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Accomplishments

*** What are the major goals of the project?**

Integrated Digitized Biocollections (iDigBio) is the central resource for the Advancing Digitization of Biodiversity Collections (ADBC) program funded by the U.S. National Science Foundation (NSF). Through ADBC, data and images for millions of biological specimens are being made available in electronic format for the research community, government agencies, students, educators, and the general public.

The vision for ADBC is a permanent database of digitized information from all biological collections in the United States that leads to new discoveries through research and a better understanding and appreciation of biodiversity through improved education and outreach, which then results in improved environmental and economic policies. Creation of the digitized database is occurring in four stages:

1. An initial stage in which the effort to digitize biological collections across the U.S. is catalyzed by funding from NSF and from effective iDigBio-driven activities that foster collaborations, identify priorities, and generate information on best practices related to standards, workflows, and data management for digitization of biological collections, as well as demonstrate the value of biodiversity and collections that document biodiversity.
2. An intermediate stage wherein digitization at Thematic Collections Networks (TCNs), Partners to Existing Networks (PENs), and other participating institutions and networks improves methods and strategies and demonstrates the scientific and societal benefits of validated and readily accessible data.
3. A third stage in which the vision for ADBC is realized through participation by all U.S. institutions with biological collections.
4. A fourth stage in which digitization is a routine and sustained practice in all institutions with biological collections, and the national database is easily accessible as an up-to-date source of information on biodiversity.

The mission of iDigBio is to develop a national infrastructure that supports the vision of ADBC by overseeing implementation of standards and best practices for digitization; building and deploying a customized cloud computing environment for collections; recruiting and training personnel, including underserved groups; engaging the research community, collections community, citizen scientists, and the public through education and outreach activities; and planning for long-term sustainability of the national digitization effort.

iDigBio is enabling digitization of data from all U.S. biological collections and is integrating those data to make them broadly available and useful with shared standards and formats. Ultimately, ADBC is furthering the discovery and understanding of biological diversity, and iDigBio is engaging the research, collections, and education communities in a spirit of collaboration in an effort to open biological research collections to new downstream user communities.

iDigBio involves the development of a permanent and powerful cloud computing infrastructure to link biological data from collections across the U.S. into a single unified web interface, overcoming the “data silos” that currently exist across the country. Search and analytical tools enable users to mine diverse data, such as taxonomy, geographic location, 2- and 3-dimensional images, vocalizations, and molecular resources tied to specimens in collections. These data promote integrative biological research on living and fossil species and provide an immense resource for agricultural science and land use management, human health, and assessing the impacts of climate change, invasive species, and other natural resource management issues.

Key partners in this effort are the TCNs, which form a national grid of institutions that are digitizing specimens and associated resources. Integration with the greater community of biocollections resources, tools and organizations is critical to accomplishing the grand challenge of digitizing and integrating data from all U.S. collections, large and small. For more details regarding the larger community that encapsulates ADBC, please refer to the Network Integrated Biocollections Alliance (NIBA) strategic plan and implementation plan.

*** What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities:

08-2013: iDigBio engaged as a collaborator on three ABI proposals: “BioFinder: Harnessing the Power of Citizen Science" (PI: Henry L. Bart Jr.); "ABI Innovation: An ontology-based universal coordinate system for navigating the Tree of Life" (PI: Nico Cellinese); "Collaborative Research: ABI Development: Kurator: A Provenance-enabled Workflow Platform and Toolkit to Curate Biodiversity Data" (PI: Bertram Ludaescher)

09-26-2013: Bruce MacFadden and Gil Nelson attended the project kickoff of the Fossil Insect TCN at Yale Peabody Museum. Our experience makes us believe that iDigBio representation at TCN kick-off meetings is very important.

11-19-2013 to 11-20-2013: iDigBio held its 3rd annual Summit in Tallahassee, FL. The Summit included representatives from all TCNs, iDigBio, and other digitization projects related to the Advancing Digitization of Biodiversity Collections (ADBC) program. The Summit discussions focused primarily on shared goals, challenges and opportunities, and collaboration among stakeholders.

12-2013: New versions of the iDigBio website and specimen portal were released to the community. The website was redesigned to focus on making it easier to understand and to use, and to be more approachable to a lay visitor. The Portal and APIs were redesigned to create the foundation for a system that will serve the community for years to come, including user interface improvements and improved stability and flexibility.

01-2014: Deb Paul was invited to join the Society for the Preservation of Natural History Collections (SPNHC) Council as the first iDigBio representative. Deb will be working with SPNHC to identify and push forward joint iDigBio/SPNHC projects and to explore ways of increasing exposure of iDigBio and its work to the SPNHC membership through SPNHC’s publications, meetings and other activities. Deb will also be providing reports for the SPNHC newsletter and for the society’s annual business meeting, providing additional opportunities to showcase iDigBio.

02-01-2014: Nearly 40 students turned out for iDigBio’s first Careers and Graduate Study in the Biological Sciences workshop, held at the University of Central Florida’s (UCF) Live Oak Center in Orlando, Florida. Funded by an NSF workshop grant awarded to Florida

State University (NSF award DBI-1358501, 9/14/2013), the event was designed to broaden the participation of minority and non-minority students in organismal biology and the biodiversity sciences.

03-07-2014: iDigBio helped to establish SCNet (http://scnet.acis.ufl.edu/), which is dedicated to supporting smaller natural history collections, especially related to the processes of collections management and digitization. SCNet has also established a listserv and inaugurated a continuing webinar series using iDigBio's web conferencing infrastructure. These webinars will serve as mini-symposia and allow network members to make virtual presentations to colleagues as well as post topics for network discussion. These two communication avenues will facilitate community-wide collaboration, sharing, camaraderie, and regular connectivity among collections professionals across disparate regions and collection types.

03-2014: iDigBio is collaborating with crowdsourcing tools including Notes from Nature, and Atlas of Living Australia's Biodiversity Volunteer Portal, to package digitization tasks into batches with compelling research or societal benefits. The emerging iDigBio management system that will create and advertise the projects and process the resulting data is called BIOSPEX for BIOdiversity SPecimen EXpeditions; the idea of evoking expeditions comes from the Biodiversity Volunteer Portal. In one target use case, a curator will be able to register digital images of specimens to the iDigBio Cloud and circumscribe the images as a set for transcription in BIOSPEX. Compelling advertisements for the task are created in BIOSPEX that are then shared with other websites and transcription crowdsourcing tools as "expeditions". The transcriptions generated in an "expedition" are then processed in BIOSPEX and the data is returned to the local specimen management system from BIOSPEX. Parts of the project benefited from the CITSCribe Hackathon in December 2013, an event co-organized by iDigBio and Notes from Nature.

04-17-2014 to 04-19-2014: Fifteen undergraduate students from 7 Florida colleges and universities converged on FLMNH for an opportunity to shadow museum professionals and explore careers in the biological sciences. Funded by an NSF grant awarded to FSU's Institute for Digital Information and Scientific Communication (NSF award DBI-1358501, 9/14/2013), the two-day event allowed undergraduates throughout central and southern Florida to learn about the importance of scientific collections to our knowledge of the earth's biodiversity. Each of the students had previously attended iDigBio's Careers and Graduate Study in the Biological Sciences workshop or the Florida Undergraduate Research Conference. The event was co-organized and co-hosted by Gil Nelson and Pam Soltis.

04-25-2014: iDigBio's External Advisory Board (EAB) members met with the iDigBio PIs and project staff via an Adobe Connect virtual conference. Presentations were given by David Jennings and Greg Riccardi to review iDigBio's activities and progress during the past year. Following the presentations, the EAB provided advice to iDigBio on several aspects of the project, including taxonomy and serving data to GBIF. The meeting concluded with a discussion and plan to rotate the membership of the EAB, including a plan for them to meet more frequently in the future.

06-30-2014: iDigBio is planning its second annual retreat for iDigBio personnel. The retreat will provide an open forum for the entire team to review iDigBio's progress and shape iDigBio's plans for the future.

Specific Objectives:

07-2013: Francois Michonneau was awarded an iDigBio graduate research assistantship for 2013-2014 to facilitate the use of collections data in addressing big-science questions by integrating tools and services into a computational environment for data integration, analysis and visualization. Francois is conducting research on digitized collections, digitizing a portion of the FLMNH collection, and assisting the iDigBio PIs in developing a list of US natural history collections.

07-2013: Reed Beaman assumed a new role where he is facilitating the use of collections data in addressing big-science questions by integrating tools and services into a computational environment for data integration, analysis and visualization. Reed will investigate/integrate data layers (environmental, human diseases, demographics, phylogenetic, GIS, etc.) and tools used to study cross-layer issues and to automate workflows needed to answer specific questions.

08-2013: iDigBio welcomed Elizabeth Ellwood as the new postdoc on public participation in digitization. Libby received her PhD from Boston University in 2012 in the lab of Richard Primack, and her thesis used historical records (including herbarium specimens) to document changes in phenology due to climate change. Libby brings a depth of knowledge of both research uses of biodiversity specimens and citizen science that none of the other applicants could match, as well as experience with GIS and K-12 teaching. She comes most immediately from a postdoc as a Fellow of the Japan Society for the Promotion of Science.

08-2013 onward: Planning began for a series of Broadening Participation workshops, led by Gil Nelson with contributions by Pam Soltis, Larry Page, Bruce MacFadden, David Jennings, Charlotte Germain-Aubrey, Austin Hendy, Blaine Marchant, Claudia Segovia, and Ryan Moraski. Additional outreach efforts to broaden the diversity of the biodiversity collections work force are being developed as a result of these planning sessions.

08-2013: Joanna McCaffrey created collaborator maps for all institutions included in each TCN (including associated PENs). These maps help communicate the scope and breadth of ADBC's national digitization effort.

08-2013: Kevin Love implemented communication of service outages via the website and portal, which is an important aspect of complying with iDigBio's own service level agreement.

08-2013: Alex Thompson published a set of requirements, formats, and guidelines for ingesting data with iDigBio (https://www.idigbio.org/content/idigbio-data-ingestion-requirements-and-guidelines).

08-2013: Joanna McCaffrey published a guide concerning first considerations for iDigBio data ingestion (https://www.idigbio.org/content/idigbio-guide-first-considerations-idigbio-data-ingestion). The goal of the guide was to provide guidance on working with iDigBio to mobilize data.

09-2013: David Jennings and Kevin Love created an iDigBio organizational chart to depict the personnel, and hierarchy, associated with each domain of the iDigBio project (https://www.idigbio.org/content/idigbio-organizational-chart).

11-2013: iDigBio welcomed Suzette King as the new Communications Coordinator to meet an important recommendation of the NSF site visit team: "Assign an individual on the project team as the lead for contacts with the continually increasing number of partner institutions, acting as the interface to other project personnel and to maintain a communications database that is accessible to all project personnel to reduce the potential for misunderstandings." Suzette is overseeing the implementation and maintenance of a communication database and is responsible for technical writing/editing of web content.

01-2014 to 02-2014: David Jennings and Larry Page collected primary roles from all iDigBio staff. David Jennings and Kevin Love then created a rich staff directory accessible only by iDigBio personnel that included these roles/responsibilities along with office numbers, mobile numbers, and email addresses (https://www.idigbio.org/content/directory). The goals were to improve internal communication and to enhance knowledge of roles/responsibilities.

05-2014: Larry Page and David Jennings worked together to formulate a strategic plan

document for iDigBio, which was recommended by the NSF site visit team. The strategic plan outlines plans for sustainability, and includes an analysis and discussion of iDigBio's strengths, weaknesses, opportunities and threats.

Ongoing: As part of the transparency regarding ongoing activities, the TCNs provide regular progress reports to iDigBio, which address the following areas: (1) progress in digitization efforts; (2) share and identify best practices and standards (including lessons learned); (3) identify gaps in digitization areas and technology; (4) share and identify opportunities to enhance training efforts; (5) share and identify collaborations with other TCNs, institutions, and organizations; (6) share and identify opportunities and strategies for sustainability; and (7) other progress that doesn't fit into the above categories. Previously submitted and compiled reports are maintained on the Internal; Advisory Committee wiki page at: https://www.idigbio.org/wiki/index.php/Internal_Advisory_Committee#TCN_Progress_Reports_to_iDigB

Significant Results:

07-2013: The website and portal have undergone an extreme amount of scrutiny. iDigBio initiated efforts to better define and identify the intended audience and then built a new web presence design based around that analysis. iDigBio called for usability testers and located 30 volunteers representing our full audience definition, and used their input to focus development of the new design.

