



TaxonWorks

An integrated web-based workbench for taxonomists and biodiversity scientists

Earth Biogenome Project
2021 Workshop at University of Illinois

Presented by Matt Yoder
Species File Group, INHS, University of Illinois

Outline

What is TaxonWorks?

Context, scope, use

TaxonWorks X Earth BioGenome Project

Challenges, opportunities



Who is the Species File Group (SFG)?



Deborah Paul



Dmitry Dmitriev



Yuri Ruskov



Dmitry Mozherin



Rich Flood



Geoff Ower



R. Edward DeWalt



José Luis Periera



Hernán Lucas Periera



Matt Yoder

<https://speciesfilegroup.org/about.html>

What does the SFG do?

Species File Group Home Software Data Collaboration Events Who About

Species File Group

The Species (life on Earth) File (software) Group (collaborating community) builds tools that facilitate cataloging, description, and study of the Earth's species.

[Learn more »](#)

Software

Specializing in [workbenches](#) for biodiversity scientists and [indexing all the Earth's species](#), our group also produces a wide range of open-source libraries and utilities.

Data

Decades long use of the tools and software used by us and our collaborators has resulted in high quality biodiversity data hosted by our group.

Collaboration

Our resources serve the scientific community through collaboration including global infrastructure like the [Catalogue of Life](#). Help us grow!



Catalogue of Life



<https://speciesfilegroup.org>



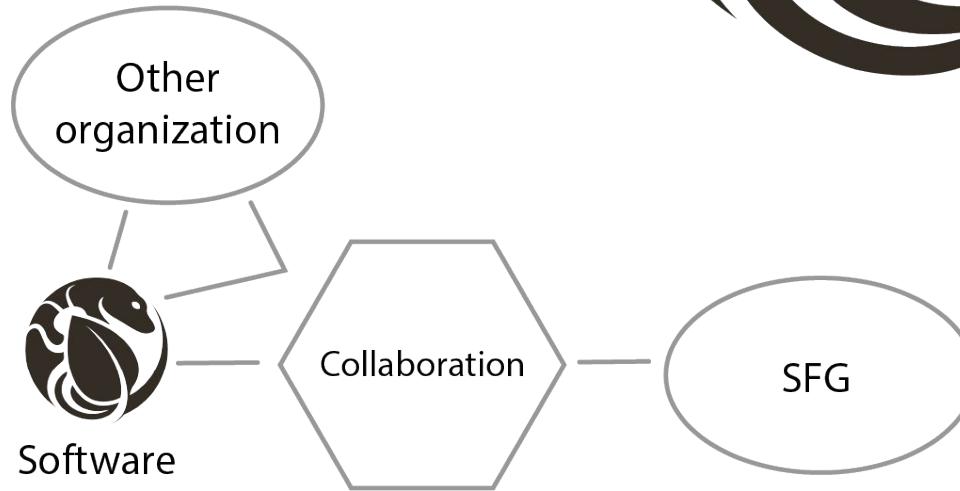
TaxonWorks

Describe life.

TaxonWorks is an integrated web-based workbench for taxonomists and biodiversity scientists.

It allows you to capture, organize, and enrich your data; share it with collaborators; and package it for analysis and publication.

TaxonWorks is software



<https://taxonworks.org/>

How is TaxonWorks used?

