Research Coordination & Scientific Community Outreach: *Summit 2014*

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University of Florida

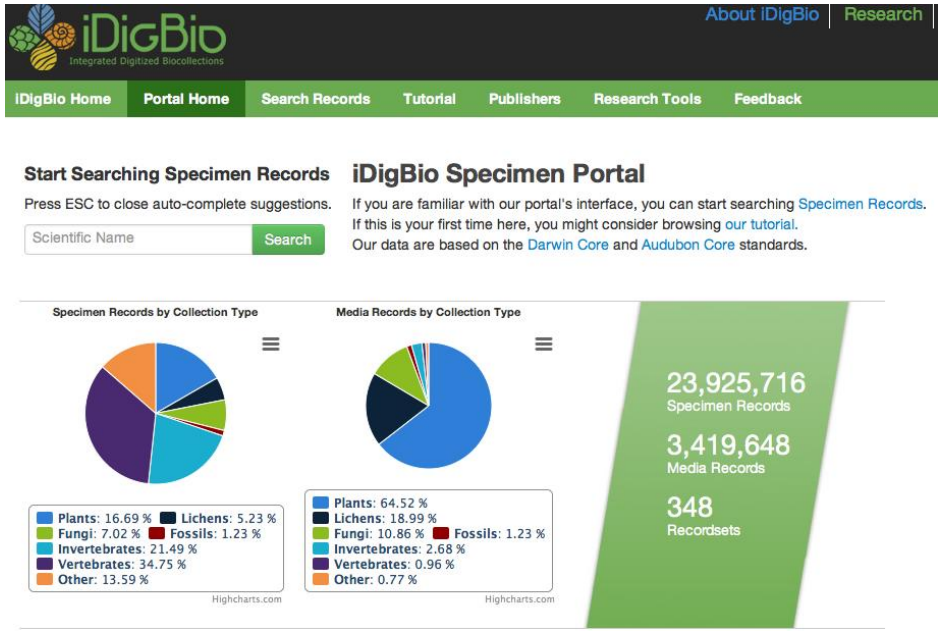
iDigBio is funded by a grant from the National Science Foundation's Advancing Digitization of Biodiversity Collections Program (Cooperative Agreement EF-1115210). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. All images used with permission or are free from copyright.

Collections: The Library of Life

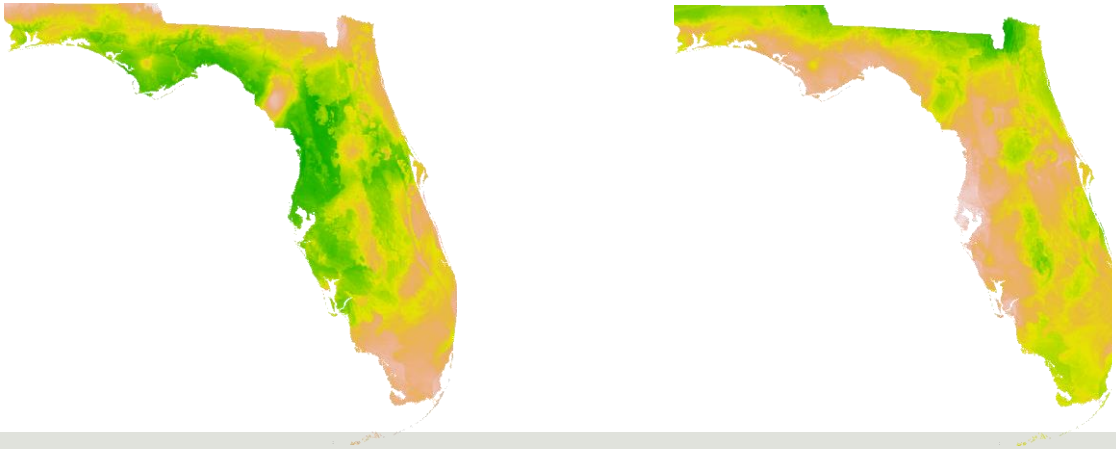
>1600 natural history collections
in the US alone
1-2 billion specimens
in the US
3-4 billion specimens
worldwide