09-2013: iDigBio conducted a review on the website internally with the persons that routinely author and edit content. The goal was improving the ability to deliver better content more efficiently to the intended audience.

09-2013: The project entitled "Full-scale Development: FOSSIL--Fostering Opportunities for Synergistic STEM with Informal Learners," under the direction of Bruce J. MacFadden, Shari A. Ellis, Austin J. Hendy, Kent J. Crippen, and Betty A. Dunckel, received NSF funding via the Advancing Informal STEM Learning (AISL) program (Award #1322725). The project will develop a cyberenabled Community of Inquiry in which our primary target audience, U.S. fossil club members, are networked with each other as well as with professional paleontologists, receive training and development, attend meetings and workshops, and have on-line access to 100 million digitized fossils in U.S. natural history museums.

09-2013: Joanna McCaffrey participated in the 2013 North American EMu User Conference, including Natural History Special Interest Group (SIG), in Wilmington, DE. The conference consisted of 69 attendees, not including 21 from Smithsonian NMNH who were unable to attend due to the government shutdown. Joanna provided support in tracking GUID issues with EMu users and KE Software to gauge their commitment to putting GUID support into EMu in the near term, which will enable EMu users to easily provide data to iDigBio. Joanna has been working with KE for more than a year to add record GUID support to EMu. Joanna wrote a petition to KE and garnered the necessary support, which means that the new GUID feature will be developed out of user interest, and not charged to users.

12-2013: The Explore Research team at FLMNH produced three new videos for iDigBio. These videos were aimed at introducing people to iDigBio and some of the major initiatives being worked on and were produced using recordings from the iDigBio symposium at SPNHC 2013. The first video was about the national digitization effort (Larry Page), the second was an introduction to digitization (Gil Nelson), and the third was an introduction to OCR and georeferencing (Deb Paul).

Ongoing: David Jennings (iDigBio), Scott Miller (NMNH), Jim Beach (Specify), Chris Dietrich (InvertNet) and Rebecca Koskela (DataOne) serve on an advisory panel for Clemson University's re-submission of an NSF digitization grant proposal to digitize the aquatic insect collections from the Southeast. The purpose of the advisory is to ensure smooth data transition to iDigBio and other existing databases.

Ongoing: Larry Page is a member of the San Jose State University School of Library and Information Science Program Advisory Committee focused on Management, Digitization, & Preservation of Cultural Heritage and Records. In addition, he serves on the NEON Collections Technical Working Group, which advises on scientific, technical & implementation issues related to the collections program.

Ongoing: Austin Mast serves on the inaugural steering committee for Notes from Nature (www.notesfromnature.org), the crowdsourcing transcription site for biodiversity research specimens. The committee is working to build on the early successes of that project towards a more robust tool that interoperates with the iDigBio cloud.

Key outcomes or Other achievements:

07-2013: iDigBio joined a digitization symposium featured at the 12th Pacific Science Inter-Congress held at the University of the South Pacific in Suva, Fiji, and followed the symposium with a digitization workshop for the Commonwealth Scientific and Industrial Research Organisation (CSIRO), in Canberra, Australia.

07-2013: Kevin Love met with Emily O'Hearn and Reed Erickson, creative projects producers in the UF College of Journalism and Communications in Weimer Hall, to discuss creative ways for iDigBio to edit/produce/use the many hours of audio and video captured at iDigBio workshops and symposia. This meeting was to support the efforts of iDigBio and FLMNH in collaboration with Explore Research.

07-27-2013 to 07-31-2013: Botany 2013 (New Orleans, LA): Symposium "Public Participation in Scientific Research: Emerging Resources for Botany"; Symposium "Herbarium Digitization for Research, Teaching, and the Public"; Symposium "Broadening Participation - Recruiting and Retaining Outstanding Scientists in the Botanical Sciences"; iDigBio exhibit/display hosted by Pam Soltis, Grant Godden, and Charlotte Germain-Aubrey

08-14-2013: Mike Smorul (SESYNC), Nirav Merchant (iPlant), Eric Carr (NIMBioS), and Andréa Matsunaga (iDigBio) met prior to the SESYNC Visualization Workshop to discuss several topics including what each center is working on, how to find potential commonalities among the centers, and how to focus on visualizations. The meeting resulted in an exchange of experiences using various tools/systems/libraries, exchange of ideas and recommendations of known solutions, and qualitative comparison between similar ones.

08-15-2013 to 08-16-2013: Greg Traub and Andréa Matsunaga participated on behalf of iDigBio in the SESYNC Visualization Workshop in Annapolis, MD. The workshop emphasized desktop-oriented tools, and included the following topics: Overview of visualization tools (by Dr. Ben Shneiderman); Hands-on exercises with Spotfire, NodeXL, RStudio; Demonstration of EventFlow, a tool currently in development to visualize events in a timeline (http://www.cs.umd.edu/hcil/); and Example code with RStudio. The benefit of the meeting was training of iDigBio staff with respect to state-of-the-art visualization tools running on desktops.

08-19-2013: Representatives of iDigBio met with representatives of BISON to discuss collaboration and data flow among iDigBio, BISON, and GBIF.

08-20-2013: Larry Page and Pam Soltis met with members of the FLMNH Planning Committee for SPNHC 2015, which will be hosted by FLMNH with symposia and other events sponsored by iDigBio. Planning is ongoing.

08-21-2013 to 08-23-2013: Larry Page initiated the iDigBio Working Group on Sustainability by sponsoring a meeting of four key individuals representing AIBS, SPNHC, NSCA and iDigBio. The meeting was held at AIBS in Washington, DC, and the key individuals were Rob Gropp at AIBS, Chris Norris from Yale, Andy Bentley from University of Kansas, and Larry Page, from iDigBio.

09-18-2013: Pam Soltis met with members of iPlant's Data Assembly Working Group,

resuming the group's monthly meetings after the summer. Issues discussed that were relevant to iDigBio involved integration of the Taxonomic Names Resolution Service into iDigBio and data storage at TACC. Subsequent meetings discussed TNRS further.

09-26-2013 to 09-27-2013: Alex Thompson, Deb Paul, and Renato Figueiredo participated on behalf of iDigBio at the COLLABIT Biocenter Technical Workshop held in Annapolis, MD. The purpose of this workshop was to bring together the technical and operational staff of the various synthesis centers to identify specific projects that can be used to bootstrap further inter-center collaboration. The meeting focused on finding common ground in IT issues among the various NSF Biocenters. Follow-up activities and meetings were outlined and scheduled, with the eventual goal of starting to form best practices documents for biocenters in a number of areas (IT, Education, Data Management). The benefits of the meeting were enhanced collaboration and networking with the other centers, especially iPlant and NEON who are the most closely related to iDigBio, and a platform for raising broader issues, such as data literacy and standards to the biology community.

10-19-2013: Kevin Love engaged Andrei Sourakov, Collections Coordinator at FLMNH, when Andrei visited the iDigBio display at the FLMNH Butterfly Festival. After viewing the demonstration of Notes from Nature, Andrei expressed an interest in working with iDigBio and collaborators to incorporate citizen science and crowdsourcing into the collections data at FLMNH. Kevin suggested that Andrei work with iDigBio senior staff and participate in the working group on the subject since iDigBio currently has a working group that addresses this topic area.

02-26-2014 to 03-01-2014: Pam Soltis participated in the 2014 AIM-UP! RCN workshop held in Asilomar, CA. She co-presented with Doug Soltis a talk on their undergraduate course and the use of specimens and specimen data in undergraduate teaching and learning.

03-24-2014 to 03-28-2014: UF's Women in Science and Engineering (WiSE) and iDigBio co-sponsored a science spring camp for 7 middle-school girls to experience real-world science and bring back what they learned back to their communities. The camp consisted of a combination of hands-on experiments directly in STEM departments at UF, educational workshops and talks on careers in science, and presenting themselves to others as a science advocate. The girls visited the FLMNH Laboratory of Molecular Systematics and Evolutionary Genetics (headed by Pam and Doug Soltis) for an afternoon of lab work after a morning in the field. Pam then accompanied the campers to the McGuire Center and Butterfly Rainforest.

05-03-2014 to 05-04-2014: The AIM-UP! RCN leaders (Austin Mast, Libby Ellwood, Rob Guralnick, John McCormack, Anna Monfils, Eileen Lacey, and Joe Cook) met over the weekend in Cedar Key prior to the Collections for the 21st Century Symposium. Facilitating AIM-UP! activities helps further iDigBio's E&O activities (particularly in the area of undergrad education).

05-08-2014 to 05-09-2014: Biodiversity Informatics Workshop - Data Carpentry Bootcamp, NESCent (Durham, North Carolina): Data Carpentry's aim is to teach researchers basic concepts, skills, and tools for working with data so that they can get more done in less time, and with less pain. Data Carpentry is a partnership of the NSF-funded BIO Centers (NESCent, iPlant, iDigBio, BEACON and SESYNC) and Software Carpentry and is sponsored by the Data Observation Network for Earth (DataONE). These NSF-funded projects combined efforts to put together this course in data management, data analysis, and data publishing. The structure and objectives of the curriculum as well as the teaching style are informed by Software Carpentry (http://software-carpentry.org).

06-22-2014 to 06-27-2014: SPNHC 2014 (Cardiff, Wales): Symposium "Update on Initiatives and Progress in Digitization of Natural History Collections"; Symposium "Recruiting, Retaining, and Supporting Small Collections in Biodiversity Digitization

Initiatives"; Symposium "Managing Archives, Special Collections and Original Source Documentation in Natural History Collections: Challenges and Opportunities"; DemoCamp; Special Interest Group Session "Collections Digitization and Opportunities for International Collaboration"

*** What opportunities for training and professional development has the project provided?**

08-12-2013 to 08-16-2013: Train-the-Trainers Georeferencing Workshop #2, University of Florida (Gainesville, FL): 5-day intermediate to advanced course on georeferencing natural history museum legacy specimen data, emphasizing how to present and teach these skills to others.

08-12-2013 to 08-16-2013: Specify 6 Workshop, University of Kansas (Lawrence, KS): Workshop starting with the basics, including the installation of Specify 6 and related software, and then progressing through increasingly advanced topics.

09-06-2013: Advanced GEOLocate Course, http://idigbio.adobeconnect.com/geotrain: Webinar covering advanced use of GEOLocate software and services available through the web-based Application Programming Interface (API).

09-16-2013 to 09-18-2013: Fluid-preserved Invertebrate Imaging Workshop, University of Michigan (Ann Arbor, MI): Workshop focused on imaging techniques for fluid-preserved invertebrates and microscopic slides.

09-23-2013 to 09-25-2013: Paleontology Digitization Workshop, Yale Peabody Museum (New Haven, CT): Workshop focused on sharing ideas, protocols, preferences, and strategies for digitization of paleo specimens.

12-10-2013 to 12-11-2013: Mobilizing Small Herbaria Workshop, Florida State University (Tallahassee, FL): Workshop targeted at small herbaria interested in beginning digitization activities.

12-16-2013 to 12-20-2013: Hackathon to Enable Public Participation in Online Transcription of Biodiversity Specimen Labels, University of Florida (Gainesville, FL): Hackathon targeted at further enabling public participation in online transcription of biodiversity specimen labels.

01-15-2014 to 01-17-2014: Education & Outreach Workshop, University of Florida (Gainesville, FL): Workshop to bring together representatives from iDigBio and each TCN to broaden collective knowledge of E&O opportunities, resources, and strategies.

01-22-2014: Demo Webinar: Visualize Text Data Using OCR Output, http://idigbio.adobeconnect.com/augmentocr: Demonstration of what can be done with OCR output of imaged specimen labels, note cards, field notebooks, ledgers, and other primary source materials.

