Digitization Modules, Tasks, and Workflows

Scripps
Gil Nelson
3 February 2016
Integrated Digitized Biocollections
Florida State University

Assessing Digitization Practices in Biological and Paleontological Collections

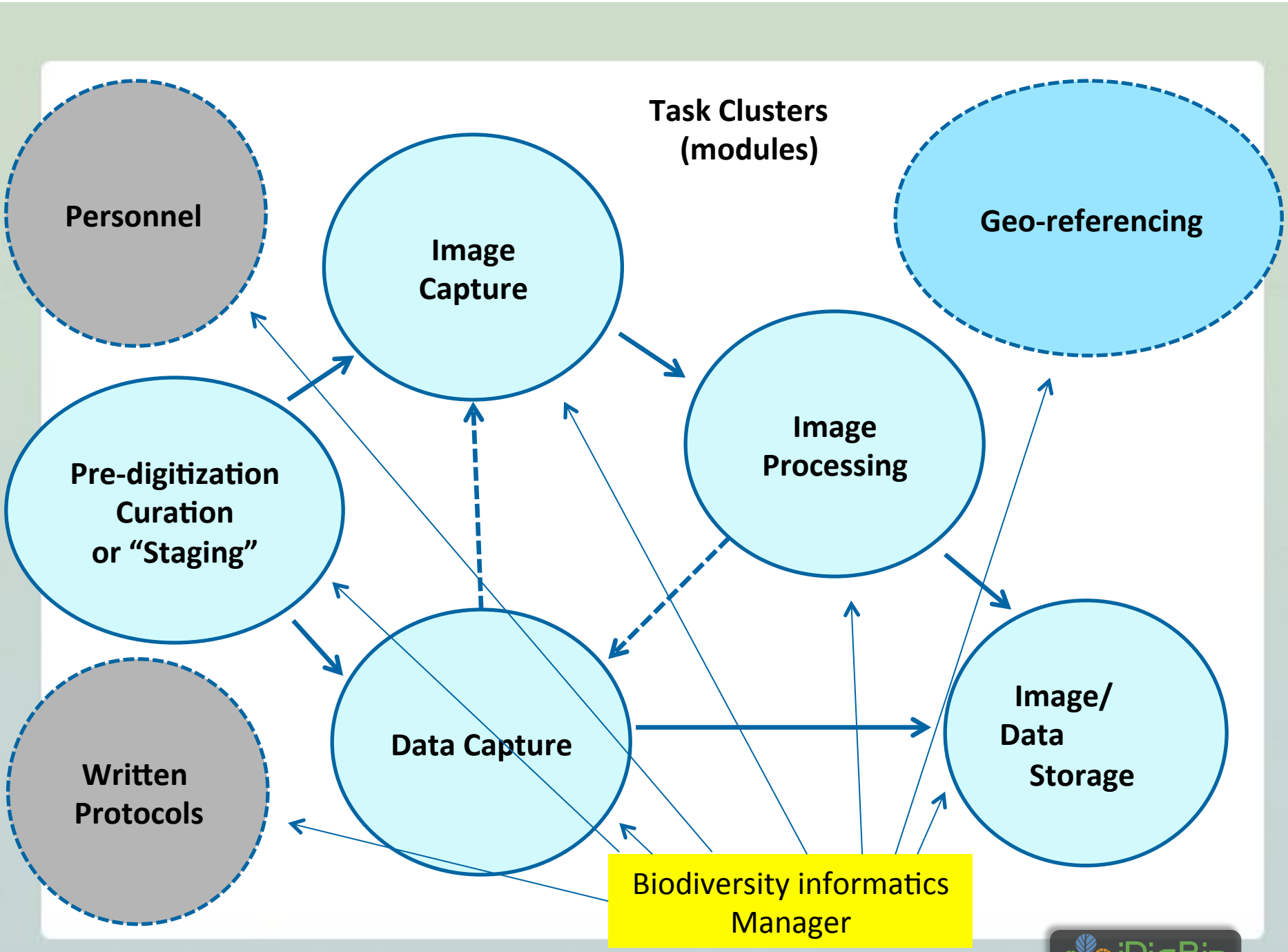
28 Collections
10 Museums
Spanning biological and paleontological collections
Insects and other invertebrates, plants, birds, mammals
Wet, dry

Five task clusters that enable efficient and effective digitization of biological collections

Gil Nelson, Deborah Paul, Gregory Riccardi, Austin R. Mast

A peer-reviewed open-access journal
ZooKeys
Launched to accelerate biodiversity research

iDigBio
Integrated Digitized Biocollections


Task Clusters
(modules)
Personnel
Image
Capture
Geo-referencing
Image
Processing
Pre-digitization
Curation
or "Staging"
Written
Protocols
Data Capture
Image/
Data
Storage
Biodiversity informatics
Manager

