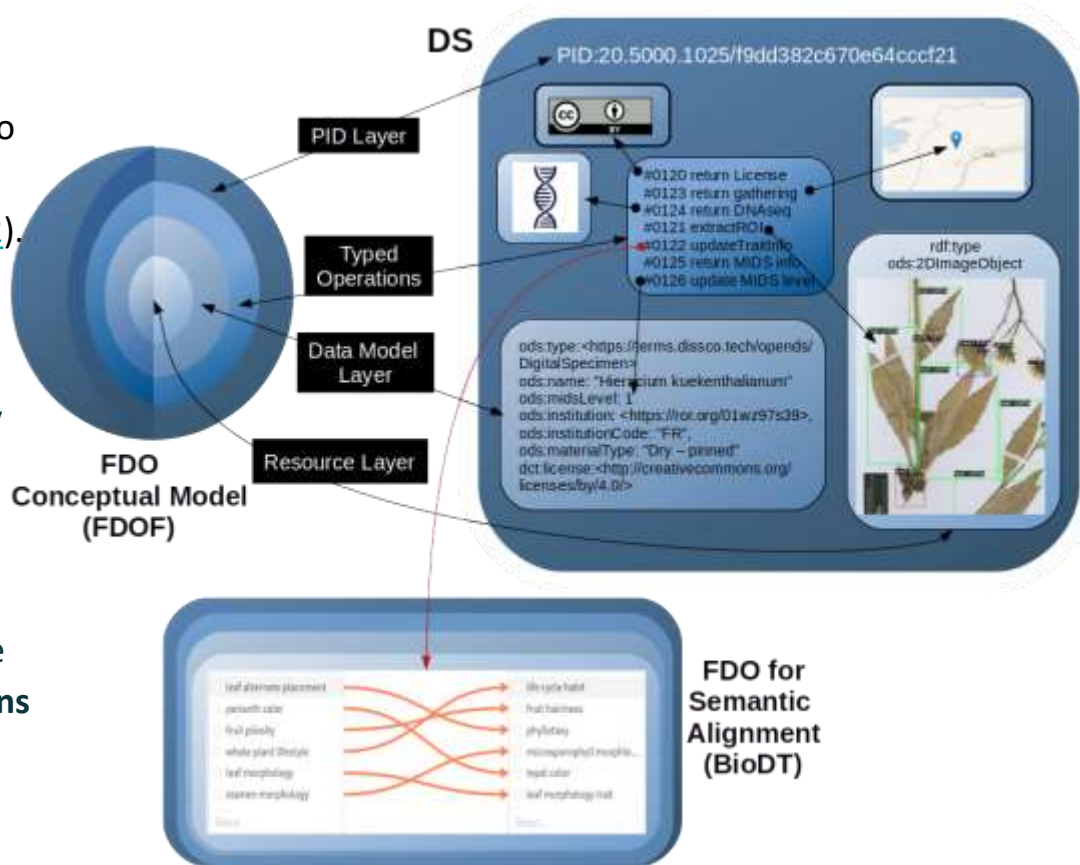
Jonas Grieb
Alexander Wolodkin
Claus Weiland

SENCKENBERG
world of biodiversity

**Digital Infrastructure:
Leveraging Machine Learning for Biodiversity FAIR
Digital Objects**

Motivation

- “Data deluge” → Digitization produces too much data for curation (baseline annotation) by humans ([Groom et al 2022](#)).
- Vision: A **global Integrated Virtual Data Collection** that can be autonomously navigated and appropriately processed by machines (“**Machine Actionability**”, [Wittenburg and Strawn 2021](#), [Lannom 2021](#)).
- Closely linked to machine learning: Enable machines to **autonomously detect patterns in data** and adjust actions accordingly (using general purpose algorithms).



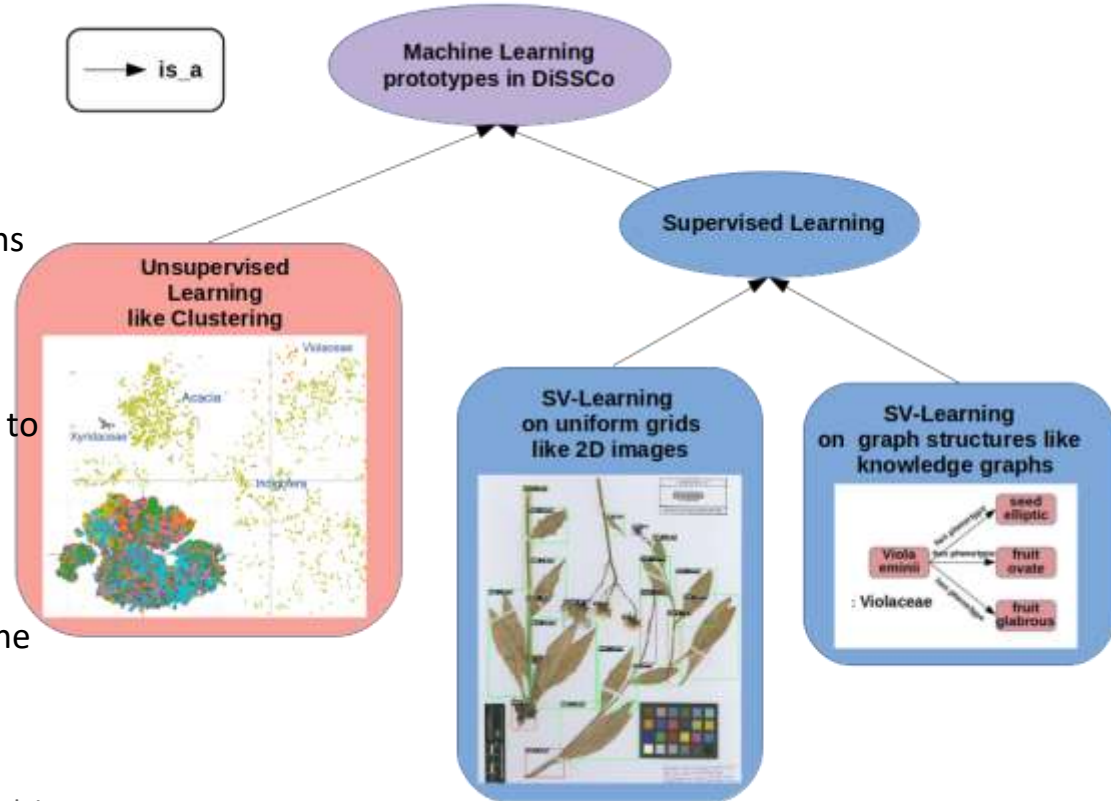
Taxonomy of machine learning in DiSSCo Prepare

Unsupervised learning

- Doesn't require labeled training data
- Applications: Data clustering, outlier detection, dimensionality reduction ([t-SNE](#), vd Maaten)
- Often more lightweight implementations → suitable for SDR-Modules

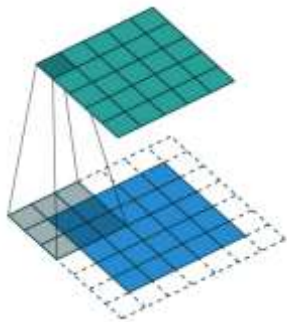
Supervised learning

- Employs large amounts of training data to predict the labels of unlabeled data
- DPP-pilots used Convolutional Neural Networks (CNNs, [Krizhevsky 2012](#)) to process images and graph structures.
- Implemented as microservices (“Machine Learning as a Service, [MLaaS](#)”).

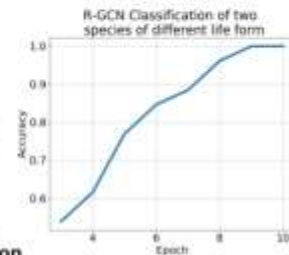
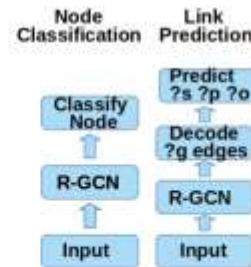
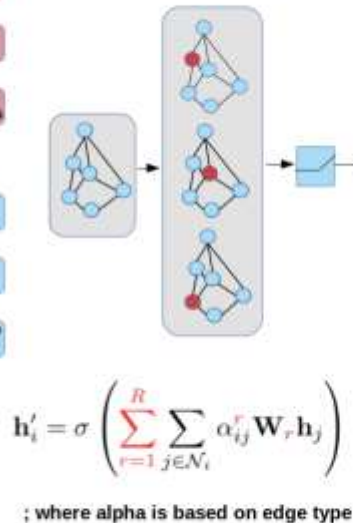
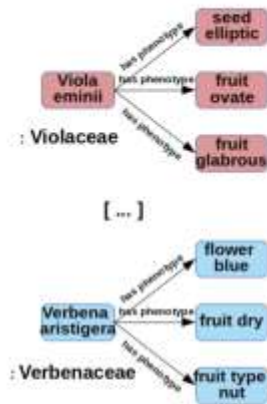


Graph Convolutions

- Tested Graph CNNs to classify entities in a biodiversity knowledge graph ([FLOPO KNB](#))
- Transfer convolutional approach from regular grid to network (R-GCNs, [Schlichtkrull 2017](#))

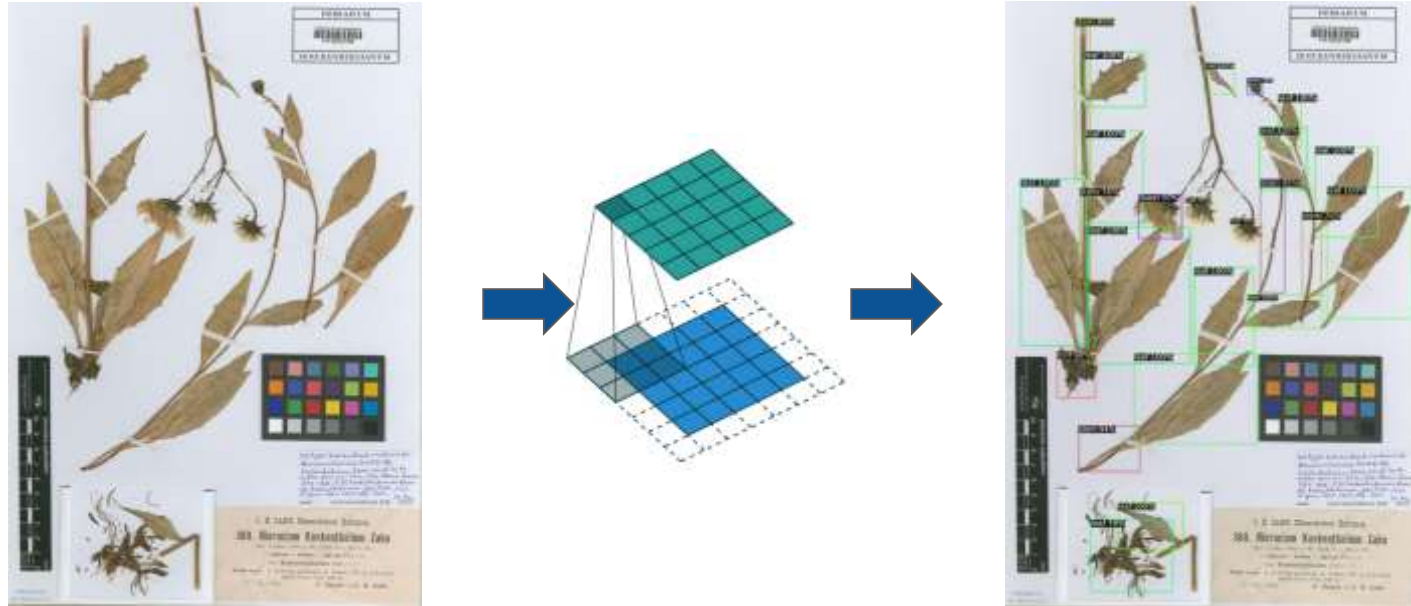


[CNN Animation](#)
by PL Pröve 2017



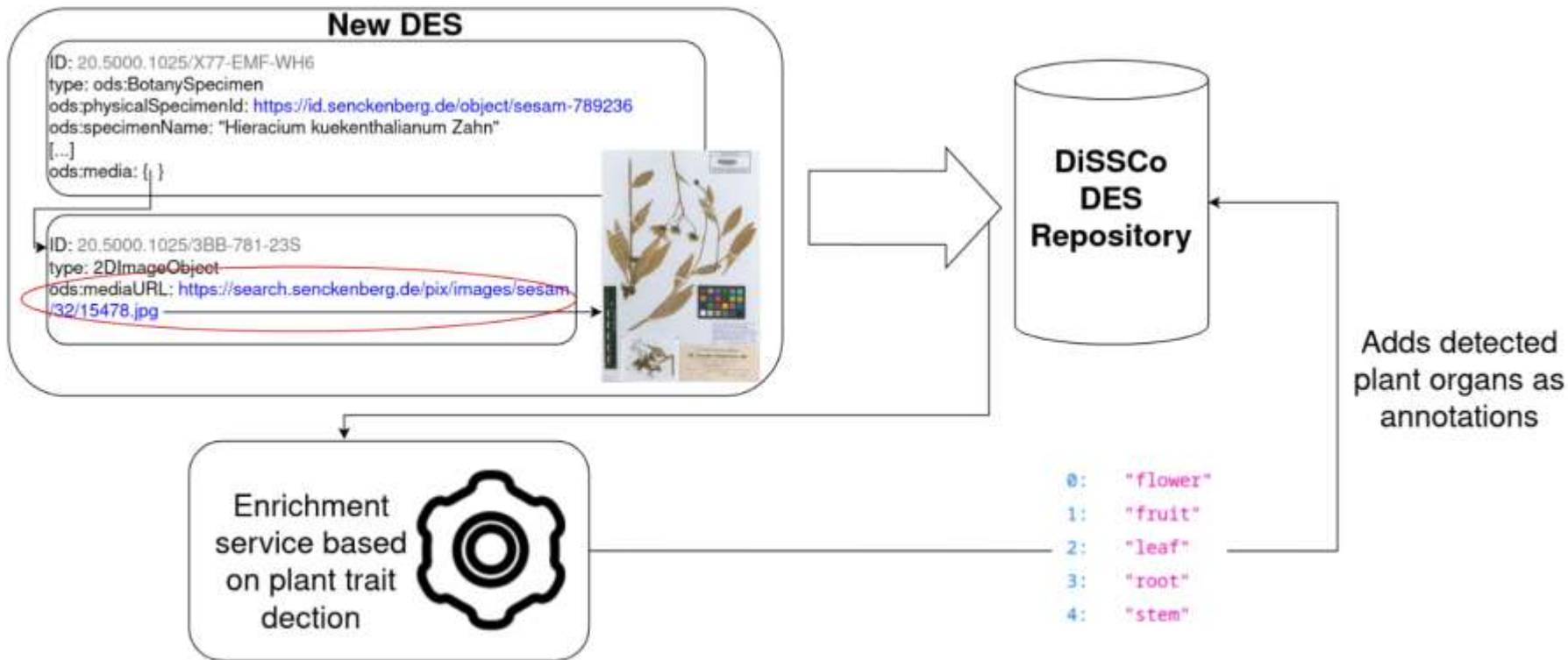
- Nodes represent species and (FLOPO) trait classes, edges (RO) properties.

“Image Pilot”: DL-based plant organ detection



Detect and classify regions of interests (ROI) on herbarium scans

“Image Pilot”: DL-based plant organ detection



ML-generated annotation

Object Id: 20.5000.1025/f9dd382c670e64cccf21

Type: ODStypeV0.1

OBJECT

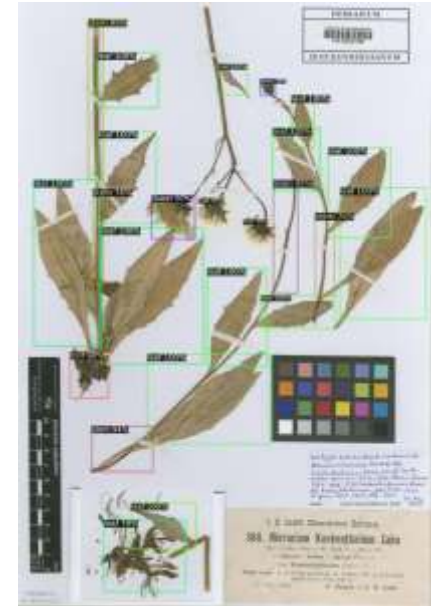
ACL

VERSIONS

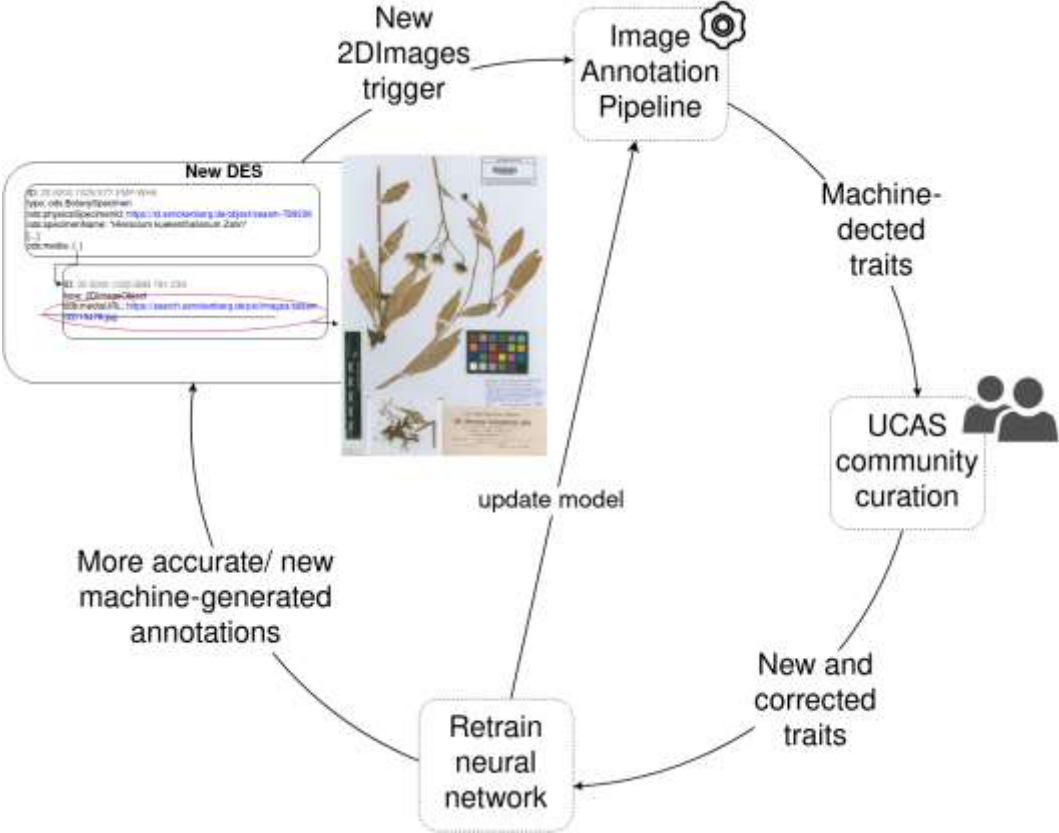
DO VIEW / DETAILS

RELATIVES

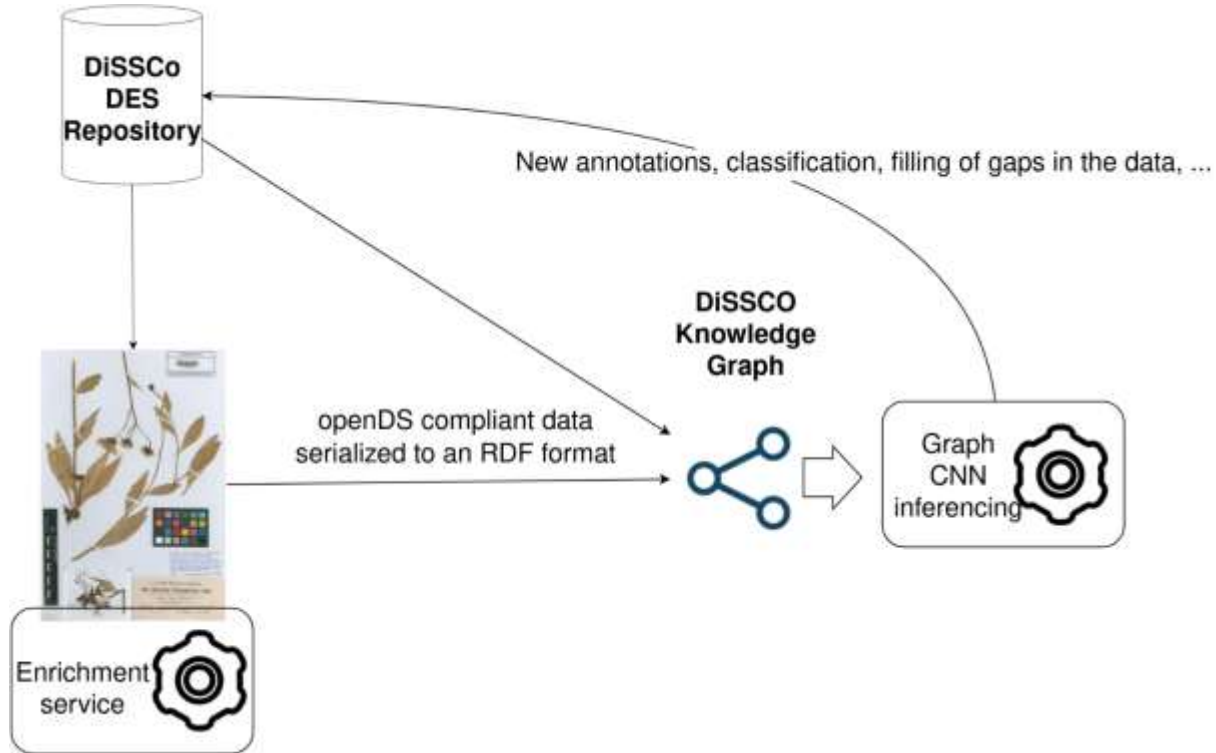
```
Code ▼
191   "dwc:measurementType": "automated plant organ classification",
192   "dwc:measurementValue": "stem",
193   "dwc:measurementAccuracy": 0.9940093755722046
194   },
195   {
196     "@id": "http://nslr.org/objects/20.5000.1025/f9dd382c670e64cccf21/annotations/14",
197     "@type": "Annotation",
198     "oa:hasSelector": {
199       "type": "FragmentSelector",
200       "value": "xywh=2043,3098,515,451"
201     },
202     "dwc:measurementType": "automated plant organ classification",
203     "dwc:measurementValue": "fruit",
204     "dwc:measurementAccuracy": 0.988004207611084
205   },
206   {
207     "@id": "http://nslr.org/objects/20.5000.1025/f9dd382c670e64cccf21/annotations/15",
208     "@type": "Annotation",
209     "oa:hasSelector": {
210       "type": "FragmentSelector",
211       "value": "xywh=823,5538,605,723"
212     },
213     "dwc:measurementType": "automated plant organ classification",
214     "dwc:measurementValue": "root",
215     "dwc:measurementAccuracy": 0.984653651714325
216   },
```



Potential



Vision



Many thanks!