02-27-2014: An Outsider's view inside NSF: E&O Trends and Tips, http://idigbio.adobeconnect.com/trendsandtips: Webinar presented by Bruce MacFadden and facilitated by Reed Beaman focused on potential funding sources for Education and Outreach funding.

03-09-2014 to 03-12-2014: Original Source Materials Workshop, Yale University (New Haven, CT): Workshop focused on digitizing archive material, including field notebooks, catalogs, ledgers, field-prepared or annotated route maps, field drawings, logbooks, journals, diaries, photographs, tags, slips, and similar items, which often contains extensive information that may not appear on labels attached to or stored with collections objects.

03-18-2014: Paleo Digitization Working Group Webinar - Bruce MacFadden: Linking Ancillary Data to Specimen Records in Paleo Databases, https://idigbio.adobeconnect.com/paleo

03-24-2014: Data Modeling Workshop (Honolulu, HI): The primary goal of the workshop was to produce a document that was specific to the data management needs of repositories; discussion topics included preserving data semantics, interoperability, identifiers, names, and services.

03-25-2014 to 03-27-2014: Biodiversity Collections Digitization in the Pacific Workshop (Honolulu, HI): This event was part of a continuing series of iDigBio-sponsored workshops focused on organizing, launching, maintaining, and enhancing biological collections digitization programs.

04-07-2014 to 04-10-2014: Small Collections Workshop, Central Michigan University (Mt. Pleasant, MI): CollectionsWeb, iDigBio, the Small Collections Network (SCNet), and Central Michigan University (CMU) co-sponsored a workshop focused on recruiting, supporting, and retaining small natural history collections within biodiversity digitization.

04-14-2014: WEBINAR: The Role of SPNHC in Supporting the Sustainability of Small Collections, https://idigbio.adobeconnect.com/scnet: SPNHC is the premier organization supporting natural history collections of all types. SPNHC has expressed interest in supporting small collections and has welcomed collaboration with SCNet, to include hosting a symposium at SPNHC 2014.

04-21-2014: WEBINAR: Building the Small Collections Network: A Model from ECN, https://idigbio.adobeconnect.com/scnet: The Entomology Collections Network (ECN) is an excellent example of combining community interest, need, and collaboration to create an important resource for collections professionals.

04-28-2014 to 05-01-2014: Imaging Methods for Paleontological Collections, University of Texas, Jackson School of Geosciences, J.J. Pickle Research Campus, & High Resolution X-ray CT Facility (Austin, TX): Workshop focused on imaging solutions for paleontological specimens and research.

05-01-2014: Collaborative Georeferencing Demo Webinar, http://idigbio.adobeconnect.com/geotrain: Demo of the GEOLocate Collaborative Georeferencing suite of tools, which provides an elegant way to manage groups of people georeferencing a project's locality data.

05-05-2014 to 05-06-2014: Collections for the 21st Century Symposium, University of Florida (Gainesville, FL): Symposium emphasizing the value of collections data in meeting challenges facing biodiversity and human societies and demonstrating the value of biodiversity, and our natural history collections, to policy makers, administrators and others who use collections data and impact the levels of support for collections.

05-12-2014: WEBINAR: Documenting the Importance of Small Collections, https://idigbio.adobeconnect.com/scnet: Anna Monfils is leading a team from the North American Network of Small Herbaria (NANSH) Working Group in a research project to provide empirical, quantifiable evidence for the value and importance of small herbaria.

05-19-2014 to 05-23-2014: Specify for Paleo Collections Workshop, University of Kansas (Lawrence, KS): This workshop focused on using Specify software for paleontology collections with topics ranging from beginning to advanced, including Specify Workbench, forms development and editing, report design, and data cleaning.

05-19-2014: WEBINAR: The Future of Funding for Small Collections, https://idigbio.adobeconnect.com/scnet: Financial support can be a major obstacle in the digitization and management of small natural history collections.

05-24-2014: TORCH 2014 - iDigBio Digitization Workshop, Sul Ross State University (Alpine, TX): This workshop was hosted by TORCH for those who are actively digitizing, plan to, or who have already digitized their collections and wish to make their data available to iDigBio.

06-02-2014: WEBINAR: Large Collections Supporting Small Collections, https://idigbio.adobeconnect.com/scnet: Through leadership in several NSF-funded TCNs, NYBG has incorporated and coordinated numerous small collections in the digitization of vascular plants, bryophytes, fungi, and algae, all under the guidance of Barbara Thiers.

06-06-2014: Georeferencing Workshop by Margaret Landis, a graduate of an iDigBio Train-the-Trainers workshop, http://www.dce.k-state.edu/conf/mammalogists/2014/workshops: Workshop focused on digitizing natural history specimen data and covering tools and techniques used to correctly interpret textual location data into spatial descriptions that can be used in mapping and analyses.

06-09-2014: WEBINAR: AIM-UP!: Advancing Integration of Museums into Undergraduate Programs, https://idigbio.adobeconnect.com/scnet: AIM-UP! is an NSF-funded Research Coordination Network exploring the use of natural history collections in undergraduate education.

* How have the results been disseminated to communities of interest?

06-26-2013: Austin Mast, Betty Dunckel, Gil Nelson, Deb Paul, and Greg Riccardi presented a lightning talk at the Evolution 2013 conference (Snowbird, UT) entitled "Engaging the public in digitization of a billion biodiversity research specimens".

07-2013: iDigBio created a 10' tradeshow display to further its exposure to the community. The display has a visual style similar to the iDigBio poster and holds a monitor for display of photos/videos of iDigBio activities.

08-2013: Austin Hendy gave a presentation to the Lee County Fossil Club on the value of collections as biodiversity data as well as for education and outreach purposes. The primary theme was making natural history collections more accessible and valuable to wider audiences, including those beyond researchers such as educators and students.

10-01-2013 to 10-02-2013: Larry Page, Pam Soltis, and Charlotte Germain-Aubrey represented iDigBio at the NEON national meeting held in Gainesville. Pam presented an overview of research activities relating specimen data to ecological questions, and Charlotte presented her research and workflows using specimen data in ecological niche modeling of Florida plants.

10-16-2013 to 10-18-2013: iDigBio was represented by Andréa Matsunaga, Renato Figueiredo, and José Fortes at the Pacific Rim Application and Grid Middleware Assembly (PRAGMA) 25, co-located with e-Science, in Beijing, China, (http://pragma25.pragma-grid.net). The event discussed future work of working groups in biosciences, cyberlearning, geoscience, resources and telescience. iDigBio cyberinfrastructure was represented in the biosciences working group. One-on-one networking took place with researchers at Kansas University (LifeMapper) and indirectly with natural history museum digitization efforts in San Diego. The benefits of the meeting were creating awareness of iDigBio and its cyberinfrastructure to scientists around the world, learning about potential scientific uses of iDigBio, and finding opportunities to seek global collaborations.

10-19-2013 to 10-20-2013: Cathy Bester, Kevin Love, Joanna McCaffrey, David Jennings, Charlotte Germain-Aubrey, and Claudia Segovia represented iDigBio at FLMNH's "ButterflyFest". iDigBio staff promoted inquiry about biodiversity and the grand challenges of the digitization community while advancing a call to action for the public to become involved as citizen scientists. At the new iDigBio display, participants learned about digitization of museum biodiversity collections and had the opportunity to interact with "Notes From Nature" as citizen scientists. Over the course of 2 days, more than 4,800 participants attended the festival and most stopped by the iDigBio display to learn more about these topics and how to become further engaged as citizen scientists. Over 100 specimen labels were transcribed during the course of the weekend, earning iDigBio the coveted "Butterfly" badge from Notes from Nature.

10-19-2013 to 10-22-2013: Bruce MacFadden represented iDigBio at the Association of Science-Technology Centers (ASTC) meeting in Albuquerque, NM.

10-21-2013: Bruce MacFadden gave a presentation entitled "Fossils In The Cloud" to the Friends of the New Mexico Museum of Natural History in Albuquerque, NM.

10-25-2013: Austin Hendy represented iDigBio at the Geological Society of America (GSA) meeting in Denver, CO.

10-23-2013 to 10-25-2013: iDigBio was represented by Andréa Matsunaga and José Fortes at the 2013 9th IEEE International Conference on e-Science in Beijing, China. e-Science is an annual international conference designed to bring together leading international and interdisciplinary research communities, developers, and users of e-Science applications and enabling IT technologies.

10-27-2013 to 11-01-2013: Biodiversity Information Standards (TDWG) 2013 (Florence, Italy): Symposium "Empowering International e-Collaboration for Sustainability"; Symposium "Success in Broadening Participation and Engagement in Digitization"; Panel discussion "Empowering International e-Collaboration for Sustainability"

10-30-2013 to 11-02-2013: Aldo Rincon and Arianna Harrington represented iDigBio at the Society for Vert Paleo meeting in Los Angeles, CA.

11-01-2013 to 11-04-2013: UF, FLMNH, and iDigBio hosted a visit from more than 400 of the nation's top science writers at the annual meeting of the National Association of Science Writers (NASW) and the Council for the Advancement of Science Writing (http://www.sciencewriters2013.org/). Pam Soltis presented a talk at the annual conference of the National Association of Science Writers held in Gainesville. The talk featured the work that she and Charlotte (and collaborators) have conducted using specimen data to predict the distributions of plant species in Florida under models of climate change.

11-05-2013: FLMNH curators Larry Page, Pam Soltis, and Bruce MacFadden presented a seminar on iDigBio to the UF Biology Department. This seminar provided an opportunity for participants to learn what the iDigBio project is all about and what research and educational opportunities are available.

11-09-2013 to 11-10-2013: Gil Nelson represented iDigBio at the Entomological Collections Network meeting in Austin, TX.

11-17-2013: Charlotte Germain-Aubrey represented iDigBio at the International Biography Society's meeting in Montreal and gave a presentation on her worked, coauthored by Pam Soltis and others.

12-10-2013: Pam Soltis presented a seminar at the Smithsonian and met with Smithsonian curators and other staff to discuss issues related to DNA and tissue banks, digitization of collections, and data sharing.

02-15-2014 to 02-18-2014: iDigBio was represented at the North American Paleontological Convention (NAPC), which was held

at the University of Florida.

02-17-2014: “Celebrating public participation in paleontology”; sponsored by The Florida Paleontological Society; chairs and presenters: Austin Hendy & Bruce MacFadden

02-19-2014: FOSSIL Project (Award #1322725) - Representatives from participating fossil clubs, the project team and other stakeholders from around the U.S. meet for presentations, brainstorming, and discussion.

02-25-2014: Rotary Club of Gainesville – Bruce MacFadden gave a talk regarding the E&O outreach opportunities for children in Panama resulting from Gatun Project.

02-21-2014 to 02-22-2014: iDigBio was represented by Claudia Segovia-Salcedo, Deb Paul, and Gil Nelson at the Florida Undergraduate Research Conference (FURC) held at Florida International University in Miami, FL. Nelson, Paul, and Segovia-Sacedo made the trip to Miami to advertise iDigBio, promote careers in the biological sciences, and recruit for the Biology Careers Shadowing Days held April 17-19 at the Florida Museum of Natural History in Gainesville, FL.

04-02-2013 to 04-05-2013: Gil Nelson represented iDigBio at the 75th Annual Meeting of the Association of Southeastern Biologists held in Spartanburg, SC.

04-07-2014: Bruce MacFadden gave a talk for FLMNH’s Science Café program entitled “Discovering Fossils in Panama: A Once-in-a-Century Opportunity”.

04-19-2014: FLMNH hosted its annual Earth Day Exploration event, which showcased specimens from the museum's research collections and provided activities for those in attendance. iDigBio created an interactive display that enabled event visitors to participate in specimen digitization. In a process developed by iDigBio collaborators, participants were guided by iDigBio project staff through workflows for specimen imaging on professional digitization hardware. In addition to getting hands on with specimens, visitors were able to interact with iDigBio graduate students and staff and learn about digitization and biodiversity collections. iDigBio was represented by David Jennings, Kevin Love, Joanna McCaffrey, Claudia Segovia, Kyuho Jeong, Yonggang Liu, Blaine Marchant, and Pam Soltis.

