



# iDigBio's Biospex System for Engaging the Public in Biodiversity Research Specimen Digitization

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...and this thing, if it does indeed exist, offers enlightenment, hope, and the potential to unlock the mysteries of the universe to all people? Sounds very powerful and maybe too dangerous to be trusted to the masses. What did you call it again?



# History of Public Participation in Scientific Research

**Inadvertent  
scientist**

- Science, but for a different primary purpose

**Gentleman  
scientist**

- Self-funded, self-directed science as a hobby

**PPSR**

- Collaborative science between citizen and scientist



April 14, 1644: 於清涼殿花御覽 天盃頂戴  
*At Seiryoden Palace, Kyoto, we enjoyed watching cherry blossoms and took sake provided by the emperor.*

The translation of the highlighted sentence is shown in red. The black entry is the date, according to the Japanese calendar.



# Benjamin Franklin



Citizen science is gaining in popularity and technological advances provide new ways of participating with minimal training.



3 billion specimens in  
biodiversity collections.

Make them available to  
researchers tackling  
contemporary research  
issues.







Making data and images of millions of biological specimens available on the web

10,430,011

Specimen Records

1,266,676

Media Records

174

Recordsets



**Why digitization matters**

More about what we do and why

#### Researchers

Learn about research directions



#### Collections Staff

Learn how your collection can benefit from our work



#### Teachers & Students

Download lesson plans about using digitized specimens



#### Digitization

Learn, share and develop best practices



#### Sharing Collections

Documentation on data ingestion



#### Working Groups

Join in, contribute, be part of the community



#### Proposals

New tool and workshop ideas

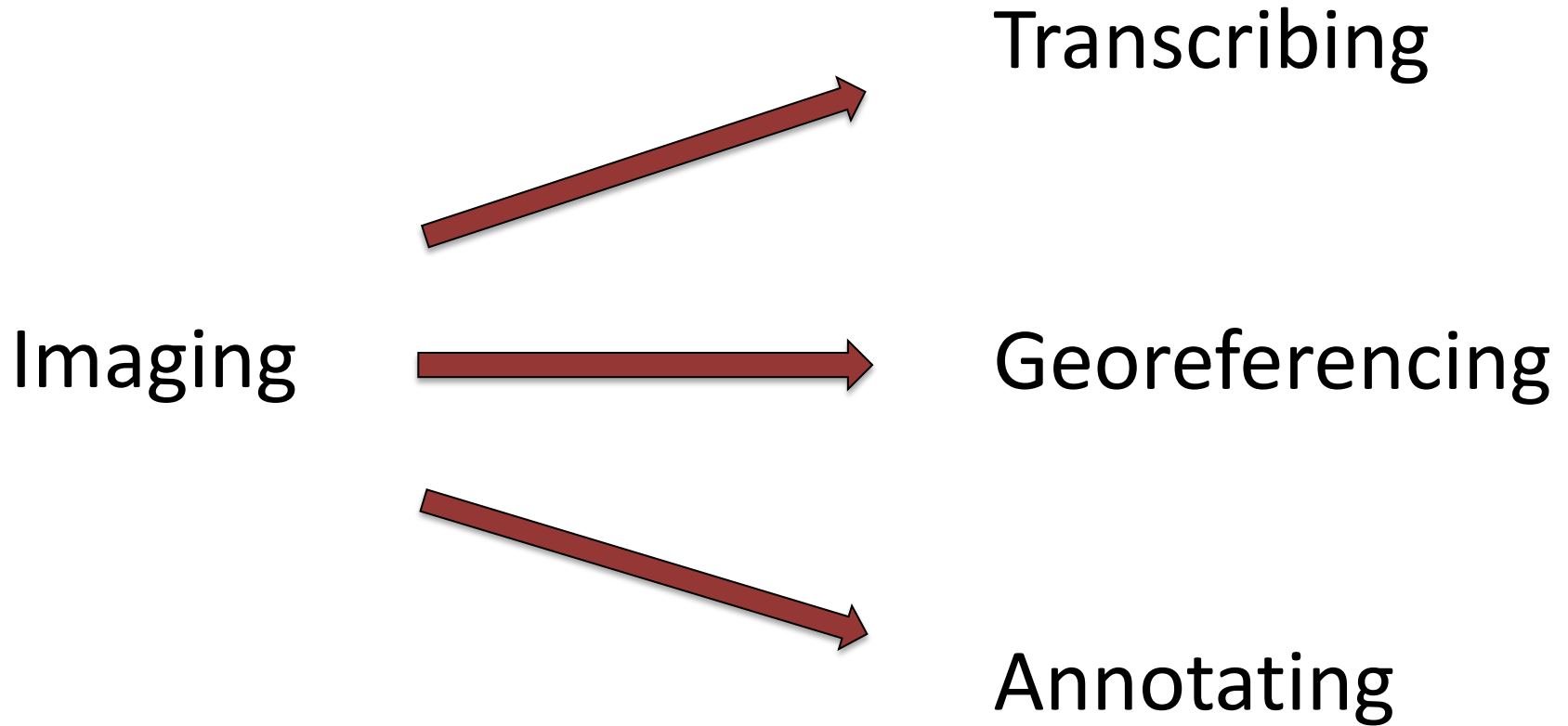


#### Citizen Scientists

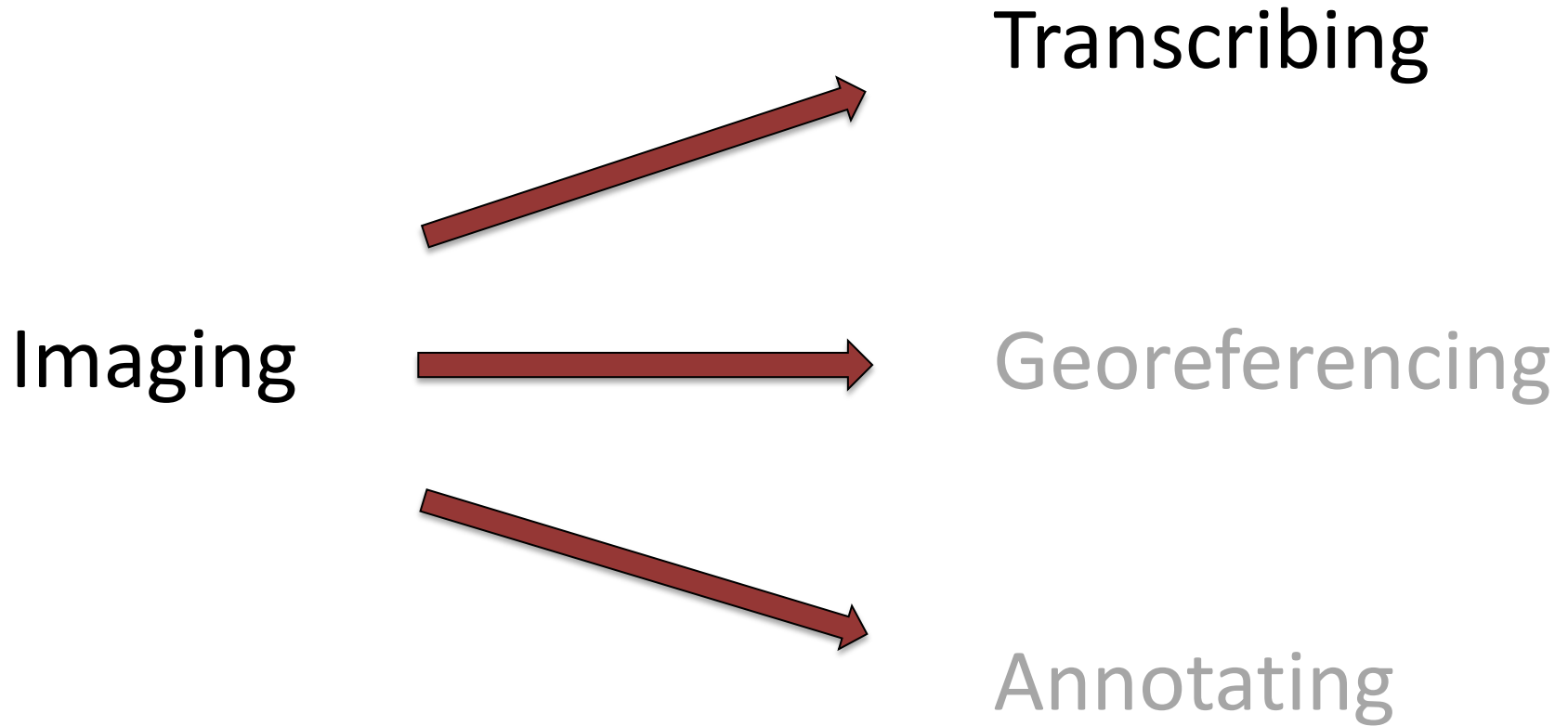
How can you help biological collections?



# Digitizing Biodiversity Specimens



# Digitizing Biodiversity Specimens



No. Locality.