(Contact)

- jonas.grieb@senckenberg.de
- claus.weiland@senckenberg.de



Session:

DIGITAL INFRASTRUCTURE

**Discussion and
Q&A**



30MIN
BREAK

DiSSCo
Distributed System of Scientific Collections

FUTURES
SINASEP's 07-09/02/2023

(We'll be back at 15:30h CET)



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

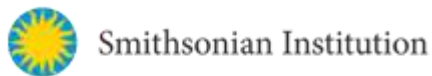
Session:

STANDARDS



Holly Little
Informatics Manager
Department of Paleobiology
Smithsonian National Museum of
Natural History

Standards
The Standards Landscape
And the community that builds it



NATIONAL
MUSEUM *of*
NATURAL
HISTORY



*Paleo Data
Working Group*



Biodiversity
Information
Standards
TDWG



Smithsonian
National Museum of Natural History

Standards - The Standards Landscape - Holly Little



Biodiversity
Information
Standards

TDWG



**BIODIVERSITY
COLLECTIONS NETWORK**



GEOLocate



ZOONIVERSE



Standards are

- an agreement on common practices among multiple parties
- technical specifications that allow for the consistent and interoperable collection and exchange of data in specific environments
- a requirement, a compliance measure, or a minimum set of qualification criteria that something must meet

Evolving Standards

ABCD: Access to Biological Collection Data

EFG: Extension for Geosciences

AC: Audubon Core

DwC: Darwin Core

GGBN: Global Genome Biodiversity Network Standard

LtC: Latimer Core (in review)

MIDS: Minimum Information about a Digital Specimen (in development)

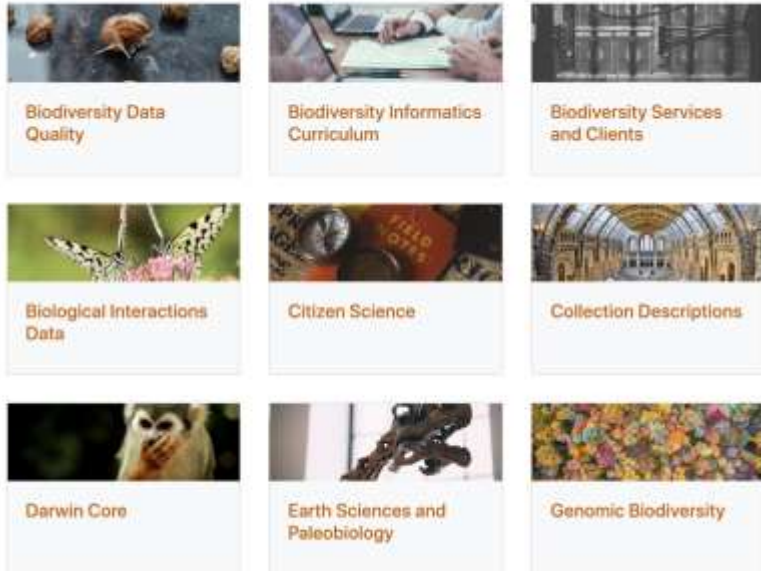


Biodiversity
Information
Standards

TDWG

Create, maintain and promote the use of open, community-driven standards to enable sharing and use of biodiversity data for all

Evolving Standards... as a community



IG Attribution

TG People in Biodiversity Data

MG Audubon Core

TG 3D Imagery and Data

TG Views Controlled Vocabularies

IG Biodiversity Data Quality

TG Framework on data quality

TG Data quality tests and assertions

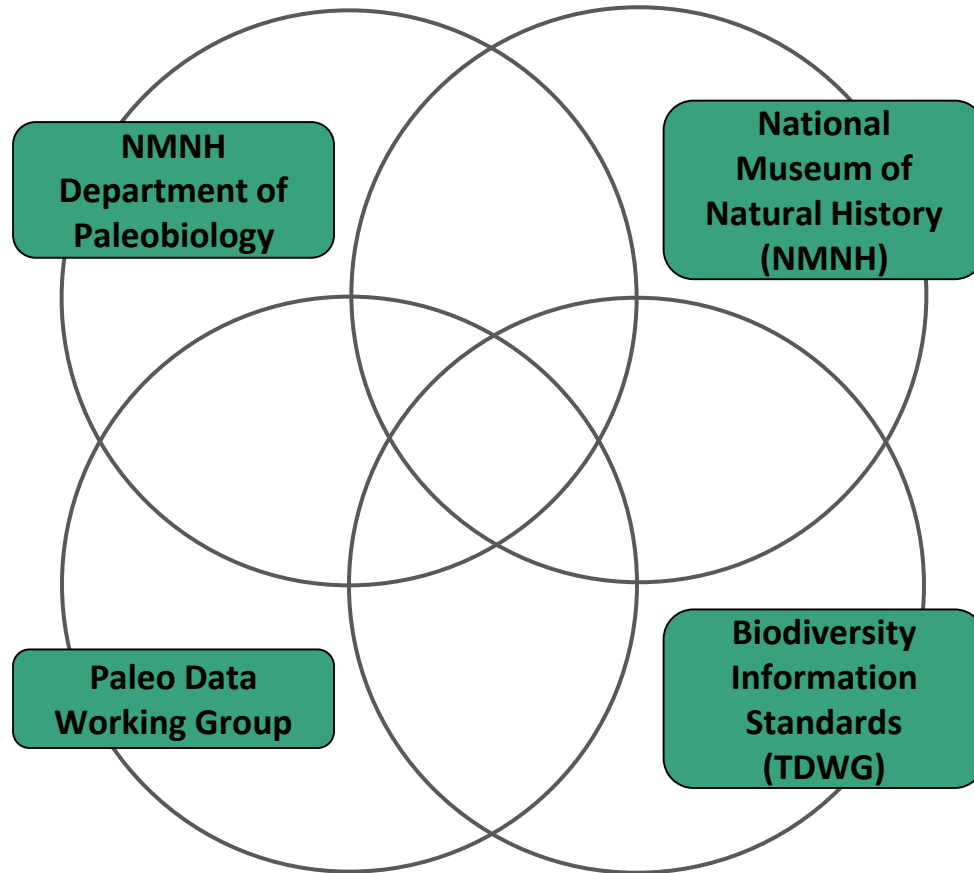
TG Data quality use cases

TG Best practices for development of vocabularies of values ("Vocabularies")

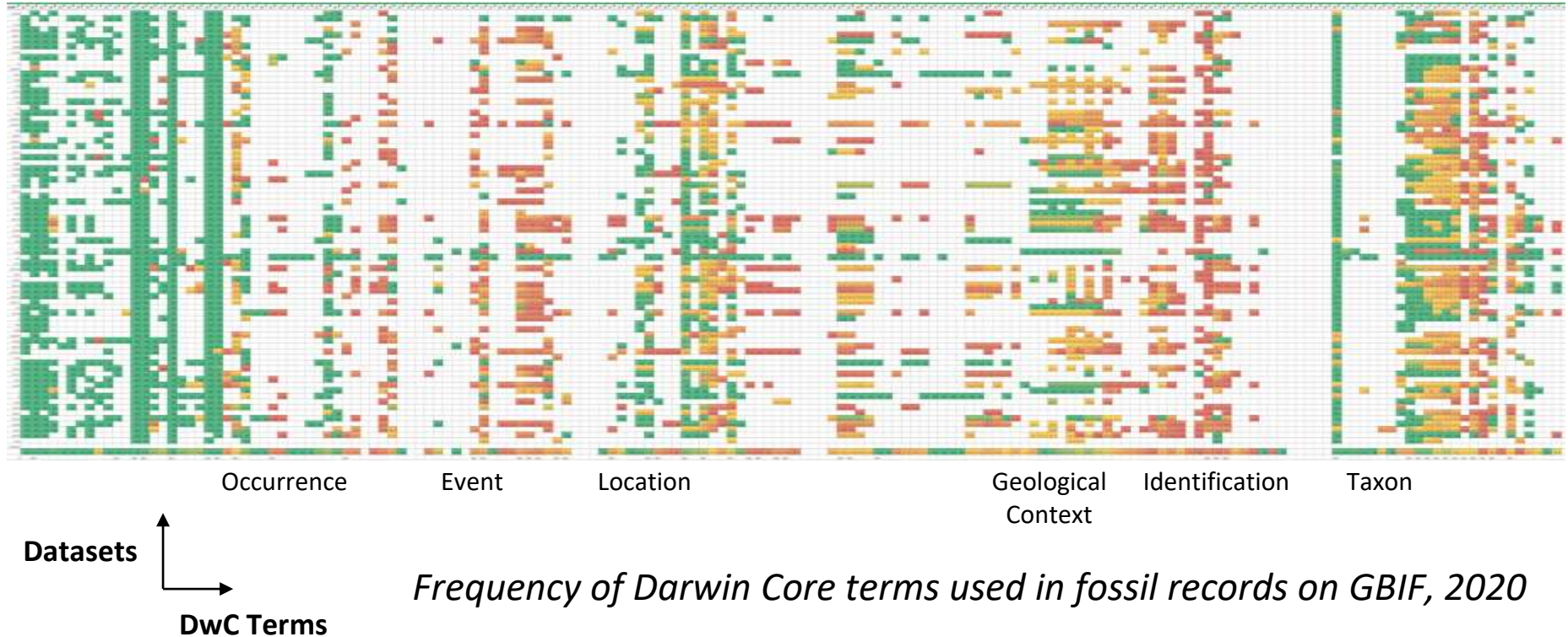


Standards are also

- Identifiers
- Vocabularies
- Ontologies
- Formats
- Infrastructure
- Community
- Guidelines
- Implementation/Adoption
- Maintenance Plans
- Training

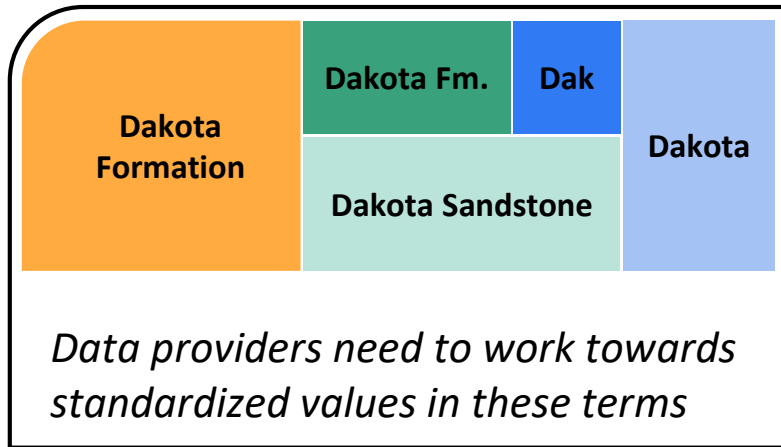


Visualizing Implementation of DwC



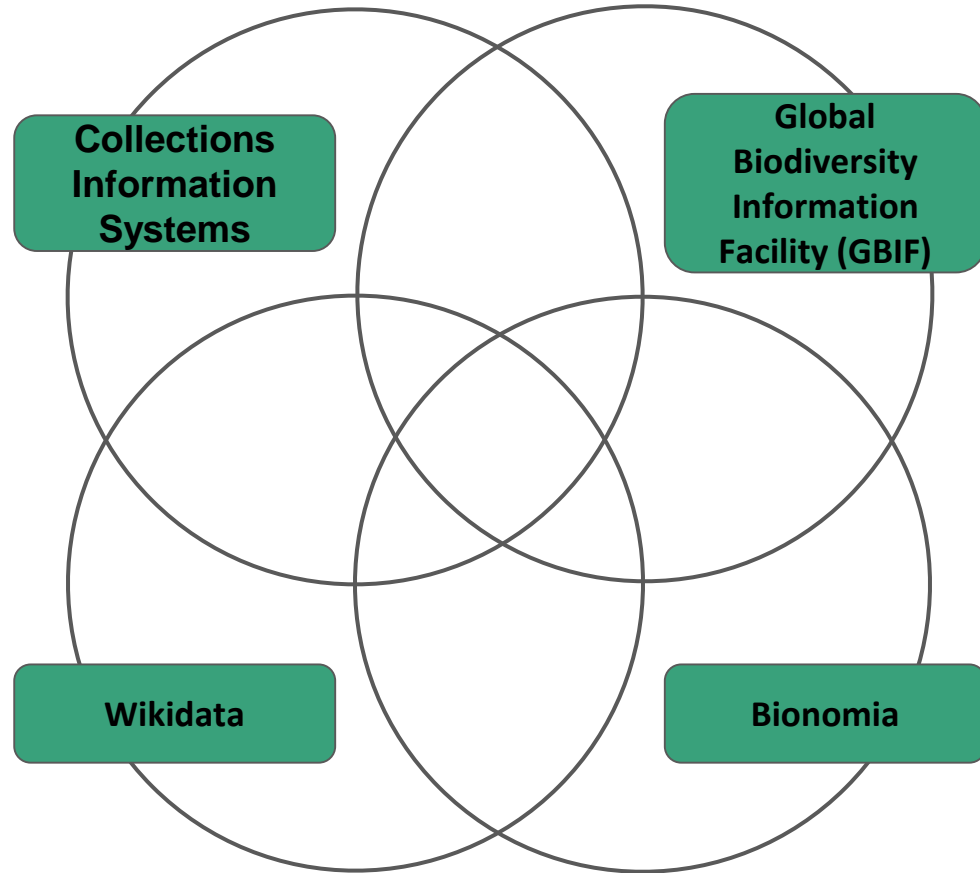
Improving Implementation of Data Standards is Essential for Research

Researchers cannot currently discover data using the entry points they expect, e.g. litho- or chronostratigraphy

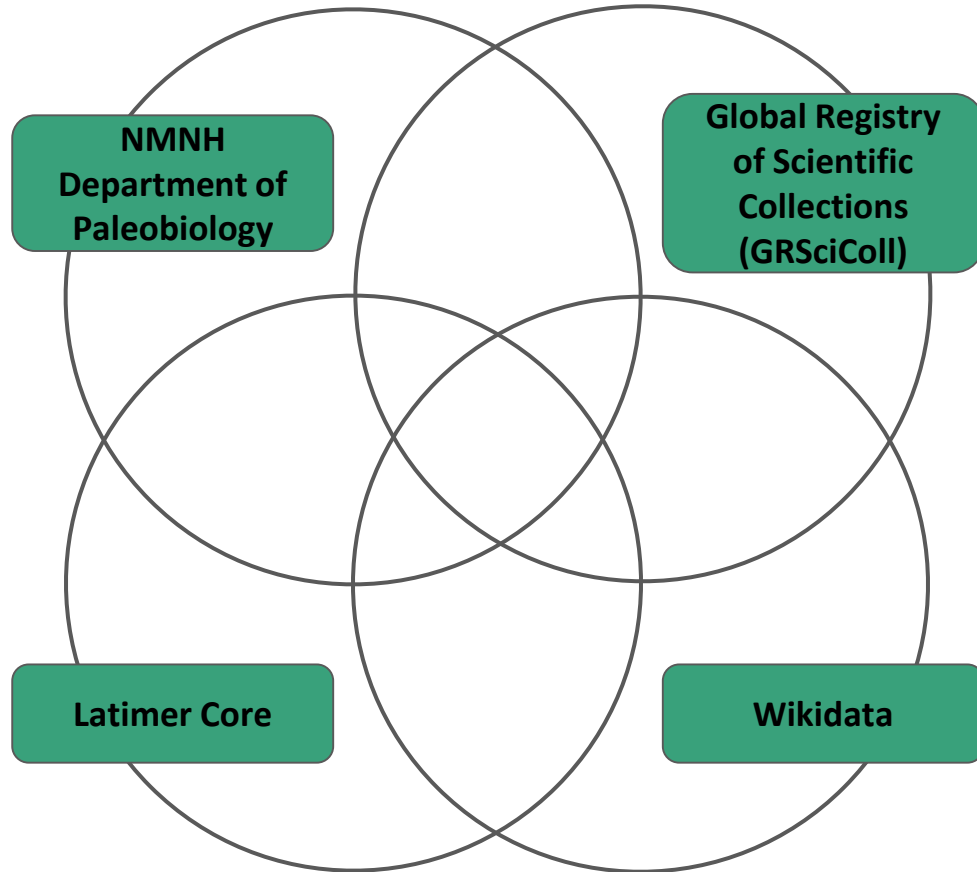


+



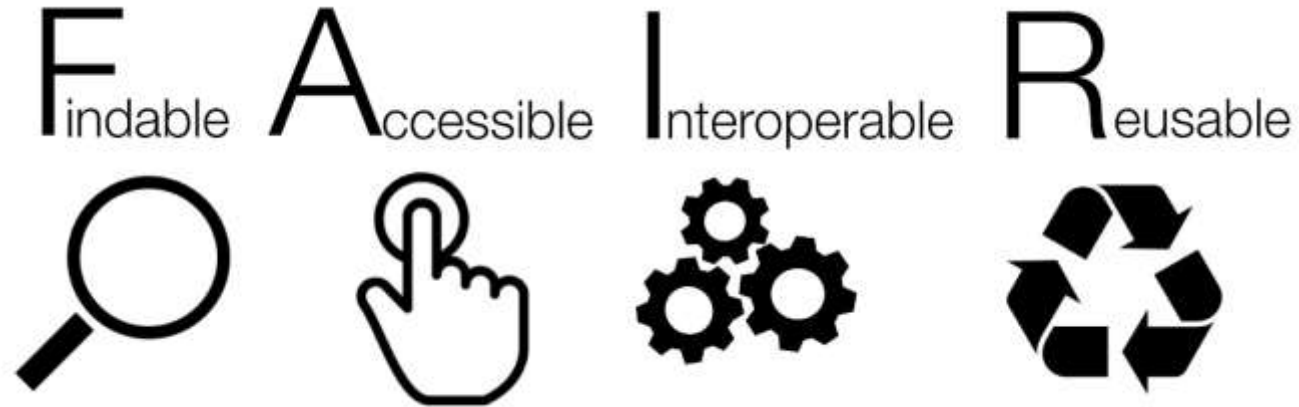


Connect systems that help us see comprehensive views of global collections as a whole



- ❖ **Better Data**
- ❖ **Better Science**
- ❖ **Better Policies**

- biodiversity_next, 2019



https://en.wikipedia.org/wiki/FAIR_data

The next 10+ years

How do we ensure we don't leave anyone behind? And that we don't create barriers to adoption?

How will advances in AI/Machine Learning impact our development and use of standards?


Can we calibrate our standards to each other as a linked ecosystem?

How do we reach new audiences?

What access points are possible and what standards do we need to expose them?

How do we enable new contributions to our data? What are the opportunities for shared authority and enhancement?