Preparing Infrastructure

Develop workflows and protocols

Select and install an institutional database
Specify
Symbiota
EMu
Arctos
Custom

Design and purchase an imaging station
Copy stand and lighting
Light box

Search and select imaging workflow and processing software

Prepare for digitization
Pre-digitization curation

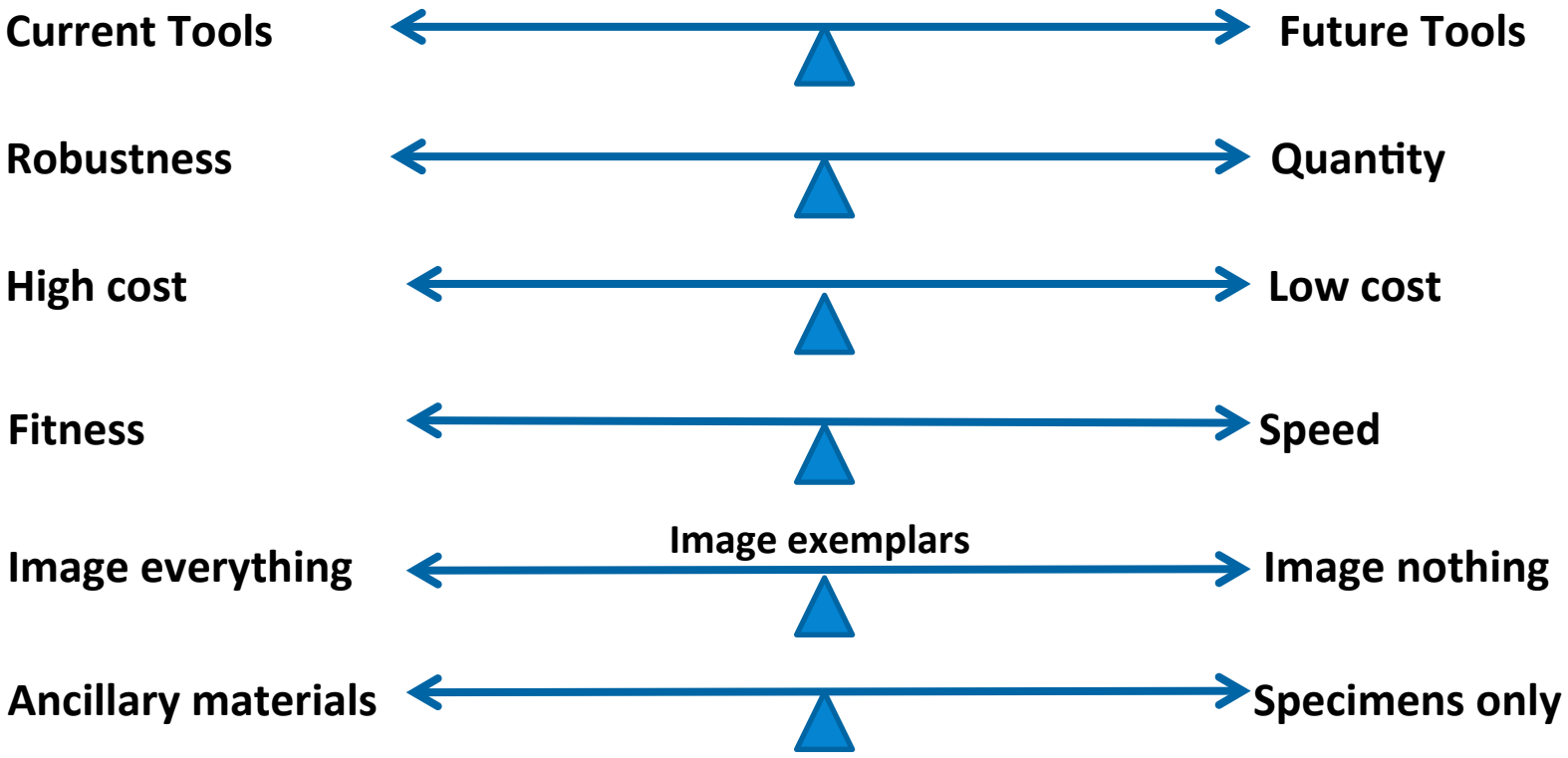
Consider and plan for data enhancement activities
e.g. Georeferencing

Tracks to Digitization

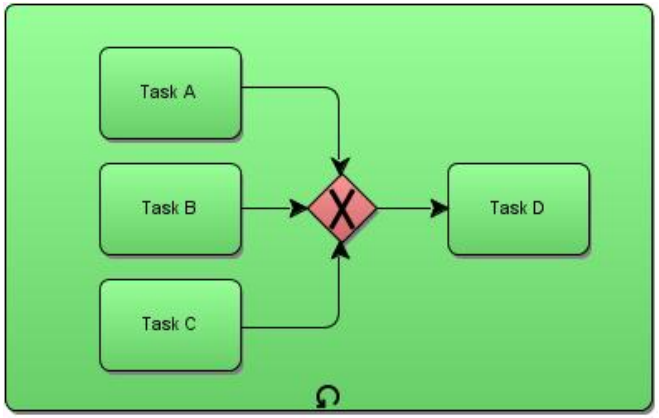
- **Taking the inside track** is often based on stretching the institution's resources. Decisions are made to maximize resources available for user-initiated digitization by using solid baseline practices. The primary focus on the inside track is to get the job done quickly and to fill the user's request.
- **Taking the middle track** has the widest range of options, standards, and results. This is the most flexible of the tracks, where decisions often fall in gray areas.
- **Taking the outside track** focuses on the collections themselves. While users may initiate digitization, it is undertaken to deliver materials to a greater public. These decisions may lead to comprehensive digitization, such as an entire book, series, or collection. The goal is to create maximum access to special collections, using preservation and archival standards. This track usually involves a level of thought and planning that is more in-depth than the fulfillment of day-to-day digitization requests.

Scan and Deliver: Managing User-initiated Digitization in Special Collections and Archives, 2011
J. Schaffner, F. Snyder. S. Supple

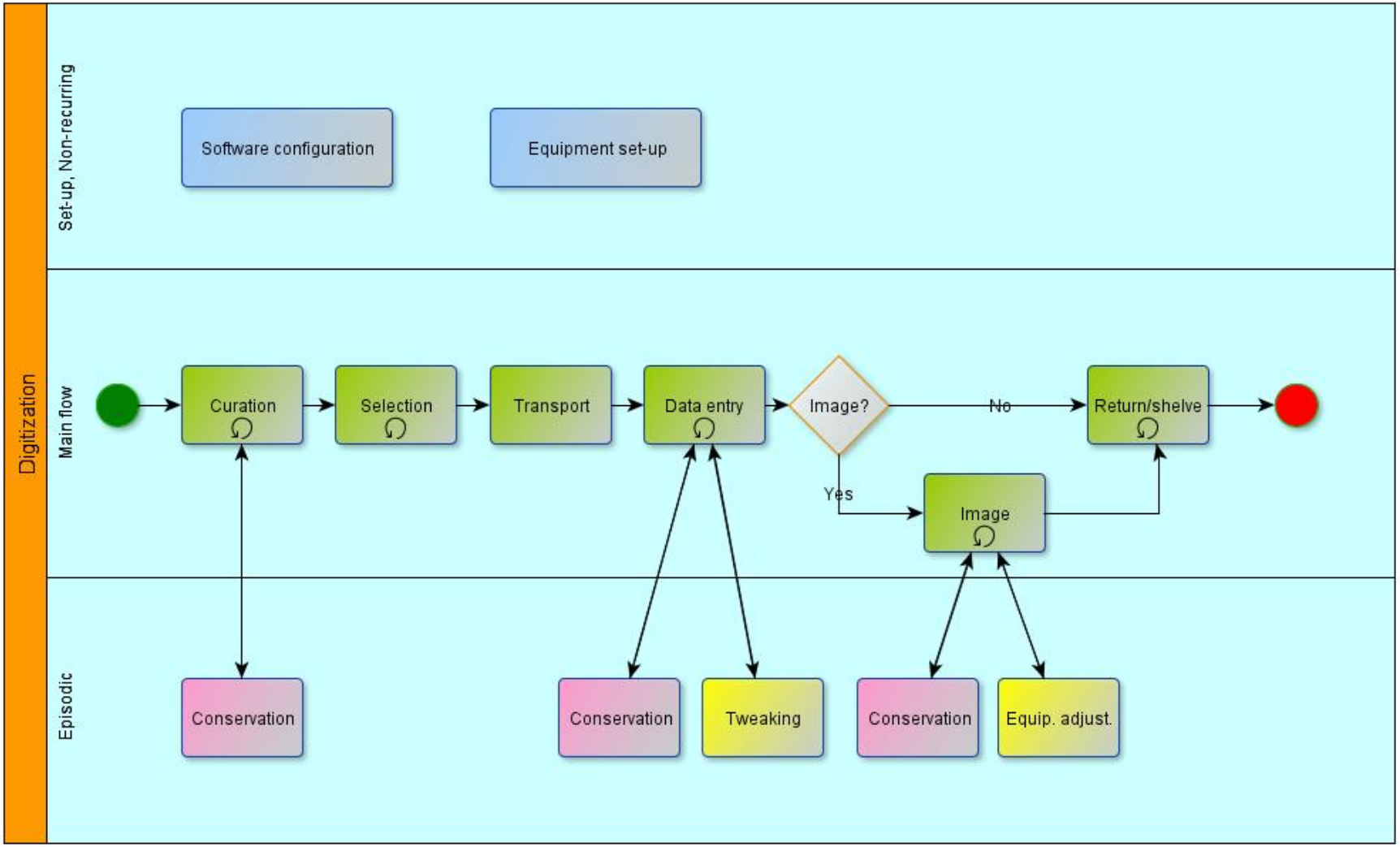
Digitization Decision Continua that Influence Data Gaps