* What do you plan to do during the next reporting period to accomplish the goals?

iDigBio will continue its mission to develop a national infrastructure that supports the vision of ADBC by overseeing implementation of standards and best practices for digitization; building and deploying a customized cloud computing environment for collections; recruiting and training personnel, including underserved groups; engaging the research community, collections community, citizen scientists, and the public through education and outreach activities; and planning for long-term sustainability of the national digitization effort. iDigBio will continue to enable digitization of data from all U.S. biological collections and integrate those data to make them broadly available and useful with shared standards and formats.

Ongoing activities:

- Joanna McCaffrey is managing the mobilization of data for ingestion into the iDigBio specimen data portal.
- Deb Paul has begun conversations with various community members regarding proposing a biodiversity informatics workshop development to bridge the current informatics knowledge gap for current and future undergraduates, graduate students and collection managers to facilitate future data management, data-sharing, data quality and ethical data-use issues.
- iDigBio post-doc Charlotte Germain-Aubrey is continuing her work on integrating herbarium specimen data, climate models, ecological niche modeling, and molecular phylogenies to formulate research workflows to be enabled by the iDigBio cyberinfrastructure.
- iDigBio personnel participate in the regular COLLABIT meetings, which are aimed at establishing collaboration and technical coordination among the nation’s Biocenters.
- Joanna McCaffrey serves on the FLMNH Informatics Committee to consult with FLMNH’s move to a new collections management system, Specify, and otherwise be a resource for the coordination of iDigBio with the FLMNH.
- Gil Nelson chairs the MISC Working Group and coordinates iDigBio's internal digitization activities.
- Joanna McCaffrey and Gil Nelson co-chair the Biodiversity Informatics Management working group.
- The core iDigBio project administration staff meet weekly to review progress and plan activities.
- The core iDigBio IT and Digitization staff meet weekly to review progress, plan activities, and coordinate decision-making on key issues.
- The iDigBio Steering Committee meets monthly to review project progress and to discuss upcoming strategic issues. In addition, the iDigBio PIs have additional meetings in-between Steering Committee meetings to discuss and resolve key issues.

- iDigBio personnel and TCN personnel meet bi-monthly in a collaborative effort to discuss ongoing operations, gaps, needs, planned activities, procedural questions, and opportunities for improvement.
- Larry Page serves as a board member on the San Jose State University School of Library and Information Science Program Advisory Committee focused on Management, Digitization, and Preservation of Cultural Heritage and Records.
- Larry Page serves on the National Ecological Observatory Network (NEON) Collections Technical Working Group, which advises regarding scientific, technical and implementation issues related to the collections program.
- Austin Mast serves on the steering committee for Notes from Nature.
- Austin Hendy is working on an infrastructure that will allow integration of FLMNH collection database specimen data with imaged specimens and housing of supplementary data (biological geological, taxonomic) for web ingestion to the Fossils of Panama website.
- Austin Hendy is surveying and imaging Panama fossil specimens from North American natural history museums, including (UCMP, CAS, PRI, USNM, and FLMNH) and developing web resources for education/research usage using those digital media.
- The Biodiversity and Digitized Data seminar course will continue in spring semester, with participation by students and others at the TCNs.
- iDigBio will continue to support regular meetings of the iDigBio Working Groups.
- Pam Soltis, Larry Page, Reed Beaman, Greg Traub, Alex Thompson, and Dan Stoner meet regularly to discuss feature development for the iDigBio portal.
- Pam Soltis began discussions with Joe Miller (formerly Atlas of Living Australia, now NSF) in July 2013 about integrating his software, PhyloJIVE, into iDigBio. Discussions continued over several months, resulting in initial integration in early May 2014, with additional developments to come.
- Pam Soltis participated in the iDigBio Education and Outreach Workshop held in Gainesville on Jan 16-17, 2014. She will be following up on several suggestions later in 2014.
- Pam Soltis initiated discussions with GenBank about linking record data with iDigBio in Feb 2014. Discussions are ongoing.
- Pam Soltis participated in discussions with colleagues on possible use of specimen data for benchmarking remote sensing data to be collected by NEON and other sources; Jaclyn Hall (UF) and Stephanie Bohlman (UF).
- Pam Soltis joined the External Advisory Board of a GoLife collaboration on fungi, which emphasizes the link between phylogeny and specimens. David Hibbett and Barbara Thiers are the PIs.
- Since Feb 2014, Pam Soltis has been working with colleagues from other NSF-funded projects, such as Open Tree of Life, Arbor, Lifemapper, to develop research collaborations for linking these resources. These collaborations will continue.
- Pam Soltis participated or participates in several event planning committees: SPNHC 2015 (May 2015), broadening diversity workshop (Feb 2014), FURC (Feb 2014), shadowing days (Apr 2014), and Small Herbarium Digitization Workshop (July 2014)

Workshops, symposia, and events already planned for Fiscal Year 4:

- **07-26-2014 to 07-30-2014:** Botany 2014 New Frontiers in Botany, Boise Centre (Boise, Idaho):
  - Symposium entitled “Digitized natural history collections records in traditional research, collaborative research, and big data research” by Michael Denslow, Corinna Gries, Barry Kaminsky, Joe Miller, Katja Schulz, Pam Soltis, Dave Vieglais, & Matt Von Konrat
  - Symposium entitled “Botanical DNA Banking and the Systematics Community: Working Together to Meet Future Research Challenges” by Wendy Applequist, Lisa Campbell, Kurt Neubig, Doug Soltis, Pam Soltis, & David Spooner
  - Symposium entitled “Georeferencing Natural History Collections: A Crash Course in Translating Locality Data into Geographic Coordinates”
  - **07-31-2014:** North American Network of Small Herbaria Workshop, Boise Centre (Boise, Idaho)
  - **10-19-2014 to 10-22-2014:** GSA iDigBio Symposium, UCSB, Vancouver, Canada
  - **10-27-2014 to 10-28-2014:** iDigBio Summit IV, University of Florida (Gainesville, Florida)
  - **05-17-2015 to 05-22-2015:** SPNHC 2015, Florida Museum of Natural History (Gainesville, Florida)

Supporting Files

Filename	Description	Uploaded By	Uploaded On
iDigBio_EAB_Report_2014.04.25.pdf	2014 iDigBio External Advisory Board Report	Lawrence Page	05/16/2014
2014_iDigBio_Evaluation_Summary.pdf	2014 iDigBio Evaluation Summary	Lawrence Page	05/16/2014

iDigBio_Strategic_Plan_2014.05.09.pdf	iDigBio Strategic Plan	Lawrence Page	05/16/2014
Award_1115210_Y3_Annual_Report_Web_Presence_Workshops.pdf	iDigBio website usage statistics, portal usage statistics, newsletter statistics, collaboration statistics, & social media statistics; iDigBio workshop statistics, demographics, descriptions, participants, & communication outreach	Lawrence Page	05/16/2014

Products

Books

Book Chapters

Conference Papers and Presentations

Austin Hendy, Bruce MacFadden, Claudia Grant (2013). *(Poster) Fossils of Panama: Developing a Bilingual Online Hub for Education and Research Resources*. Geological Society of America Annual Meeting and Expo. Denver, Colorado. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Deborah Paul, Austin Mast, Greg Riccardi, Gil Nelson (2013). *(Poster) iDigBio as a Resource for the Digitization of a Billion Biodiversity Research Specimens*. TDWG 2013 Annual Conference. Florence, Italy. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Austin Mast, Gil Nelson, Deborah Paul, Greg Riccardi (2013). *(Poster) iDigBio as a resource for the digitization of a billion biodiversity research specimens*. Evolution 2013. Snowbird, Utah. Status = ACCEPTED; Acknowledgement of Federal Support = Yes

Andréa Matsunaga, Alex Thompson, Renato Figueiredo, Charlotte Germain-Aubrey, Matthew Collins, Reed Beaman, Bruce MacFadden, Greg Riccardi, Pamela Soltis, Lawrence Page, José A.B. Fortes (2013). *A Computational- and Storage-Cloud for Integration of Biodiversity Collections (doi:10.1109/eScience.2013.48)*. 2013 9th IEEE International Conference on e-Science. Beijing, China. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Inventions

Journals

Bruce J. MacFadden, Jonathan I. Bloch, Helen Evans, David A. Foster, Gary S. Morgan, Aldo Rincon, and Aaron R. Wood (2014). Temporal Calibration and Biochronology of the Centenario Fauna, Early Miocene of Panama. *The Journal of Geology*. 122 (3), 113. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.1086/675244

Elizabeth R. Ellwood, Betty Dunckel, Paul Flemons, Robert Guralnick, Gil Nelson, Greg Newman, Sarah Newman, Deborah Paul, Greg Riccardi, Nelson Rios, Katja C. Seltmann, Austin R. Mast (2014). Accelerating Digitization of Biodiversity Research Specimens through Online Public Participation. *BioScience*. . Status = SUBMITTED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI:

J. A. Cook, S. V. Edwards, E. Lacey, R. P. Guralnick, P. S. Soltis, D.E. Soltis, C. Welch, K. C. Bell, K. E. Galbreath, C. Himes, J. Allen, T. A. Heath, A. C. Carnaval, K. L. Cooper, M. Liu, J. Hanken (2014). Aiming Up: Natural history collections as emerging resources for innovative undergraduate education in biology. *BioScience*. . Status = AWAITING_PUBLICATION; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Ramona L. Walls, John Deck, Robert Guralnick, Steve Baskauf, Reed Beaman, Stanley Blum, Shawn Bowers, Pier Luigi Buttigieg, Neil Davies, Dag Endresen, Maria Alejandra Gandolfo, Robert Hanner, Alyssa Janning, Leonard Krishtalka, Andréa Matsunaga, Peter Midford, Norman Morrison, Éamonn Ó. Tuama, Mark Schildhauer, Barry Smith, Brian J. Stucky, Andrea Thomer, John Wieczorek, Jamie Whitacre, John Wooley (2014). Semantics in Support of Biodiversity Knowledge Discovery: An Introduction to the Biological Collections Ontology and Related Ontologies. *PLoS ONE*. 9 (3), e89606. Status = PUBLISHED; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes ; DOI: 10.1371/journal.pone.0089606

Licenses

Other Products

Audio or Video Products.

Gallery of videos produced by iDigBio, including videos that introduce each TCN: http://vimeo.com/idigbio

Educational aids or Curricula.

A Guide to Common Fossils of the Gatun Formation (Poster and Field Guide): http://www.flmnh.ufl.edu/panama-pire/pcppireteach/download.htm

Educational aids or Curricula.

Advanced GEOLocate Course - Services, Integration, End-to-End Workflows: http://idigbio.adobeconnect.com/p47ekqz7lum/

Educational aids or Curricula.

FOSSIL Project website portal: http://www.flmnh.ufl.edu/myfossil/

Educational aids or Curricula.

Glossary of biology terms to aid users of the iDigBio website and wiki: https://www.idigbio.org/wiki/index.php/Biology_FAQ

Educational aids or Curricula.

Glossary of digitization tools has been posted on the iDigBio Wiki, to be maintained and enhanced by iDigBio personnel and the community: https://www.idigbio.org/wiki/index.php/Glossary_of_Tools

Educational aids or Curricula.

Glossary of digitization/biological projects and organizations has been posted on the iDigBio Wiki, to be maintained and enhanced by iDigBio personnel and the community: https://www.idigbio.org/wiki/index.php/Glossary_of_Projects_and_Organizations

Educational aids or Curricula.

Glossary of digitization/biological terms has been posted on the iDigBio Wiki, to be maintained and enhanced by iDigBio personnel and the community: https://www.idigbio.org/wiki/index.php/Glossary_of_Terms

Educational aids or Curricula.

Glossary of technology terms to aid users of the iDigBio website and wiki: https://www.idigbio.org/wiki/index.php/Technology_FAQ

Educational aids or Curricula.

Information and links on US DNA banks and genetic resource repositories: https://www.idigbio.org/genetic-resources

Educational aids or Curricula.

Links to all of the materials associated with iDigBio workshops: https://www.idigbio.org/wiki/index.php/IDigBio_Workshops

Educational aids or Curricula.

Online repository for sharing existing customized workflows from as many collection types and institutions as possible: https://www.idigbio.org/content/digitization-workflows

Educational aids or Curricula.