323. *Mendal*

NAME, SYNONYMS, AND PECULIARITIES.

*Radiated brown Stilbite*

*in Cuccolite, from  
primitive Rocks.*

*Bicucullaria* (L.) Bernh.  
E of *Bicucullaria occidentalis* Rydb.  
rr. Bot. Club 29(3):160. (1902)  
Legler, 1 Sep 2005 WTU

FLORA OF NORTH AMERICA

*Bicucullaria* (L.) Bernh.

Sley R. Stern (CHSC)

1993

Revision acc. to International Rules

*Bicucullaria* (L.) Bernh.

L. St. John.

much 1923.

Bull. Torr. Cl. 29:160:1902.



FIDE  
PIPER, FL. WASH.  
PAGE 284

*Bicucullaria cucullaria* (L.) Millsp.

FLORA OF WASHINGTON.  
W. KLICKITAT CO.

PLANTS OF OKLAHOMA  
ROBERT BEBB HERBARIUM  
The University of Oklahoma

Oklahoma County

Scrophulariaceae

*Penstemon oklahomensis* Penn.

SE corner of Tinker AFB. T11N R2W Sec. 26.  
Topography: rolling upland. Habitat: Mixed-Grass Prairie.  
Herbaceous perennial. 2-3 dm tall. Flowers white.

F. L. Johnson

TNK017

4 May 1994

Plant Inventory of Tinker Air Force Base by Oklahoma Biological Survey



*Penstemon oklahomensis* Penn.  
Habitat: Mixed-Grass Prairie  
Coll. F. L. Johnson  
4 May 1994

[v2.1.1] COON DISTRICT

Natural Order: *Rutaceae*  
Generic name: *Citrus*  
Specific name: *Garrawayi*, Bail.  
Vernacular name:  
Habitat: *W. White, Coon.*  
Collector: *R.W. Garraway*  
Remarks: *May 1904*  
F. M. BAILEY.



*Oxytropis Halleri* - Bunge  
Sea cliffs  
Malvern  
Sutherlandshire.  
10. VII. 85. H.E. Fox

By Rev. CHARLES BAILEY,  
Representing, Chas. B. Bailey, Manchester.

No. *Oxytropis Halleri* B.  
Cybele Bot. Ex. Herbarium W. L. Nason, Chesham.  
Locality: *Malvern*  
County: *Wiltshire*  
Collected by *H. Dick*, *W. L. Nason*  
Communicated by Charles Bailey, Manchester.