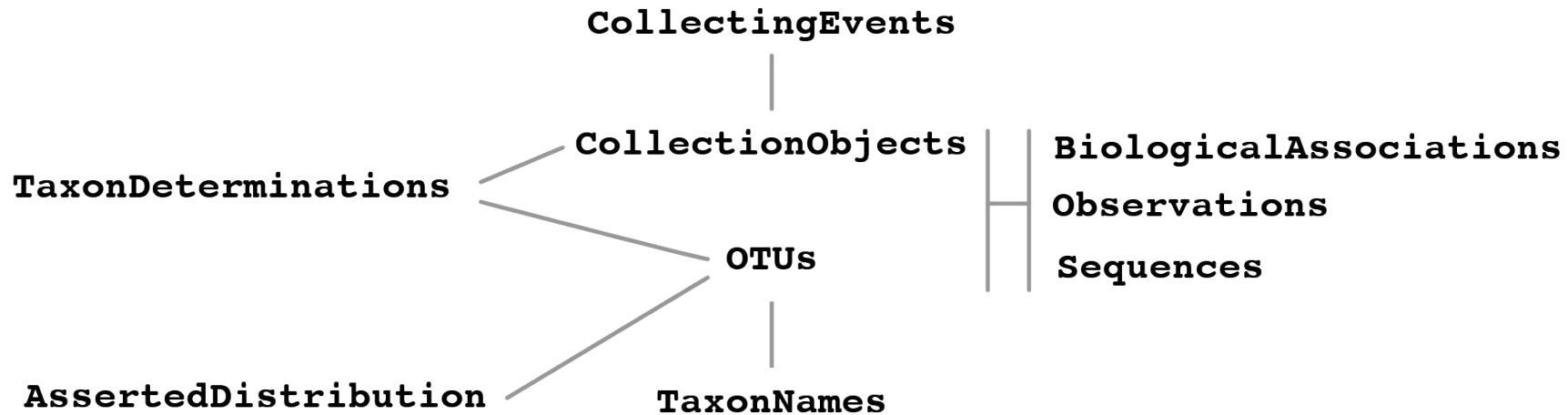


- ■ Manage data underlying systematics studies
- ■ Facilitate natural history collection curation
- Formalize taxonomic nomenclature
- Comprehensively catalog taxonomies
- ■ Support meta-projects

Source of data

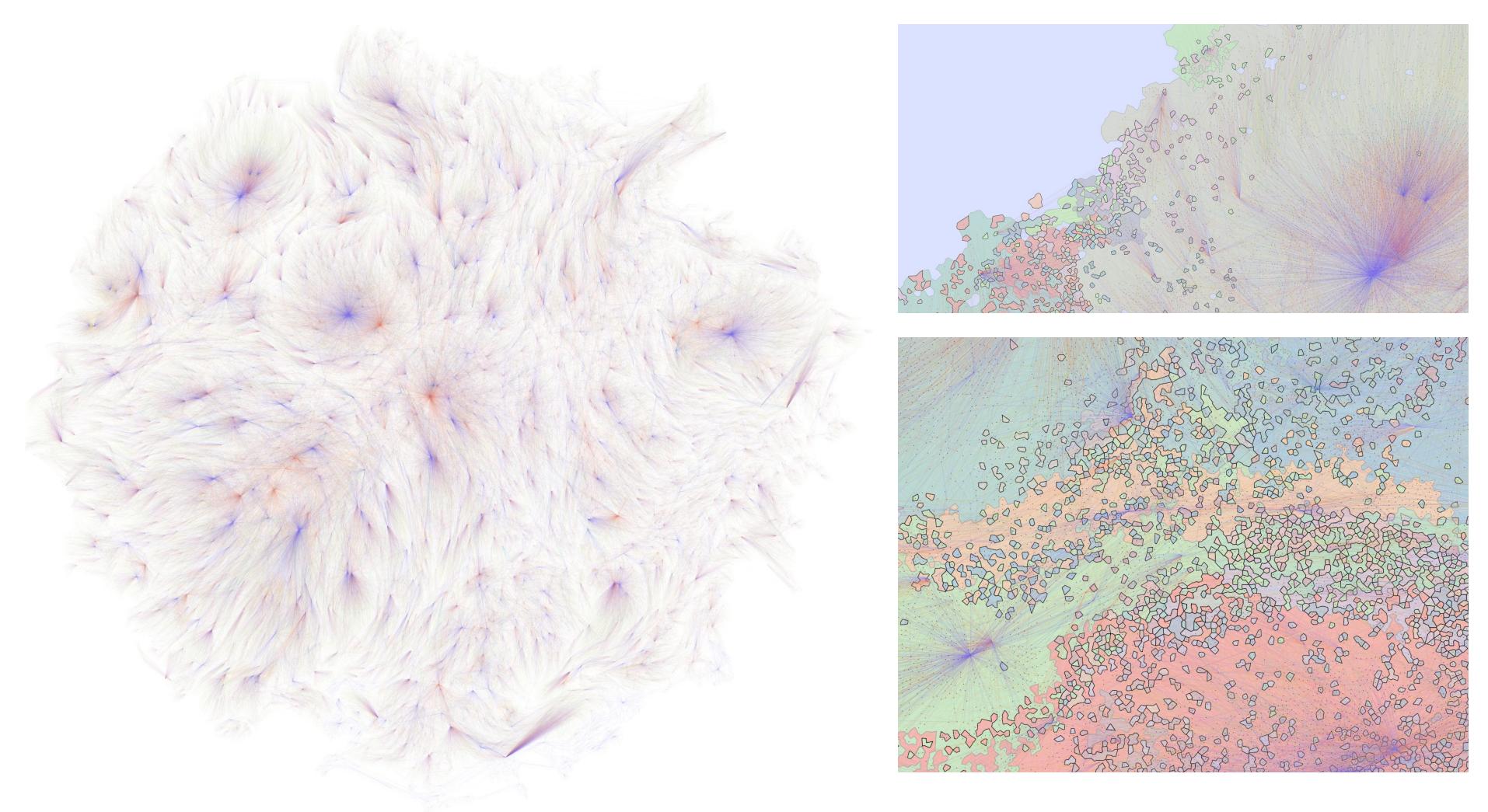
- past (old)
- present (new)