Research @ iDigBio

- Specimen portal

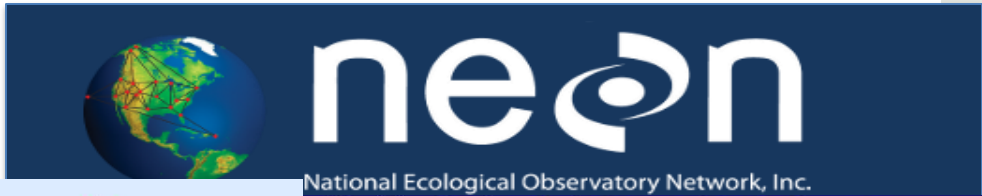


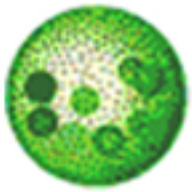
- Computational workflows



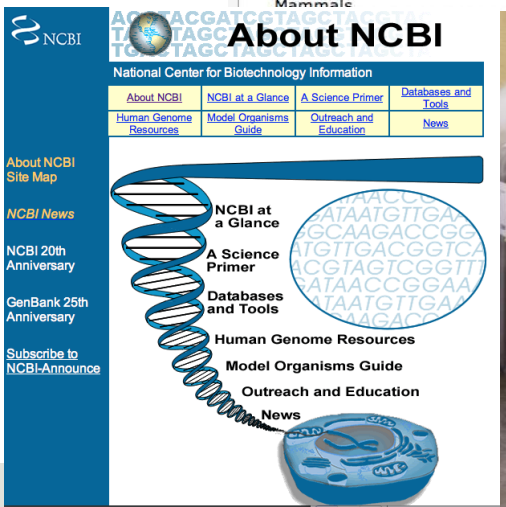
Linking Collections to…

- Phylogeny
- Ecology
- Paleontology
- Living Collections
- Genomics
- Other Repositories





UTEX



Linking to GenBank

Welcome to NCBI

The National Center for Biotechnology Information advances science and health by providing access to biomedical and genomic information.