ATLAS of LIVING AUSTRALIA  
sharing biodiversity knowledge



Smithsonian

SMITHSONIAN DIGITAL VOLUNTEERS: TRANSCRIPTION CENTER



Les herbonautes

L'herbier numérique collaboratif citoyen

ZOONIVERSE  
REAL SCIENCE ONLINE



herbaria@home  
recording historical biodiversity

log in | register

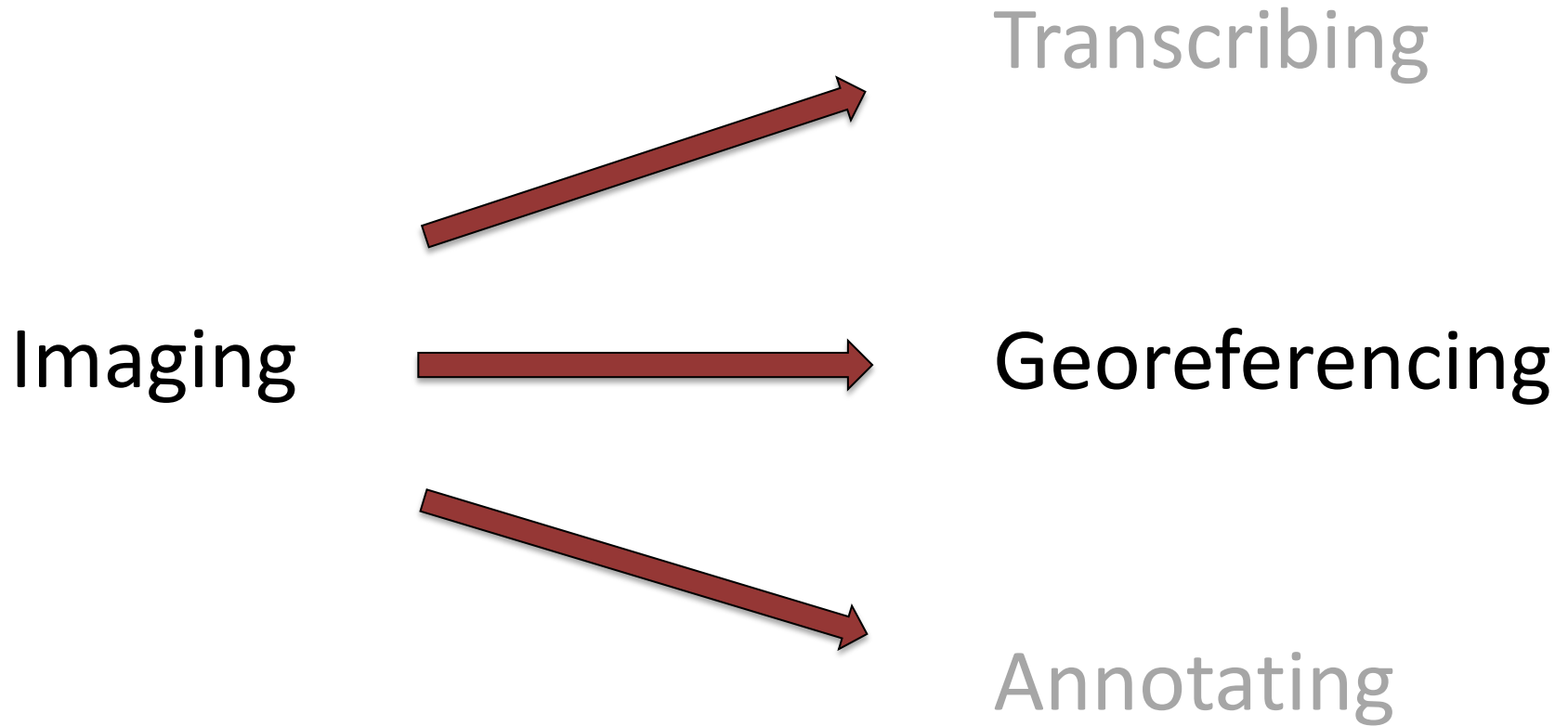


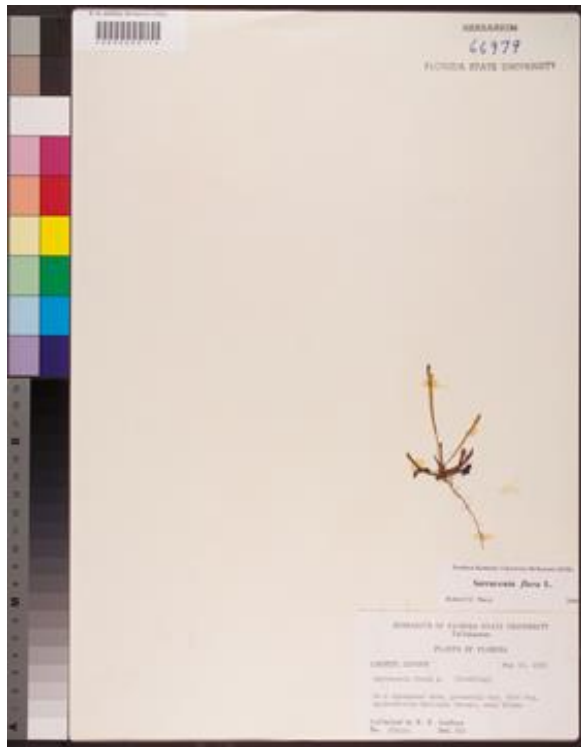
## DISCOVER LIFE



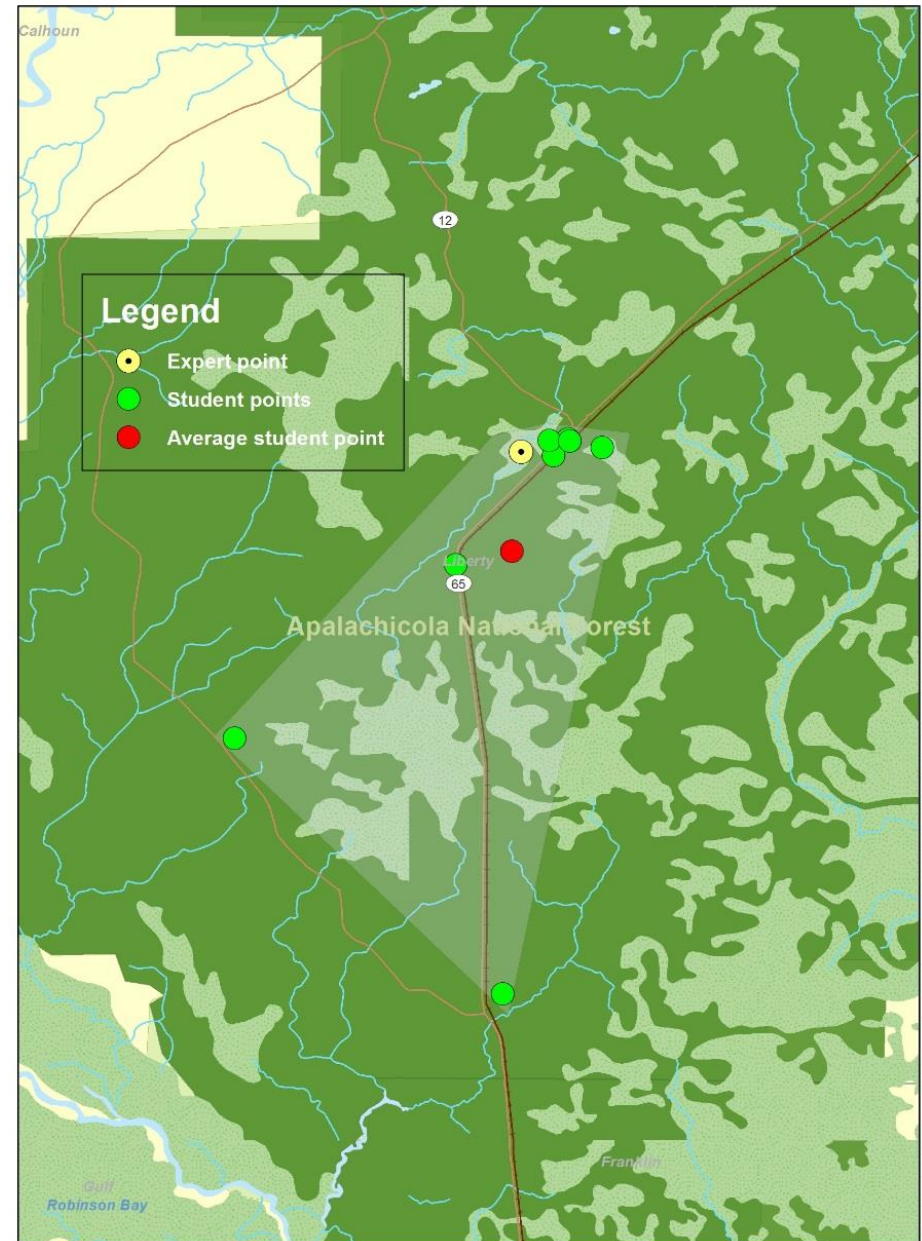
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# Digitizing Biodiversity Specimens