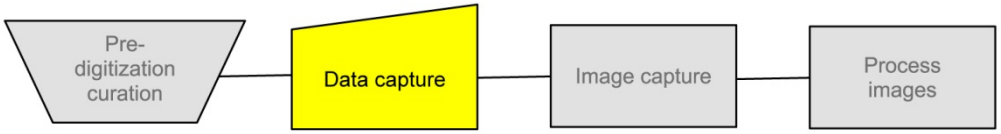


Values of defined workflows



- Promote efficiency and automation of processes
- Facilitate routing and scheduling of activities
- Provide for balancing workloads
- Ensure that processes are visible and predictable
- Allow for escalations and notifications
- Enhance tracking of tasks
- Foster collaboration of all parties involved
- Stimulate the convergence of process and information
- Promote continuous evaluation and redesign


Digitization
Set-up, Non-recurring
Software configuration
Equipment set-up
Main flow
Curation
Selection
Transport
Data entry
Image?
No
Return/shelve
Yes
Image
Episodic
Conservation
Conservation
Tweaking
Conservation
Equip. adjust.



Guiding Principles

Follow a modular approach

- "Plug and play" modules are preferred.
- Simple modules involving a limited number of tasks are easier to troubleshoot and maintain.
- Divide large modules into sub-modules.
- Modules are generally self-contained but tangential.
- There is no consensus workflow, virtually all workflows are customized.

Assign roles deliberately

- Adjust to strengths of each technician--using students and volunteers requires flexibility in role assigned to personnel rather personnel assigned to role.

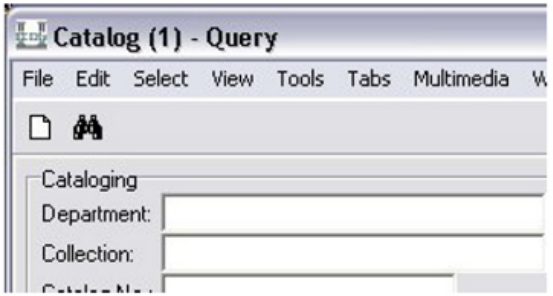
Create task lists

- Complete.
- Clear.
- Succinct.
- Ordered.
- Reusable.

Documentation and Instructions

- **Written Protocols**
  - Essential!
  - Include screen shots and pictures.
  - Attention to detail (leave nothing to the imagination).
  - Express limits on technician authority.

- **Feedback Loops**
  - Technicians: best source of efficiency adaptations, either by show or tell.
  - Easy methods for receiving feedback.
  - Personal copies of the protocol.
  - Master copy available via Google docs or other shared storage for updates and suggestions.



Continuous Workflow Improvement

Develop written workflows that reflect actual practice

Continuous evaluation of written and actual workflows by:

- Technicians
- Workflow managers
- Collections managers

With particular attention to:

- Bottlenecks
- Redundancy
- Handling time
- Varying rates of productivity

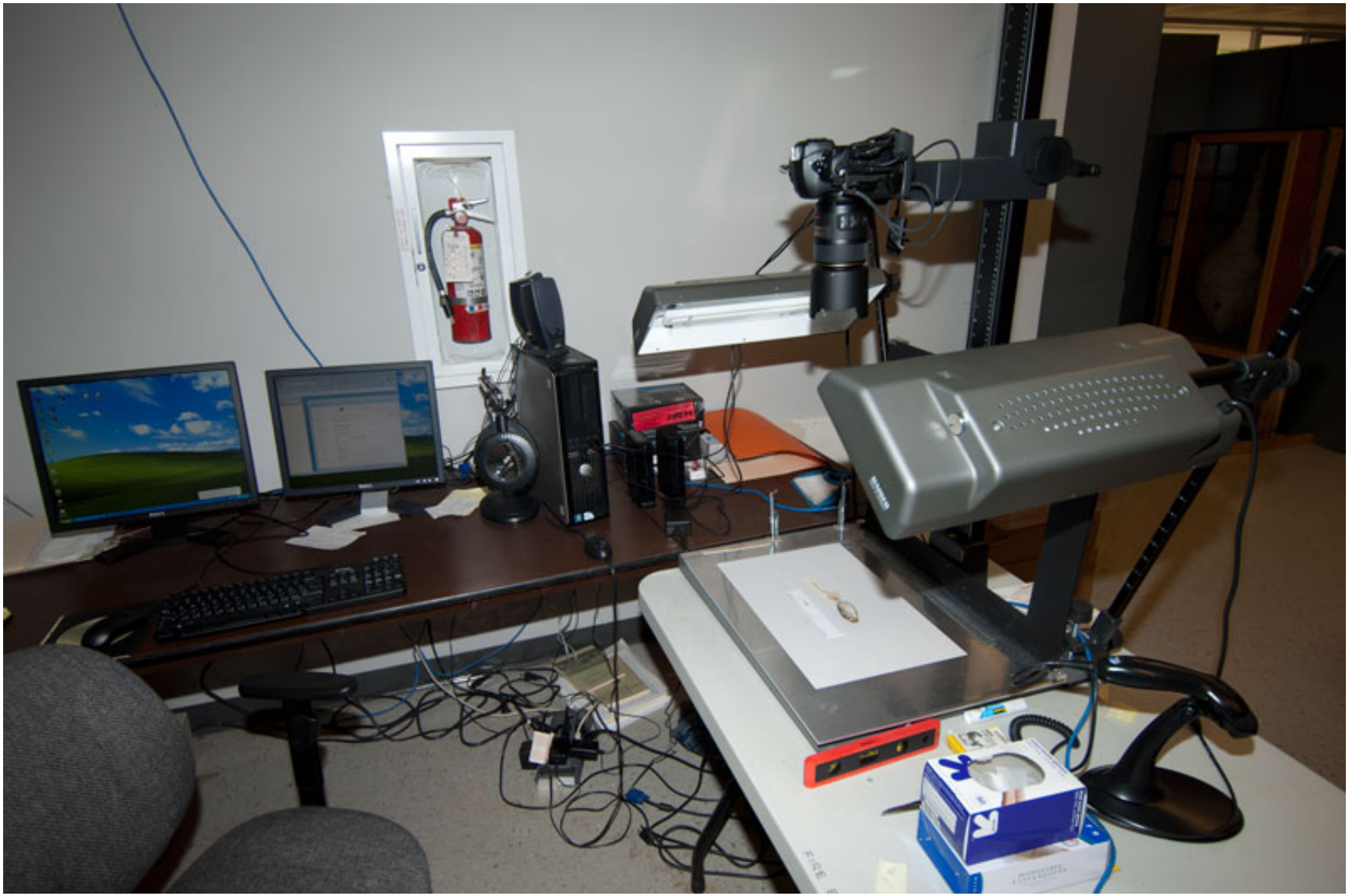
Imaging Equipment List

- Copy stand
- Camera
- Lens
- Cables
  - AC adapter
  - Long USB cable
- Computer
- Software
  - Camera control software
  - Image management software
- Lights OR Photo-eBox BIO
- Miscellaneous