Page designed to gather known effective OCR practices from the community and share examples of OCR use, OCR Output and Workflows utilizing OCR. It is a designed to be a compilation of OCR resources, Technical Issues and Workflows for use by the community: https://www.idigbio.org/wiki/index.php/Augmenting_OCR

Educational aids or Curricula.

Page to gather and organize resources used for Georeferencing has been posted to the iDigBio Wiki, to be maintained by iDigBio personnel and the community: https://www.idigbio.org/wiki/index.php/Georeferencing

Educational aids or Curricula.

Videos about the national digitization effort (Larry Page), an introduction to digitization (Gil Nelson), and an introduction to OCR and georeferencing (Deb Paul): https://www.idigbio.org/biblio?s=author&f[author]=64&f[type]=114

Educational aids or Curricula.

Wiki for upcoming digitization workshops, including the creation of videos and documents to support workshop participants: https://www.idigbio.org/wiki/index.php/Digitization_Training_Workshops

Educational aids or Curricula.

Continual development and updating of workflow modules and task lists for digitizing biodiversity collections. The workflow modules lists to serve as foundations from which institution-specific workflows can be created: https://www.idigbio.org/content/workflow-modules-and-task-lists

Protocols.

Identifier

Guide for Data Providers: https://www.idigbio.org/content/guid-guide-data-providers

Protocols.

MISC Phase I report: ttps://www.idigbio.org/wiki/images/c/c9/Phase_I_Report.pdf

Protocols.

iDigBio Service Level Agreement: https://www.idigbio.org/sites/default/files/Service-Level-Agreement-v1.pdf

Protocols.

iDigBio Terms of Use Policy: https://www.idigbio.org/content/idigbio-terms-use-policy

OTHER.

Communication and dissemination of iDigBio events, workshops, symposia, and meetings: https://www.idigbio.org/calendar

OTHER.

Form for bi-monthly TCN progress reports to iDigBio: https://www.idigbio.org/content/tcn-bi-monthly-progress-report-idigbio

OTHER.

Form for reporting of external collaborations, meetings, etc. by iDigBio staff: https://www.idigbio.org/content/idigbio-external-collaboration-reporting

OTHER.

Full-scale tradeshow display for use at conferences: https://www.idigbio.org/wiki/index.php/IDigBio_10%27_Display

OTHER.

NIBA Implementation Plan: https://www.idigbio.org/content/niba-implementation-plan

OTHER.

Public outreach via Facebook: https://www.facebook.com/iDigBio

OTHER.

Public outreach via Twitter: https://twitter.com/idigbio

OTHER.

Tabletop tradeshow display for use at conferences: https://www.idigbio.org/wiki/index.php/IDigBio_Table_Top_Display

Other Publications

Godden, G. T. and P. S. Soltis (2014). *A new iDigBio web feature links DNA banks and genetic resources repositories in the United States*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = AWAITING_PUBLICATION; Acknowledgement of Federal Support = Yes

L. Endara, J. A. Soto-Centeno, T. A. Lott, and P. S. Soltis (2014). *Preserving biodiversity for long-term research: The Genetic Resources Repository of the Florida Museum of Natural History*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = AWAITING_PUBLICATION; Acknowledgement of Federal Support = Yes

K. M. Neubig, W. M. Whitten, J. R. Abbott, S. Elliott, D. E. Soltis, P. S. Soltis (2014). *Variables affecting DNA preservation in archival plant specimens*. In W. L. Applequist and L. M. Campbell, DNA Banking for the 21st Century: Proceedings of the U.S. Workshop on DNA Banking. William L. Brown Center, Peru. Status = AWAITING_PUBLICATION; Acknowledgement of Federal Support = Yes

Patents

Technologies or Techniques

Nothing to report.

Thesis/Dissertations

Websites

BioSpex
http://www.biospex.org/

iDigBio is collaborating with crowdsourcing tools including Notes from Nature, and Atlas of Living Australia's Biodiversity Volunteer Portal, to package
digitization tasks into batches with compelling research or societal benefits.
The emerging iDigBio management system that will create and advertise the
projects and process the resulting data is called BIOSPEX for BIOdiversity
SPecimen EXpeditions.

Fossils of Panama
http://www.flmnh.ufl.edu/panama-pire/fossils-of-Panama/default.htm

Fossils of Panama is an initiative of the Florida Museum of Natural History Fossils in the Cloud Project - an effort to digitize the museum's paleontological collections. Fossils of Panama leverages the availability of digital images and online media to build a greater awareness and appreciation of Panama's past biodiversity, as well as provide

a web resource for the scientific and education community in which common fossils of Panama can be simply and rapidly identified. This online resource builds on the extensive collections of Panamanian fossils in the Florida Museum of Natural History and a number of other U.S. natural history museums. This initiative is funded through the Florida Museum of Natural History, iDigBio [NSF# 1115210], and the Panama Canal Project-PIRE [NSF# 0966884]

Small Collections Network
http://scnet.acis.ufl.edu/

SCNet is a collaborative resource dedicated to supporting smaller natural history collections and the professionals who manage them, especially related to the processes of collections management and digitization. SCNet has also established a listserv and inaugurated a continuing webinar series using iDigBio's web conferencing infrastructure.

Temporary TCN Storage
https://storage.idigbio.org

Temporary storage location provided to enable storage of images for TCNs requiring this resource.

iDigBio API
http://api.idigbio.org/

This site provides access to the specimen and images stored in the iDigBio cloud infrastructure through API access.

iDigBio Beta Portal
http://beta-portal.idigbio.org/

Beta version of the iDigBio portal for development and testing of new features to be integrated into the production version of the portal. This gives the community of users the opportunity to see, play, and review upcoming releases.

iDigBio Specimen Data Portal
https://www.idigbio.org/portal/

Portal demonstrating access to the specimen and image database, including search technology and geovisualization functions. A complete redesign of the portal was released in December 2013 to coincide with the redesigned website.

iDigBio Test Website
https://www-qa.idigbio.org/

QA version of the iDigBio website for testing of new features to be integrated into the production version of the website. This gives the community of users the opportunity to see, play, and review upcoming releases.

iDigBio Website
https://www.idigbio.org

Primary website for collaboration, dissemination of information, and training. Currently includes forums, a primary website, and a Wiki. A complete redesign of the website was released in December 2013 that focused on making it easier to understand and to use. In addition, the site was improved to be more approachable to a lay visitor. With the latest release of the iDigBio specimen portal, there is also a new consistency in the visual language used, which will help users navigate the collection of technologies that make up the iDigBio website.

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Page, Lawrence	PD/PI	6
Fortes, Jose	Co PD/PI	3

MacFadden, Bruce	Co PD/PI	2
Riccardi, Gregory	Co PD/PI	2
Soltis, Pamela	Co PD/PI	1
Dunckel, Betty	Faculty	1
Figuero, Renato	Faculty	3
Mardis, Marcia	Faculty	1
Mast, Austin	Faculty	1
Ellwood, Elizabeth	Postdoctoral (scholar, fellow or other postdoctoral position)	9
Germain-Aubrey, Charlotte	Postdoctoral (scholar, fellow or other postdoctoral position)	9
Hendy, Austin	Postdoctoral (scholar, fellow or other postdoctoral position)	4
Bester, Cathy	Other Professional	12
Bruhn, Robert	Other Professional	12
Byatt, Peter	Other Professional	1
Collins, Matthew	Other Professional	2
Grant, Claudia	Other Professional	1
Grosso, Jesse	Other Professional	2
Jennings, David	Other Professional	12
Johnson, Dale	Other Professional	3
Josephs, Oicenth	Other Professional	4
King, Suzette	Other Professional	7
Leiva, Diane	Other Professional	1
Love, Kevin	Other Professional	12
Mathis, Jason	Other Professional	3
McCaffrey, Joanna	Other Professional	12
Paul, Deborah	Other Professional	12
Spinks, Jeremy	Other Professional	2

Stoner, Dan	Other Professional	5
Thompson, Alex	Other Professional	12
Traub, Gregory	Other Professional	12
Beaman, Reed	Staff Scientist (doctoral level)	5
Ellis, Shari	Staff Scientist (doctoral level)	4
Matsunaga, Andrea	Staff Scientist (doctoral level)	9
Nelson, Gil	Staff Scientist (doctoral level)	12
Harrington, Arianna	Graduate Student (research assistant)	4
Jeong, Kyuho	Graduate Student (research assistant)	4
Liu, Yonggang	Graduate Student (research assistant)	3
Marchant, Blaine	Graduate Student (research assistant)	4
Michonneau, Francois	Graduate Student (research assistant)	5
Moraski, Ryan	Graduate Student (research assistant)	4
Rincon, Aldo	Graduate Student (research assistant)	4
Segovia, Claudia	Graduate Student (research assistant)	4
Soomro, Sarfaraz	Graduate Student (research assistant)	4
Orleus, Lunide	Undergraduate Student	1
Stouder, Deanna	Consultant	1
Flemming, Adania	Other	1

Full details of individuals who have worked on the project:

Lawrence M Page
Email: lpage1@ufl.edu
Most Senior Project Role: PD/PI
Nearest Person Month Worked: 6

Contribution to the Project: Director of iDigBio. Overall project management and oversight. Responsible for ensuring that the project delivers value to all downstream users and influences policymakers, as well as ensuring that iDigBio develops and adopts a viable sustainability plan.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Jose A Fortes
Email: fortes@ufl.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 3

Contribution to the Project: Director for Computational Activities. Oversight of data integration, support for computational needs and assessment of new technologies and programs. Responsible for the team that will implement and maintain the infrastructure to handle the horizontally-scalable data and media stores for iDigBio specimen data. Responsible for conceptualizing, implementing and supporting tools and processes to support core infrastructure workflow, such as data ingestion, data validation, GUID pattern registration by institution, a GUID resolution service, APIs to provide access to the data store, graphical user interface development, security, development of and adherence to acceptable Service Level Agreements, and the integration of tools that will support research activities and other downstream user needs.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, Brazil - 0 years, 0 months, 2 days; China - 0 years, 0 months, 4 days; Taiwan - 0 years, 0 months, 1 days

Bruce J MacFadden
Email: bmacfadd@flmnh.ufl.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: Director for Education and Outreach. Oversight of educational and outreach activities. Bruce is also responsible for enhancing the level of awareness and expertise related to digitization and related activities

Funding Support: University of Florida Panama PIRE [NSF# 0966884] FOSSIL [NSF# 1377275]

International Collaboration: Yes, Panama
International Travel: Yes, Panama - 0 years, 0 months, 22 days; Ireland - 0 years, 0 months, 8 days

Gregory A Riccardi
Email: griccardi@fsu.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 2

Contribution to the Project: iDigBio co-Director for Computational Activities. Oversight of data integration, support for computational needs and assessment of new technologies and programs. Greg leads the FSU team responsible for digitization workflow and tool optimization activities. He is also the subject matter expert in bio/paleo-specimen imaging, and the primary iDigBio resource for conceptualization and implementation of data consistency processes and technologies including GUID assignment, taxonomy identification, collector data sources, etc.

Funding Support: Florida State University

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Pamela S Soltis
Email: psoltis@flmnh.ufl.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Director for Research Activities. Liaison to the scientific community and coordination of scientific research activities and needs. Developing workflows to stimulate and facilitate research based on biodiversity collections data.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Betty Dunckel
Email: bdunckel@flmnh.ufl.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Betty Dunckel serves on the iDigBio project's Internal Steering Committee. Betty has expertise in informal science education and outreach, and is a strong supporting resource for Bruce MacFadden's Education and Outreach planning activities. Betty is also a Co-PI on the FOSSIL project.

Funding Support: University of Florida FOSSIL [NSF# 1377275]

International Collaboration: No
International Travel: No

Renato Figuero
Email: renatof@ufl.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 3

Contribution to the Project: Renato Figueiredo serves as a member of the iDigBio Internal Steering Committee and is a faculty member with the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Renato is primarily responsible for iDigBio appliance architecture decisions and appliance development/maintenance.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, China - 0 years, 0 months, 4 days

Marcia Mardis
Email: marcia.mardis@cci.fsu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Marcia Mardis is working at FSU with the research and evaluation components of the project to study the social science factors of iDigBio and its interactions with the TCNs.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Austin Mast
Email: amast@bio.fsu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 1

Contribution to the Project: Austin Mast serves as a member of the iDigBio Internal Steering Committee. Austin is contributing to the coordination of activities among FSU personnel, he contributed to the development of the FSU-produced digitization ZooKeys publication, he is leading the development of the Citizen Science Working Group, and he is leading the creation of a joint Citizen Science/Education and Outreach Workshop.