Holly Little ▪ littleh@si.edu

 0000-0001-7909-4166

Paleo Data Working Group: <https://paleo-data.github.io/> 



DiSSCO
Distributed System of Scientific Collections



FUTURES
Brussels 07-09/02/2023

**Standards
THANK YOU**



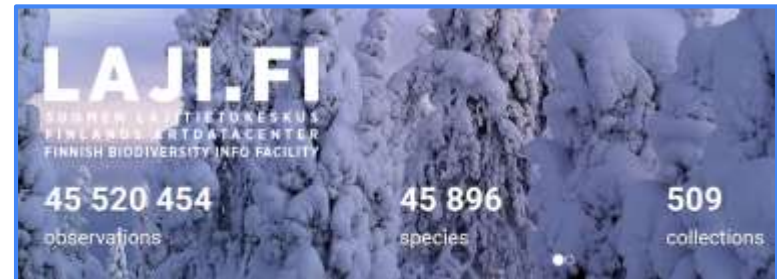
Anniina Kuusijärvi (presenting)
Finnish Museum of Natural History
LUOMUS
Esko Piirainen
Finnish Museum of Natural History
LUOMUS

Standards

CETAF Stable Identifiers at Luomus / FinBIF

Implementation background

- Finnish Museum of Natural History - Luomus maintains Finnish national Collection Management System **Kotka**
- Kotka is used by all natural history museums in Finland (14 institutions)
- Luomus also coordinates and develops **Finnish Biodiversity Information Facility (FinBIF)**
 - **Laji.fi** portal and many other IT systems
- Started assigning URIs for specimens in 2010
- **3,5M specimens** with HTTP URIs



Implementation principles

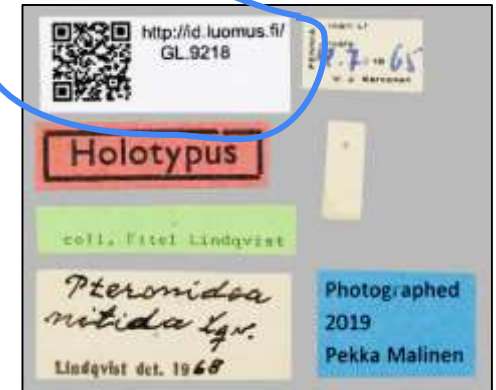
- Globally unique, persistent, resolvable (human and machine) and “dumb”
- Short
- Kotka and other FinBIF information systems use HTTP URIs for **all entity types**, these include e.g.
 - Specimen, preparation/sample, material transaction
 - Media: Image, Audio, Video, 3d-model/scan
 - Collection/Dataset
 - Observation event
 - Annotation / Quality comment
 - IT-system users, organisations
 - Etc..

Main focus on specimen identifiers

Resources	
Name	Count
MY.identification	3760873
MY.unit	3559201
MY.gathering	3481048
MY.document	3481038
MM.image	2450653
MY.measurementClass	2405693
MO.occurrence	393498
MX.taxon	304779
MY.typeSpecimen	153427
MF.sample	138574
MF.preparationClass	126870
MC.taxonConcept	109146
skos:Concept	100194
MKV.iucnRedListEvaluation	83255
PUU.event	73037
MKV.habitatObject	63337
PUU.branch	48478
MKV.endangermentObject	46867
HBF.downloadRequest	17167
MA.person	17130
HRA.transaction	3672

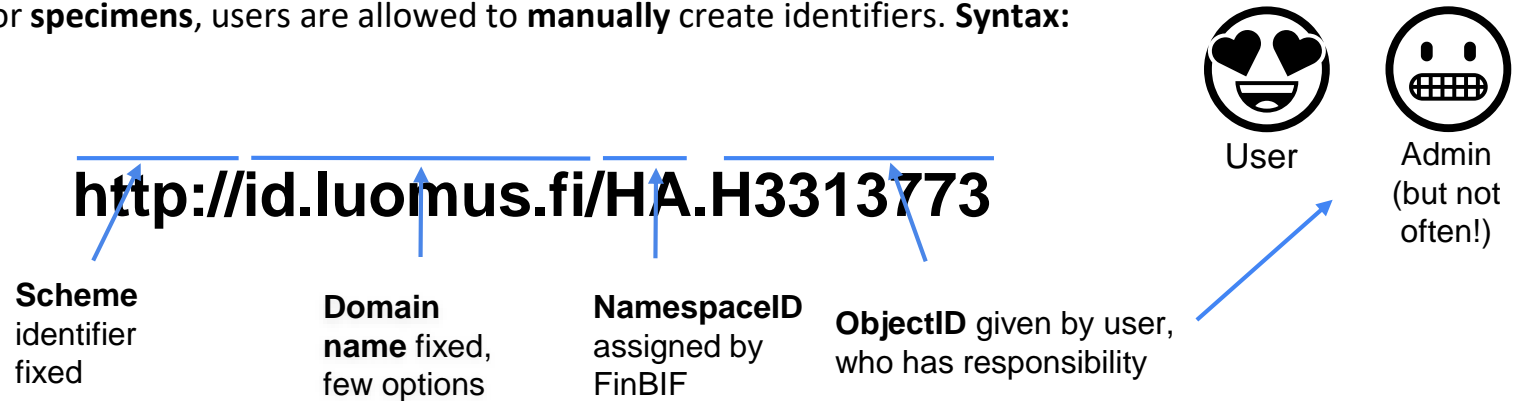
Examples

- **Luomus** specimen: <http://id.luomus.fi/GL.9218>
- Other Finnish Museums:
 - **University of Turku** specimen:
<http://mus.utu.fi/ZMUT.5788>
 - **University of Oulu** herbarium specimen:
<http://id.herb.oulu.fi/GAL.8683>
 - **Kuopio Natural History Museum** specimen:
<http://tun.fi/SLE.42297>
- **tun.fi** used also by all other museums and other type of resources



Identifier syntax and creation

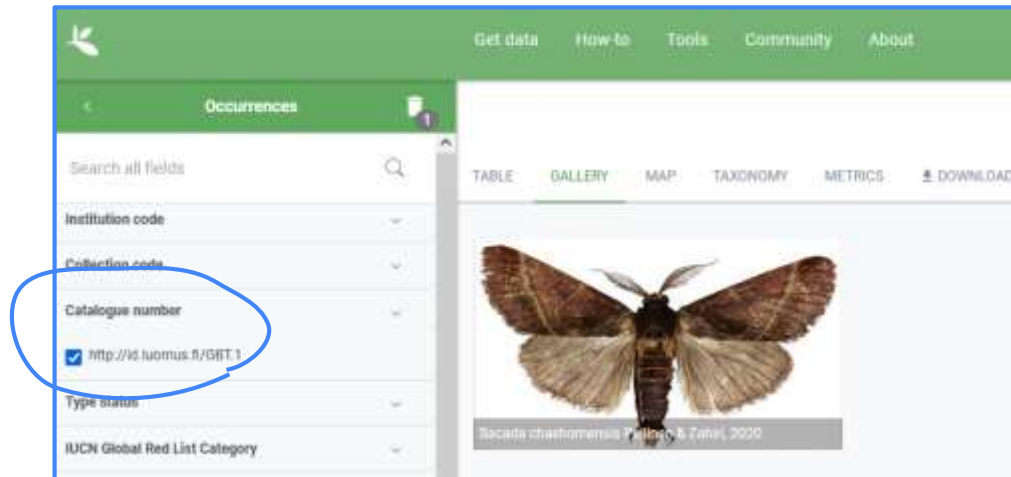
- For **specimens**, users are allowed to **manually** create identifiers. **Syntax:**



- All other resource identifiers are **automatically** generated

Sharing Identifier to GBIF

We include our specimen identifier to GBIF as **dwc:catalogueNumber** – making it findable via GBIF Search UI Simple search



Advantages of the identifiers

- Collections
 - Quick and easy access to specimen data
 - Mobile access
 - Unique & reliable identification of specimens
 - Human-readable & memorable
- Research and open data
 - Increased visibility and quality
 - Quick & easy access to specimen data
 - Traceability
 - Credits to institutions and collectors
- Technical
 - Low cost
 - Easy to maintain



Concluding thoughts

- Users do often want to include **meaning** to identifiers
 - Continuous **balancing act**, think beforehand
- Many competing identifier proposals exist but we at FinBIF **continue with these** for now
 - We are looking into generating DOIs for our specimens as well
- A specimen will always have **multiple identifiers**

helpdesk@laji.fi

Big thanks to my colleagues at Luomus!





**Meise
Botanic Garden**

Mathias Dillen
Quentin Groom
Meise Botanic Garden



Standards

**Minimum Information about a Digital Specimen
(MIDS)**

What is MIDS?

A standard listing the data elements of a Natural History specimen that should be digitally available to achieve a certain level of digitization

1. Bare
2. Basic
3. Regular
4. Extended

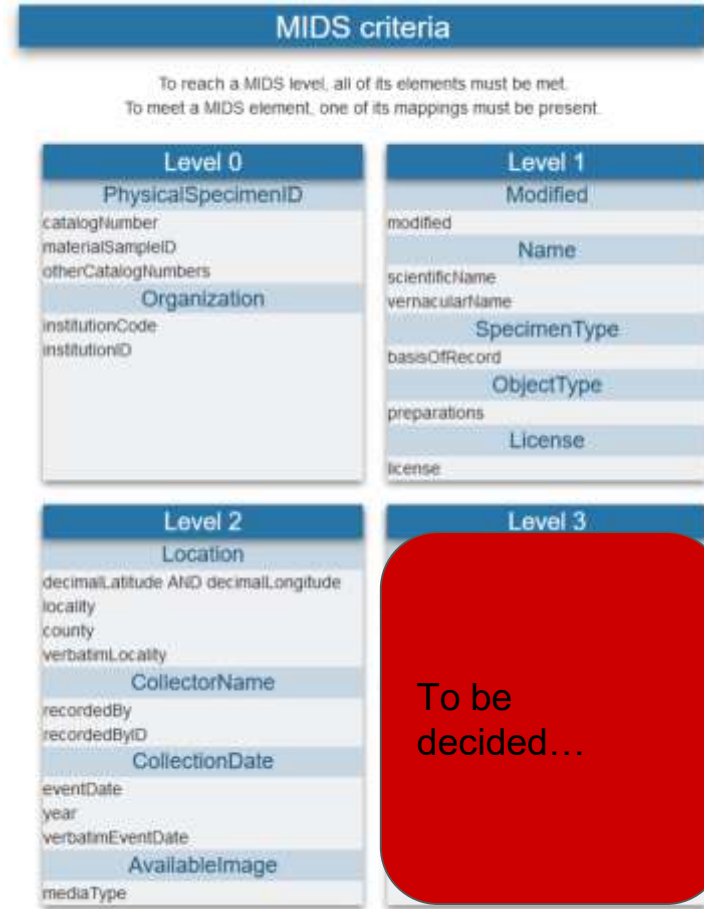
Why do we need MIDS?

- Guide digitization strategies
- Measure digitization status
- Promote interoperability
- Indicate specimen data comprehensiveness

Calculating MIDS

Needs to be

- Reproducible
- Repeatable
- Automatic
- As generic as possible



This page provides an overview of the collections held by participating institutions. The default view shows combined data for all the collections, but you can use the filter on the right to narrow your view down to a single institution, or all institutions within a single country.

Filter by country/institution

All

Collections from **all institutions**

8

Countries

9

Institutions

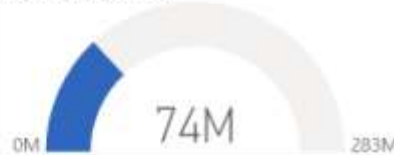
282.8M

Objects

73.8M

Digitised objects

Digitisation progress



Digitised objects by MIDS level



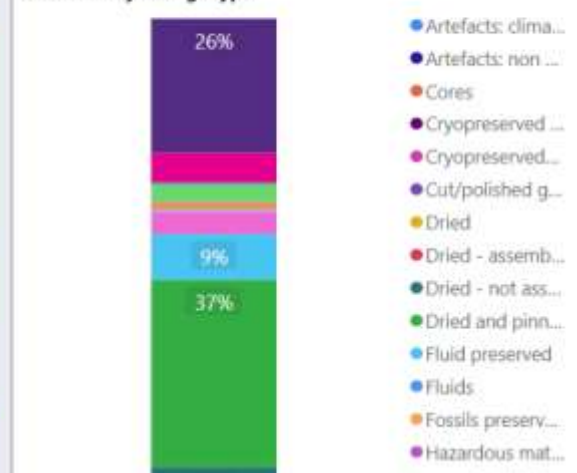
What type of objects are they?

The charts below describe the collection(s) physical characteristics like discipline, classification and storage method

Collection by discipline and category



Collection by storage type



Filter to view MDS scores for part of the dataset

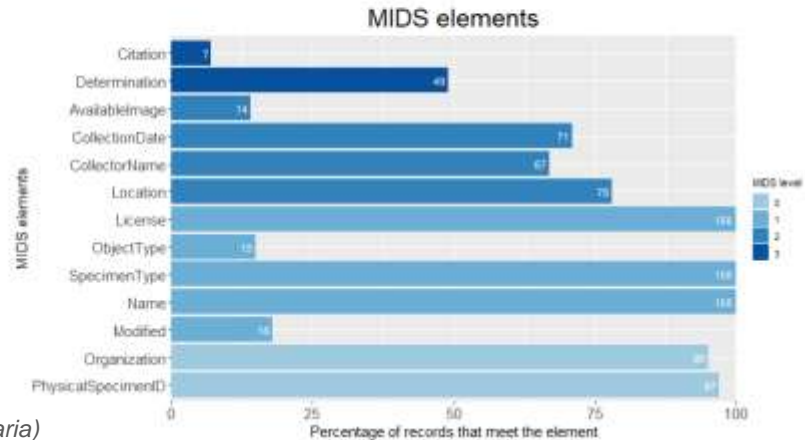
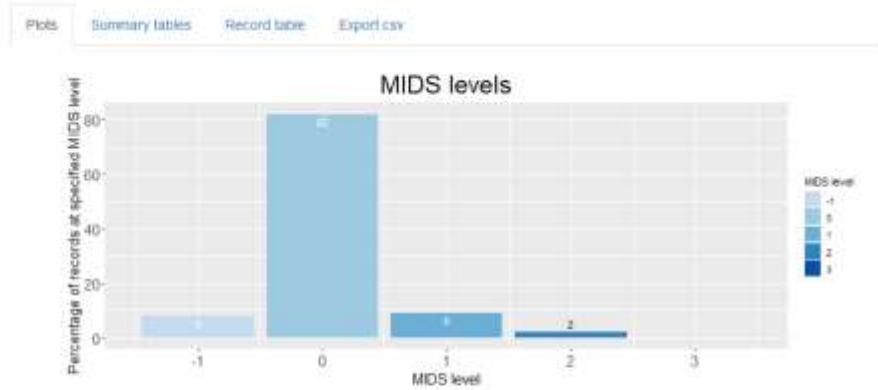
Filter on collection date

Collection date range: 01/01/1951 to 31/12/2022

Filter on countrycode

Filter on the following taxonomic rank

None



GBIF download
 doi:[10.15468/dl.fuu99k](https://doi.org/10.15468/dl.fuu99k)
 (PreservedSpecimen from Bulgaria)

Acknowledgments:

Pieter Huybrechts
Lynn Delgat



**HO
GENT**





Roger Hyam

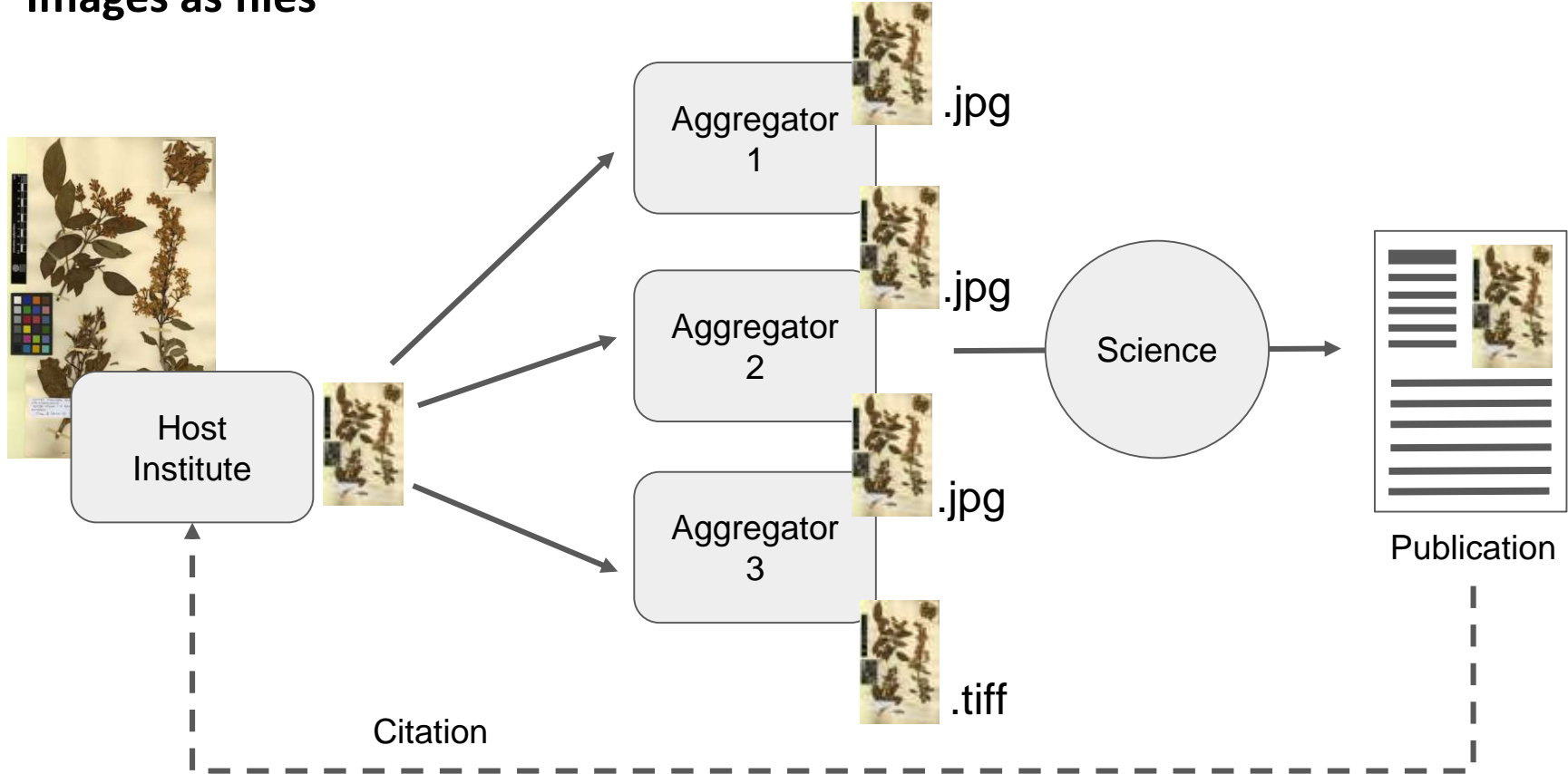
Royal
Botanic Garden
Edinburgh



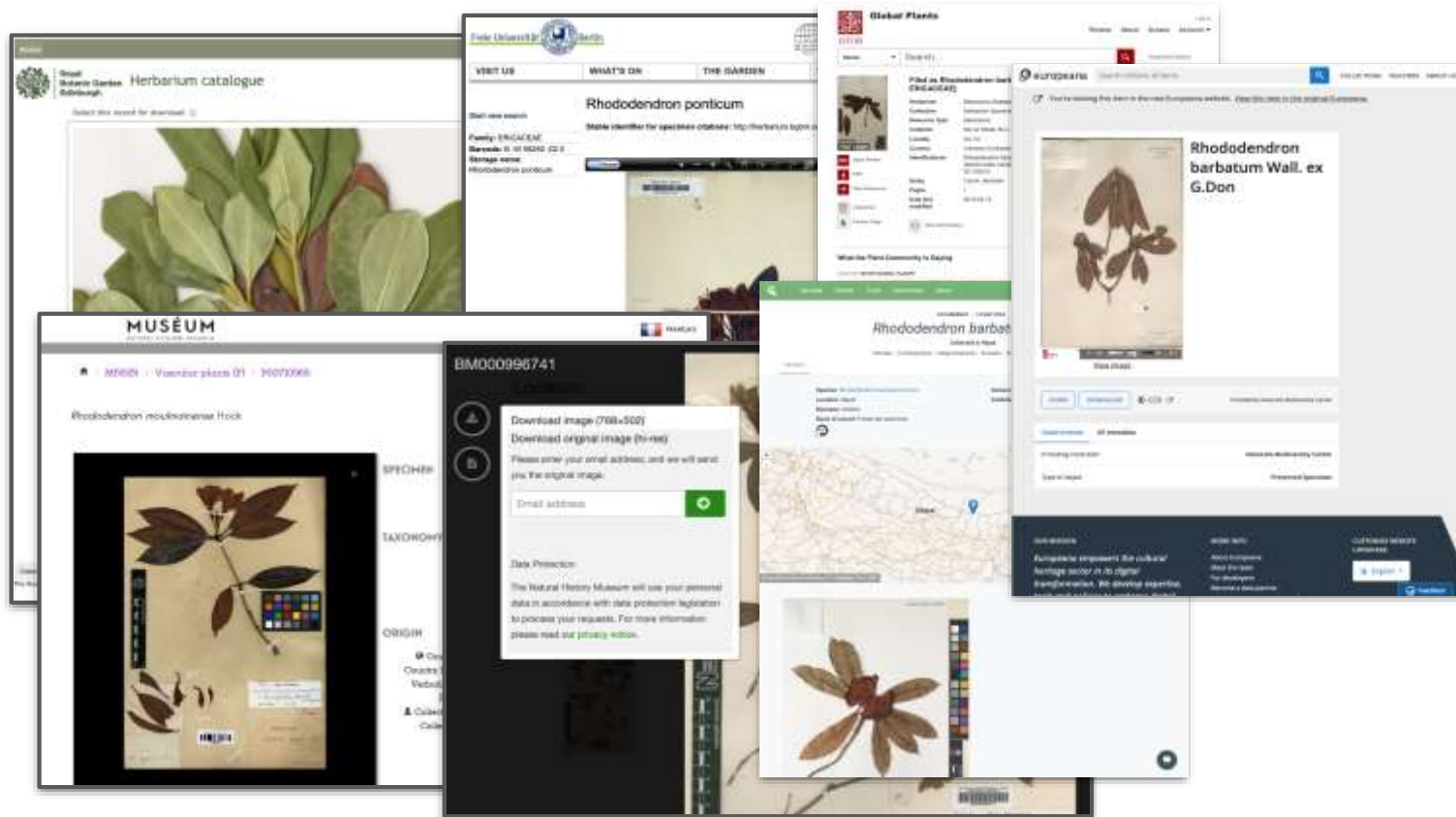
Standards

The International Image Interoperability Framework (IIIF) – taking specimen images to the next level

Images as files



A visualisation zoo!