Camera
Canon - Nikon

Best quality you can afford

Resolution
Full frame vs. cropped frame



Imaging station

Unequalled opportunity
for completeness and detail


Westcott R405-6" China

Photo eBox

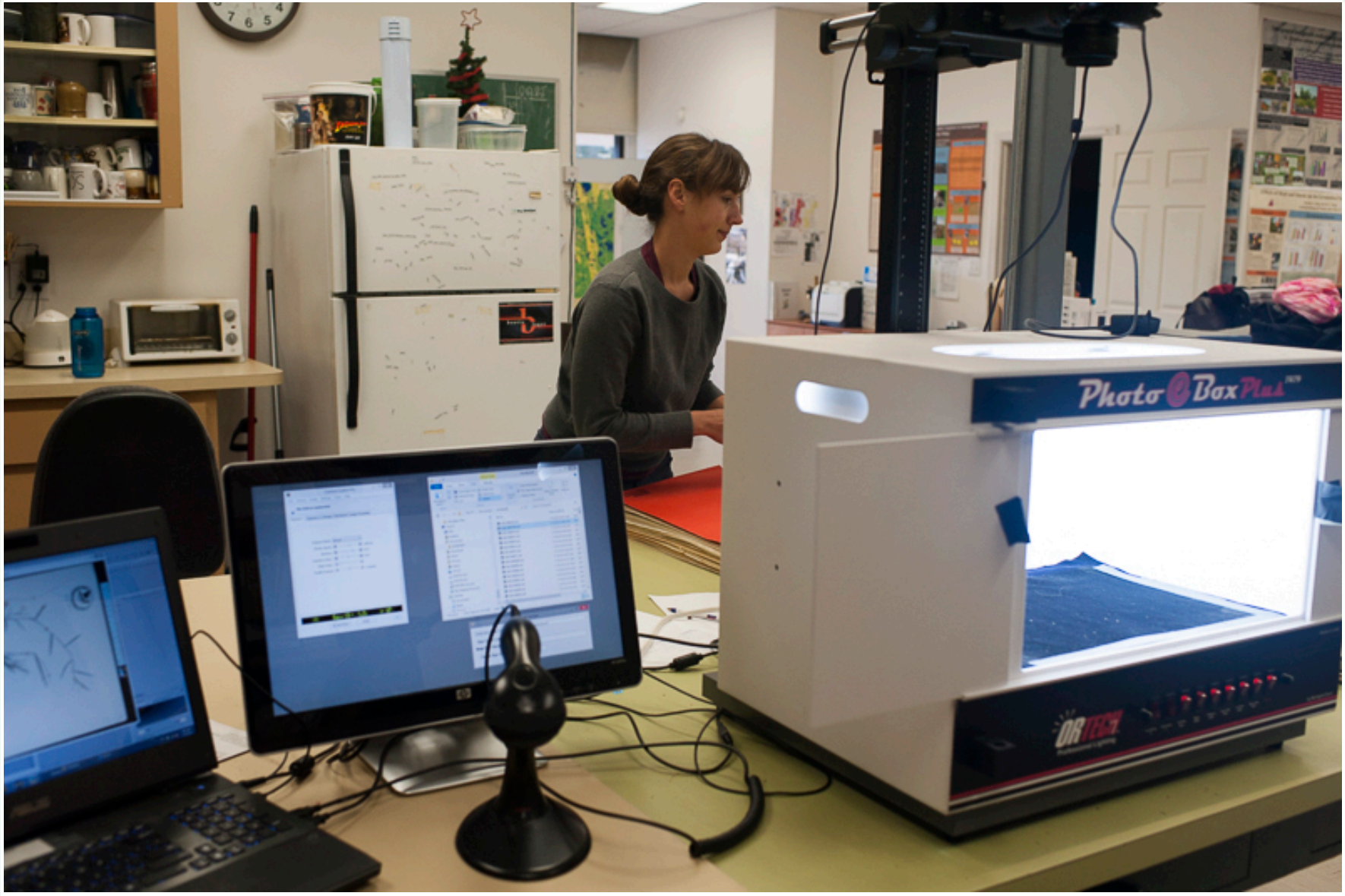
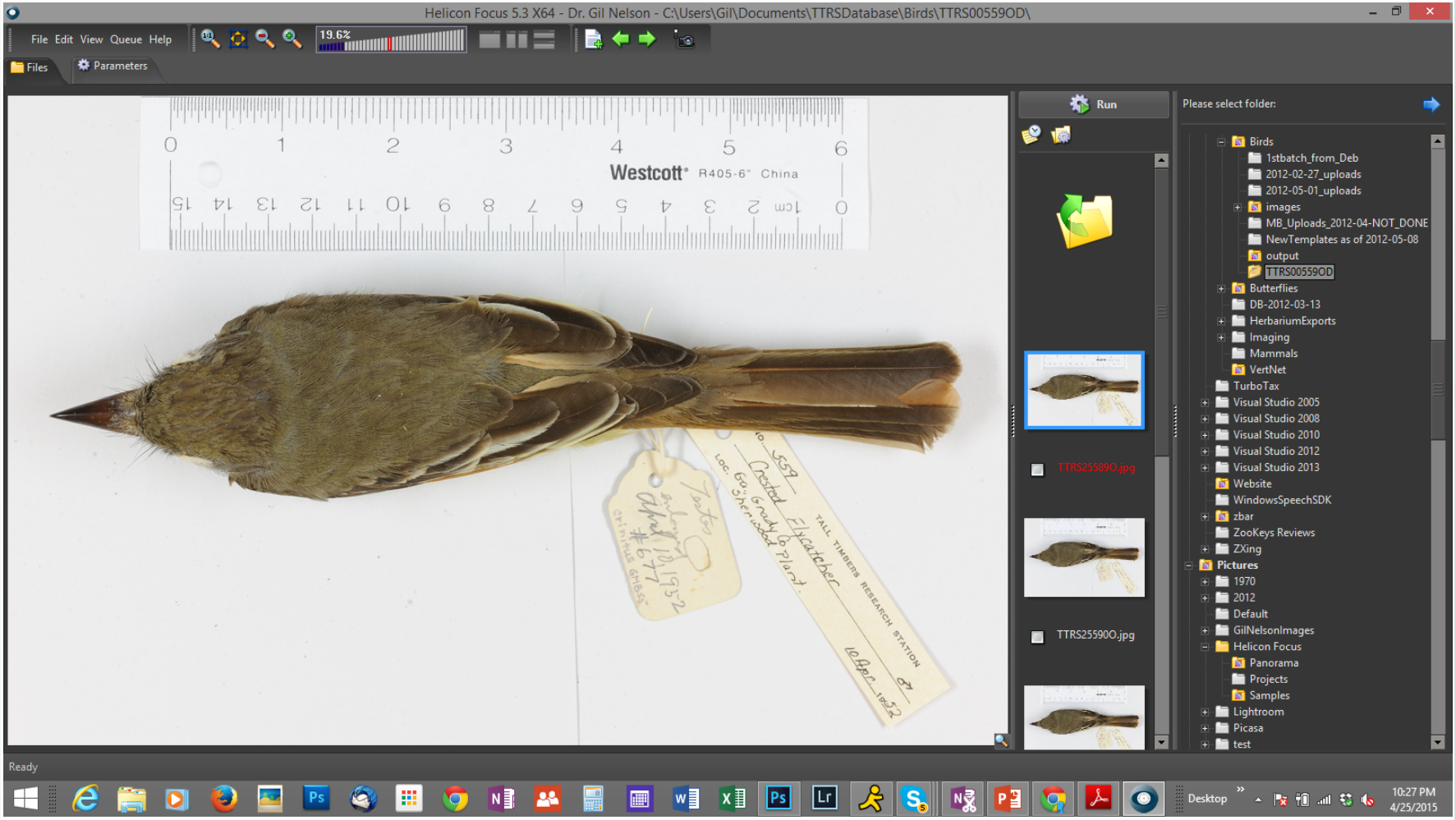
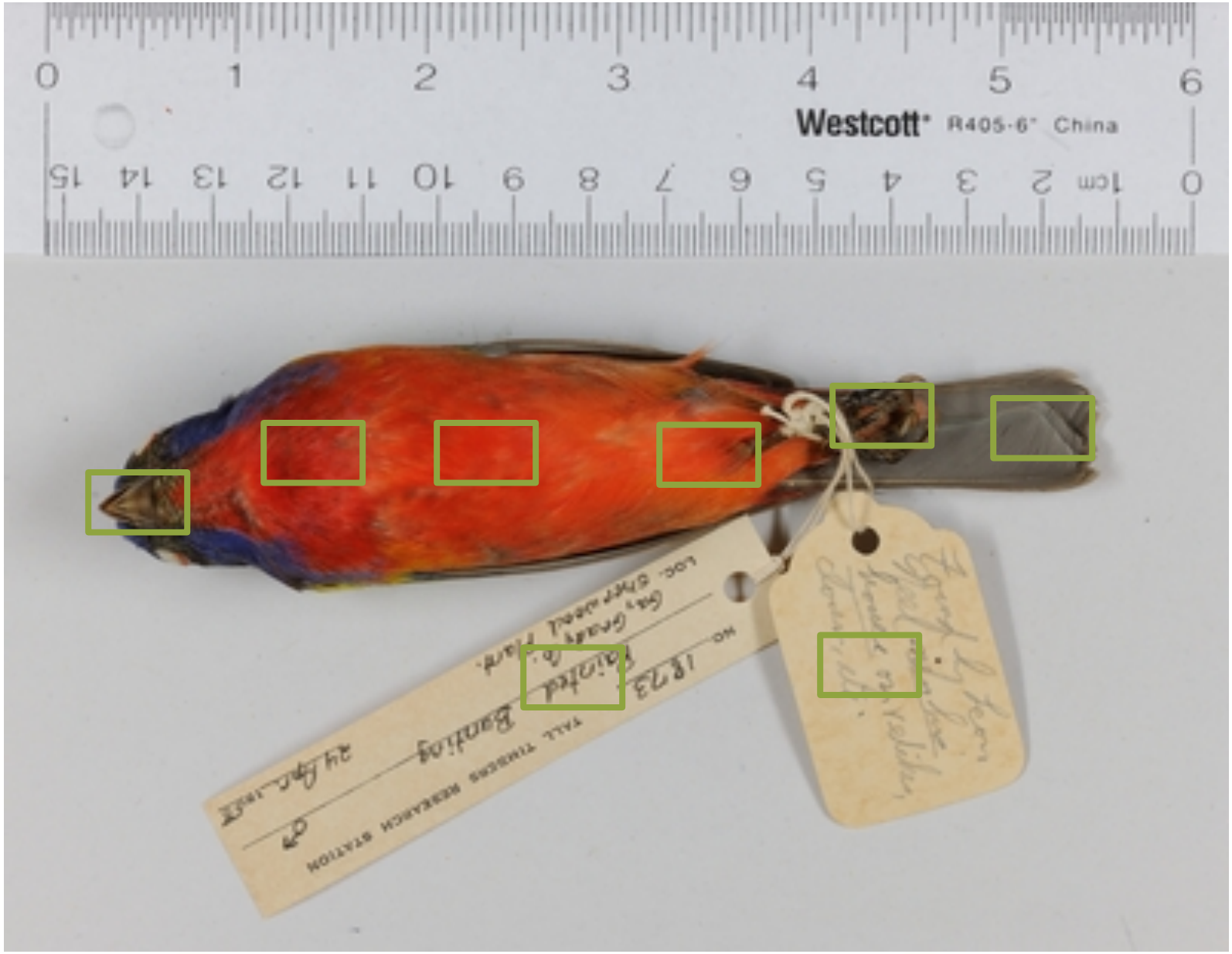