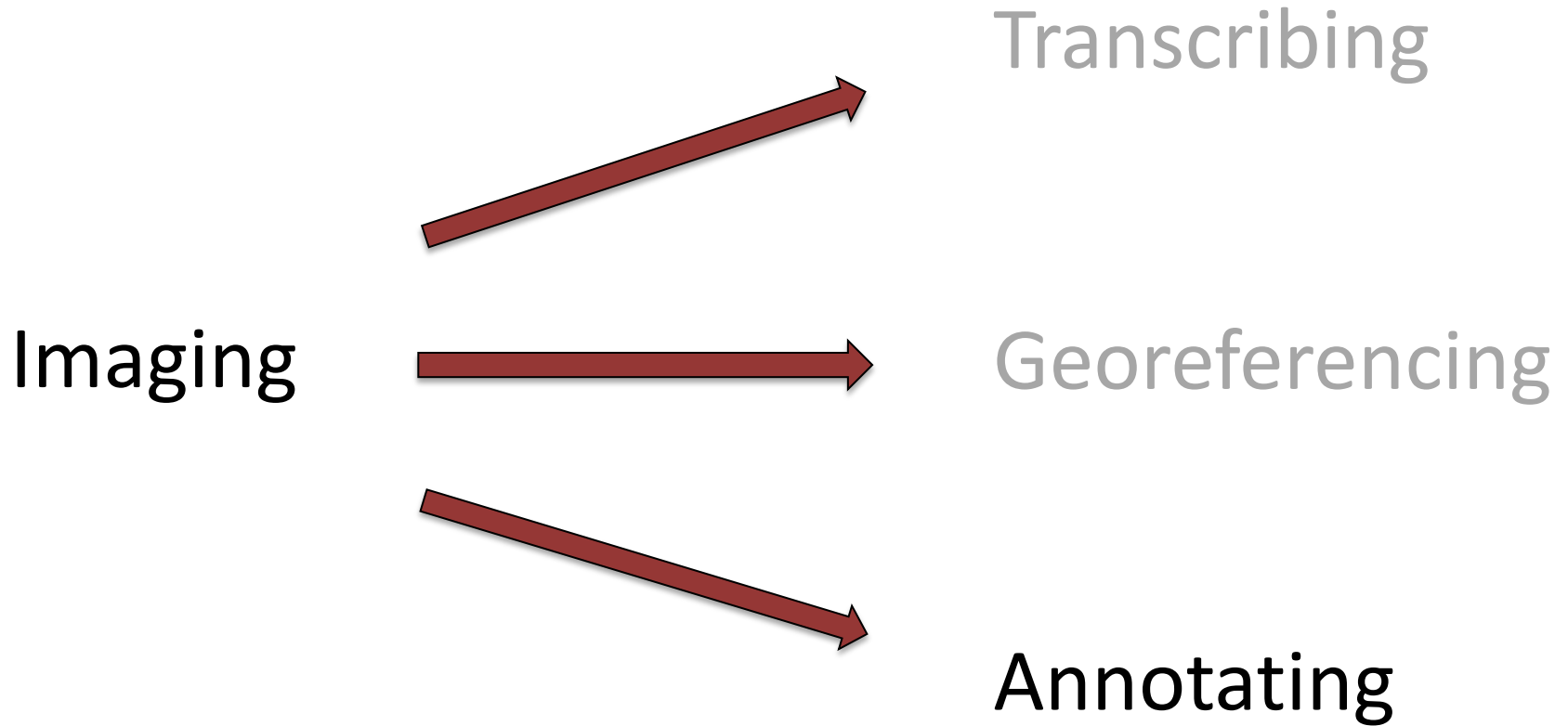


Apalachicola National Forest.  
 Verbatim Locality: titi bog, Apalachicola  
 National Forest, near Wilma.  
 Habitat: in a sphagnous area, presently  
 dry, titi bog