About the NCBI | Mission | Organization | Research | NCBI News

- **Examples of the /specimen_voucher information:**

```
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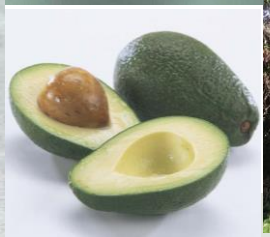
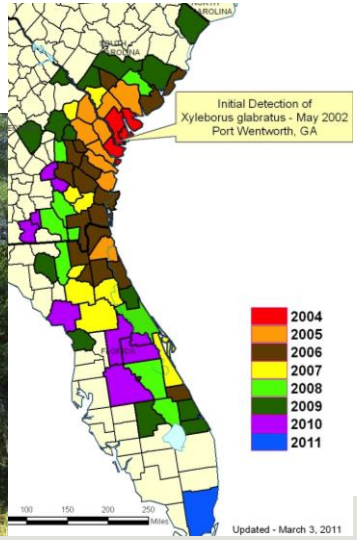
Tracking the Movement of Invasive Species

- Where have invasives been introduced, and how quickly are they spreading?
- What is the pattern of spread, and do patterns covary with other species?
- How does climate change affect the spread of invasives?
- Can we predict future invasions?





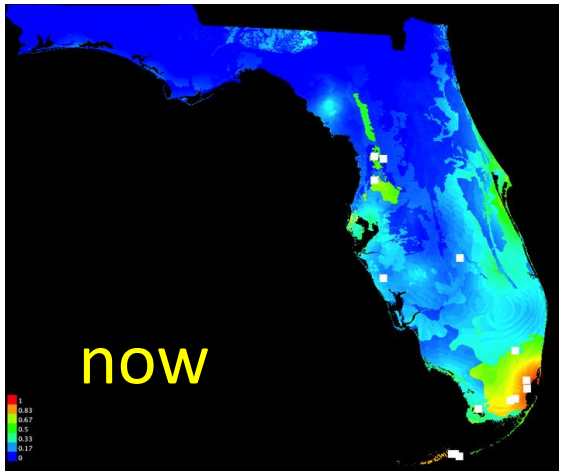
Ecological Niche Modeling: locality information

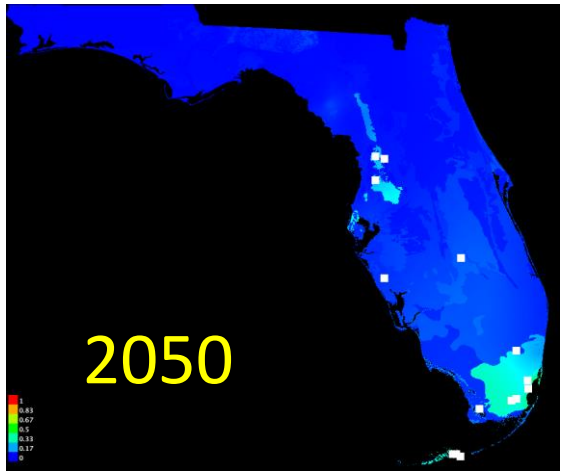
GEOLocate 29.65, -82.32

number,dwc:preparations,dwc:identificationVerificationStatus,idigbio:subfamily,idigbio:preparationCount,fcc:pickedBy,dwc:eventRemarks,dwc:VerbatimEventDate,dwc:associatedReferences,idigbio:endangeredStatus,dwc:locationAccordingTo,dwc:georeferenceSources,dwc:associatedSequences,dwc:formation,dwc:higherClassification,dwc:catalogNumber,dwc:verbatimSRS,dwc:higherGeography,dwc:individualCount,dwc:decimalLongitude,dwc:datasetName,dwc:month,dwc:georeferencedBy,dwc:eventTime,dwc:identificationQualifier,idigbio:

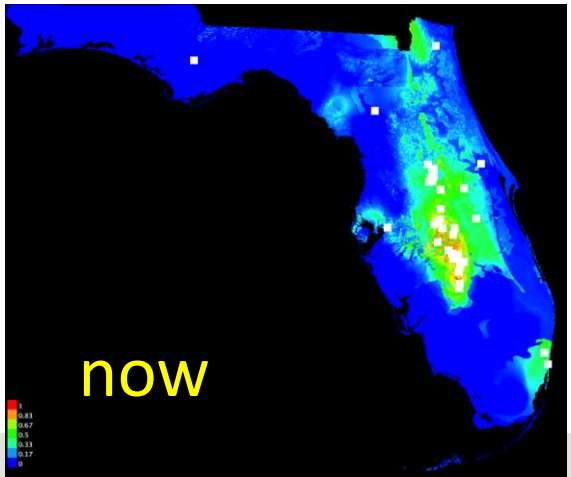
Responses to Climate Change: past, present, future

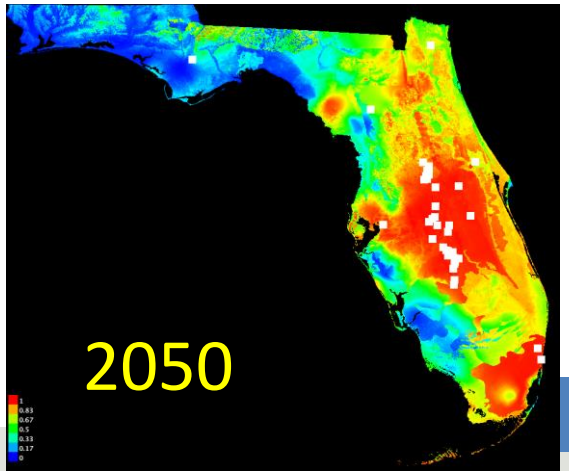
Abildgaardia ovata (flatspike sedge)





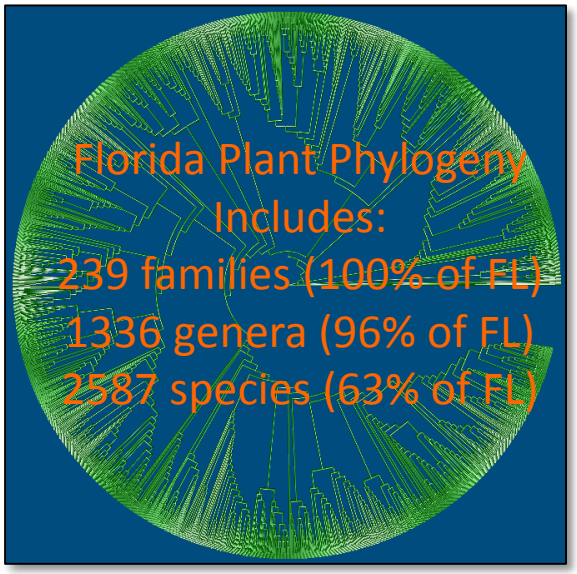
Prunus geniculata (scrub plum)





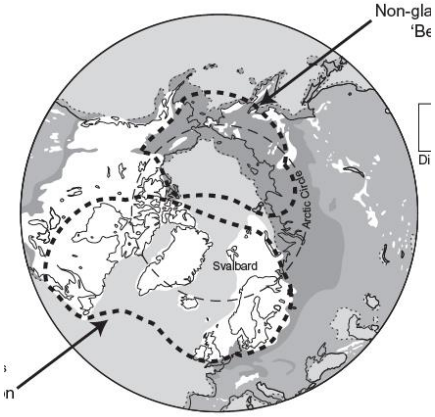
Florida Plant Diversity in a Changing Climate

Integrating herbarium specimen data, ENM, climate change models, and phylogeny



Charlotte Germain-Aubrey