Photo Box Plus

Photo eBox Plus

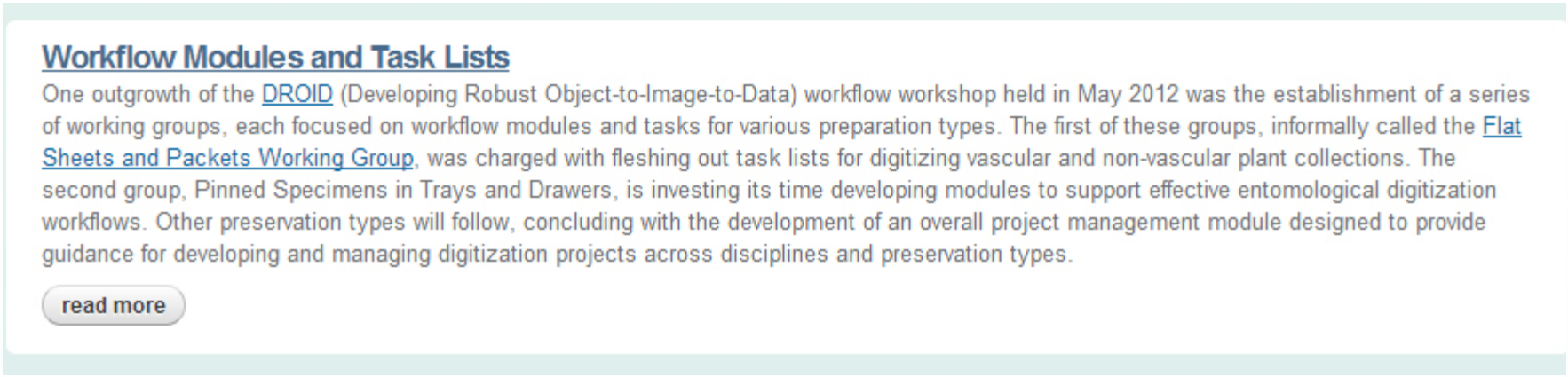
Helicon Focus




Westcott R405-6" China
TALL TIMBERS RESEARCH STATION
Painted Bunting
24 Apr. 1923

Idigbio.org->Digitization->Documentation->Workflow and Protocols->Workflow Modules and Task Lists

https://www.idigbio.org/content/workflow-modules-and-task-lists

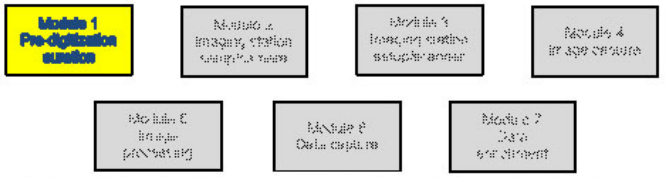


Researchers
Browse our specimen portal

Collections Staff
Learn how your collection can benefit from our work

Teachers & Students
Learning resources & opportunities to engage

Workflow Modules and Task Lists



One outgrowth of the DROID (Developing Robust Object-to-Image-to-Data) workflow workshop held in May 2012 was the establishment of a series of working groups, each focused on workflow modules and tasks for various preparation types. The first of these groups, informally called the Flat Sheets and Packets Working Group, was charged with fleshing out task lists for digitizing vascular and non-vascular plant collections. A reconstitution of this working group, convened in January 2015, added 8 modules to this set of workflows and updated the existing ones.The second working group, Pinned Specimens in Trays and Drawers, invested its time developing modules to support effective entomological digitization workflows. Things in Spirits in Jars devoted time to workflows for fluid-preserved collections. The 3D Objects in Trays and boxes completed its work in spring 2015 and focused mostly on paleontological specimens.

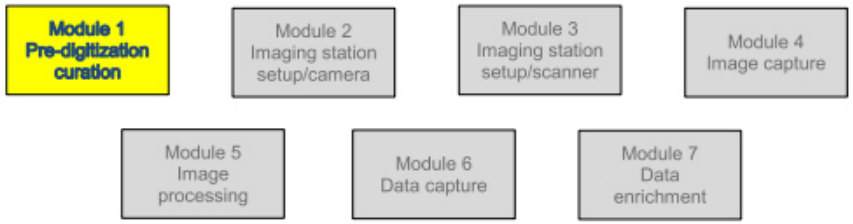
We have chosen a modular approach for presenting our results in order to accommodate the broad range of workflow implementations within the collections community. We recognize that there is no consensus workflow that fits all situations, even within a single preservation type. In light of this, we have attempted to assemble orderly, comprehensive task lists to serve as foundations from which institutionally specific workflows can be created. Not all institutions will use every task, but we hope that the lists we have developed encompass all relevant digitization tasks. We also hope that those in the collections digitization community will provide feedback on these lists, either through forum posts or e-mails to Gil Nelson, alerting us to deficiencies and oversights.

Links to published modules as they are completed are provided below:

Flat Sheets and Packets Working Group - Vascular and Non-vascular Plants

- Module 1 Pre-digitization Curation Tasks
- Module 2 Selecting Components for an Imaging Station
- Module 3 Imaging Station Setup Camera/Copy Stand
- Module 4 Imaging Station Setup Light box
- Module 5 Image Station Setup Scanner
- Module 6 Imaging