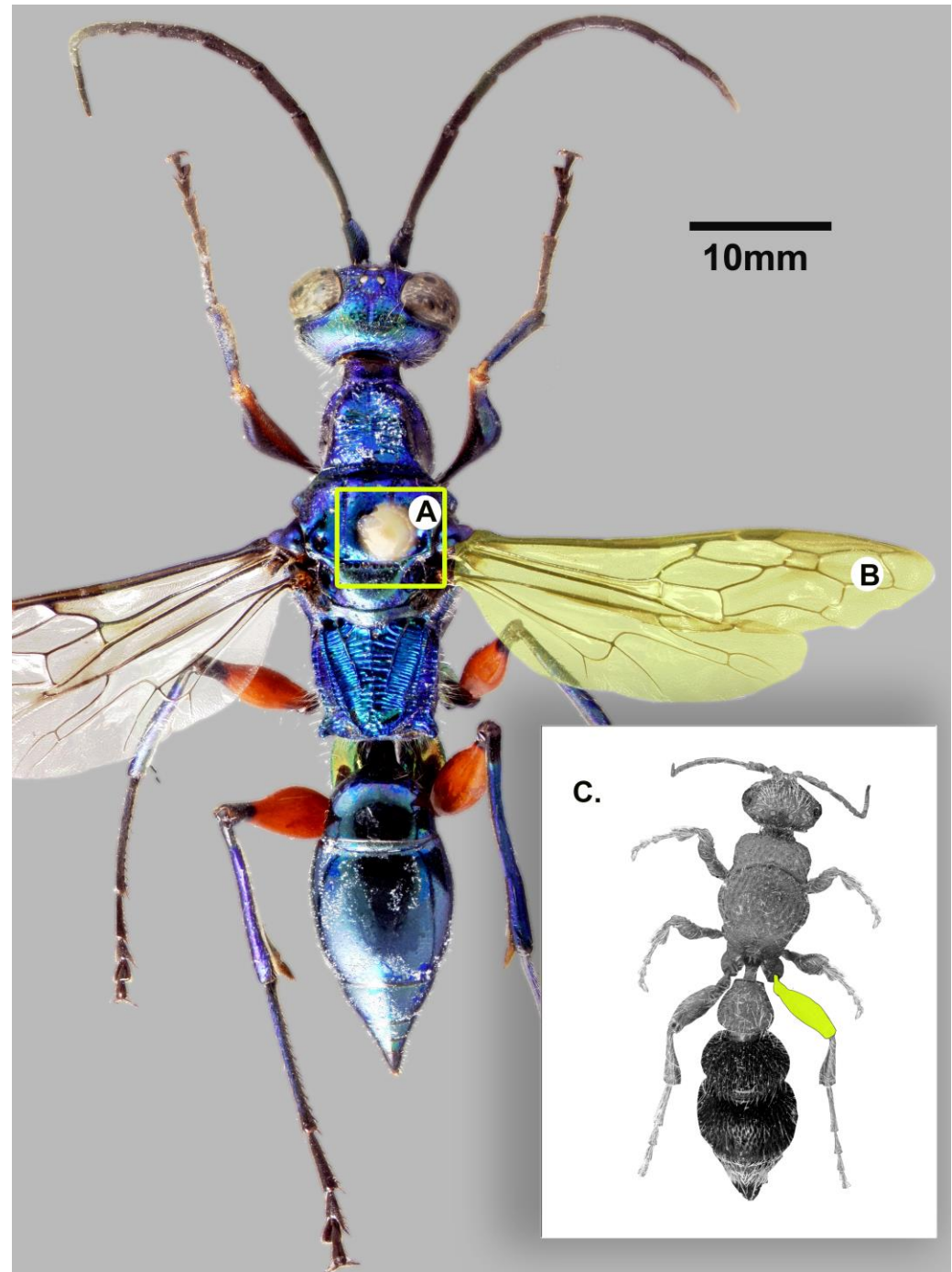


# Digitizing Biodiversity Specimens

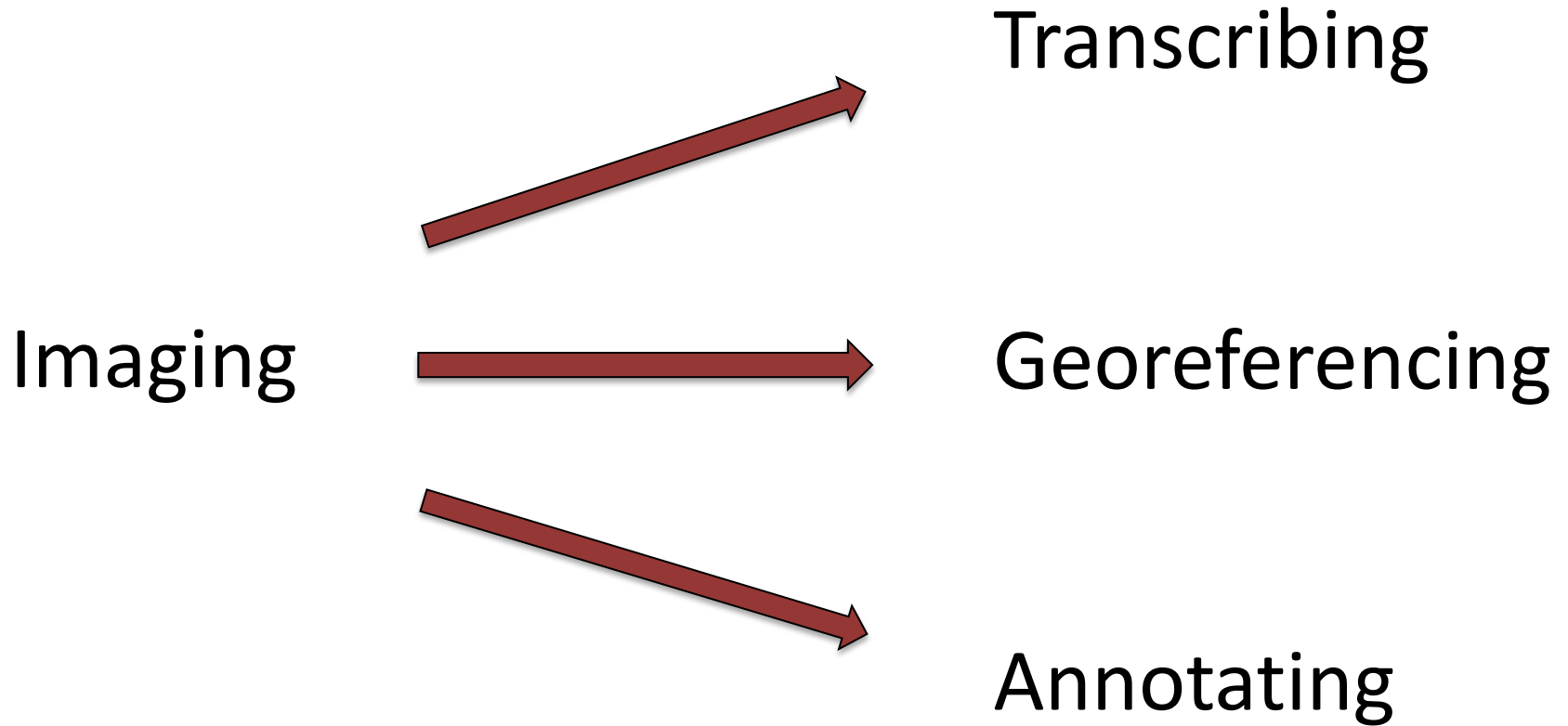


C: “What color is this part of the body?”

*Ampulex compressa* (F.) from the  
Museum für Naturkunde Berlin  
([morphbank.net/?id=102143](https://morphbank.net/?id=102143))



# Digitizing Biodiversity Specimens





# BIOSPEX.ORG



Use BIOSPEX to provision, advertise, and lead public  
**Biodiversity Specimen Digitization Expeditions**

See how BIOSPEX will help liberate data from museum cabinets

**START**



#1

A curator of plant specimens digitally images all 21,000 of her Florida specimens and runs optical character recognition (OCR) software on the images, then uses BIOSPEX to bundle the specimen images using the OCR text string into about 20 expeditions that each ignite public interest for their themes or research importance. Groupings could be made by state park of origin, decade of collection, likelihood of handwriting on the label (using an OCR quality parameter), rarity, or invasiveness.

HERBARIUM OF FLORIDA STATE UNIVERSITY, TALLAHASSEE  
 PLANTS OF: Florida COUNTY: Leon  
 Hibiscus militaris Cav.  
 73-61  
 SR12 at Atkinson Rd (on road to Tall Timbers). Big  
 stand of pink flowers H. militaris mixed with  
H. aculeatus.  
 DATE: 7/31/73  
 COLLECTED BY: M.V. Menzel  
 NO. 117699 DET.

#2



Descendants of a famous ornithologist are interested in reconstructing the paths of his field trips. They gather together 32,000 specimen records from 42 different museums by exporting files from a specimen portal, such as that at iDigBio. A large fraction of the specimens do not have latitude and longitude associated with them, but they do have locality information that can be used to assign latitude and longitude.

#3