Distributions of Polyploids and their Diploid Progenitors



- Do polyploids have broader 'ecological amplitude' and/or ranges than diploid parents?
- ENM for polyploids and parents
- Predicted distributions under models of climate change
  - Will polyploids and diploids respond in similar ways?

Blaine Marchant

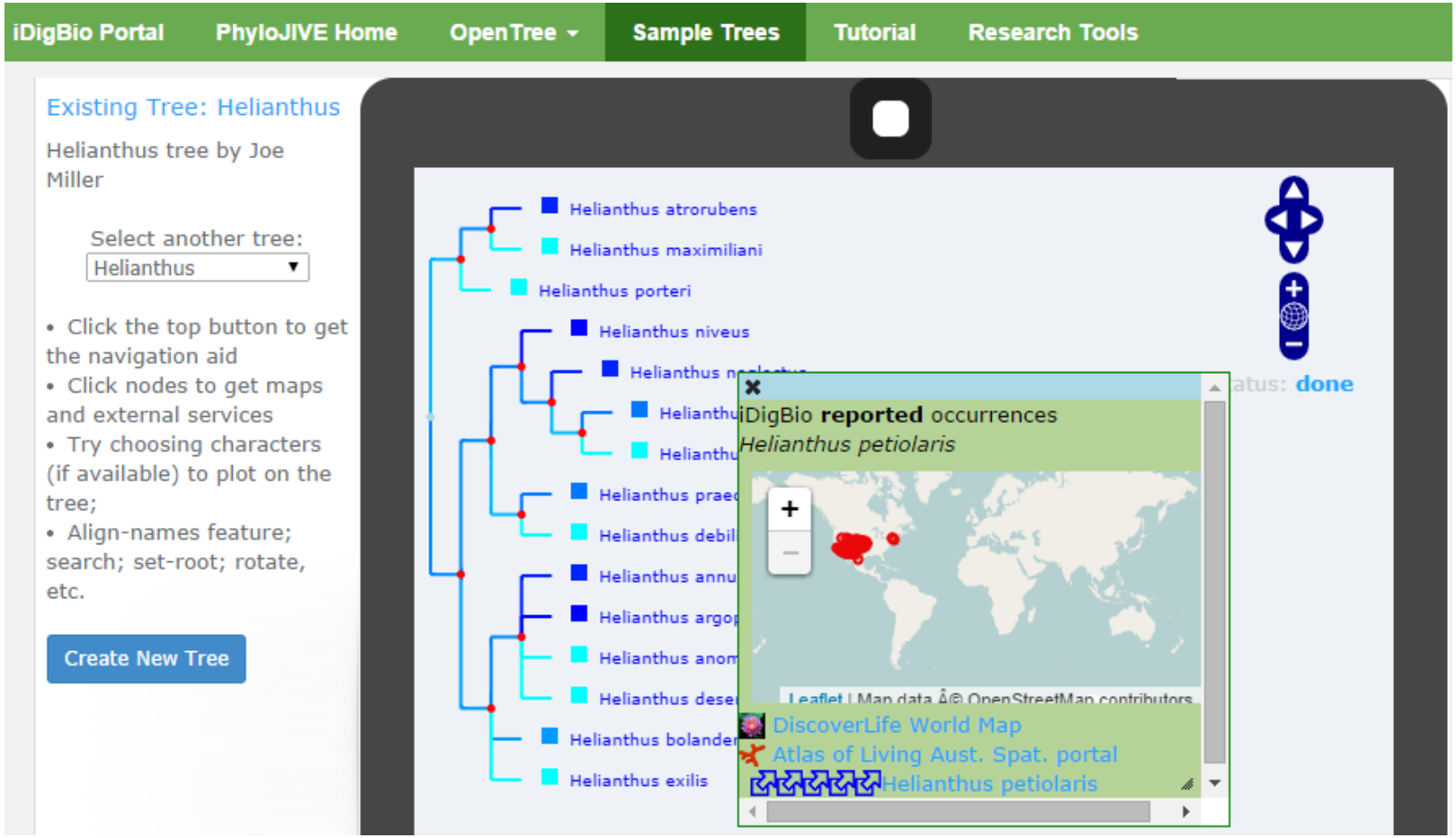
Linking to Phylogeny

PhyloJIVE

Links biodiversity data to trees
Joe Miller & Garry Jolley-Rogers
phylojive.ala.org.au/

A. buxifolia
Source: Australian Plant Image Index Image by: Macd

PhyloJIVE instance in iDigBio



- Developed by Garry Jolley-Rogers, Joe Miller, and Temi Varghese
- Integrates biodiversity data with phylogeny
- http://phylojive.acis.ufl.edu/

A. Matsunaga

Connecting Trees, Specimens, Tools, Data

iDigBio
Integrated Digitized Biocollections

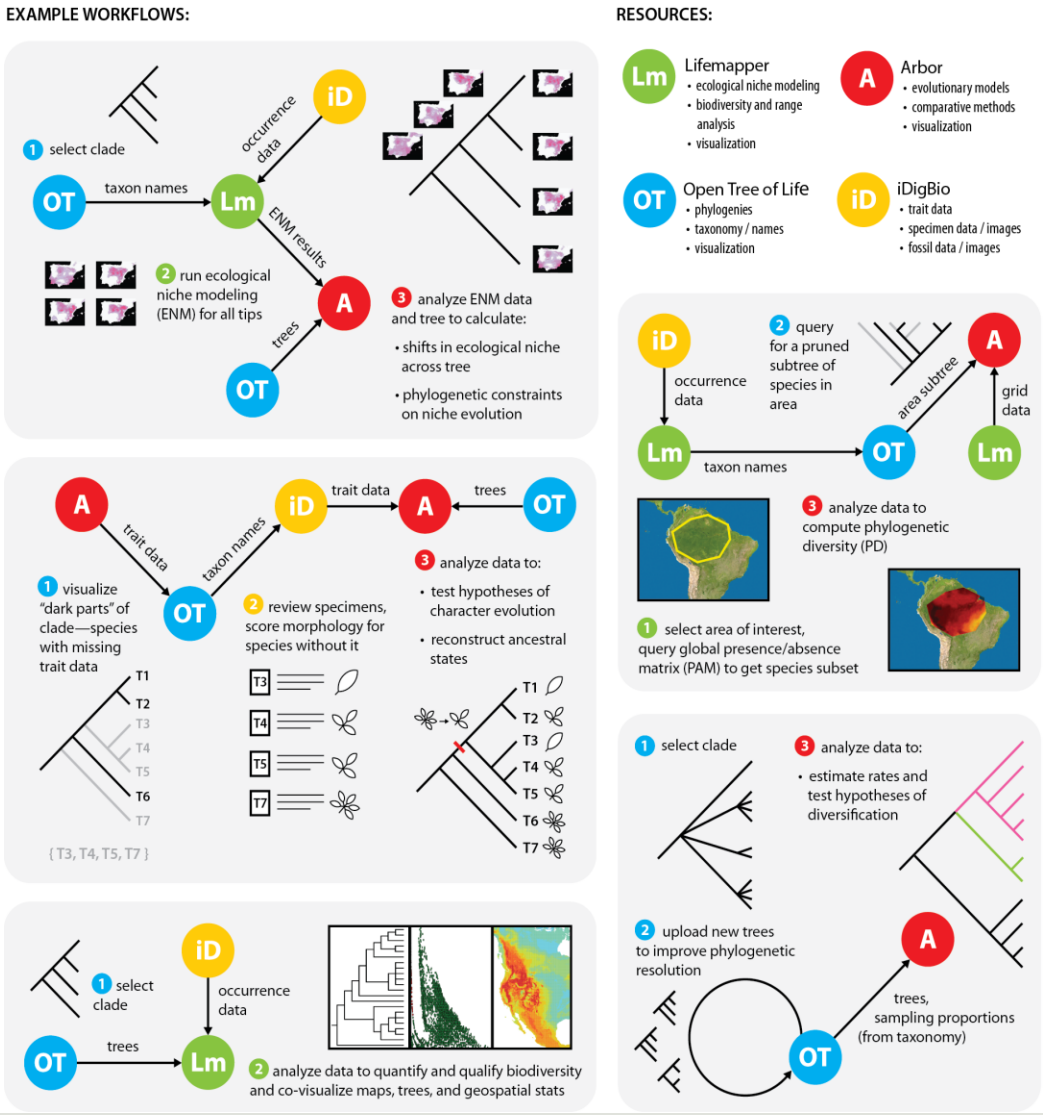
BIEN

OPEN