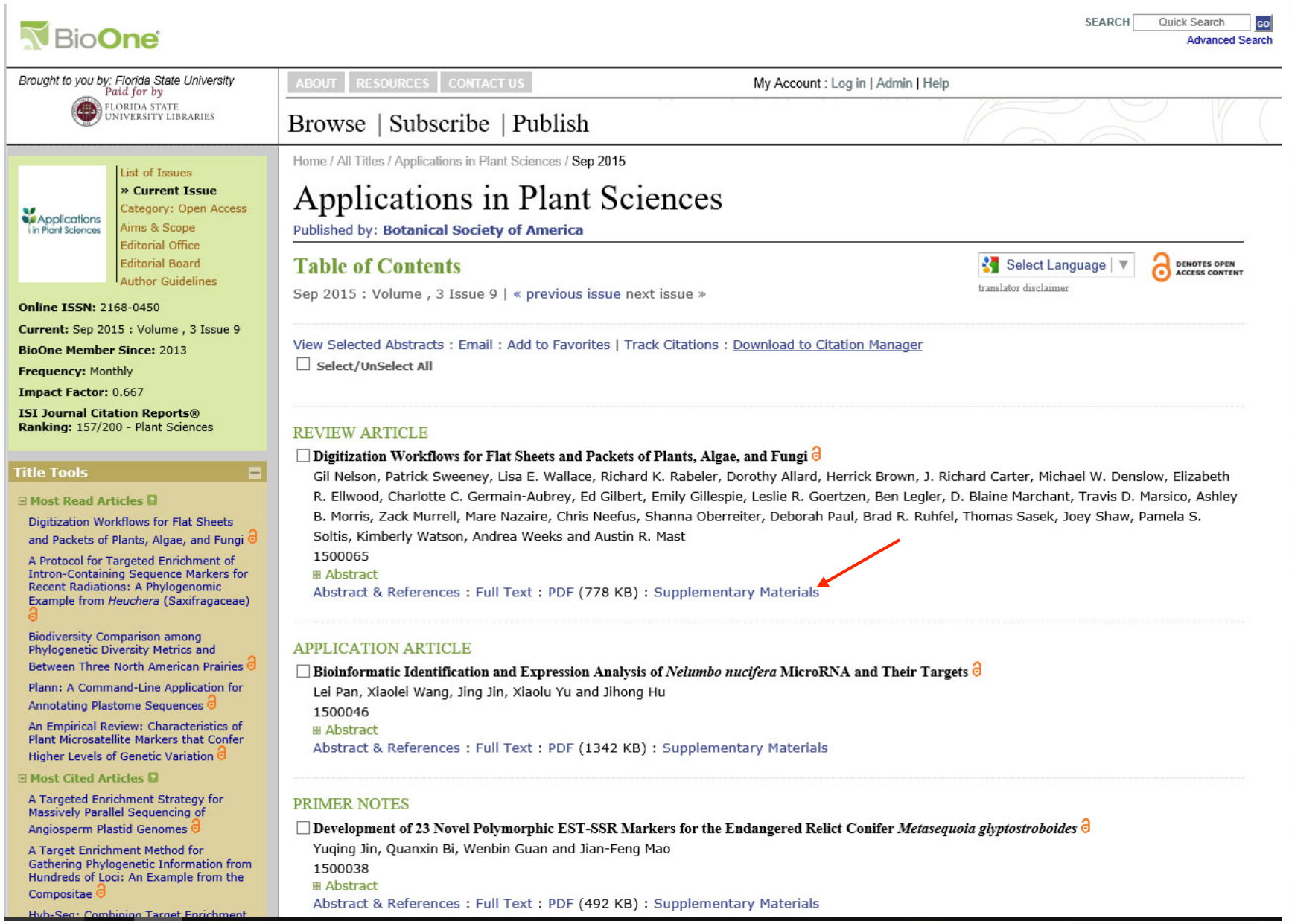
Workflow Detail: Pre-digitization Curation (for flat sheets and packets)



Module 1: Pre-digitization Curation Task List

Task ID	Task Description	Explanations and Comments	Resources
T1	Apply storage locator barcodes to storage locations (rooms, cabinets, shelves, folders, drawers, etc).	Most useful when systematically digitizing an entire collection. Otherwise potentially helpful with herbarium inventory. May be less helpful for collections that are digitizing in random order or only portions of the collection related to specific projects, or with significant separation between the pre-digitization curation, databasing, and image capture modules.	Barcodes, QRcode, DataMatrix.
T2	Select specimens to digitize.	For herbaria, this often includes all specimens. Where this is not the case, selection should follow the institution's pre-determined digitization policies or project management plan.	Digitization policy manual or project management plan.
T3	Associate/insert machine readable barcodes/documents with/into folders.	Some institutions create machine readable documents to gather data at the cabinet and/or folder level. Documents might contain such information as family, higher geography, and current identification ("filed-as name"). These data will be read and associated with individual collection records in Module 4, T1 or Module 7. Tasks T2 or T3 might also include determining whether specimens are out on loan or	QRcodes, DataMatrix, 1D barcode, or OCR-readable documents for insertion into specimen folders.

http://www.bioone.org/toc/apps/3/9



BioOne

SEARCH Quick Search GO
Advanced Search

Brought to you by: Florida State University
Paid for by
FLORIDA STATE UNIVERSITY LIBRARIES

ABOUT | RESOURCES | CONTACT US

My Account : Log in | Admin | Help

Browse | Subscribe | Publish

List of Issues
» Current Issue
Category: Open Access
Aims & Scope
Editorial Office
Editorial Board
Author Guidelines

Online ISSN: 2168-0450
Current: Sep 2015 : Volume , 3 Issue 9
BioOne Member Since: 2013
Frequency: Monthly
Impact Factor: 0.667
ISI Journal Citation Reports® Ranking: 157/200 - Plant Sciences

Title Tools

Most Read Articles
- Digitization Workflows for Flat Sheets and Packets of Plants, Algae, and Fungi
- A Protocol for Targeted Enrichment of Intron-Containing Sequence Markers for Recent Radiations: A Phylogenomic Example from *Heuchera* (Saxifragaceae)
- Biodiversity Comparison among Phylogenetic Diversity Metrics and Between Three North American Prairies
- Plann: A Command-Line Application for Annotating Plastome Sequences
- An Empirical Review: Characteristics of Plant Microsatellite Markers that Confer Higher Levels of Genetic Variation

Most Cited Articles
- A Targeted Enrichment Strategy for Massively Parallel Sequencing of Angiosperm Plastid Genomes
- A Target Enrichment Method for Gathering Phylogenetic Information from Hundreds of Loci: An Example from the Compositae
- Hyb-Seq: Combining Target Enrichment

Home / All Titles / Applications in Plant Sciences / Sep 2015

Applications in Plant Sciences

Published by: **Botanical Society of America**

Table of Contents

Sep 2015 : Volume , 3 Issue 9 | « previous issue next issue »

Select Language
translator disclaimer

DENOTES OPEN ACCESS CONTENT

View Selected Abstracts : Email : Add to Favorites | Track Citations : Download to Citation Manager