An environmental group is concerned about the health of a local river. They gather together 12,000 specimen records of all types (fish, invertebrates, aquatic plants, etc.) that mention the river by name using the same protocol as the ornithologist's family.



NEXT

#1



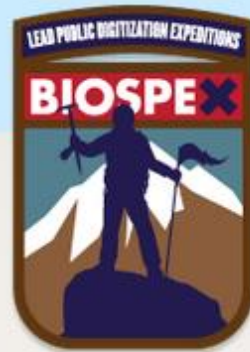
The curator then uses BIOSPEX to deploy the expeditions a few at a time to an existing website with a large citizen science community for label transcription.

#2



The family uses BIOSPEX to bundle the locality records into sets that make the georeferencing efficient (e.g., by collection year) then deploys them a few expeditions at a time to a website with a large citizen science community for assignment of latitude and longitude.

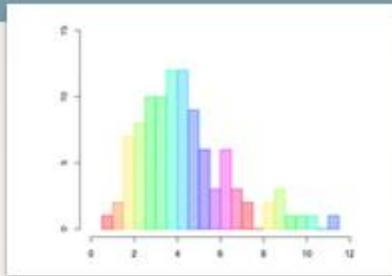
#3



The environmental group uses BIOSPEX to bundle those from the same taxonomic groups (e.g., all the fish) into expeditions for crowd-sourced georeferencing.

NEXT



**#1**

The curator processes the resulting transcriptions in BIOSPEX later and exports the data back to her local data management system.

**#2**

The family later downloads the complete data set to map the trips and sends the latitude and longitude data back to the 42 different museums that hold the specimens from BIOSPEX.

**#3**

The environmental group uses the map of historical records that is produced as a baseline for understanding the distribution of diversity that they see today and that they are documenting using another citizen science tool, such as [dts.ci.org](https://dts.ci.org). The group sends the latitude and longitude data back to the museums that hold the specimens from BIOSPEX so that the data can be reused.

**ABOUT**

# BIOSPEX



The BIOSPEX data management system is a project of iDigBio, The National Resource for Advancing Digitization of Biodiversity Collections. For more information on the project, please contact [Austin Mast](#) or [Greg Riccardi](#).

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