Funding Support: Florida State University

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Elizabeth Ellwood
Email: eellwood@bio.fsu.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 9

Contribution to the Project: Libby Ellwood is a post-doctoral scholar in Austin Mast's lab at FSU. Libby is focusing on methods of establishing public participation as part of iDigBio.

Funding Support: Florida State University

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Charlotte Germain-Aubrey
Email: cgermain@ufl.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 9

Contribution to the Project: Charlotte Germain-Aubrey is a post-doc working with Pamela Soltis. Charlotte is developing workflows to facilitate research that integrates molecular phylogenetics and ecological niche modeling with biodiversity collections data for ultimate integration into the iDigBio cyberinfrastructure. She is pioneering research workflows to integrate data across major clades from separate collections.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, Canada - 0 years, 0 months, 4 days

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Austin Hendy
Email: ahendy@flmnh.ufl.edu
Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)
Nearest Person Month Worked: 4

Contribution to the Project: Austin Hendy is a post-doc working with Bruce MacFadden. Austin is in charge of the Fossils of Panama initiative which coordinates the digitization of fossils collected from Panama into the collections at the Florida Museum of Natural History, in addition to researching the use of digitized fossils in education and outreach. Austin is also a Co-PI on the recently funded FOSSIL project, which aims to increase the role of amateur paleontologists in the U.S. in digitization activities and improve awareness of and access to digitized natural history collections.

Funding Support: University of Florida FOSSIL [NSF# 1377275]

International Collaboration: Yes, Panama
International Travel: Yes, Panama - 0 years, 0 months, 22 days

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Cathy Bester
Email: cbester@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Cathy Bester is the Education & Outreach Coordinator. Cathy is responsible for coordinating

and implementing the E&O activities of the HUB and communicating and facilitating coordination and networking among the TCNs in order to promote, encourage, develop, and implement relevant E&O and broader impact activities. When Oicenth left iDigBio, Cathy assumed her previous responsibilities as Project Assistant to ensure the workshops were not impacted. Cathy will remain the iDigBio Project Assistant moving forward.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Robert Bruhn
Email: bruhnrp@yahoo.com
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Robert Bruhn is facilitating public participation in the digitization of biodiversity specimens. Robert is a programmer focused on producing interoperability between existing cyberinfrastructure used for digitization of biodiversity specimens and iDigBio, including tailoring the iDigBio portal interface to meet citizen science needs.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Peter Byatt
Email: pbyatt@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Peter Byatt is a videographer with the Florida Museum of Natural History's Explore Research exhibit, which showcases the University of Florida's most exciting discoveries. Peter is creating and editing videos from iDigBio materials for presentation to wide audiences. Peter no longer works for the Florida Museum of Natural History.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Matthew Collins
Email: mcollins@acis.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 2

Contribution to the Project: Matthew Collins is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Matthew is assisting with IT infrastructure design and implementation.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Claudia Grant
Email: cgrant@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Claudia has been working with Austin Hendy to get digitized images of fossils from Panama on-line.

Funding Support: University of Florida

International Collaboration: Yes, Panama
International Travel: Yes, Panama - 0 years, 0 months, 22 days

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Jesse Grosso
Email: grosso5@ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 2

Contribution to the Project: Responsible for assisting Project Manager and Cathy Bester in logistics related to Participant activities (Workshops, Working Groups, etc.); scheduling; maintaining project records including meeting minutes. Jesse no longer works for iDigBio.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

David Jennings
Email: djennings@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: David Jennings is the Project Manager and is responsible for specific definition of project scope, control of scope creep, coordination of project activities, coordination of interaction with collaborators, identification of key stakeholders and outreach to HUB and TCN stakeholders, budget tracking and management, planning/leading various weekly, monthly and annual meetings, managing day-to-day project activities, risk management, and project reporting.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Dale Johnson
Email: dalej@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 3

Contribution to the Project: Dale Johnson is a project coordinator with the Florida Museum of Natural History's Explore Research exhibit, which showcases the University of Florida's most exciting discoveries. Dale is coordinating efforts to create videos from iDigBio materials for presentation to wide audiences.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Oicenth Josephs
Email: ophang@hotmail.com
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 4

Contribution to the Project: Oicenth Josephs was the Project Assistant. Oicenth was responsible for navigating FLMNH and UF processes/policies related to ongoing project and office operations; logistics coordination for Participant activities (Workshops, Working Groups, etc.); scheduling; maintaining project records including meeting minutes. Oicenth no longer works for iDigBio.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Suzette King
Email: sking@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 7

Contribution to the Project: Suzette King is the Communications Coordinator for iDigBio. Suzette is overseeing the implementation and maintenance of a communications database and is responsible for technical writing/editing of web content.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Diane Leiva
Email: dleiva@fsu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Dr. Leiva is helping Dr. Riccardi manage the FSU subproject by working with the FSU administration on budgets, personnel, travel and other expenses. She also participates in planning and evaluation of the FSU activities.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Kevin Love
Email: klove@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Kevin Love provides website development and maintenance, assistance with functional/technical requirement development, and will serve as the 1st level support (user services) for the Specimen Database tool and other technology questions (distinct from digitization user support questions, which are in the domain of Gil Nelson and Deb Paul). Kevin is also taking an increasing role in the development of aspects of the iDigBio Specimen Portal and technical writing (internal documentation, as well as end-user documentation). Kevin is also very interested in education and outreach, and is a frequent participant, for example, in local fairs that promote STEM via iDigBio.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Jason Mathis
Email: jamathis@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 3

Contribution to the Project: Jason Mathis is a videographer with the Florida Museum of Natural History's Explore Research exhibit, which showcases the University of Florida's most exciting discoveries. Jason is creating and editing videos from iDigBio materials for presentation to wide audiences.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Joanna McCaffrey
Email: jmccaffrey@flmnh.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Joanna McCaffrey is the Biodiversity Informatics Manager. Her work focuses on working closely with ACIS to further their understanding of museum collections and related bioinformatics issues, especially usability and product requirements. Joanna contributed to the Digitizing Plant Collections workshop and co-planned the iDigBio Symposium at the 2013 SPNHC meeting. She has written various documents to support project clarity of message.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Deborah Paul
Email: dpaul@fsu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Deborah Paul is the project's informatics analyst at FSU. Deb is working closely with Gil Nelson to analyze and document digitization processes and tools. Deb is responsible (Co-chair) for the Augmenting Optical Character Recognition Working Group (AOCR). She is co-chair of the Georeferencing Working Group (GWG) that continues to work on Geo-Referencing training materials and training workshops. Deb contributed to the ZooKeys article, and continues to develop the digitization informational/instructional content on the iDigBio website for Georeferencing and uses for OCR output in concert with the working groups.

Funding Support: Florida State University

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Jeremy Spinks
Email: jspinks@fsu.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 2

Contribution to the Project: Jeremy Spinks joined iDigBio to assist in improving the usability of the project website. This has involved reviewing the site, collecting feedback, and proposing architectural and visual changes. The task of implementing the changes is ongoing.

Funding Support: Florida State University

International Collaboration: No
International Travel: No

Dan Stoner
Email: dstoner@ACIS.UFL.EDU
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 5

Contribution to the Project: Dan Stoner joined iDigBio in February 2013 as an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Dan is assisting with data/media ingestion and infrastructure.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Alex Thompson
Email: godfoder@acis.ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Alex Thompson is an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Alex is the ACIS iDigBio Infrastructure engineer and programmer, serving as the primary technical contact for the development and maintenance of all infrastructure services provided by ACIS to the iDigBio project. This originally included the 'social portal' (www.idigbio.org's website, wiki, and project management software implementation). Primary support for the social portal has been handed over to Kevin Love. Alex is currently focused on the provision and maintenance of temporary storage for TCNs, and the implementation of the permanent horizontally-scalable data and media store. Alex will also be the lead on the development of many of the iDigBio APIs and the graphical user interface used by human downstream users to access iDigBio specimen data.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 5 days

Gregory Traub
Email: gtraub@ufl.edu
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 12

Contribution to the Project: Greg Traub joined iDigBio in February 2013 as an IT Expert at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Greg is assisting with IT infrastructure design and implementation.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Reed Beaman
Email: rbeaman@flmnh.ufl.edu
Most Senior Project Role: Staff Scientist (doctoral level)
Nearest Person Month Worked: 5

Contribution to the Project: Reed Beaman facilitates the use of collections data in addressing big-science questions by integrating tools and services into a computational environment for data integration, analysis and visualization. Reed also serves as a member of the iDigBio Internal Steering Committee.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, Italy - 0 years, 0 months, 3 days

Shari Ellis
Email: shellis@flmnh.ufl.edu
Most Senior Project Role: Staff Scientist (doctoral level)
Nearest Person Month Worked: 4

Contribution to the Project: Shari Ellis is the Project Evaluator. She works with the project to conduct robust evaluations and assessments, including those related to workshops, symposia, and summits. Shari is also a Co-PI on the FOSSIL project.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Andrea Matsunaga
Email: ammatsun@acis.ufl.edu
Most Senior Project Role: Staff Scientist (doctoral level)
Nearest Person Month Worked: 9

Contribution to the Project: Andrea Matsunaga is a research scientist at the University of Florida's Advanced Computing and Information Systems (ACIS) Laboratory. Andrea is working on research aspects of the development of the cloud-based iDigBio cyberinfrastructure, obtaining data sets for testing and inclusion in a demonstrator website, and ensuring that the product is sufficiently scalable and capable of serving the needs of downstream users.

Funding Support: University of Florida

International Collaboration: No
International Travel: Yes, China - 0 years, 0 months, 3 days

Gil Nelson
Email: gnelson@bio.fsu.edu
Most Senior Project Role: Staff Scientist (doctoral level)
Nearest Person Month Worked: 12

Contribution to the Project: Gil Nelson serves as a member of the iDigBio Internal Steering Committee and is a digitization process and tool documentation/improvement specialist. He is researching, documenting and evaluating workflows at both mature and new digitization locations. Findings and conclusions are being published as content on the iDigBio website, as well as a formal ZooKeys paper. Going forward, Gil will provide virtual and hands-on support to institutions that are implementing new digitization workflows, as well as to implement efficiency improvements in existing institutions. Gil also chairs the Minimum Information Standards and Authority Files Working Group and is coordinating the development of data element expectations and requirements for iDigBio contributors. Also coordinates several planning teams producing and conducting preparation-specific digitization training workshops, chairs several workflow development working groups originated at and a follow up to the DROID workshop (to include workflow working groups for Flat Sheets and packets, Pinned Things in Trays and Drawers, 3D Objects in Spirits in Jars, and 3D Objects in Trays and Drawers), the Biodiversity Informatics Managers working group as co-lead with Joanna McCaffrey, and the International Whole-drawer Digitization Interest Group, co-leading with Nicole Fisher of the Australian National Insect Collection.

Funding Support: Florida State University

International Collaboration: Yes, Australia, Fiji
International Travel: Yes, Australia - 0 years, 0 months, 5 days; Fiji - 0 years, 0 months, 5 days

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Arianna Harrington
Email: aharrington@flmnh.ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Arianna Harrington is a Ph.D. student working with Bruce MacFadden and Austin Hendy on the Fossils of Panama project, with an emphasis on 3-D digitization.