Tree of Life
A community-assembled ToL

Lifemapper

ARBOR
revolutionary workflows

Connecting Trees, Specimens, Tools, Data



Connecting Trees, Specimens, Tools, Data

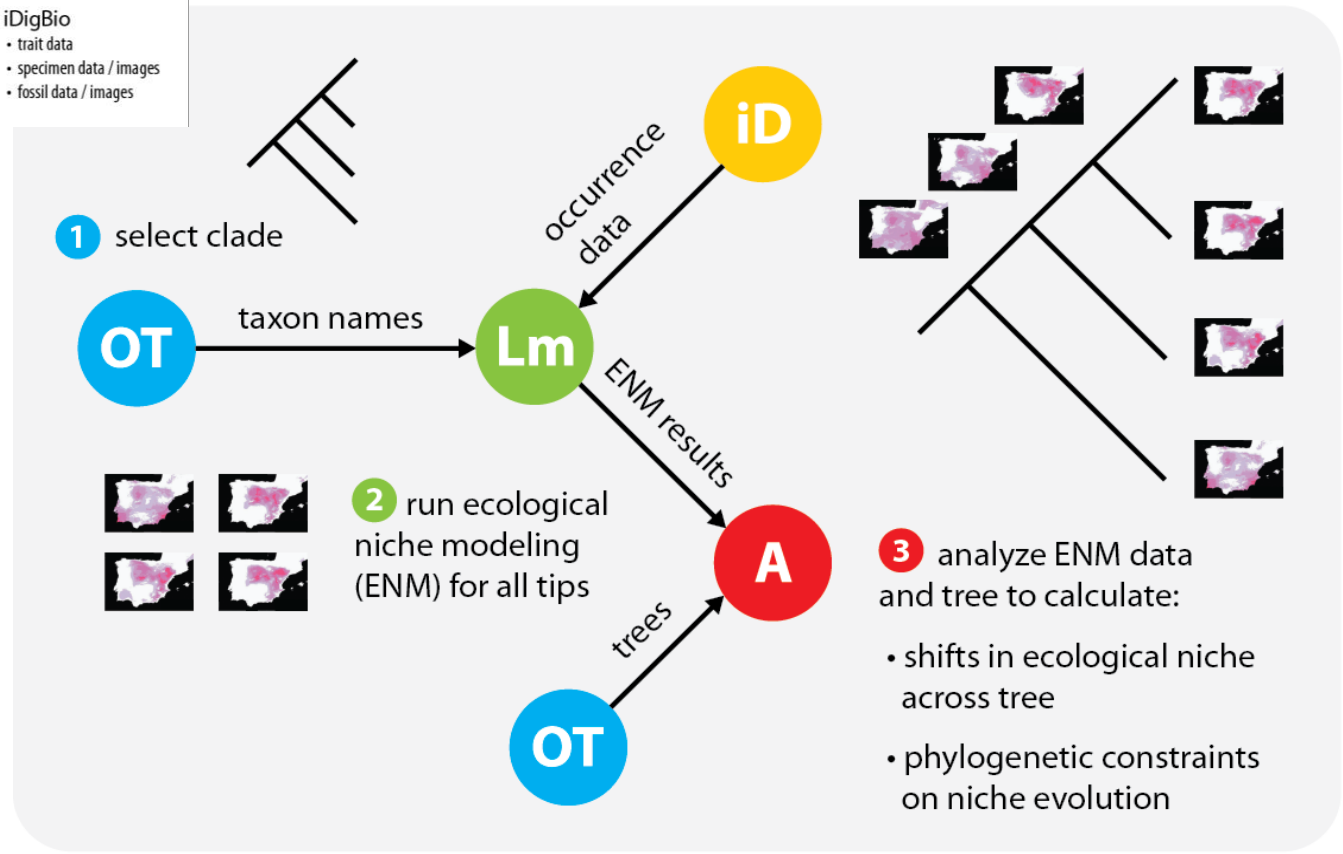
RESOURCES:

Lm Lifemapper
- ecological niche modeling
- biodiversity and range analysis
- visualization

A Arbor
- evolutionary models
- comparative methods
- visualization

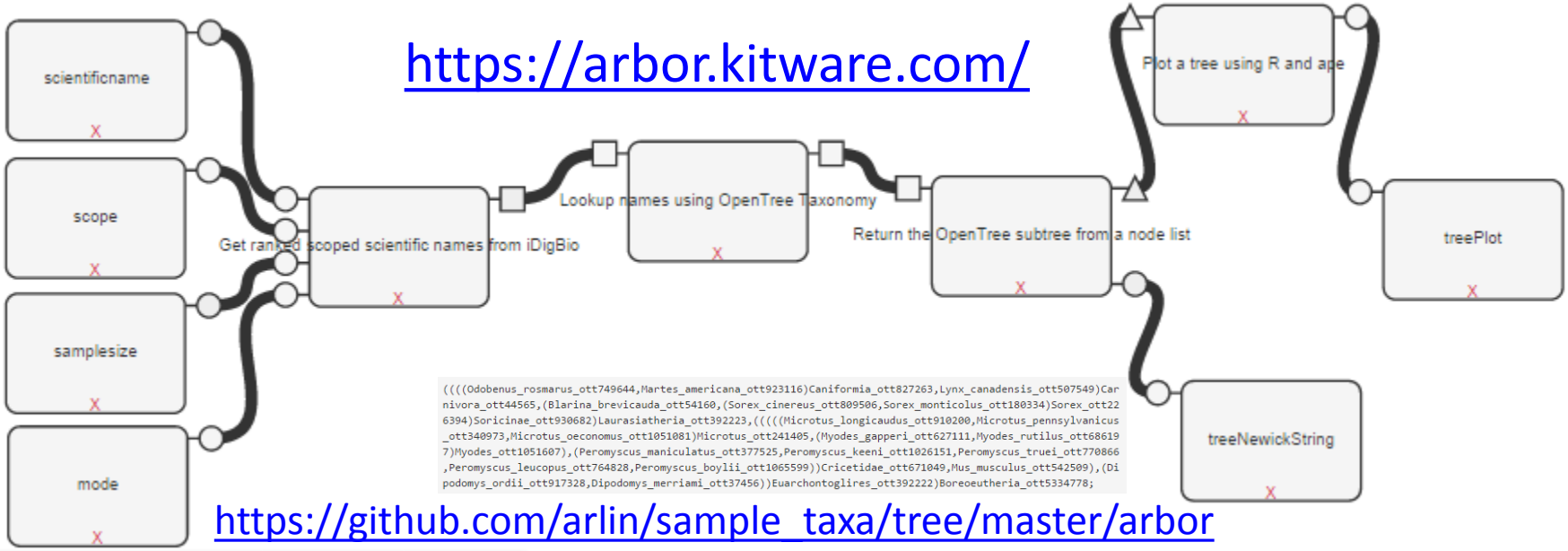
OT Open Tree of Life
- phylogenies
- taxonomy / names
- visualization

iD iDigBio
- trait data
- specimen data / images
- fossil data / images

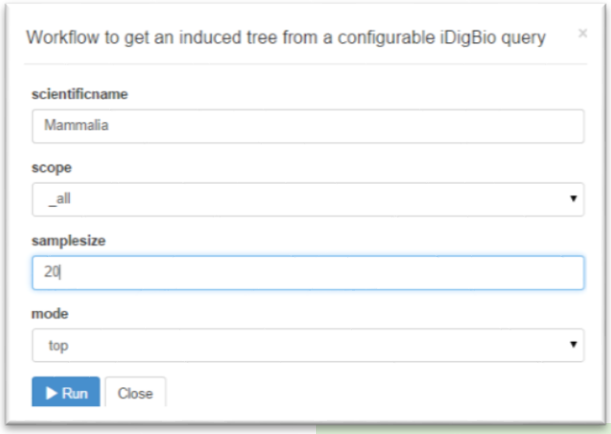


Arbor, OpenTree, and iDigBio

https://arbor.kitware.com/



https://github.com/arlin/sample_taxa/tree/master/arbor

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        }
    }
}
```
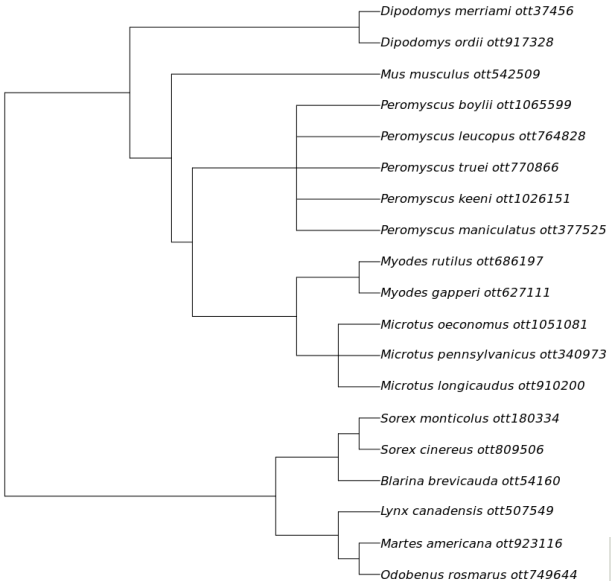