TaxonWorks core



- + Supporting/linking classes (40)
- + Annotation classes (9)

...rows to things.



Some SFG collaborators using TaxonWorks

3i World Auchenorrhyncha Database

Orthoptera Species File

Plecoptera Species File

Universal Chalcidoidea Database

Cucujoidea World Catalog

Opiliniones of the World

Odonate Central

Lepindex

INHS Insect Collection

NCSU Insect Collection

UNH Insect Collection

Frost Museum

Ant Web

Kojun Kanada

... ultimately ~40 more to this list



<https://stats.taxonworks.org/>

Tasks - apps in an integrated wrapper

TaxonWorks v0.19.1 Issues

Universal Chalcidoidea Database (UCD)

FILTER CARDS Reset

Alphabetical list of source authors

Browse OTUs

Browse asserted distributions

CATEGORIES Filters Browse New

Nomenclature

Source

Collection object

Collecting event

Biology

Matrix

Dna

Image

STATUS Status

TaxonWorks v0.19.1 Issues

Universal Chalcidoidea Database (UCD)

Browse nomenclature

Select a taxon name Root > Animalia > Arthropoda > Insecta > Hymenoptera > Chalcidoidea > Pteromalidae > Pteromalinae > **Pteromalus** > *Pteromalus puparum*

OTU

Navigation: Previous Random Next

Valid Invalid Both

History (113)

- *Ichneumon puparum* Linnaeus, 1758: 567.
- *Pteromalus (Pteromalus) puparum* (Linnaeus, 1758)
- *Ichneumon puparum* Linnaeus, 1758 (unavailable or invalid, linked to *Eupelmus puparum* Linnaeus, 1758)
- *Teromalus puparum* Linnaeus, 1758 (unavailable or invalid, linked to *Eupelmus puparum* Linnaeus, 1758)
- *Ichneumon puparum* Linnaeus, 1758 in Linnaeus, 1761: 409.
- *Cynips sp.* in Geoffroy, 1762: 305. (not Latin)
- *Ichneumon antiopea* Scopoli, 1763: 289.
- *Ichneumon antiopea* Scopoli, 1763 (unavailable or invalid, linked to *Eupelmus puparum* Linnaeus, 1758)
- *Ichneumon puparum* Linnaeus, 1758 in De Geer, 1771: 883-887.
- *Ichneumon puparum* Linnaeus, 1758 in Fabricius, 1775: 342.
- *Cynips sp.* (unavailable or invalid, linked to *Ichneumon puparum* Linnaeus, 1758)

species **Pteromalus puparum (Linnaeus, 1758)**

Summary

- This name is valid/accepted. The record is for a Protonym. There are 40 names referenced in this entry. Records exist in the date range 31-Dec-1758 to 20-Jul-2021. The following OTUs are linked to this name: *Pteromalus puparum* (Linnaeus, 1758)