Funding Support: University of Florida

International Collaboration: Yes, Panama
International Travel: Yes, Panama - 0 years, 0 months, 22 days

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Kyuho Jeong
Email: xetron@ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Kyuho Jeong is a graduate student with the ACIS Laboratory, advised by Dr. Renato Figueiredo. Kyuho is currently working on the Specify thin client appliance.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Yonggang Liu
Email: myidpt@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 3

Contribution to the Project: Yonggang Liu is a Ph.D. student with the Advanced Computing and Information Systems (ACIS) Laboratory, advised by Dr. Renato Figueiredo. Yonggang is assigned to help with the technology and standards development. He is currently responsible for the design and development of a media ingestion tool that will reliably upload files from the provider's local data source to the iDigBio media storage system.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Blaine Marchant
Email: dbmarchant@ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Blaine Marchant is a Ph.D. student working with Pamela Soltis. He is using plant specimen records to test hypotheses about the distribution of polyploid species relative to their diploid parents.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Francois Michonneau
Email: francois.michonneau@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 5

Contribution to the Project: Francois Michonneau was awarded an iDigBio graduate research assistantship for 2013-2014. Francois is conducting research on digitized collections and/or digitizing a portion of the FLMNH collection and is assisting the iDigBio PIs in developing a list of US natural history museums.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Ryan Moraski
Email: rpm225@gmail.com
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Ryan Moraski is a Ph.D. student in Biology working with Pamela Soltis. Ryan is focusing on ways to integrate georeferencing into research-oriented workflows and on applications of georeferenced data for research projects. He is also georeferencing collection data for collections at FLMNH and contributing to ecological niche modeling for fishes and Lepidoptera. He will also contribute to efforts to integrate data across major clades from separate collections.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Aldo Rincon
Email: arincon@ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Aldo Rincon is a Ph.D. student working with Bruce MacFadden and Austin Hendy on the Fossils of Panama project, with an emphasis on pre-digitization curation.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Claudia Segovia
Email: claudia@ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Claudia Segovia is a Ph.D. student working with Pamela Soltis. She is working in the FLMNH's Genetic Resources Repository to gain curatorial experience. She will participate in discussions about connecting similar collections across the country.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Sarfaraz Soomro
Email: sarfarazsoomro@ufl.edu
Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 4

Contribution to the Project: Sarfaraz Soomro is a master's student with the ACIS Laboratory, advised by Dr. José Fortes. Sarfaraz is assigned to perform research on information systems, and to help with the development of data integration tools under 0.5 FTE.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Lunide Orleus
Email: l.orleus1809@ufl.edu
Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 1

Contribution to the Project: Lunide is a student assistant working with PI Larry Page to investigate digitization workflow issues related to images of alcohol-stored specimens.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

Deanna Stouder
Email: deanna@execvisionvalue.com
Most Senior Project Role: Consultant
Nearest Person Month Worked: 1

Contribution to the Project: Deanna worked with Larry Page and David Jennings on the plans for the iDigBio Summit III. During the Summit, Deanna helped lead two breakout sessions on the topic of Sustainability. Deanna brings a wealth of experience from the scientific, academic, non-governmental, and federal sectors. She has also been a professional, leadership, and executive coach since 2006 enabling individuals and their organizations to achieve their goals for themselves and their organizations.

Funding Support: Deanna J. Stouder Coaching

International Collaboration: No
International Travel: No

Adania Flemming
Email: aflemming@flmnh.ufl.edu
Most Senior Project Role: Other
Nearest Person Month Worked: 1

Contribution to the Project: Adania Flemming is an office assistant for iDigBio, performing relevant tasks as requested by project leadership and administration.

Funding Support: University of Florida

International Collaboration: No
International Travel: No

What other organizations have been involved as partners?

Name	Type of Partner Organization	Location
ABBYY	Industrial or Commercial Firms	Milpitas, CA
American Institute of Biological Sciences (AIBS)	Other Nonprofits	Reston, VA
Cornell University	Academic Institution	Ithaca, NY
Encyclopedia of Life (EOL)	Other Nonprofits	USA
Fishnet2 Project	Other Nonprofits	USA
Florida State University	Academic Institution	Tallahassee, FL
GEOLocate	Other Nonprofits	USA
Global Biodiversity Information Facility (GBIF)	Other Nonprofits	Denmark
Global Environmental Facility (GEF)	Other Nonprofits	Brazil
Map of Life	Other Nonprofits	USA
Mississippi Herbaria Consortium	Other Nonprofits	Oxford, MS
Morphbank	Other Nonprofits	Tallahassee, FL
American Museum of Natural History (AMNH)	Other Nonprofits	New York, NY
Natural Science Collections Alliance (NSCA)	Other Nonprofits	Washington, D.C.
New York Botanical Garden (NYBG)	Other Nonprofits	Bronx, NY
North Carolina State University (NCSU)	Academic Institution	Raleigh, NC
Notes fom Nature	Other Nonprofits	USA
Society for the Preservation of Natural History Collections	Other Nonprofits	New York, NY
Specify	Other Nonprofits	USA
Symbiota	Other Nonprofits	USA
Texas Oklahoma Regional Consortia of Herbaria (TORCH)	Other Nonprofits	USA
The Global Registry of Biorepositories (GRBio)	Other Nonprofits	USA

University of Arizona (UA)	Academic Institution	Tucson, AZ
Arctos	Other Nonprofits	USA
University of Colorado at Boulder (CU)	Academic Institution	Boulder, CO
University of Illinois at Urbana-Champaign (UI)	Academic Institution	Urbana ,IL
University of Kansas (KU)	Academic Institution	Lawrence, KS
University of New Hampshire (UNH)	Academic Institution	Durham, NH
University of Wisconsin-Madison (UW)	Academic Institution	Madison, WI
VertNet	Other Nonprofits	USA
Yale University	Academic Institution	New Haven, CT
Atlas of Living Australia (ALA)	Other Nonprofits	Australia
Botanical Society of America (BSA)	Other Nonprofits	St. Louis, MO
COLLABIT	Other Nonprofits	USA
CollectionsWeb	Other Nonprofits	USA
Consortium of California Herbaria (CCH)	Other Nonprofits	USA
Consortium of Pacific Northwest Herbaria (PNW)	Other Nonprofits	USA

Full details of organizations that have been involved as partners:

ABBYY

Organization Type: Industrial or Commercial Firms
Organization Location: Milpitas, CA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://www.abbyy.com/ Commercial Optical Character Recognition (OCR) software; member of OCR working group.

American Institute of Biological Sciences (AIBS)

Organization Type: Other Nonprofits
Organization Location: Reston, VA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Collaboration in various activities, including development of Implementation Plan for the Network Integrated Biocollections Alliance and symposium co-hosted by SPNHC on uses of natural history collections

data.

American Museum of Natural History (AMNH)

Organization Type: Other Nonprofits
Organization Location: New York, NY

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations”. Participated in iDigBio’s Summit III.

Arctos

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://arctos.database.museum/ iDigBio and Arctos are working together to determine if users can submit their data to iDigBio directly, without necessarily going thru VertNet IPT. This provides an excellent opportunity for iDigBio to work with medium-sized collections.

Atlas of Living Australia (ALA)

Organization Type: Other Nonprofits
Organization Location: Australia

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: http://www.ala.org.au/ iDigBio IT staff have discussed opportunities to leverage ALAs web services and interfaces. There are questions of scalability and compatibility that have caused iDigBio to delay the commitment of resources toward this activity.

Botanical Society of America (BSA)

Organization Type: Other Nonprofits
Organization Location: St. Louis, MO

Partner's Contribution to the Project:
In-Kind Support

More Detail on Partner and Contribution: The BSA included three iDigBio-funded symposia on digitization in its scientific program in the 2013 meeting in New Orleans.

COLLABIT

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:

Collaborative Research

More Detail on Partner and Contribution: COLLABIT@LISTSERV.UTK.EDU Collaboration and technical coordination among the nation's biocenters.

CollectionsWeb

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support

More Detail on Partner and Contribution: http://www.collectionsweb.org/ Deb Paul working with Alan Prather and James Woolley (CollectionsWeb planning committee) to facilitate iDigBio participation in upcoming workshop.

Consortium of California Herbaria (CCH)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: http://ucjeps.berkeley.edu/consortium/ Primary RDCN institution. Participated in iDigBio's Summit III.

Consortium of Pacific Northwest Herbaria (PNW)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Location http://www.pnwherbaria.org/ Primary RDCN institution. Outreach for PNW workflow and OCR experiences feedback. Participated in iDigBio's Summit III.

Cornell University

Organization Type: Academic Institution
Organization Location: Ithaca, NY

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Developing a Centralized Digital Archive of Vouchered Animal Communication Signals". Participated in iDigBio's Summit III.

Encyclopedia of Life (EOL)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: http://eol.org/ Bob Corrigan and iDigBio IT Staff have initiated communication to understand opportunities for collaboration with data exchange and utilization of EOL web services. Joanna McCaffrey and Reed Beaman have continued the conversation around how to share data, such as species lists.

Fishnet2 Project

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Fishnet2 Project

Florida State University

Organization Type: Academic Institution
Organization Location: Tallahassee, FL

Partner's Contribution to the Project:
Facilities
Collaborative Research
Personnel Exchanges

More Detail on Partner and Contribution: FSU is an integral partner with UF on the project. Participated in iDigBio's Summit III.

GEOLocate

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support

More Detail on Partner and Contribution: http://www.museum.tulane.edu/geolocate/ Integral to the success of the Georeferencing WG efforts, meetings, and Train-the-Trainers workshops.

Global Biodiversity Information Facility (GBIF)

Organization Type: Other Nonprofits
Organization Location: Denmark

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: iDigBio informatics and IT staff have been interacting with GBIF staff on the enhancement of software tools for data exchange, on training materials for managing persistent identifiers, and on the development of data models for specimen collections. The http://www.gbif.org/ Georeferencing Working Group (GWG) is participating with GBIF by testing the early versions of GBIF eLearning materials for non-facilitated (remote) georeferencing training materials. The GWG has also offered videos and presentations from the GWG Train the Trainers workshop to GBIF for their inclusion in the eLearning materials.

Global Environmental Facility (GEF)

Organization Type: Other Nonprofits
Organization Location: Brazil

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Evaluate potential for collaboration with Brazilian Digitization Project: Global Environmental Facility (GEF)

Map of Life

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Location http://www.mappinglife.org/ Map of Life assembles and integrates different sources of data describing species distributions worldwide. These data include expert species range maps, species occurrence points, ecoregions, and protected areas from providers like IUCN, WWF, GBIF, and more. All of Map or Life's data assets are stored, managed, backed up, and accessed using a hosted CartoDB instance in the cloud.

Mississippi Herbaria Consortium

Organization Type: Other Nonprofits
Organization Location: Oxford, MS

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary RDCN institution. Participated in iDigBio's Summit III.

Morphbank

Organization Type: Other Nonprofits
Organization Location: Tallahassee, FL

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://www.morphbank.net/ Finalizing plans for assuring only vouchered Morphbank specimen records go to iDigBio data portal.

Natural Science Collections Alliance (NSCA)

Organization Type: Other Nonprofits
Organization Location: Washington, D.C.

Partner's Contribution to the Project:
In-Kind Support

More Detail on Partner and Contribution: Collaborating on various initiatives to publicize the value of digitized information from natural history collections. Joint sponsorship of symposium on uses of natural history collections data held at annual meeting in Rapid City, South Dakota on 20 June 2013.

New York Botanical Garden (NYBG)

Organization Type: Other Nonprofits
Organization Location: Bronx, NY

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: TCN institution for “Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations”. Participated in iDigBio’s Summit III.

North Carolina State University (NCSU)

Organization Type: Academic Institution
Organization Location: Raleigh, NC

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “The Macrofungi Collection Consortium: Unlocking a Biodiversity for Understanding Biotec Interactions, Nutrient Cycling and Human Affairs”. Participated in iDigBio’s Summit III.

Notes fom Nature

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://www.notesfromnature.org/ iDigBio is working with Notes from Nature to build robust crowdsourcing tools that interoperates with the iDigBio cloud infrastructure.

Society for the Preservation of Natural History Collections

Organization Type: Other Nonprofits
Organization Location: New York, NY

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: Collaboration on symposium on uses of natural history collections data held at SPNHC annual meeting in Rapid City, South Dakota on 20 June 2013. Deb Paul is the first iDigBio representative on the SPNHC Council.

Specify

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://specifysoftware.org/ Specify is continuing to work closely with iDigBio by developing software support for iDigBio's data requirements. By introducing a globally unique identifier and by creating an export feature specifically tailored to iDigBio, Specify users will have a streamlined path to data ingestion.