The trouble with images as files

- **Resolution**
 - Images are rarely shared at the resolution they are captured
 - You can't zoom into a paper.
- **Versioning**
 - There is no single source of authority
 - Improvements don't get pushed to user
- **Compositing**
 - No originals from multiple institutions on the same page
 - Multiple views of the same specimen not supported 🦋
 - Annotations of the image don't appear with the image
 - Transcriptions and translations aren't overlaid
- **Open Science**
 - The user can't contribute back to the origin

Analogy: *“It is like emailing around Word docs rather than using a shared drive.”*

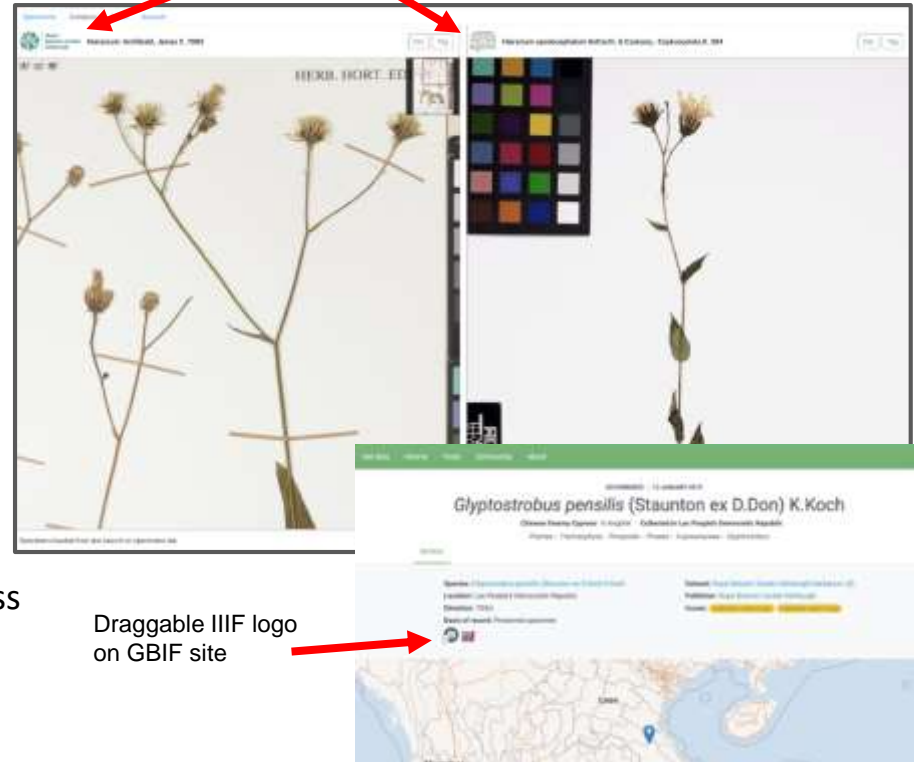


The solution already exists



SYNTHESYS+ Work Package 4 Task 4.3

Specimens from different institutions in the same application



- **Aims**
 - Promote the adoption of IIIF
 - Exemplar implementations
 - Integration with existing standards
- **Outcomes**
 - 11 major institutions from 7 countries
 - 5 case studies
 - Best Practice Implementation Manual
 - Adoption by CETAF as best practice
 - Inclusion in the GBIF index
- **Future Projects**
 - “No brainer” adoption in new deployments
 - Integration with AI by providing uniform access

<https://cetafidentifiers.biowikifarm.net/wiki/IIIF>

- The successful IIF roll-out was the fruit of much hard work by dedicated people spread across institutions and countries.
- Many of these techies are work behind the scenes and don't often get a mention.
- The standards we used have been developed and shared by individuals and institutions from other disciplines in a spirit of openness.
- All these contributions warrant our gratitude.



Standards
THANK YOU

David Fichtmueller
Botanic Garden and Botanical
Museum Berlin (FU-BGBM)



Standards

Wikidata - A Collaborative Database About Everything

What is Wikidata?

A screenshot of the Wikidata page for Wikidata (Q2013). The page is in English and shows the following content:

- Header: English, Not logged in, Talk, Contributions, Create account, Log in
- Navigation: Read, View history, Search Wikidata
- Item: Wikidata (Q2013)
- Description: free knowledge graph hosted by Wikimedia and edited by volunteers
- URLs: wikidata.org | m.wikidata.org | www.wikidata.org | WD | WKP | d
- Language table with columns: Language, Label, Description, Also known as
- Statement: instance of Wikimedia content project
- Statement: semantic wiki

What is Wikidata?



Structured Information



=

Encyclopedic Articles



Data Model

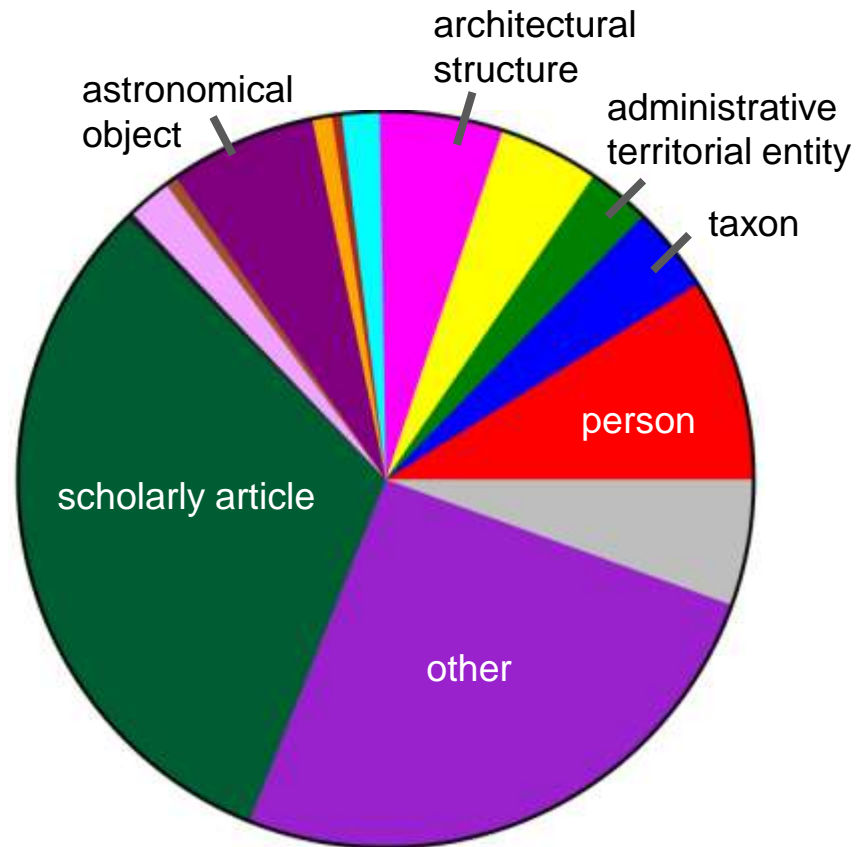
The screenshot shows the Wikidata page for the item 'European Union' (Q458). The page is annotated with green boxes and labels to illustrate its data model components:

- Label:** A box around 'European Union' is labeled 'Label'.
- Q-Number:** A box around '(Q458)' is labeled 'Q-Number'.
- Description:** A box around 'political and economic union of 27 European states' is labeled 'Description'.
- Aliases:** A box around 'EU | E.U. | eu | Europe' is labeled 'Aliases'.
- Table:** A table with columns 'Language', 'Label', 'Description', and 'Also known as' is shown. The 'Also known as' column lists 'EU', 'E.U.', and 'eu'.
- Statements:** A box around the first statement 'instance of regional organization' is labeled 'Statement'. The 'instance of' part is labeled 'Property' and 'regional organization' is labeled 'Object'.
- Data Value:** A box around '1 November 1993' is labeled 'Data Value'.
- Qualifiers:** A box around 'statement is subject of Maastricht Treaty' is labeled 'Qualifiers'.

The left sidebar contains navigation links such as 'Main page', 'Community portal', 'Project chat', 'Create a new item', 'Recent changes', 'Random item', 'Query Service', 'Nearby', 'Help', 'Donate', 'Lexicographical data', 'Tools', and 'Cite this page'.

Statistics

- > 100.000.000 Items
- > 1.800.000.000 Edits
- 25.000 Active Users
- 11.000 Properties



Editing

Manual

- Easy to use UI

s

country (*sovereign state*)
sovereign state that this item is in (not to be used for human beings)

main subject
primary topic of a work (see also P180: depicts)


published in
larger work that a given work was published in, like a book, journal c

author name string (*songwriting credits string*)
stores unspecified author or editor name for publications; use if Wiki

stated in
to be used in the references field to refer to the information documer

Semi-Automated

- QuickStatements

QuickStatements 

Create new command batch for as

NEW	Len	"My Test Item"	Den	"Just an example it
LAST	P31	Q14944328		
LAST	P170	Q58329424		

Automated

- Via API

Querying

API

- When you know what you want

Query Service

- SPARQL Queries


Wikidata Query Service

Examples
Help
More tools
Query Builder









```

1 SELECT ?author ?authorLabel ?animal ?animalLabel ?publication ?publicationLabel WHERE {
2   ?author wdt:P31/wdt:P279* wd:Q39201.
3   ?author wdt:P31 ?animal.
4   ?author wdt:P800 ?publication.
5   ?publication wdt:P31 wd:Q13442814.
6
7   SERVICE wikibase:label { bd:serviceParam wikibase:language "[AUTO_LANGUAGE],en". }
```

author	authorLabel	animal	animalLabel	publication	publicationLabel
 wd:Q1386318	F. D. C. Willard	 wd:Q146	house cat	 wd:Q29597859	Two-, Three-, and Four-Atom Exchange Effects in bcc ³ He

Community

New Properties

- Proposal: Why is it needed? Where and how would it be used?
- Public Comment Period: Other Wikidata users can weigh in.
- If general support: new Property is created.

Wiki Projects for specific topics

WikiProject Biodiversity

https://www.wikidata.org/wiki/Wikidata:WikiProject_Biodiversity

WikiProject Taxonomy

https://www.wikidata.org/wiki/Wikidata:WikiProject_Taxonomy

Wikibase

The software that Wikidata runs on.

Mediawiki with Wikibase Extensions and related tools

You can run your own instance

For content that doesn't fit into Wikidata





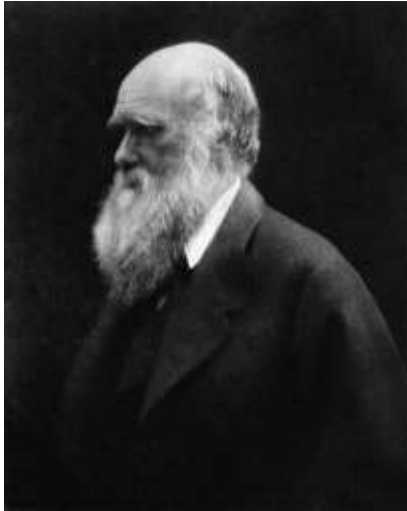
Standards
THANK YOU



Joaquim Santos
University of Coimbra (Herbarium)

Standards People's identifiers

People are a fundamental part of Natural History Collections



Charles Darwin

Julia Margaret Cameron, Public domain, via
Wikimedia Commons



**A line-up of Charles Darwin's finch specimens from
the Galapagos Islands**

© The Trustees of The Natural History Museum, London

People are unique, but their names are not



Schimper

[Add languages](#) ▼

[Article](#) [Talk](#)

[Read](#) [Edit](#) [View history](#)

From Wikipedia, the free encyclopedia

Schimper is a surname. Notable people with the surname include:

- [Andreas Franz Wilhelm Schimper](#) (1856–1901), botanist and phytogeographer
- [Georg Wilhelm Schimper](#) (1804–1878), German botanist and naturalist, born in Reichenschwand
- [Karl Friedrich Schimper](#) (1803–1867), German naturalist and poet
- [Wilhelm Philippe Schimper](#) (1808–1880), German-French botanist, born in Dossenheim-sur-Zinsel, a town near the River Rhine

*This page lists people with the surname **Schimper**.*



If an [internal link](#) intending to refer to a specific person led you to this page, you may wish to change that [link](#) by adding the person's [given name\(s\)](#) to the link.

Category: Surnames

Some people can use different names

MACDONALD COLLEGE HERBARIUM

Scientific name *Carex pedunculata* Muhl.

English name


Place collected *Île Perrot PQ*

Date *May 11, 1937*

Collector *Dorothy E. Newton*

McGill University Herbarium

MONT RIGAUD



Co. Vaudreuil
Quebec, Canada

Lat. 45°25' N to 45°29' N
Long. 74°14' W to 74°21' W
Alt. 38m to 221m
Duplicates 0

August 13, 1977

Polygonum pensylvanicum L.

Roadside. In sun, on dry sandy gravel.
Coll. Linda Newstrom 1051 Det. by D. Swales


We need a way to unambiguously identify people

- VIAF - Virtual International Authority File
- ISNI - International Standard Name Identifier
- Harvard Index of Botanists
- IPNI - International Plant Names Index
- ZooBank
- Biodiversity Heritage Library
- **ORCID - Open Researcher and Contributor ID**
- **Wikidata**



Bionomia

Profiles Scribers Organizations Datasets Articles Countries Families Agent Strings Help Others



Wilhelm Philippe Schimper

Guillaume Philippe Schimper; Schimpf.; Wilhelm Philipp Schimper
 * January 12, 1800 – March 20, 1880
 botanist, paleontologist, librarian, mycologist, university teacher, biologist, zoologist
 French botanist (1800-1880)

<https://www.wikidata.org/wiki/Q63251>
 W: https://en.wikipedia.org/wiki/Wilhelm_Philippe_Schimper [view]
 Germany France

Public Profile Refresh

Discover **21** File Attributions Reclaims Ignored Bulk Attributions

Help attribute 21,137 specimens. Choose collected, identified, or both Make less exact [Advanced Search & Filter](#)

Bulk Assignment		Scientific Name	Collected By	Identified By	Date Collected	Date Identified	Family	Institution	Catalog Number	Type Status	Basis Of Record	Full Item
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both	Both

The screenshot shows the article page for "The disambiguation of people names in biological collections" on the Biodiversity Data Journal website. The page includes a navigation bar with "Home", "Articles", "About", "About Person", "Books", "Journals", and "Blog". The article is categorized as "Methods" and is dated 10 Oct 2022. The authors listed are Quentin Groom, Christian Bräucher, Robert W. N. Cuhay, Matthias Dillen, Peter Huybrechts, Nicole Koenig, Niels Klazenga, Siobhan Leachman, Deborah L. Paul, Heather Rogers, Joaquim Santos, David Peter Shorttouse, Alison Vaughan, Sabine von Meiring, and Elspeth M Haston. The abstract discusses the challenges of disambiguating people's names in biological collections and the need for a shared dataset and standards. A sidebar on the right contains a table of contents and a list of related resources and best practices. The page is powered by ORPHA.

Biodiversity Data Journal Home Articles About About Person Books Journals Blog My tasks Joaquim Santos

Methods Biodiversity Data Journal 10, e85088
<https://doi.org/10.3897/BDJ.10.e85088> (10 Oct 2022)

The disambiguation of people names in biological collections

✦ Quentin Groom, Christian Bräucher, Robert W. N. Cuhay, Matthias Dillen, Peter Huybrechts, Nicole Koenig, Niels Klazenga, Siobhan Leachman, Deborah L. Paul, Heather Rogers, Joaquim Santos, David Peter Shorttouse, Alison Vaughan, Sabine von Meiring, Elspeth M Haston

Abstract

Scientific collections have been built by people. For hundreds of years, people have collected, studied, identified, preserved, documented and curated collection specimens. Understanding who those people are is of interest to historians, but much more can be made of these data by other stakeholders once they have been linked to the people's identities and their biographies. Knowing who people are helps us attribute work correctly, validate data and understand the scientific contribution of people and institutions. We can evaluate the work they have done, the interests they have, the places they have worked and what they have created from the specimens they have collected. The problem is that all we know about most of the people associated with collections are their names written on specimens. Disambiguating these people is the challenge that this paper addresses. Disambiguation of people often proves difficult in isolation and can result in staff or researchers independently trying to determine the identity of specific individuals over and over again. By sharing biographical data and building an open, collectively maintained dataset with shared knowledge, expertise and resources, it is possible to collectively deduce the identities of individuals, aggregate biographical information for each person, reduce duplication of effort and share the information locally and globally. The authors of this paper aspire to disambiguate all person names efficiently and fully in all their variations across the entirety of the biological sciences, starting with collections. Towards that vision, this paper has three key aims: to improve the linking, validation, enhancement and valorisation of person-related information within and between collections, databases and publications; to suggest good practice for identifying people involved in biological collections; and to promote coordination amongst all stakeholders, including individuals, natural history collections, institutions, learned societies, government agencies and data aggregators.

Keywords

Contents Article info Citation Metrics Comment Related

Pgs	Taxa	Data	Bels	Cited
Article metadata				
Introduction				
Disambiguation in Society				
— Ethical and legal considerations				
— Cultural considerations				
— Prejudices & biases				
The informatics landscape of disambiguation				
— Wikidata				
— ORCID				
— Bionomia				
— Sustainability				
Relevant informatics resources				
— Exchange standards				
— OpenRefine				
Best practices				
— Before you start				
— Preparation				
— Prioritisation				
Search				
— Searching in collection management systems				
— Searching online				
Assets				

Sign up

Powered by ORPHA

**Linking all existing specimens to the people that collected them,
and ensuring that new specimens have unambiguous collectors
from deposition in a collection**

Creation and implementation of Identifiers for people connected to scientific collections will:

- allow interoperability of scientific data
- give a boost to interdisciplinary research
- **raise the quality of biodiversity data**
- **quantify the return of investment of research**
- **reveal and acknowledge the contribution to science of a wider diversity of people involved in the collections**
- give recognition to the colonial history of collections
- reduce the costs of maintaining collection data
- **help implement the Nagoya protocol and the targets of the CBD**
- **increase efficiency of digitisation of collections**
- facilitating reporting requirements



THANK YOU

Matt Woodburn
Natural History Museum, London



Standards

Latimer Core: overview and applications



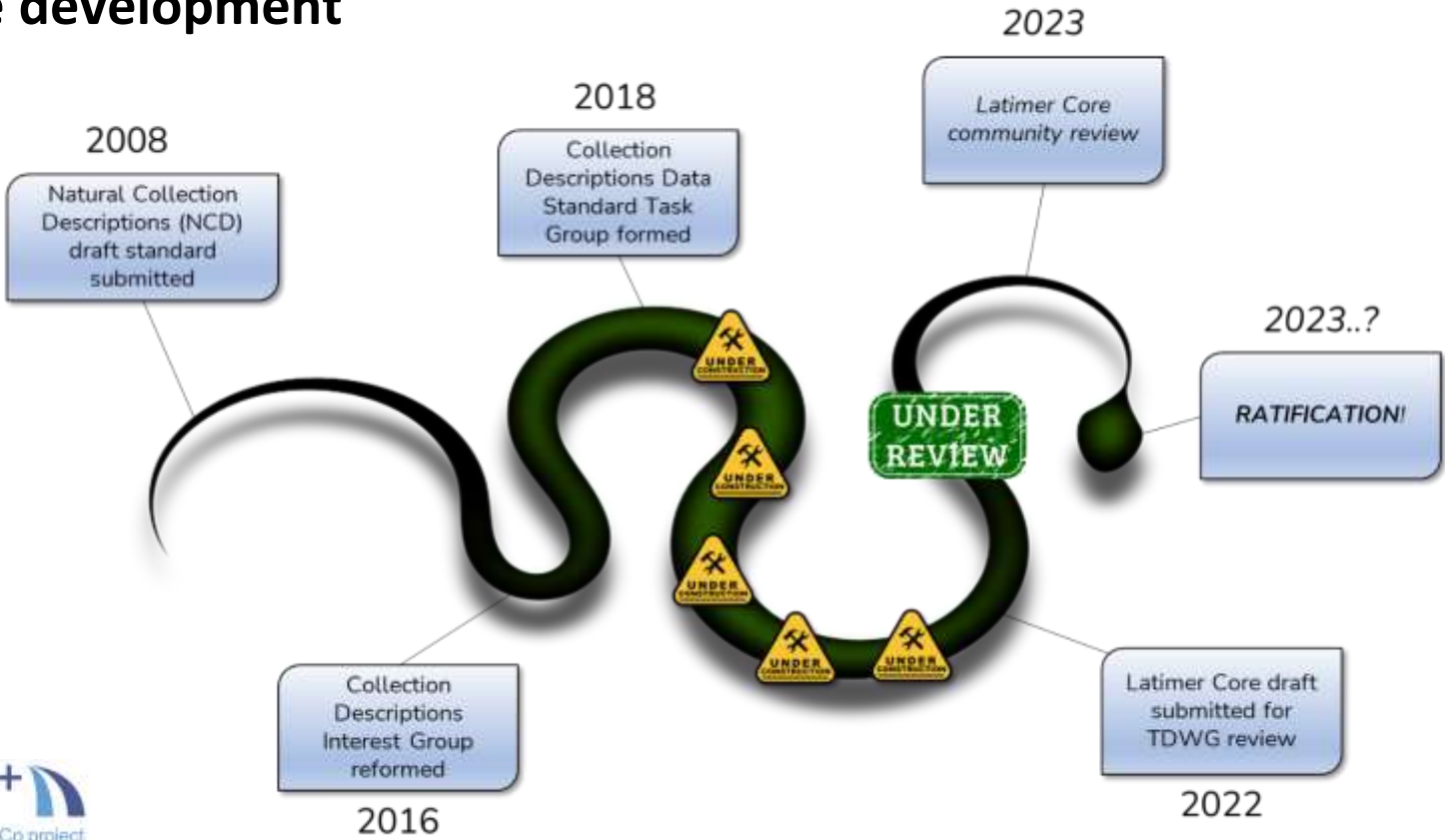
What is Latimer Core?