Select/UnSelect All

REVIEW ARTICLE

Digitization Workflows for Flat Sheets and Packets of Plants, Algae, and Fungi
Gil Nelson, Patrick Sweeney, Lisa E. Wallace, Richard K. Rabeler, Dorothy Allard, Herrick Brown, J. Richard Carter, Michael W. Denslow, Elizabeth R. Ellwood, Charlotte C. Germain-Aubrey, Ed Gilbert, Emily Gillespie, Leslie R. Goertzen, Ben Legler, D. Blaine Marchant, Travis D. Marsico, Ashley B. Morris, Zack Murrell, Mare Nazaire, Chris Neefus, Shanna Oberreiter, Deborah Paul, Brad R. Ruhfel, Thomas Sasek, Joey Shaw, Pamela S. Soltis, Kimberly Watson, Andrea Weeks and Austin R. Mast
1500065
Abstract
Abstract & References : Full Text : PDF (778 KB) : Supplementary Materials

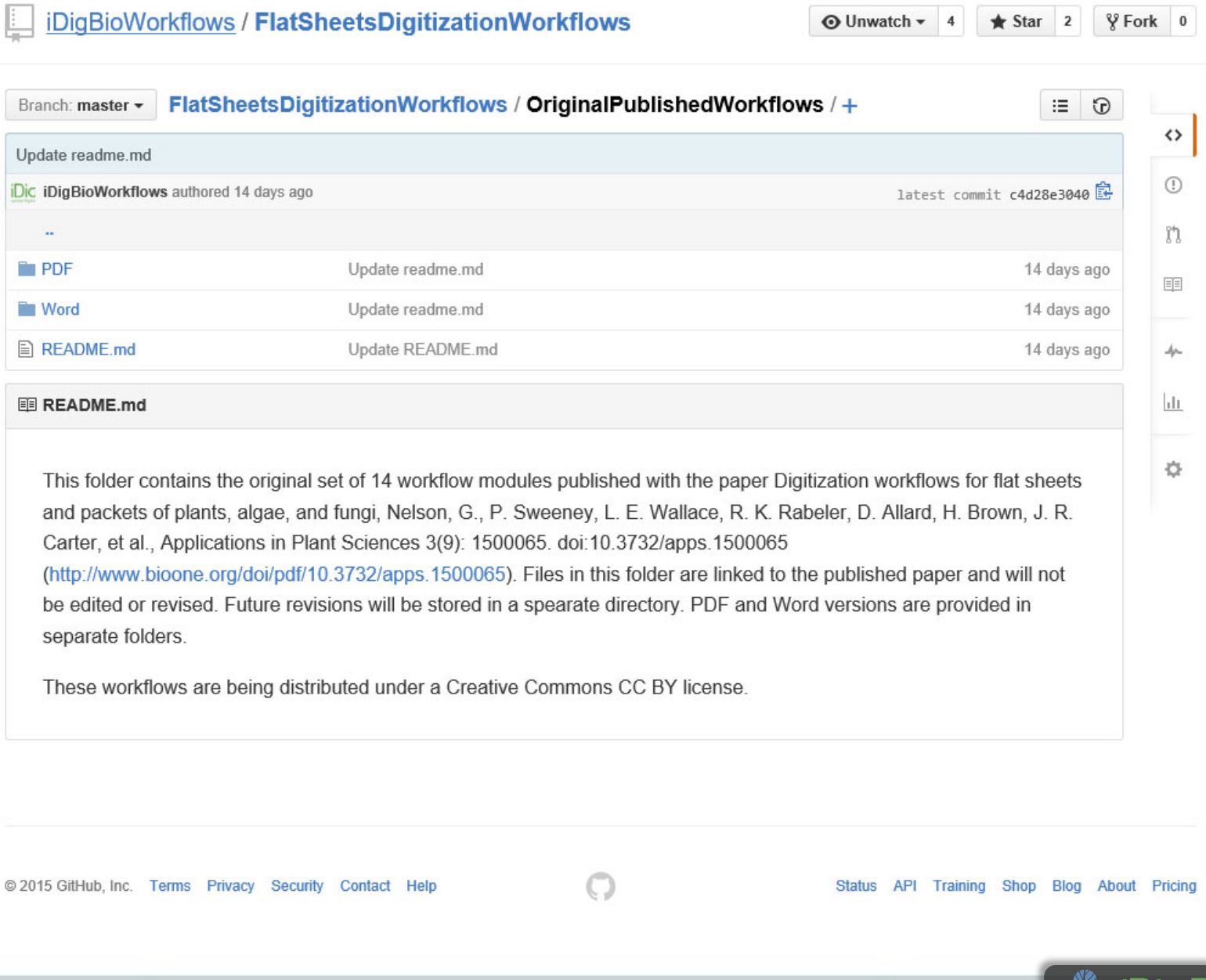
APPLICATION ARTICLE

Bioinformatic Identification and Expression Analysis of *Nelumbo nucifera* MicroRNA and Their Targets
Lei Pan, Xiaolei Wang, Jing Jin, Xiaolu Yu and Jihong Hu
1500046
Abstract
Abstract & References : Full Text : PDF (1342 KB) : Supplementary Materials

PRIMER NOTES

Development of 23 Novel Polymorphic EST-SSR Markers for the Endangered Relict Conifer *Metasequoia glyptostroboides*
Yuqing Jin, Quanxin Bi, Wenbin Guan and Jian-Feng Mao
1500038
Abstract
Abstract & References : Full Text : PDF (492 KB) : Supplementary Materials

iDigBio Integrated Digitized Biocollections


iDigBioWorkflows / FlatSheetsDigitizationWorkflows
Unwatch 4
Star 2
Fork 0
Branch: master
FlatSheetsDigitizationWorkflows / OriginalPublishedWorkflows / +
Update readme.md
iDigBioWorkflows authored 14 days ago
latest commit c4d28e3040
..
PDF Update readme.md 14 days ago
Word Update readme.md 14 days ago
README.md Update README.md 14 days ago
README.md
This folder contains the original set of 14 workflow modules published with the paper Digitization workflows for flat sheets and packets of plants, algae, and fungi, Nelson, G., P. Sweeney, L. E. Wallace, R. K. Rabeler, D. Allard, H. Brown, J. R. Carter, et al., Applications in Plant Sciences 3(9): 1500065. doi:10.3732/apps.1500065 (http://www.bioone.org/doi/pdf/10.3732/apps.1500065). Files in this folder are linked to the published paper and will not be edited or revised. Future revisions will be stored in a spearate directory. PDF and Word versions are provided in separate folders.
These workflows are being distributed under a Creative Commons CC BY license.
© 2015 GitHub, Inc. Terms Privacy Security Contact Help
Status API Training Shop Blog About Pricing

iDigBio

Integrated Digitized Biocollections