Soft Validation

Relationships

- as species in combination *Pteromalus puparum* (Linnaeus, 1758) should not be younger than *Pteromalus (Pteromalus) puparum* (Linnaeus, 1758)

Taxon name **Fix all**

- Etymology is missing
- Missing relationship: *Pteromalus puparum* (Linnaeus, 1758) should be a secondary homonym or duplicate of *Pteromalus*

Innovating in the UI

The screenshot shows a user interface for managing collection objects. At the top, there's a header with the text "DEACCESSIONED" - specimen lost - 2021, INHS Insect Collection 740992, det. Anthocoridae Fieber, 1837, and a "CollectionObject" button. Below the header is a circular navigation menu with the following segments:

- Extracts
- Observation matrices
- Biological associations
- Data attributes
- Taxon determinations
- Biocuration classifications
- Collecting event
- Origin relationships

Below the menu, there are two tabs: "Collection objects" (selected) and "Task". The main area displays "Biocuration Classifications" with filters for Life Stage (Immature, Pupae, Exuvia, Egg(s), Adult) and Sex (Unknowable Sex, Gynandromorph, Male, Female).

Modal annotors/forms

This screenshot shows a modal window for the taxon *Aphelinus (Indaphelinus) ancer*. The window has a circular navigation menu with the following segments:

- Identifiers
- Data attributes
- Notes
- Tags
- Citations
- Latinized endings
- Type material
- Verbatim name
- Depictions
- Alternate values
- Confidences

The "Data attributes" segment is currently selected. The main area of the modal contains fields for "Name" (Aphelinus (Indaphelinus) ancer), "Rank" (Species), "Status" (Valid), and "Synonyms" (Aphelinus ancer). There are also sections for "Identifiers", "Notes", "Tags", "Citations", "Latinized endings", "Type material", "Verbatim name", "Depictions", "Alternate values", and "Confidences".

The screenshot shows a "Pinboard" interface with a sidebar and a main content area.

Pinboard

TaxonNames

- Aphytis
- Pteromalus puparum

Sources

- Wasmann, E. (1908) Termitholen. Ein neues termitophiles Staphylinidengenuss (*Termitotels schultzei*), nebst anderen Beobachtungen über die Gäste von *Hodotermes*. In: L. Schultz (Ed), Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika, ausgeführt in den Jahren 1903–1905 mit Unterstützung der Kgl. Preussischen Akademie der Wissenschaften zu Berlin. Erster Band: Systematik und Tieregeographie. Denkschriften der Medicinisch-Naturwissenschaftlichen Gesellschaft zu Jena, 13, Gustav Fischer, Jena, Germany, pp. 441–445 + 1 pl. [v + 504 pp. + 25 pls.]
- Snyder, T.E. (1934) New termites from India. Indian Forest Records, Entomology 20, 1–28.
- Otus
- Pteromalus puparum (Linnaeus)

OTU ita.

Images

mes.

Pinboard

TaxonWorks API - your curation, accessible

Integration

<https://gist.github.com/rafaelafrance/d1e85fe07e0697614b9271d3798dfa35>

Websites



Flexibility

<https://api.taxonworks.org/>

TaxonWorks milestones

Preserving legacy/bespoke data

User growth, time used

2500+ issues on Github

New standards (NOMEN)

Standards compliance (DwC, NeXML, etc.)