A TDWG data standard for describing collections of natural science objects

- Supports the representation and discovery of natural science collections, by structuring data about the **groups of objects** that those collections and their subcomponents encompass
- Applies to a wide range of collection description use cases, from describing the overall collections holdings of an institution to the contents of a single drawer of material
- Enables the modelling of the sometimes complex relationships between these groups of objects



Latimer Core development





Overview

23 classes, 224 properties

Structuring, describing and interlinking the data - persistent identifiers (PIDs), licences, links etc

CollectionDescriptionScheme

SchemeTerm

SchemeMeasurementOrFact

RecordLevel

ResourceRelationship

Dynamic metrics and narratives

MeasurementOrFact

Taxon

GeographicOrigin

ChronometricAge

GeologicalContext

ObjectClassification

Characteristics of the objects within the group

ObjectGroup

The 'collection' - a group of collection objects, with properties that describe them collectively

OrganisationalUnit

CollectionStatusHistory

StorageLocation

Collections custody, management and tracking

Person

Identifier

PersonRole

Reference

Address

TemporalCoverage

ContactDetail

Event

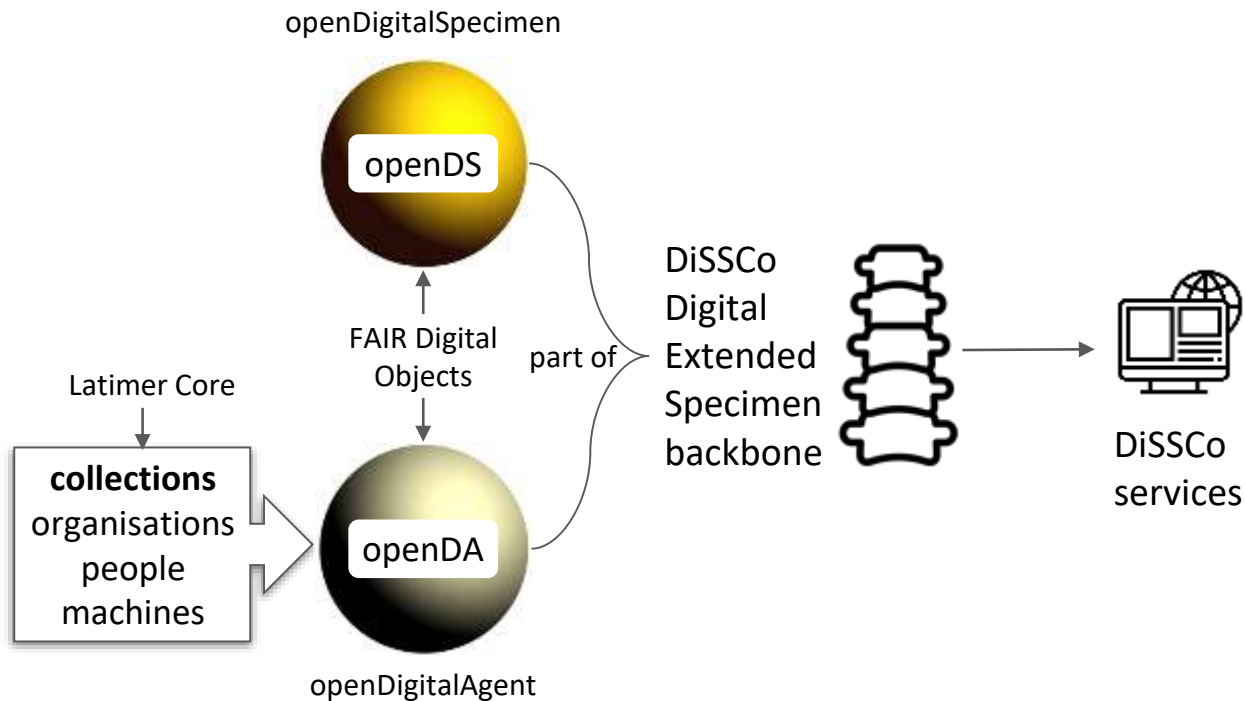
Generic, reusable classes



Applications: DiSSCo core data architecture



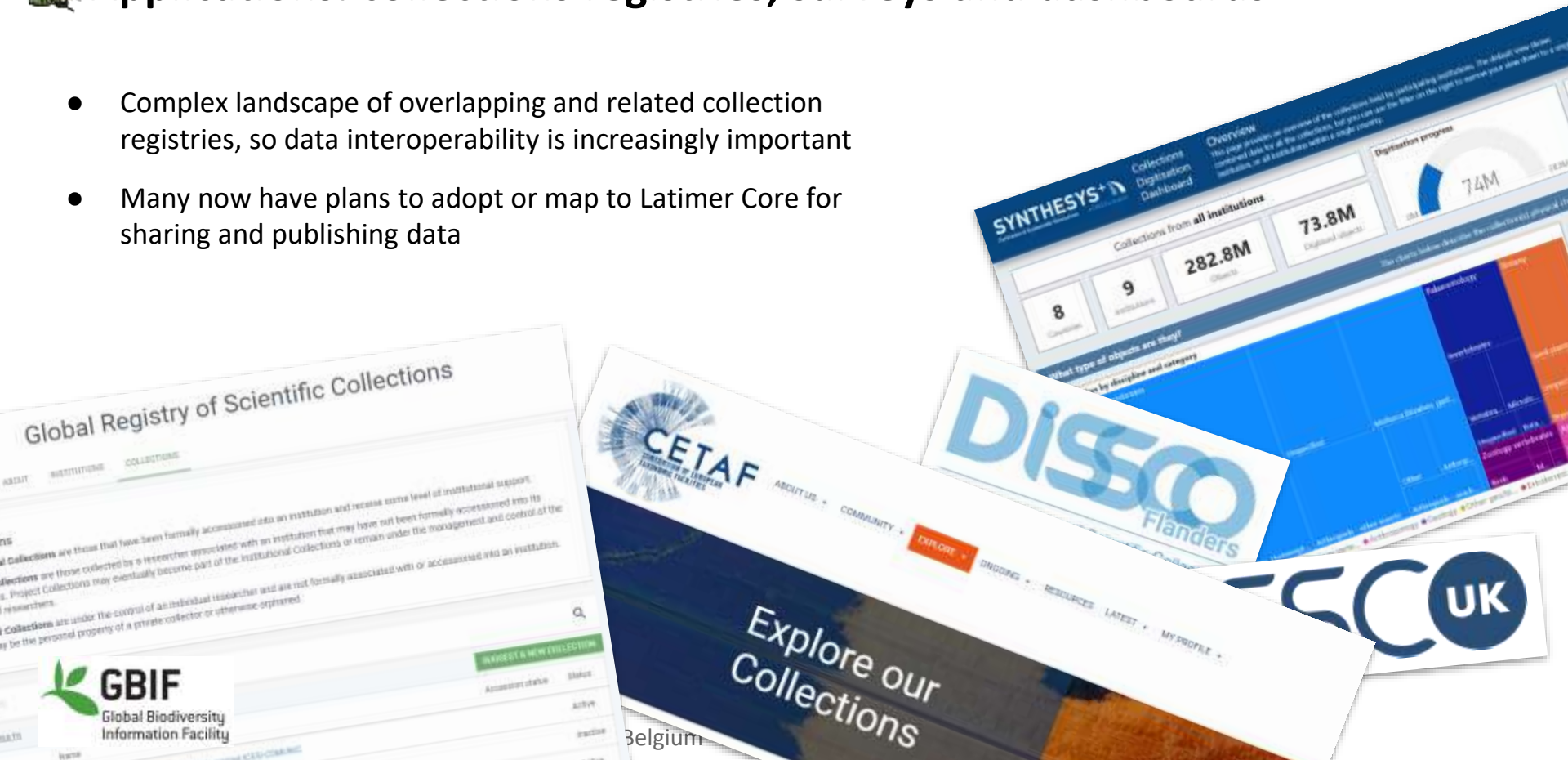
- Work in progress to serialise Latimer Core as FAIR Digital Objects, to represent collections in the core DiSSCo Digital Object Architecture
- Collections data will be served up as Latimer Core to DiSSCo end user services (e.g. ELViS and the Collections Digitisation Dashboard)





Applications: collections registries, surveys and dashboards

- Complex landscape of overlapping and related collection registries, so data interoperability is increasingly important
- Many now have plans to adopt or map to Latimer Core for sharing and publishing data





Applications: institutional collections management

Collections assessment and discovery ("Join the Dots")

~3000 object groups providing a structured overview of the entire NHM collection, digitised and undigitised

Used as an internal tool for collections assessment, and published on the NHM Data Portal for discovery

Collections move programme ("NHM Unlocked")

Latimer Core models and concepts are underpinning spatial calculations, conservation assessments and move planning for relocation of 30M+ specimens

Exploring the application to above-specimen-level digitisation workflows



Collections Management System implementation ("RECODE")

Exploring the implementation of Latimer Core as a core data structure for representing groups of objects across a range of potential use cases

narratives, thematic collections, collected material, loans, acquisitions, audits, unsorted collections, indexes...

Please visit

Standards - Latimer Core: overview and applications - [Matt Woodburn](#)

<https://github.com/tdwg/cd/wiki>

for more information

Huge thanks to

Ben Norton

Deborah Paul

Gabriele Dröge

Ian Engelbrecht

Janeen Jones

Jutta Buschbom

Kate Webbink

Maarten Trekels

Quentin Groom

Rob Sanderson

Sarah Vincent

Sharon Grant

Steve Baskauf

(and many others!)



FUTURES
Brussels 07-09/02/2023

Standards
THANK YOU

Edmund K. Schiller
Naturhistorisches Museum Wien



Standards

Sorting our jungle of juristic requirements

with suggestions for implementation in and beyond DiSSCo

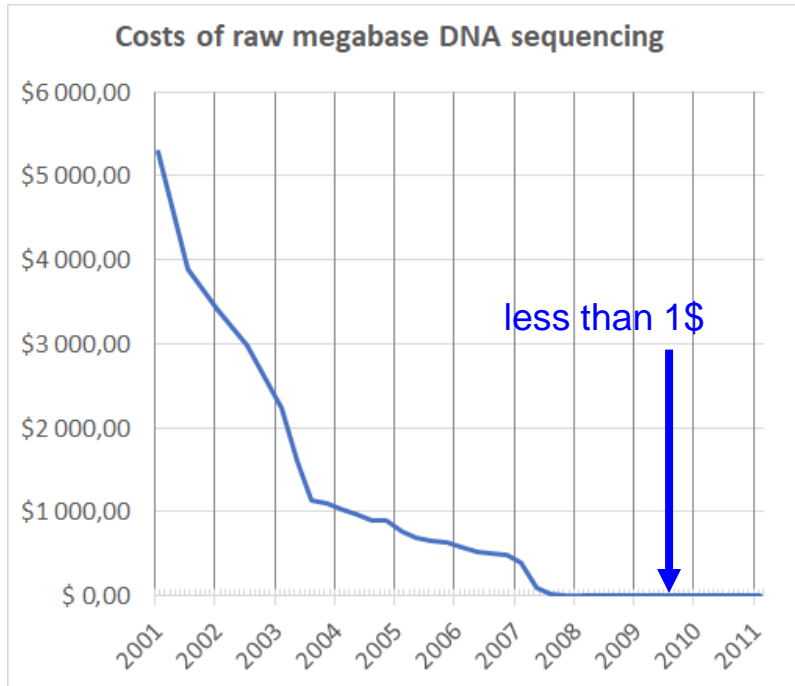
For decades - or even centuries - it is daily business to sort organisms



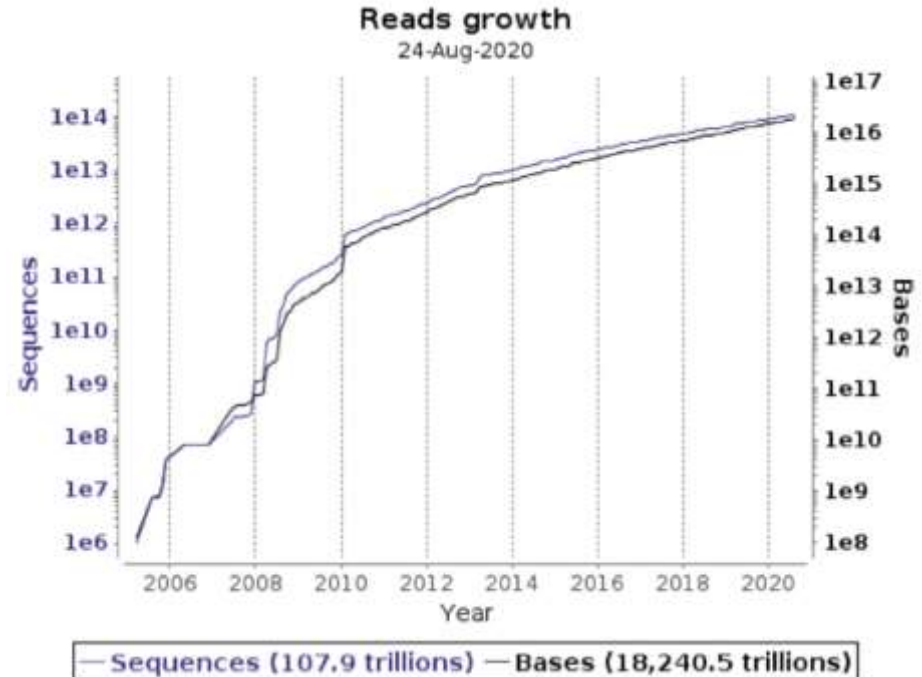
after collecting, & where necessary export/import



Genetic research became cheaper – much cheaper !



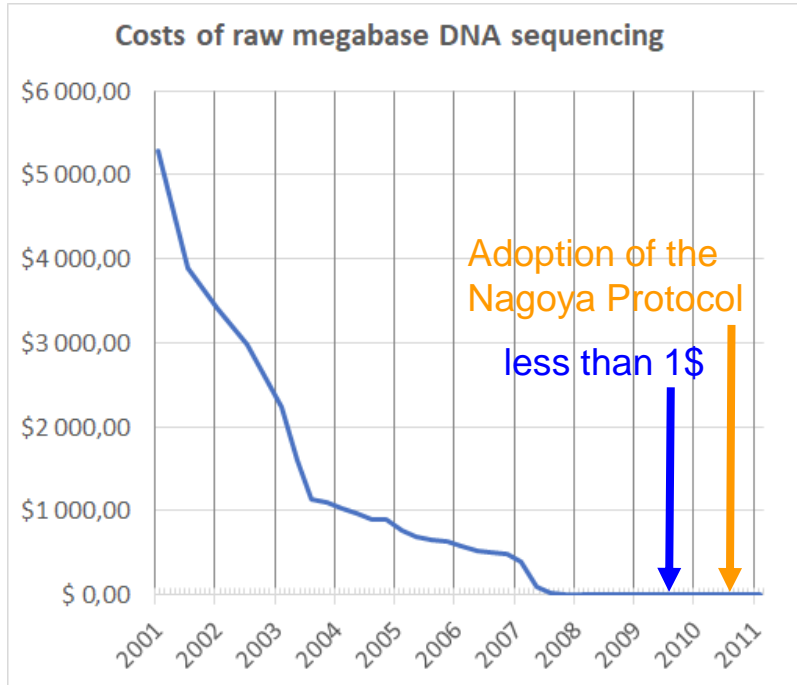
Data from



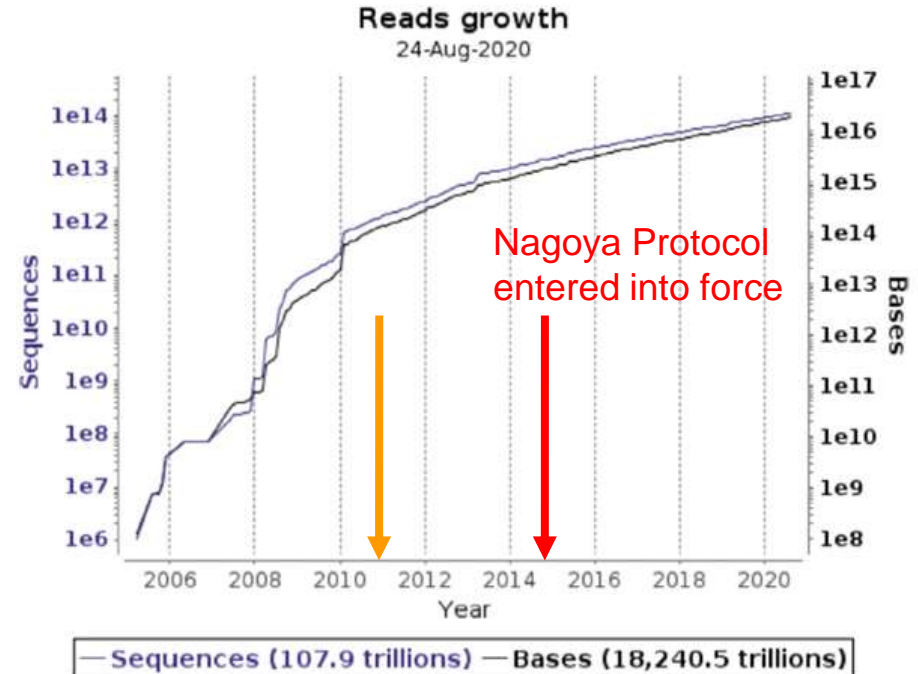
Data growth in the European Nucleotide Archive ENA

from Harrison et al. 2021. The European Nucleotide Archive in 2020. Nucleic Acids Research 49: D82-D85

Genetic research became cheaper – much cheaper !