Success! Produced the following outputs:

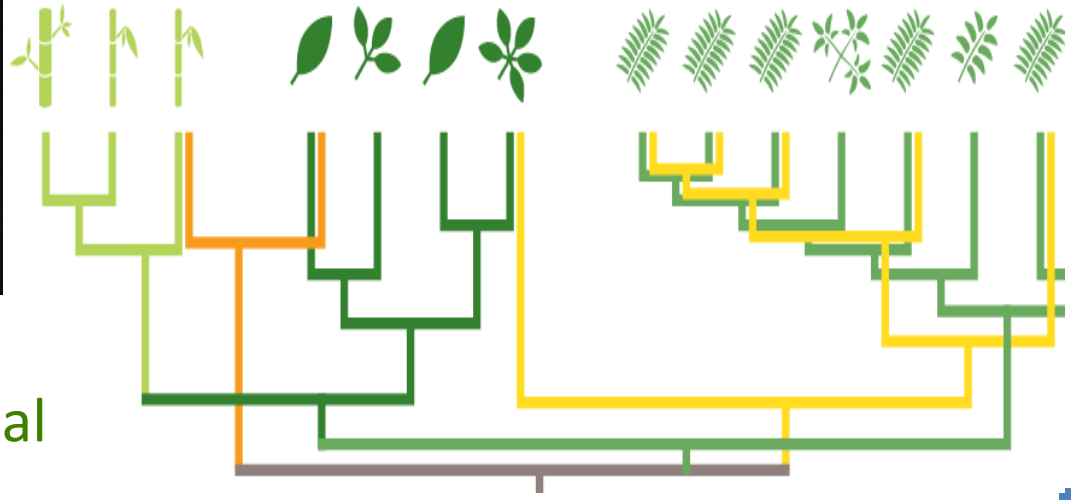
- Workflow to get an induced tree from a configurable iDigBio query treeNewickString [string]
- Workflow to get an induced tree from a configurable iDigBio query treePlot [image]