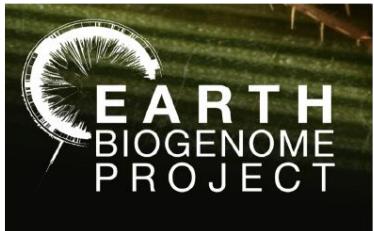
Polished development environment (specs, containers, CI)

Extra SFG maintained instances

Spun-off software libraries



Envisioning



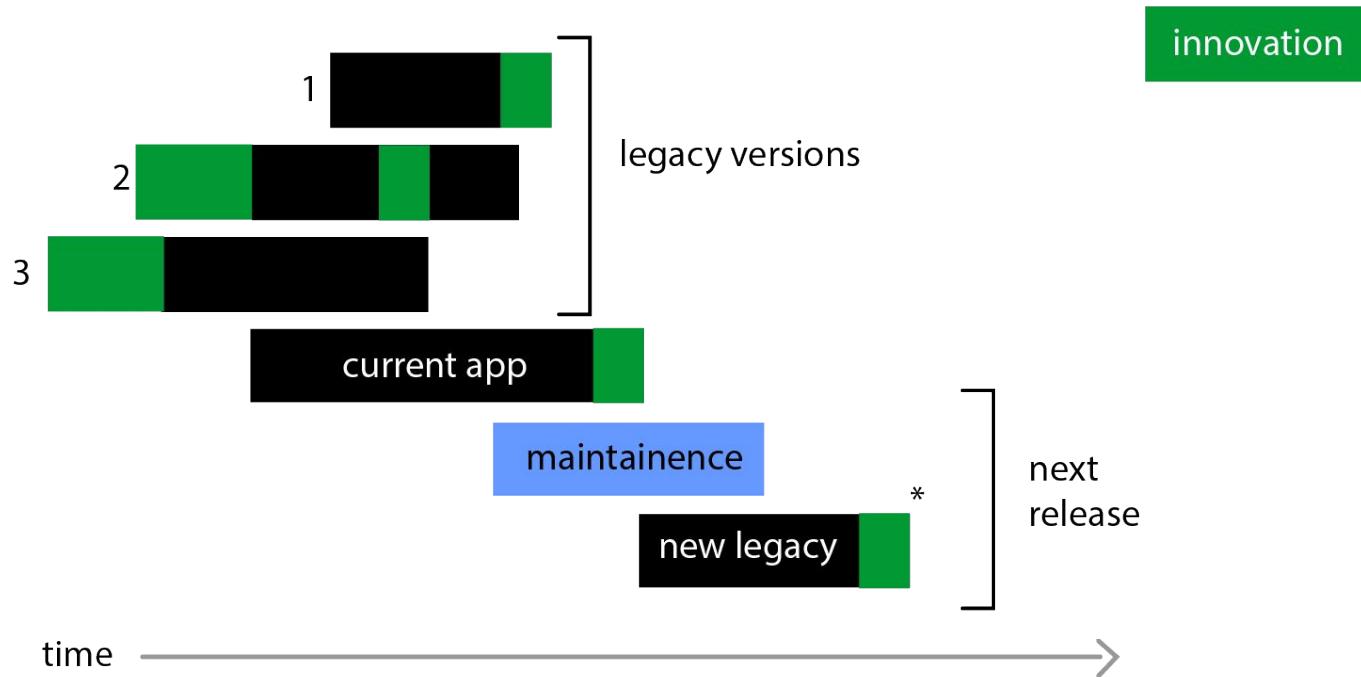
x need to

Describe classes of problems that scale:

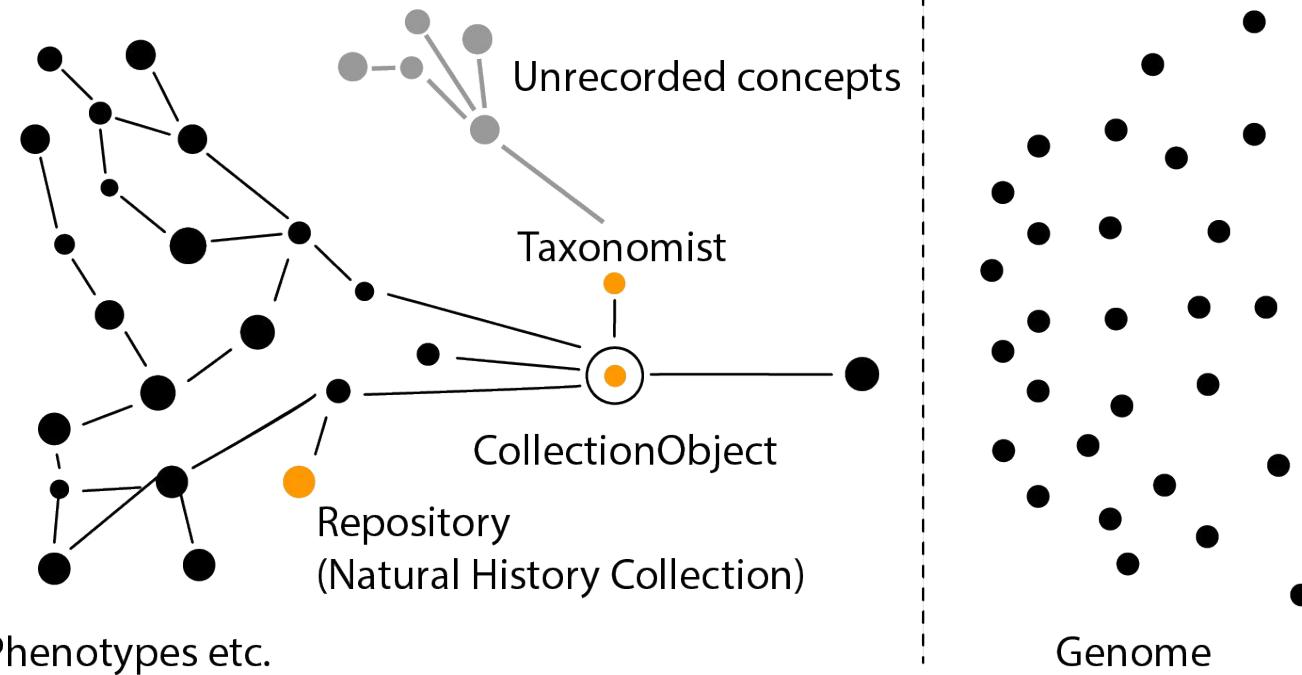
- Finding specimens
- Prioritizing targets (workflows)
- Common interfaces (annotations)
- Documenting observations
- Pipeline integrations
- Documenting *the unravelling*



Intersection of TaxonWorks and Genomics



Up to the genome

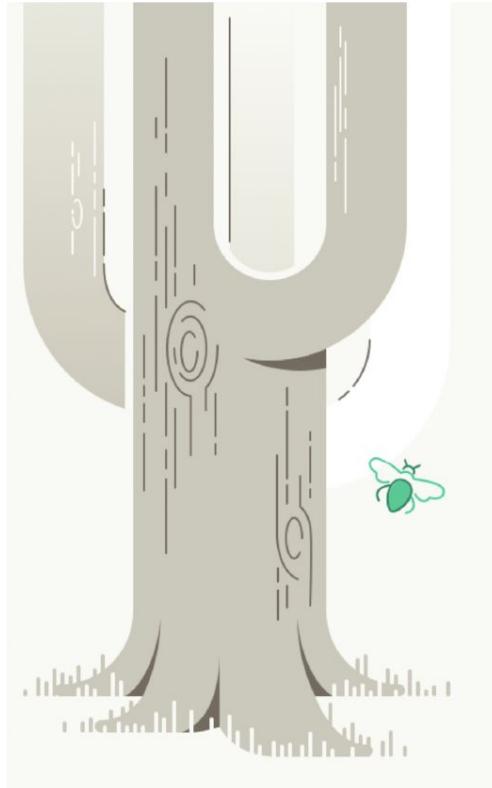


In 10 years ...

We won't have a genome for every species...

... but we may be closer to a scientific renaissance fueled by the intersection of genomics and natural history.

How do we use this time to grow a solid foundation for this potential synergy?



Thanks!

Community Liaison
Deborah Paul <dlpaul@illinois.edu>

Events, announcements, outreach
<https://speciesfilegroup.org/events.html>

Source
<https://github.com/SpeciesFileGroup/taxonworks>

Chat
<https://gitter.im/SpeciesFileGroup/taxonworks>

Announcements, highlights
<https://twitter.com/taxonworks>