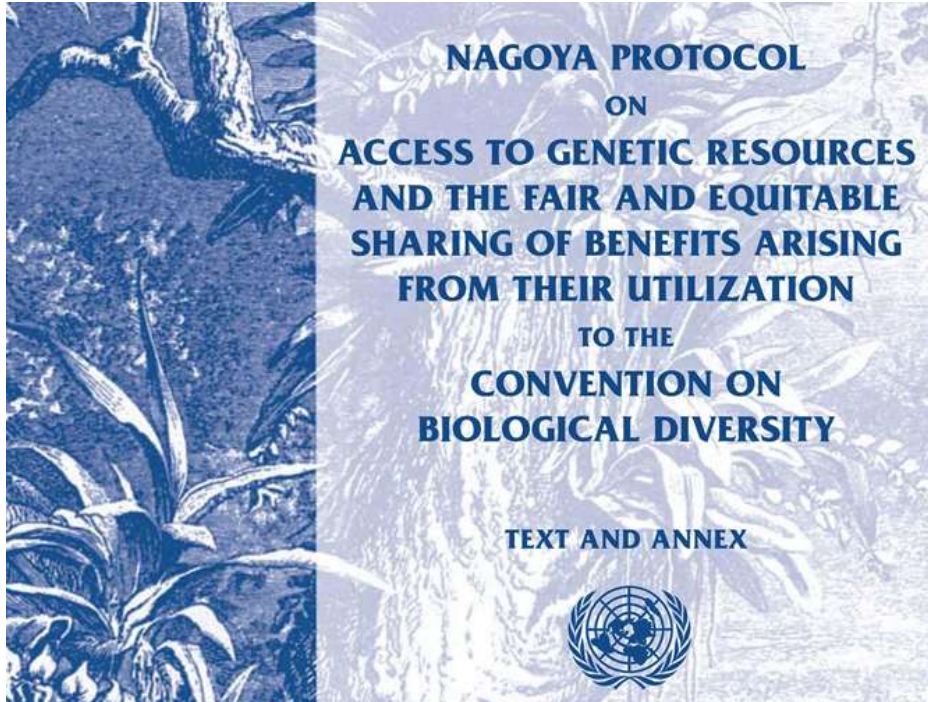
Data from



Data growth in the European Nucleotide Archive ENA

from Harrison et al. 2021. The European Nucleotide Archive in 2020. Nucleic Acids Research 49: D82-D85

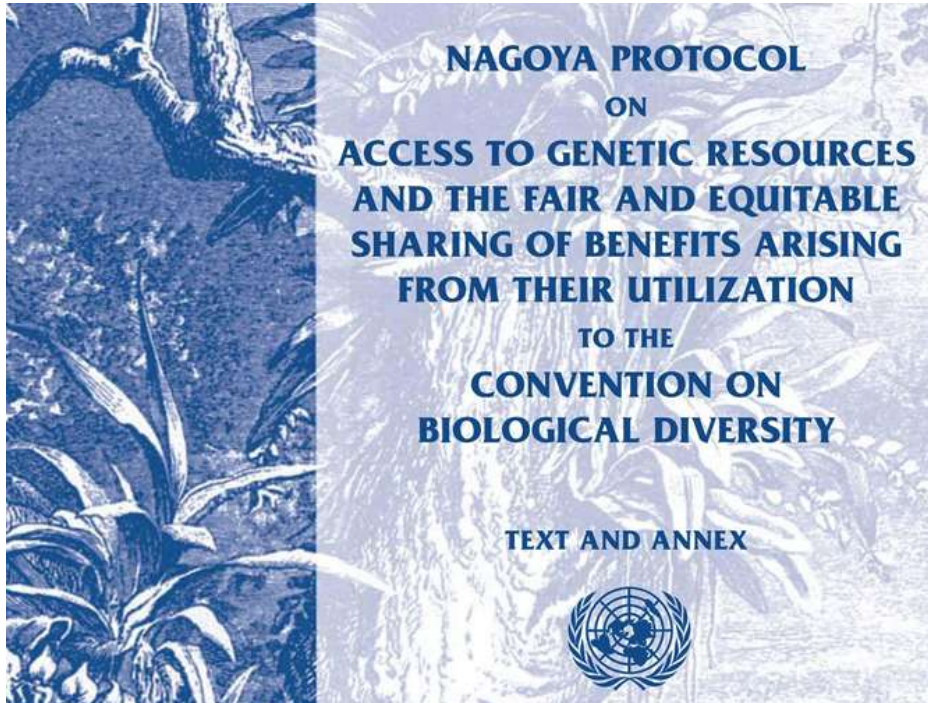
The notion spreaded that organisms are “genetic resources”



Definition:

genetic resources are genetic material of actual or potential value

The notion spreaded that organisms are “genetic resources”



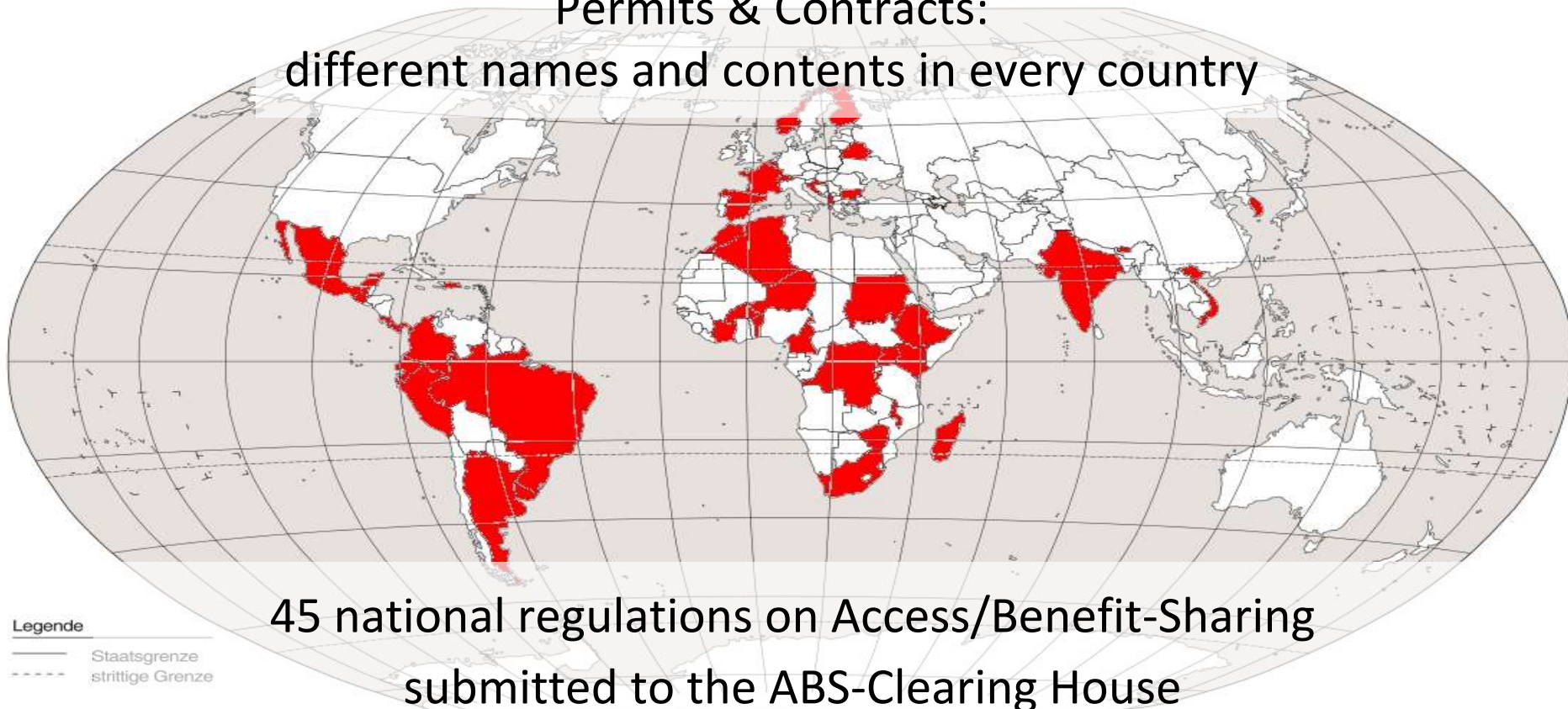
Definition:

genetic resources are
genetic material of
actual or potential value

Source of:

monetary benefits
&
non-monetary benefits

Permits & Contracts: different names and contents in every country



Legende

— Staatsgrenze
- - - - strittige Grenze

0 1250 2500 3750 5000 6250 km

Biodiversity Permit/Contract Typology & Typology for legal/contractual terms for biodiversity objects

Permits/Contracts: ● 7 Categories with altogether 38 Types

Legal/Contractual Terms: ● 50 general Types
● 26 specific Types (limited resources)
● 11 loan Types (limited resources)

Suggestion - The Institutional Database

Coll.: 8415 Obj. Präfix 8076 Obj. InvNr SubNr Suffix

Arachnoidea [kein] 28 697

Schnellsuche: 

Euscorpium tergestinum - (C.L. Koch, 1837)

Europa / Österreich / Niederösterreich / Krems an der Donau(Stadt) / Krems an

Referenzierte Objekte



Datum d. Revision:

Acqu.-Nr.:

Raum: 509 (2. OG)

Kasten:

Fach:

Attribut	Wert
Anzahl (gesamt)	1
Anzahl (weiblich)	1
Bestimmt von (DETERMIN)	Hörweg, Christoph
Fundort Anmerkung	AT, Niederösterreich, Krems
Gegeben von (DONAVIT)	Hörweg, Christoph
Sammler (LEGIT)	Hörweg, Christoph

Taxonomie

Fundort

Permit / Contract

Terms

C3 - Permits for Collecting & related / taking / possessing

T10 - Authorisation to enter site

T11 - Collecting Permit



Suggestion - The Institutional Database

Coll.: 8415 Obj. Präfix 8076 Obj. InvNr SubNr Suffix
 Arachnoidea [kein] 28 697

Schnellsuche: 

Euscorpium tergestinum - (C.L. Koch, 1837)

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Sammler (LEGIT)	Hörweg, Christoph

Taxonomie

Fundort

Permit / Contract

Terms

G3 - permission & free further use

L2 - destructive sampling restricted



Aktualisieren



Suggestion - The Institutional Database

Coll.: 8415 Obj. Präfix 8076 Obj. InvNr SubNr Suffix

Arachnoidea [kein] 28 697

Schnellsuche:

Euscorpium tergestinum - (C.L. Koch, 1837)

Europa / Österreich / Niederösterreich / Krems an der Donau(Stadt) / Krems an

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Kasten:

Fach:

Attribut	Wert
Anzahl (gesamt)	
Anzahl (weiblich)	
Bestimmt von	
Fundort Anr.	
Gegeben von	
Sammler (L)	

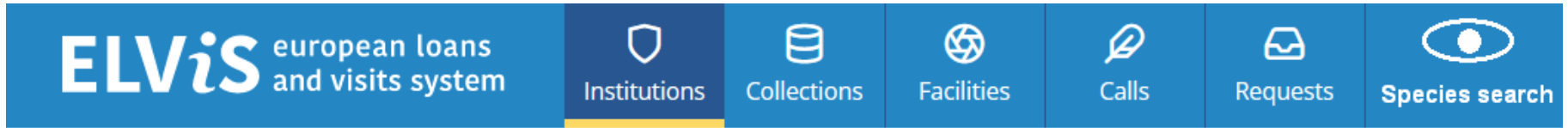
Taxonomie Fundort Permit / Contract Terms

G3 - permission & free further use

L2 - destructive sampling restricted

Aktualisieren

Suggestion - ELViS/DiSSCo



← [Back to species search](#)

← [Back to collections](#)

← [To Naturhistorisches Museum Wien](#)

Species search result(s)

Species	Identifier	NUTS	place	terms
Euscorpium tergestinus (C.L. Koch, 1837)	NHMW Arach-28697	AT126	Krems (Stadt)	G3 permission & free further use L 2 destructive sampling restricted

Suggestion-ELViS/DiSSCo

Code:

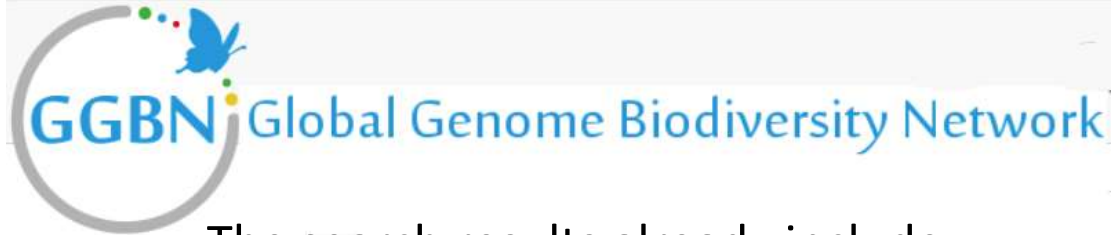
Document content in a form that computers can act upon

The technical infrastructure reflects the dynamic nature of metadata

EXAMPLE CODE 6: Linking the specimen to its holding institution

```
{
  "@graph" : [ {
    "@type": "prov:Entity",
    "@id" : "ex:physicalSpecimen1",
    "prov:label" : "Common earthworm"
  }, {
    "@type": "prov:Agent",
    "prov:type" : [ "prov:Organization" ],
    "@id" : "ex:institution1_holding",
    "prov:location" : "https://www.wikidata.org/wiki/Q40",
    "prov:label" : "NHMW, Vienna, Austria"
  }, {
    "@type": "prov:Agent",
    "prov:type" : [ "prov:Organization" ],
    "@id" : "ex:institution2_requesting",
    "prov:location" : "https://www.wikidata.org/wiki/Q27",
    "prov:label" : "National Museum of Ireland, Dublin, Ireland"
  }, {
    "@type": "prov:Attribution",
    "@id" : "ex:institution1_accession",    \\ (P)ID
    "entity" : "ex:physicalSpecimen1",    \\ specimen
    "agent" : "ex:institution1_holding"    \\ holding institution
  } ]
}
```

Suggestion - international platforms



The search results already include
e.g. for a sample of the beetle *Abacetus bipunctatus* (Motschulsky, 1865):

Permit(s)

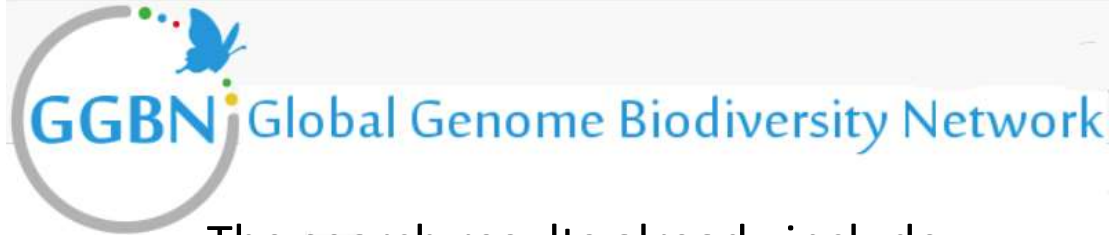
Permit Type: Permit - Exemption

Permit Status: Permit available

Permit Status Remarks: Contact NMNH for details

Permit Remarks: Contact NMNH for details

Suggestion - international platforms



The search results already include
e.g. for a sample of the beetle *Abacetus bipunctatus* (Motschulsky, 1865):

Permit(s)

Permit Type: Permit - Exemption

Permit Status: Permit available

Permit Status Remarks: Contact NMNH for details

Permit Remarks: Contact NMNH for details

→ Permit(s) and Contract(s)

→ **15 Permit Types** redefined &
extended to **38 Types**

→ new: Legal/Contractual Terms

Many thanks go to my co-workers in this task:

Karin Wiltschke, Jutta Buschbom, Eva Häffner, Frederik Leliaert, Breda Zimkus, John Dickie,
Suzete Gomes, Chris Lyal, Daniel Mulcahy, Alan Paton, Gabi Droege



<https://www.menti.com>

CODE:2874 9660




Mentimeter



DiSSCo Futures

Brussels 07-09-02-2023


museum
NATURALSCIENCES.BE

 CETAF AFRICA


Meise
Botanic Garden

Thank you!

End of sessions for Day 2



DiSSCo Futures

Brussels 07-09-02-2023



Day 3

WELCOME

(Starts at 09:00h CET)



Distributed System of Scientific Collections

FUTURES
Brussels 07-09/02/2023

Session:

**ORGANISATIONAL
HUMAN CAPACITY**



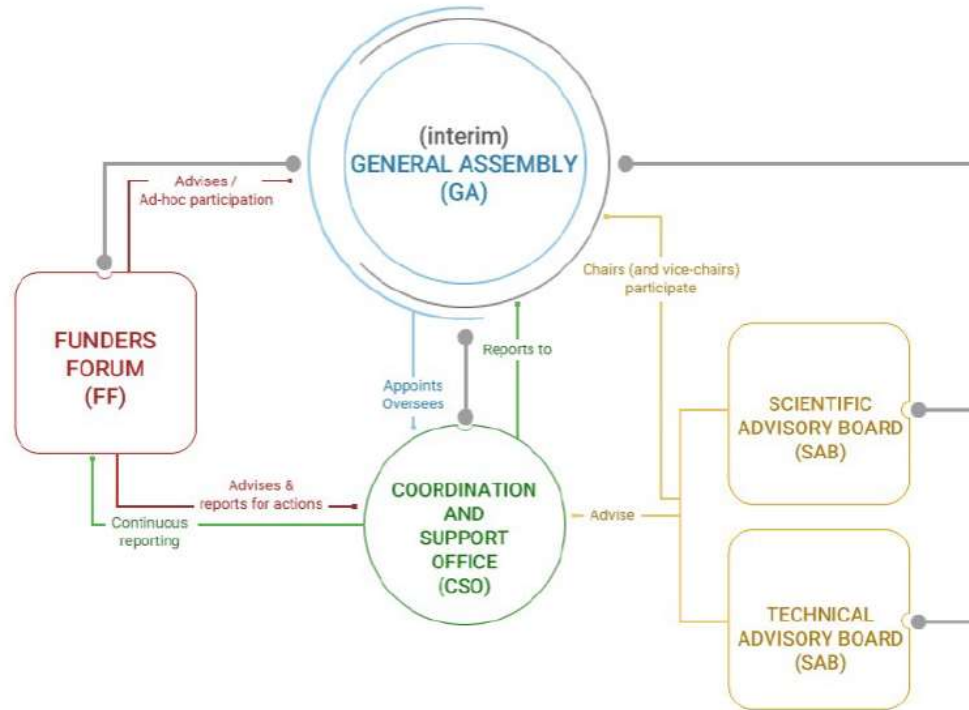
Eva M. Alonso
Naturalis Biodiversity Center

Session: Organisation & Human Capacity
DiSSCo Governance

Structure

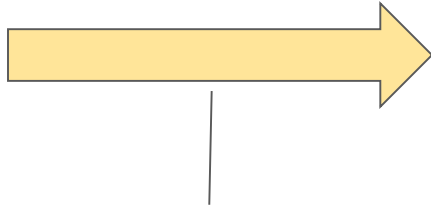
1. DiSSCo Governance during the preparatory & transition phases
 - a. DiSSCo is a community-driven RI
2. DiSSCo ERIC Roadmap
 - a. DiSSCo ERIC governance model
 - b. Next Steps

DiSSCo Governance during the preparatory & implementation phases



- Community driven initiative
- Strong institutional role
- National funders as advisory body
- Projects no programmes

Working towards DiSSCo LE governance model

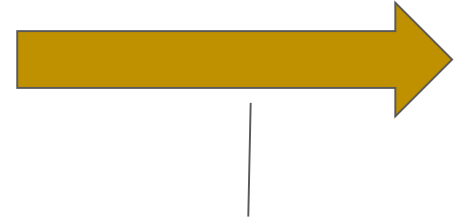


IRL Objectives

1. Legal Entity & Roadmap
2. New LE Governance
3. Business framework
4. New LE Statutes

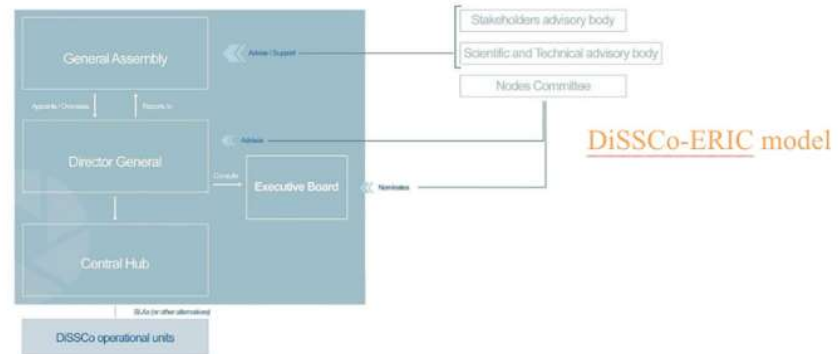
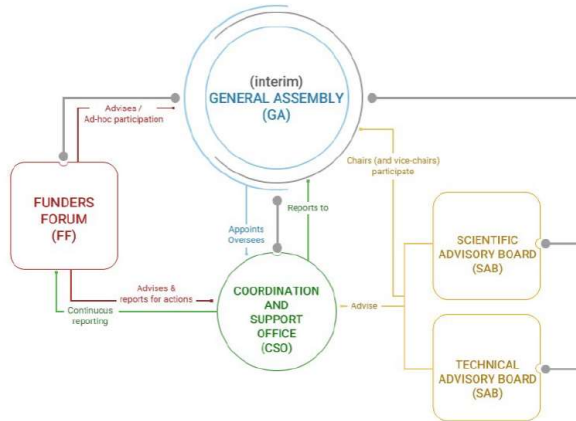


DPP WP7 + WP4:
Preparation technical work
Collective effort (WP8 + CSO)
National funders (FF)



DiSSCo ERIC Roadmap

What does it mean to become an ERIC in terms of governance?



Community-driven Research Infrastructure

Preparatory Phase - A community driven process

All key decisions go through a thorough and inclusive consultation process

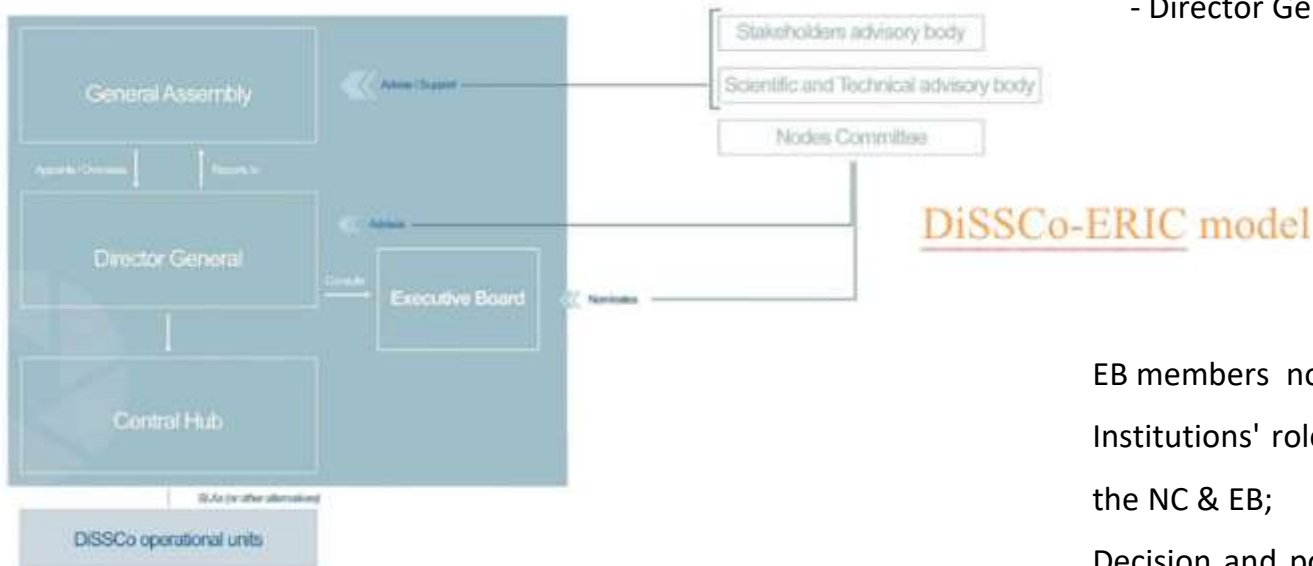
Expert Team → CSO Team → SAB/TAB → National Nodes → Funders Forum → iGA



How did we work?