A. Matsunaga

PhotosyntheticPathway
Respiration LeafArea NfixationCapacity
SLA RegenerationCapacity PlantLifespan
WoodDensity GrowthForm
PhenologyType LeafN
LeafP LeafLongevity PhotosyntheticCapacity
MaxPlantHeight SeedMass

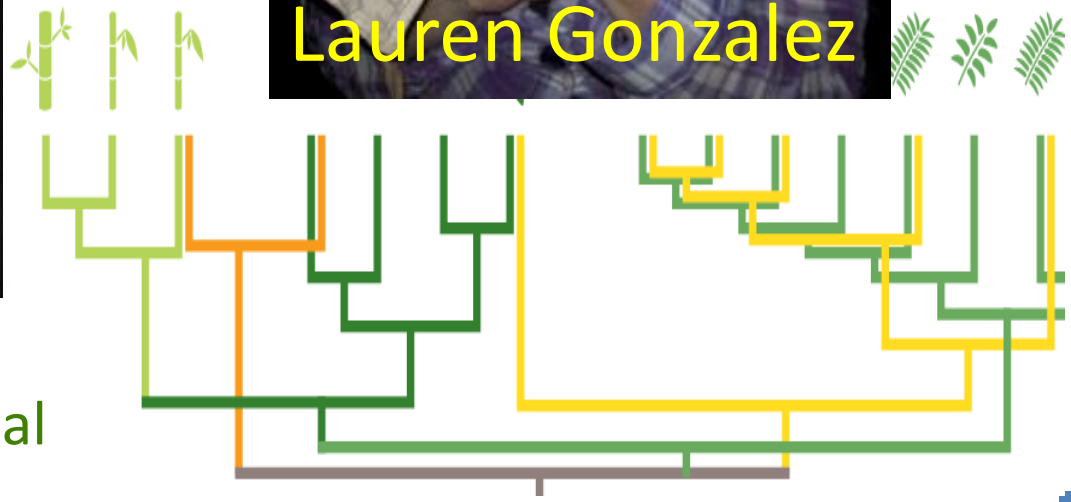
Using Images to Infer Functional Traits



Connect to ecology

Evolution of plant functional traits

Using Images to Infer Functional Traits



Connect to ecology

Evolution of plant functional traits

Many Uses for Specimen Data in Research

- Connections to other resources, e.g. GenBank
- Ecological Niche Modeling
- Integration with phylogeny, e.g. PhyloJIVE
- Complex integration of phylogeny, specimens, ENM, other heterogeneous data
- Images as sources of traits for ecological studies
- Others???

- *Discussion: Future Uses of Data in Research*
- *Research Applications Working Group*

Thank you!

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webcal://www.idigbio.org/events-calendar/export.ics

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