- **Collective effort**
- **Best practices and reference documentation** (Interviews with well-consolidated ERICS (BBMRI, EPOS, ELI, DARIAH and CLARIN) and other initiatives (ELIXIR, GBIF), ERIC regulation)
- **Identify priorities** from the community & national priorities and national expectations
- **Principles for governance**
 - **Flexible** to guarantee agile decision-making processes
 - **Community representation** to guarantee effective implementation
 - **Efficient** operation to promote DiSSCo strategy and strategic planning
 - **Long-term sustainability**
- **Communication**: 4 thematic workshops, 4 NNs meeting, 2 Drop-in session, 20 expert/writing groups meetings & DPP AHMs.

DiSSCo ERIC Governance model

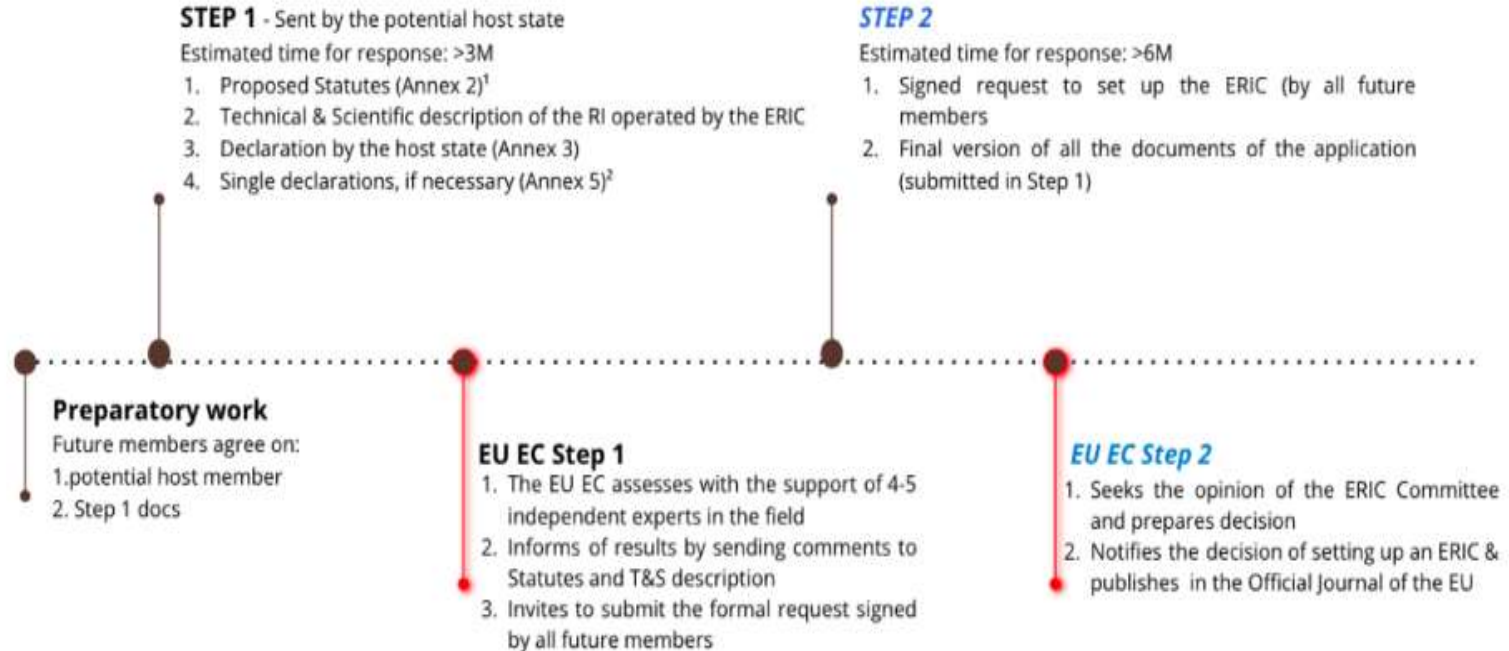


Two-layer model

- General Assembly
- Director General supported by Executive B.

EB members nominated by the NC;
Institutions' role through their participation in the NC & EB;
Decision and powers of representation of the DiSSCo ERIC remain with the DG.

ERIC Process - What we have to do



DiSSCo ERIC - next steps

Next Steps

- Preparation of Technical and Scientific description
- Call for Hosting and Founding members

How: Non-linear methodology essential to continuously enrich the work

- Steps structure and focus communication
- Open communication and consultation of work at early stages build trust and eliminates defensiveness
- Stakeholders are empowered by being an active part of the decision-making
- Decisions are fully endorsed by majority



THANK YOU



Ana Casino
CETAF

Session: Organisation & Human Capacity
Human Capacity: DiSSCo talks of a collective effort

DiSSCo Research Infrastructure

We have learned about a entire set of [achievements](#) made through the different DiSSCo-linked initiatives

We have heard about [different facets and dimensions](#) of the RI

We have witnessed the [huge advances](#) made during the preparatory phase of DiSSCo RI



Collections



Technology



Data



Standards

...and?

Human resources

Is that a “normal” resource?

Human resources is the workforce of an organization

This concept links to **human capital**, the knowledge and skills of the individuals

At the end we are talking about our major driver:



people!

Enabling the community to move forward



Capacity building for implementing a collective effort

To ensure effective use of the RI and full exploitation of its services

Components: Training, specialization, digital maturity, standardization



Instrumental contributions for wide endorsement

To secure commitment and sustainable contributions on the long-term

Components: NNs, Business model, costs and funding, policies and protocols



Supporting pillars for the construction of DiSSCo

To facilitate the RI operation through the DiSSCo ERIC, a central hub supported by a distributed community

Components: HR policies, landscape, global frameworks

Capacity building for a collective effort

- Map of the **digital maturity** across the community
 - Self-assessment to facilitate access
 - A mechanism to be linked to other similar tools (policies compliance, specialization plan, CETAF registries)
- Identification of the **capacity needs** in competences and skills
 - To gather training offer (living catalogues)
 - To generate best practices and recommendations
 - To disseminate standardized procedures
 - To speed-up the learning curve among different levels of maturity
- Definition of a **training strategy**
 - To streamline training activities and tool-up the staff
 - To create centres of expertise
 - To measure resources required
 - To establish structured and sustainable mechanisms

Capacity building – some relevant outputs

- **Training mechanisms and structures**
 - Training catalogue under SYNTHESIS+ (SYNTH+)
 - Training strategy under DiSSCo Prepare (DPP)
 - Training school under MOBILISE
- **Assessment tools**
 - Specialization plan (DPP)
 - Metadata schema for policies compliance (SYNT+) and Assessment tool (DPP)
 - Best practices and standardization (MOBILISE)
 - Help desk (SYNT+ and DPP)
 - Users' manual (SYNTH+ and DPP)





Instrumental contributions for wide endorsement

- Establishment of an **open space with National Nodes** for dialogue and interaction and provide the means to articulate a coherent and comprehensive narrative for DiSSCo
 - To enable permanent update
 - To collect harmonized feedback
 - To run collective surveys and consultations
- Consolidation of the **community engagement**
 - To tackle shared challenges with a collective approach to underline impact
 - To strengthen the cohesiveness and coherence of proposed pathways
- Definition of a **supporting business framework**
 - To identify the criteria, interdependencies, cost units and cost lines of DiSSCo
 - To integrate services delivery (cost recovery) and services procurement processes
 - To secure long-term commitment through contributions
- Promotion for **wide endorsement**
 - To secure a joint vision with a common message
 - To consider national specificities and accommodate narratives



Instrumental contributions – some relevant outputs

- **Communication and outreach**
 - Communication strategies (SYNT+, DPP, and MOBILISE)
 - Websites, social media and visual material (all)
 - Common dissemination actions: conferences, events, workshops (all)
- **Engagement mechanisms**
 - NNs meetings (DPP)
 - Networking activities (MOBILISE workshops)
 - Advocacy strategies (DPP)
- **Financial structure**
 - Cost Book of DiSSCo
 - Pre-procurement, services cost, contributions model
- **Landscape analysis and integrative tools**
 - Case-studies towards EEA and other areas/agencies of interest
 - Recommendations for collaboration with private sector (SYNT+ and DPP)
 - Identification of standards and protocols (MOBILISE)
 - Common repositories and knowledge graphs definitions (DPP)





Supporting pillars for the construction of DiSSCo

- Identification of **dashboards** and supporting elements
 - To offer a common understanding and an overall view
 - To track progress and gaps
- **HR suitable** structures and policies
 - For recruitment and selection
 - For securing teams stability
 - For distributed operation
- Analysis of the surrounding **landscape** to operate in
 - To consolidate links with RIs and ensure cross-fertilization
 - To build long-term strategic partnerships
 - To consider services provision from relevant stakeholders
- Alignment with **global initiatives**
 - To contribute to a global aggregated picture
 - To leverage on ongoing /coupling activities and share efforts



Supporting pillars – some relevant outputs

- **Identification of dashboards and supporting elements**
 - Dashboard for Digitization of collections (SYNT+)
 - Map of users' communities and requirements (DPP)
 - Helpdesk (SYNTH+ and DPP)
- **Policies and recommendations**
 - Access criteria both TA and VA (SYNT+)
 - HR policies (DPP)
 - Structural mechanisms as the Centres of Excellence (DPP),
 - Guidelines for standards (MOBILISE) in archiving and data preservation, data publishing, persistent and unambiguous people identifiers, data mobilisation, FAIRness in data management.
- **Global endeavours**
 - Linked projects (such as BiCIKL, BGE, BioDT, TETTRIs)
 - Biodiversity next, FDO, others
- **Comprehensive result: Construction Master Plan for DiSSCo RI**



People is not just a resource. It is the driver to success

To communicate, to share, to teach and train, to collect, to engage, to advocate, to produce, to spread, to gather, to research, to implement, to think strategically, to promote, to foster, to build a common understanding around digital specimens, to drive a profound change to transform the way we operate and tackle challenges.

To drive the mindset shift and the institutional change required to effectively carry out the digital transformation of this new era in the field of natural science collections.

Let's look together to the future of DiSSCo



Distributed System of Scientific Collections

FUTURES
Brussels 07-09/02/2023

THANK YOU



Ana Casino

CETAF

Eva Alonso

Naturalis Biodiversity Centre

Session: Organisation & Human Capacity
Experts' Panel and Discussions

Organizational and human capacity gathers a multiplicity of aspects
funding, training, stakeholders' interaction, impact, inclusion and harmonization



Organizational and human capacity gathers a multiplicity of aspects
funding, training, stakeholders' interaction, impact, inclusion and harmonization

Funding (Ana de Castro, NL): “The importance of engaging funding agencies early in the construction of a RI”.

Training (Larissa Smirnova-MA, BE): “Tooling up and training our human resources”

Impact (Rui Figueira, UL, PT): “Producing an impact in economic and social terms”.

Harmonization (Helen Hardy, NHM; UK): “ Assessing the level of maturity of our community”.

Stakeholder's interaction (Urmaz Koljag, NHM Out; EE): “Leveraging and connecting with complementary RIs”.

Inclusion (Francois Dussolier, MNHN, FR): “ How experience on building cohesiveness at national level support the development of DiSSCo”.



Building, facilitating an ever-growing network!



Collaborating and inspiring each other in-person and online



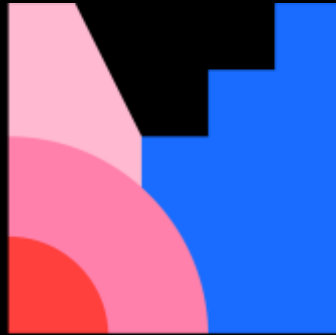
Exchanging knowledge and expertise to build a pan-European collection





Linking people, projects, institutions and data to proudly say





[Presenter link](#)

Participants, please go to www.menti.com and use the code: 8923 5011

We have five quick questions for you

Please, go to www.menti.com and use the code 8923 5011

QUESTION 1

1. Following your participation, to which level has your institution improved its maturity in each of DiSSCo dimensions? 



QUESTION 2

2. In which three key drivers should DiSSCo invest during the next phases to ensure an effective participation of your institution?

- 1st | Involvement of funding agencies at national level
- 2nd | Development of standard procedures and workflows
- 3rd | Implementation of e-services
- 4th | Training and capacity building
- 5th | Support to the community interaction
- 6th | Communication and outreach
- 7th | Connection to related RIs in the environmental field

QUESTION 3

3. In your opinion, which principles followed in DiSSCo Prepare have been key to its success and should be used in the transition phase?

1st | Transparency

2nd | Inclusiveness & collective effort

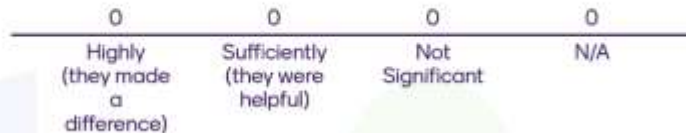
3rd | Professional drafting

4th | Simplicity & completeness

5th | Flexibility

QUESTION 4

4. Do you consider the external actors (e.g. other RIs and National agencies) to be instrumental in the development of DiSSCo's organisation?



QUESTION 5

5. In your opinion, in which areas would you consider training to be essential to increase skills and competences of the community staff?

- 1st | Data management
- 2nd | Digitization
- 3rd | Curation
- 4th | Standardisation
- 5th | Finances
- 6th | Technical developments





30MIN
BREAK

DiSSCo
Distributed System of Scientific Collections

FUTURES
SYNLAB's 07-09/02/2023

(We'll be back at 11:00h CET)



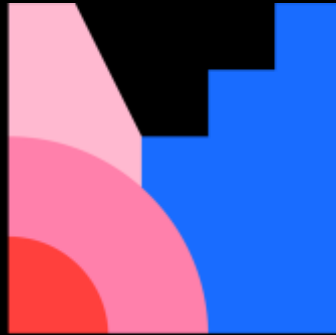
Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

Session:

CLOSING PLENARY



[Presenter link](#)

Participants, please go to www.menti.com and use the code: 4681 2728

Jana Hoffmann
Digitisation

Sandy Knapp
Virtual Access

Kristina Gorman
Physical Access

Sharif Islam
Digital Infrastructure

Quentin Groom
Standards

Ana Casino
Organisational & Human Capacity



Closing Plenary

Closing remarks from previous sessions



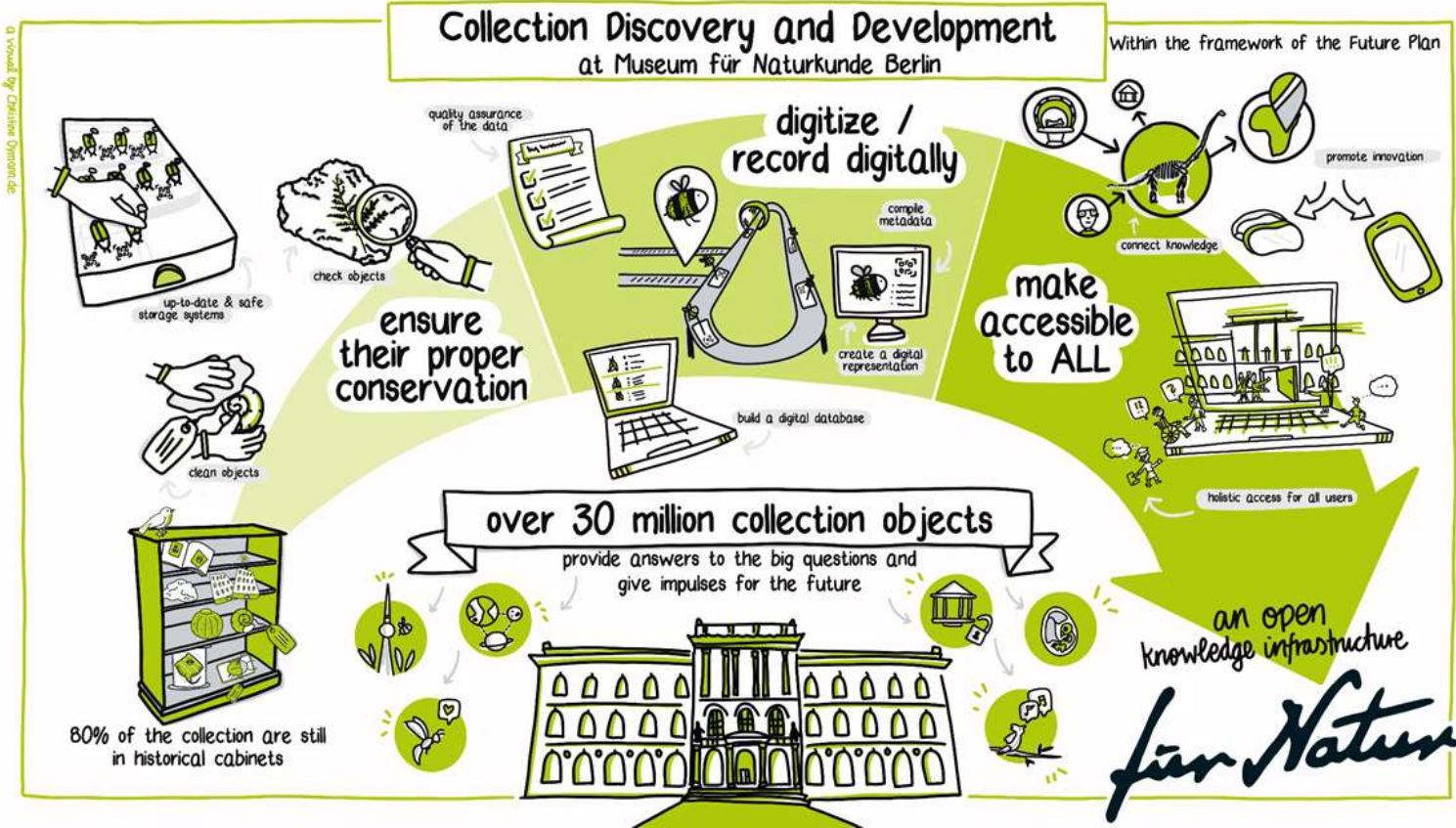
Jana Hoffmann
Digitisation



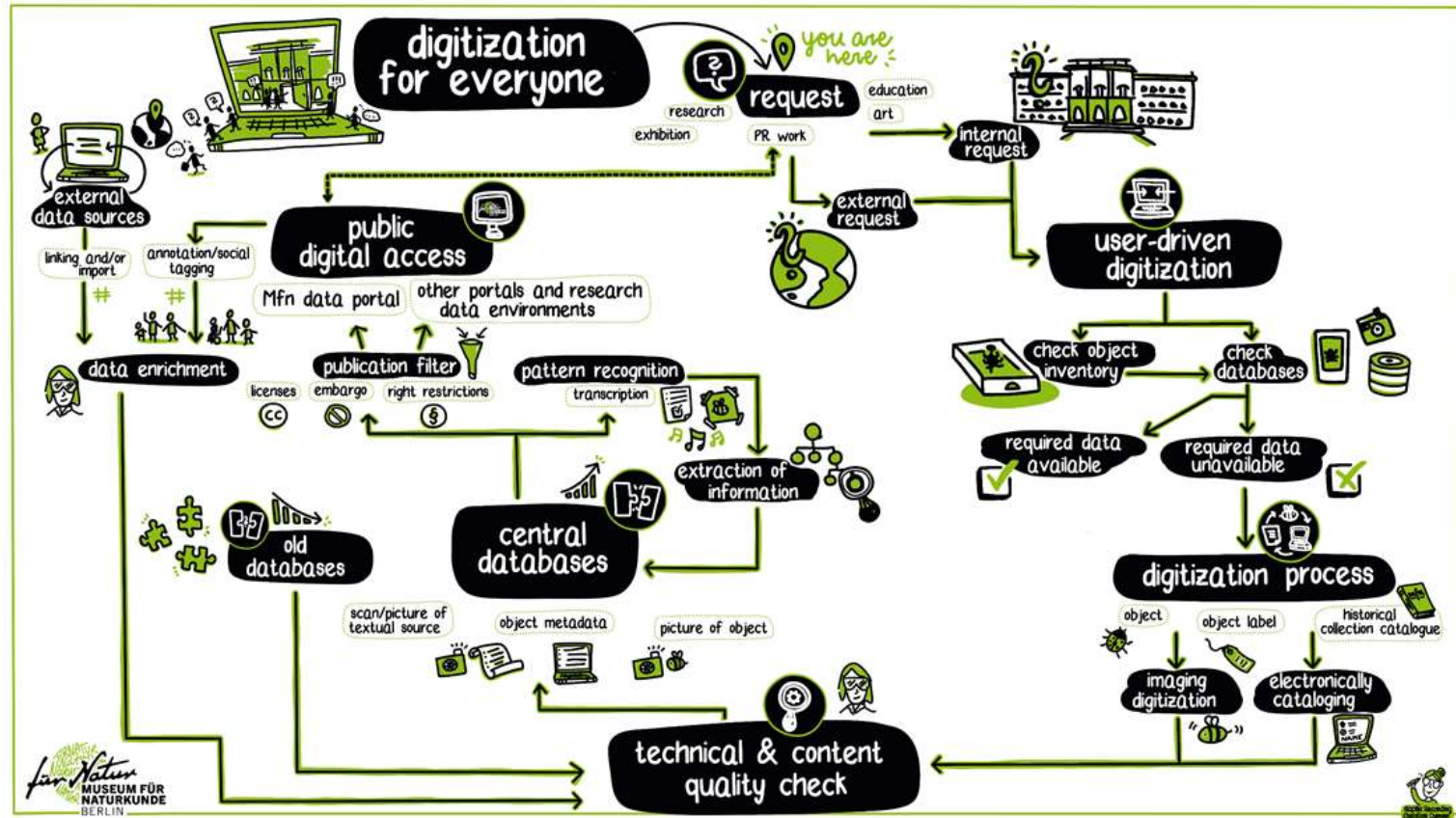
Closing Plenary
Closing remarks from previous sessions

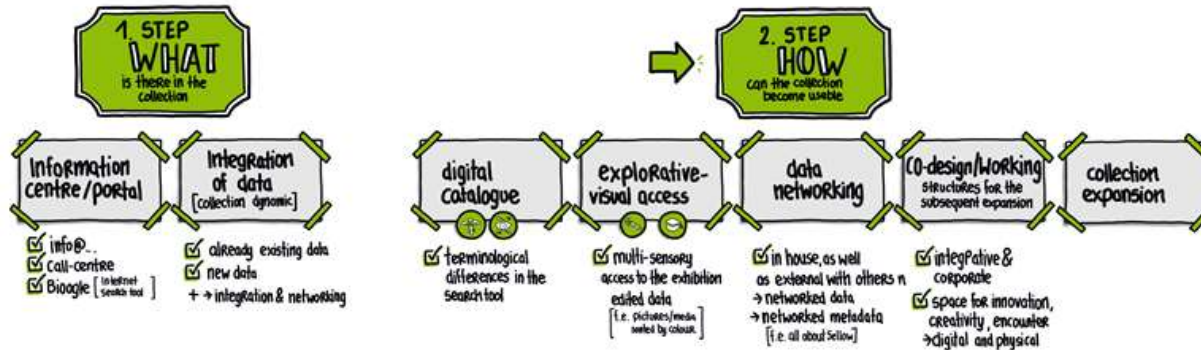
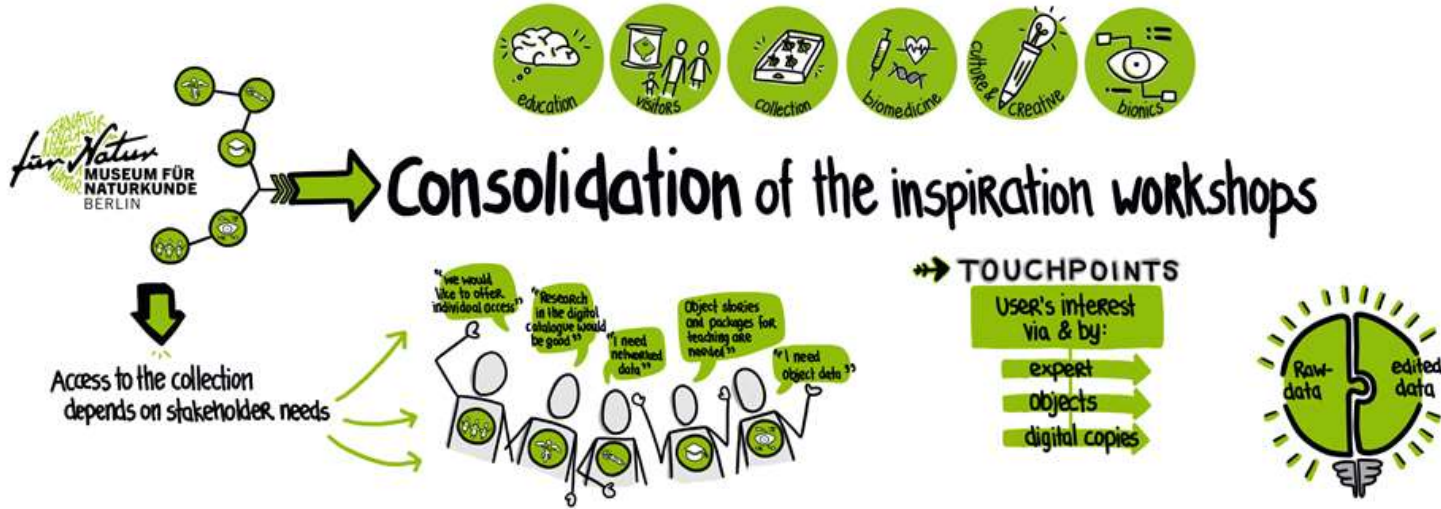
Digitisation - part of a larger transformation process

- broad discovery versus on-demand - or both?



<https://doi.org/10.7479/44ds-qd81>





Digitisation - part of a larger transformation process

- broad discovery versus on-demand - or both?
- linking physical objects to the possibilities of the digital - not forget them
- communicate and accept the overhead
- explore the possibilities of new revenue streams to meet the overhead

Take home messages...

- Standing on the shoulder of giants - We have accomplished a lot already!
- Never-Ending story - technology, workflows, user requirements, knowledge
- Let's not forget to implement and consolidate!
- Diversity is key - in perspectives, identities, ... , origin

Jana Hoffmann
Digitisation



Sandy Knapp
Virtual Access



Closing Plenary
Closing remarks from previous sessions

Jana Hoffmann
Digitisation

Sandy Knapp
Virtual Access



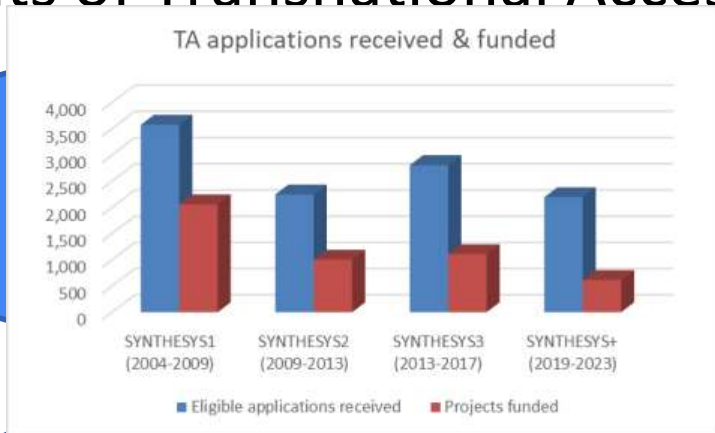
Kristina Gorman
Physical Access



Closing Plenary
Closing remarks from previous sessions

Benefits of Transnational Access

ks – Physical Access [Kristina Gorman](#)

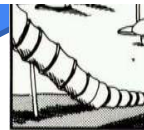


workflows or techniques developed and implemented in response to user demands contribute to NHM research excellence

Outputs

- SYNTHESYS 1-4: **>8,000*** recorded research outputs.
- **>4,600*** of which Accepted, In press or Published.

enhanced value in the collections



modelling
diversity
freshwater + terrestrial
em functioning
deposit distribution
curity

Challenges

Open access to RIs in the ERA – remaining challenges (2)

- **Limited EU funding available for RI networks:**
 - **Need to find sustainable models for ensuring transnational access to RIs:**
 - Stimulating the creation of permanent access programmes at pan-European RIs
 - Formalising networks of national RIs providing access
 - Opening up national funding programmes
 - Reflecting on the role of EU funding – funding priorities, co-funding of access programmes, making a case for a broad European access programme
 - **Evolving access models and user requirements** – increased remote and virtual access, broadening of the user base, including less-expert users (eg. industry)
- ✓ **integration**, under same projects, of different types of research infrastructures, breaking barriers between networks of similar or complementary RIs

Challenges

More digitisation → More knowledge → More demands for access

“Transnational Access”

“Virtual Access”

“Access”

Jana Hoffmann
Digitisation

Sandy Knapp
Virtual Access

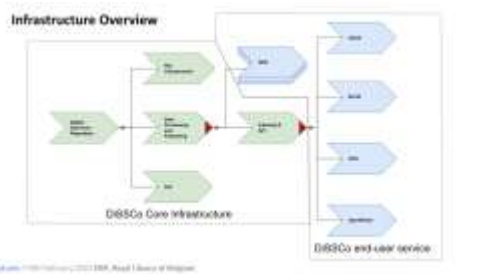
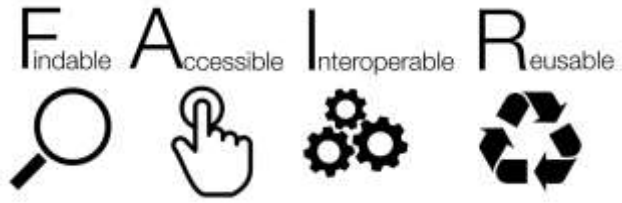
Kristina Gorman
Physical Access

 **Sharif Islam**
Digital Infrastructure

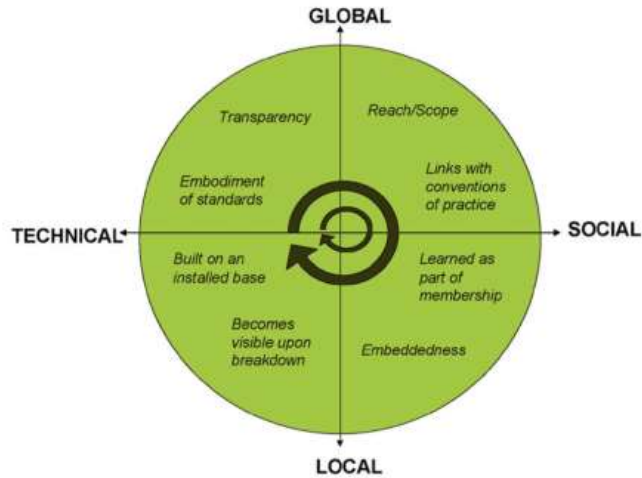


Closing Plenary
Closing remarks from previous sessions

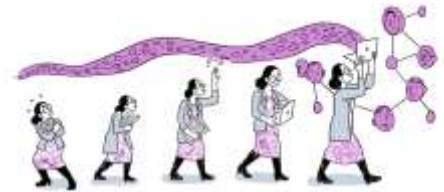
Digital Infrastructure



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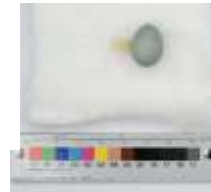


Cyberinfrastructure as *distributions* along technical/social & global/local axes



EVOLVING TOWARDS AN ERA OF OPEN RESEARCH

S. Basu



Jana Hoffmann
Digitisation

Sandy Knapp
Virtual Access

Kristina Gorman
Physical Access

Sharif Islam
Digital Infrastructure



Quentin Groom
Standards



Closing Plenary
Closing remarks from previous sessions

Standards need effort

- Standards development requires international collaboration
- Standards take a lot of work to develop
- Standards take a lot of work to maintain
- Standards adoption is not automatic and take time



RESEARCH DATA ALLIANCE



Biodiversity
Information
Standards

TDWG

Standards give a big return on investment

- Standards accelerate digitization and research
- Standards future proof work
- Standards support innovation
- Standards save a lot of time and money!



RESEARCH DATA ALLIANCE



Biodiversity
Information
Standards

TDWG

Standards connect data together

- CETAF Stable Specimen identifiers
- People identifiers
- Wikidata - A collaborative database about everything



Biodiversity
Information
Standards

TDWG



Standards underpin DiSSCo

- Latimer Core: Collections descriptions and comparisons
- Minimum Information for a Digital Specimen (MIDS)
- International Image Interoperability Framework (IIIF)
- Legal best practices



Biodiversity
Information
Standards

TDWG

Standards

- Contribute
- Fund
- Prioritize



Biodiversity
Information
Standards

TDWG

Jana Hoffmann
Digitisation

Sandy Knapp
Virtual Access

Kristina Gorman
Physical Access

Sharif Islam
Digital Infrastructure

Quentin Groom
Standards


Ana Casino
Organisational & Human Capacity



Closing Plenary
Closing remarks from previous sessions

Take home messages

Organisation & Human Capacity

Take-home messages

Training and capacity building

- **Training is a mechanism that act transversally**, engaging the community, scaling-up and widening the process of furnishing staff adequate skills, providing bottom-up information on needs and requirements for improvement.
- A **consolidated team of experts** at the central Hub is strongly required for ensuring smooth, rapid and harmonized streamlining of the DiSSCo developments, once the ERIC is formalized.

Funding

- In a distributed RI as DiSSCo, **multiple sources of funding** will be collated while the core operation will be sustained with governmental financial commitment (min 5 years rounds) and supported with institutional contributions through the provision of both reliable, updated, and FAIR data at scale and format needed, and the services built on top.
- The **active participation** of governmental funding agencies in the construction process of DiSSCo has been pivotal for first, understanding requirements across countries and secondly, transmit the need for long-term commitment.

Take-home messages

Harmonisation

- The creation, formalization or even the identification of the needs for **new or improved standards** have been instrumental for fostering the setting-up of suitable structures that could allow interoperability, development of common unified certificates, and alignment of processes and workflows.
- The community has to be aware of the **progress done**, the maturity achieved, the expertise gathered but also, of the **challenges ahead** in terms of new skills, capabilities and the way institutions need to respond to RI requirements.

Impact

- The exploitation of DiSSCo will create an **enormous impact on different societal layers**, political, social and economical. The impact should be measured against what would be the situation without DiSSCo RI.
- SEI proves the **return expected** for DiSSCo RI fully operational might be between **7-10 times** the investment made.

Take-home messages

Stakeholders' interaction

- DiSSCo operates in a large, varied and increasingly populated landscape which adds complexity to understand synergies, detect complementariness and find the correct niches. A different and more enriching perspective is to **analyse the cross-fertilization** rather than identifying borders and specificities.
- Initiatives running at national or regional level can be used as references to be **replicated, scaled-up or customized** throughout DiSSCo community to avoid duplication of efforts in a world with a technology in continuous evolution.

Inclusion

- The **criteria of inclusion** is instrumental to elude different maturity levels while consolidating a strong sense of community and build on trust, confidence and engagement.
- **National efforts** are fundamental to support DiSSCo endeavour but also, can benefit from the RI to scale up and operate seamlessly.



[Presenter link](#)

Participants, please go to pollev.com/mutualsands447

Debate about the statement:

"DiSSCo should have digitisation
as its main priority"



Distributed System of Scientific Collections

FUTURES

Brussels 07-09/02/2023

This house believes that DiSSCo should have digitisation as its main priority

Urgency:

The time to act is now

Uniqueness:

Mass digitisation is *our* greatest shared challenge

Value:

We are more than the sum of our parts

Opportunity:

Digitisation unlocks the greatest potential

Efficiency:

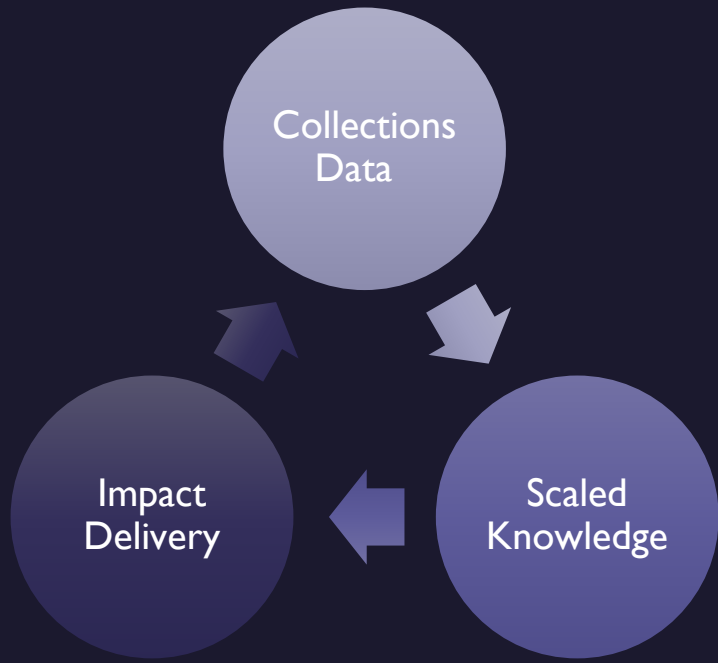
Productivity comes from scale

Funding:

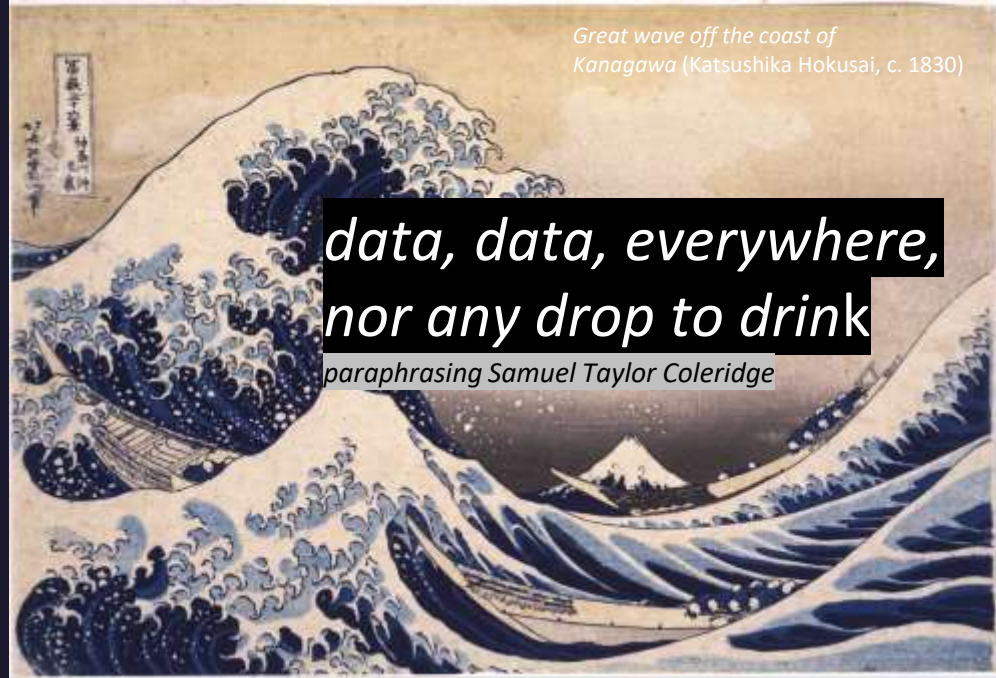
Pan European funding is possible

Collections data is infrastructure





Accelerate Collections-to-Impact



Great wave off the coast of
Kanagawa (Katsushika Hokusai, c. 1830)

*data, data, everywhere,
nor any drop to drink*

paraphrasing Samuel Taylor Coleridge

- Avoid moving from **Physical Silos** to **Digital Silos**
- Establish clear **value chains** – information-2-knowledge
- As data volume grows so is the need for **scaled up knowledge production** operations
- Use the combined powers of **human and artificial intelligence**
- Let **true demand drive** content mobilisation

Ask Me Anything about DiSSCo



Distributed System of Scientific Collections

FUTURES

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Example questions

- Will DiSSCo provide money for digitisation?
- When will Latimer Core be a standard?
- What do I need to do to share my data as Digital Specimens?
- How can I add documentation to the DiSSCo Knowledgebase?
- Can I use ELViS for National Access Calls?
- ...

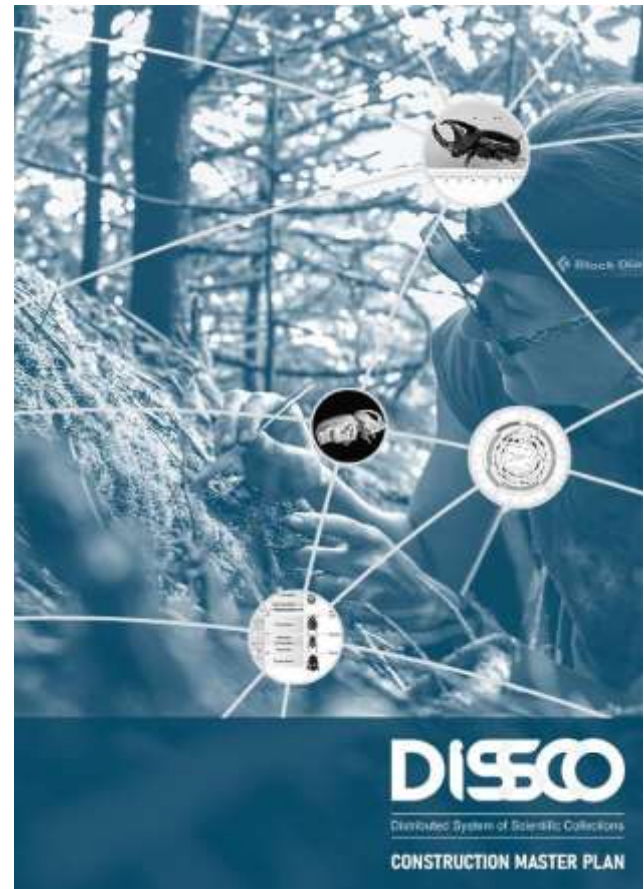


Distributed System of Scientific Collections

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Brussels 07-09/02/2023

Closure Handover of DiSSCo's Construction Master Plan





DiSSCo Futures

Brussels 07-09-02-2023


museum
NATURALSCIENCES.BE

 CETAF AFRICA


Meise
Botanic Garden

Thank you!