Symbiota

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://symbiota.org/ Symbiota has made significant advances in support of iDigBio's needs as a result of the recent AOCR hackathon. The result is a more tightly coupled digitization workflow experience for Symbiota users when introducing character recognition of their label data. No longer is it a piecemeal effort to perform OCR and copy paste the results into the data collection system, instead the OCR algorithms of LABELX and SALIX are embedded in Symbiota, allowing for a reduction in time and effort.

Texas Oklahoma Regional Consortia of Herbaria (TORCH)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: http://www.torcherbaria.org/drupal/ Primary RDCN institution. Participated in iDigBio's Summit III.

The Global Registry of Biorepositories (GRBio)

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: http://grbio.org/ GRBio is the first-ever consolidated, comprehensive clearinghouse of information about biological collections in natural history museums, herbaria, and other biorepositories. This online-registry is a source for authoritative information about collections as well as validated, standardized data such as addresses, contacts, and values for the Darwin Core identifiers for institutions (InstitutionID) and collections (CollectionID).

University of Arizona (UA)

Organization Type: Academic Institution
Organization Location: Tucson, AZ

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Southwest Collections of Arthropods Network (SCAN): A Model for Collections Digitization to Promote Taxonomic and Ecological Research". Participated in iDigBio's Summit III.

University of Colorado at Boulder (CU)

Organization Type: Academic Institution
Organization Location: Boulder, CO

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “Fossil Insect Collaborative: A Deep-Time Approach to Studying Diversification and Response to Environmental Change”. Participated in iDigBio’s Summit III.

University of Illinois at Urbana-Champaign (UI)

Organization Type: Academic Institution
Organization Location: Urbana ,IL

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “InvertNet: An Integrative Platform for Research on Environmental Change, Species Discovery and Identification”. Participated in iDigBio’s Summit III.

University of Kansas (KU)

Organization Type: Academic Institution
Organization Location: Lawrence, KS

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “Digitizing Fossils to Enable New Syntheses in Biogeography- Creating a PALEONICHES”. Also University of Kansas (KU) Biodiversity Institute collaborated on the recent Wet Collections Digitization Workshop in March 2013.

University of New Hampshire (UNH)

Organization Type: Academic Institution
Organization Location: Durham, NH

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “The Macroalgal Herbarium Consortium: Accessing 150 Years of Specimen Data to Understand Changes in the Marine/Aquatic Environment”. Participated in iDigBio’s Summit III.

University of Wisconsin-Madison (UW)

Organization Type: Academic Institution
Organization Location: Madison, WI

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for “Plants, Herbivores, and Parasitoids: A Model System for the Study of Tri-trophic Associations”. Participated in iDigBio’s Summit III.

VertNet

Organization Type: Other Nonprofits
Organization Location: USA

Partner's Contribution to the Project:
In-Kind Support
Collaborative Research

More Detail on Partner and Contribution: http://vertnet.org/ Primary RDCN institution. Participation in workshops and working group discussions of software, hardware and OCR. Participated in iDigBio's Summit III.

Yale University

Organization Type: Academic Institution
Organization Location: New Haven, CT

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Primary TCN institution for "Mobilizing New England Vascular Plant Data to Track Environmental Changes". Participated in iDigBio's Summit III.

Have other collaborators or contacts been involved? Yes

Impacts

What is the impact on the development of the principal discipline(s) of the project?

The Integrated Digitized Biocollections (iDigBio) project has made significant progress since the initiation of funding in 2011. iDigBio's innovations include both sociological and technological accomplishments with wide-ranging benefits to the collections community.

First and foremost, iDigBio has established successful ***communication*** between the Information Technology (IT) and biological collections communities. Having bridged this "cultural" barrier, iDigBio personnel are working together to identify challenges and to design appropriate solutions. This communication extends beyond the personnel specifically working on iDigBio to other partners, such as the Thematic Collections Networks (TCNs), which allows for collaboration, synergy, and effective training throughout the community.

Perhaps the most successful innovation of iDigBio to date is the series of ***training workshops*** that have been organized and sponsored by iDigBio personnel. These workshops have delivered effective training on digitization-related methods and practices, as well as on other topics contributed by the workshop participants. These workshops and training materials, publically available at www.idigbio.org, have provided a wealth of new resources and have secured iDigBio's leadership role in ***workforce development*** within the collections community. During its first 3 years, iDigBio has facilitated the attendance of over 1,265 participants (over 701 of which are unique) from over 309 unique institutions to its 38 workshops, summits, symposia, and other events.

Finally, the forthcoming ***availability of massive amounts of specimen data*** has energized the collections community about the use of specimen data for a variety of big research questions that have been intractable to this point. This renewed energy within the community has fostered iDigBio to produce significant innovations in IT design and implementation, including: Creating the practice of introducing identifiers in the data stream to enable data linking; Development of emerging data models for ingestion and integration of data sets from diverse collections; Cloud architecture for data storage, retrieval, and management; an Open schema infrastructure to offer flexibility and agility in handling an evolving data model; and an Appliance framework to respond to the needs of biocollections informatics. iDigBio's specimen data portal (portal.idigbio.org) provides access to all of iDigBio's specimen and media records and currently includes over 235 collections, 14,036,195 specimen records, and 2,290,983 media records. Upgraded versions of the iDigBio portal are released semi-annually.

What is the impact on other disciplines?

Nothing to report.

What is the impact on the development of human resources?

The iDigBio program is currently supporting post-docs, graduate students, and undergraduate students. iDigBio is, therefore, participating in the development and training of the next generation of young scientists who will take the lead in digitized collections in the future and sustain the activities related to iDigBio through their ongoing activities.

iDigBio collects voluntary anonymous demographic data in its post-workshop surveys to track participation.

08-2013 to 05-2014: Claudia Segovia-Salcedo served as a Research Assistant with Pam Soltis. Her primary assignments in the fall semester were related to the operation of the FLMNH Genetic Resources Repository so that she could contribute expertise to the developing national network of DNA banks, assembled by iDigBio (in fiscal year 2 by RA Grant Godden, Kevin Love, and Pam Soltis). During spring semester, Claudia's main assignment was on outreach activities.

08-2013 to 05-2014: Blaine Marchant served as a Research Assistant with Pam Soltis to develop research use cases focusing on ecological ranges of polyploid species relative to their diploid parents. He developed a set of pipelines to use specimen data for this longstanding question. Results are included in a paper on polyploidy (Soltis et al. 2014, Phil. Trans. Roy. Soc., in press) and will be presented in a poster at Botany 2014 (July 2014) and in a further publication (Marchant et al. in prep.).

08-2013 to 12-2013: Ryan Moraski served as a Research Assistant with Pam Soltis to develop his georeferencing skills further and apply them to ecological niche modeling. He will use these skills in upcoming training workshops for FLMNH and at Botany 2014.

07-2013 to present: Dr. Charlotte Germain-Aubrey worked as a post-doc with Pam Soltis on developing pipelines for ecological niche modeling and other research applications, using Florida plant species. She is also active in outreach activities, having organized (with collaborators, including Claudia Segovia-Salcedo) a spring break camp for middle schools girls: WiSE Girlz Spring Camp in March 2014. Charlotte also participated in iDigBio's Georeferencing and Education & Outreach workshops. Finally, Charlotte participated in two workshops with the UF Postdoc Association in the Fall of 2013 focused on leadership and mentoring skills.

08-2013 to 12-2013: Pam Soltis initiated a new seminar course for the graduate students supported by iDigBio. The course – Biodiversity and Digitized Data – was led by post-docs Charlotte Germain-Aubrey and Austin Hendy and included graduate students from Biology and Engineering. The course utilized Adobe Connect to enable remote participation from people such as Austin Mast (FSU) and Libby Elwood (FSU). The purpose of this discussion group was to link scientists, educators, and informaticians around our common interest in data accessibility and usability.

01-2014 to 05-2014: Pam Soltis, along with fellow iDigBio personnel Charlotte Germain-Aubrey and Reed Beaman, led a graduate seminar on Biodiversity and Digitized Data in spring semester. During the spring, there was remote participation by TCN members and other collaborators from Drexel University/Academy of Natural Sciences, New York Botanical Garden, Northern Arizona University, UC-Berkeley, along with participants from UF and FSU. The course was also offered in the fall semester but was restricted to UF students; all grad students funded by iDigBio participated, as did several other students.

01-2014 to 05-2014: Pam Soltis and Doug Soltis taught an undergraduate course, Research Methods in Plant Evolutionary Biology, to expose and immerse students in research. Students collected plant specimens in the field, prepared specimens for deposition in the herbarium, databased the records, imaged the specimens, and later learned to georeference and construct ecological niche models using specimen data. Eight undergraduates were enrolled.

03-31-2014 and 04-09-2014: Pam Soltis organized tours of FLMNH collections for a UF Science Journalism class taught by Dr. Czerne Reid to expose students to natural history collections and their use in research.

07-2013 to present: Dr. Kurt Neubig worked as a research collaborator with Pam Soltis on analysis of DNA quantity and quality in plant specimens under different preservation conditions. Kurt prepared a paper on this topic, which will appear as a book chapter later this year (Neubig et al., in press). Kurt is also instrumental in expanding the phylogenetic tree of Florida plants for integration with models developed by Charlotte. Undergraduate Savannah Elliott contributed to both projects.

What is the impact on physical resources that form infrastructure?

The iDigBio cyberinfrastructure team is following a formula that balances strategic planning with the agility to meet new challenges, short-term project needs, and enhanced/clarified specifications in order to meet the following objectives: (1)

Implement a horizontally scalable cloud infrastructure for object (media) storage; (2) Implement a horizontally scalable cloud infrastructure for text (data/metadata) storage; (3) Implement infrastructure to enable hosting for the web services/websites of strategic partners; (4) Deploy iDigBio appliances and services via multiple channels (e.g., web services, locally-run virtual machines, Infrastructure-as-a-Service cloud implementations) to enhance, simplify and/or improve activities completed by data providers and data consumers; (5) Implement a Graphical User Interface (GUI) to enable end-users, including data contributors and data consumers, access to search/visualize/download text and media data from the cloud infrastructure; and (6) Implement a comprehensive authentication and access control system to enable data tracking and a cohesive user experience among the systems listed above, as well as the iDigBio collaboration and communication website (composed of Drupal, Redmine, and MediaWiki installations).

What is the impact on institutional resources that form infrastructure?

The iDigBio cyberinfrastructure team is following a formula that balances strategic planning with the agility to meet new challenges, short-term project needs, and enhanced/clarified specifications in order to meet the following objectives: (1) Implement a horizontally scalable cloud infrastructure for object (media) storage; (2) Implement a horizontally scalable cloud infrastructure for text (data/metadata) storage; (3) Implement infrastructure to enable hosting for the web services/websites of strategic partners; (4) Deploy iDigBio appliances and services via multiple channels (e.g., web services, locally-run virtual machines, Infrastructure-as-a-Service cloud implementations) to enhance, simplify and/or improve activities completed by data providers and data consumers; (5) Implement a Graphical User Interface (GUI) to enable end-users, including data contributors and data consumers, access to search/visualize/download text and media data from the cloud infrastructure; and (6) Implement a comprehensive authentication and access control system to enable data tracking and a cohesive user experience among the systems listed above, as well as the iDigBio collaboration and communication website (composed of Drupal, Redmine, and MediaWiki installations).

Some of the educational and outreach activities so far pertain in this category. For example, the Fossils in the Cloud initiative provides digital resources (poster of digitized specimens) to K12 schools in a pilot study in Santa Cruz County, California. The approximate impact of these activities includes about a dozen STEM teachers and about 1,500 students annually.

What is the impact on information resources that form infrastructure?

iDigBio digitization experts are pursuing a process of information gathering and documentation based upon both grounded theory and business process modeling/management, including reaching out beyond the natural history collections community for digitization expertise from other fields, to achieve the following objectives: (1) Engage the collections community to market and build interest in utilizing iDigBio services, including both data access services and collaboration tools; (2) Obtain preliminary data sets for ingestion, storage, testing and exposure via the iDigBio specimen portal; (3) Establish Minimum Information Standards and data fitness for use parameters; (4) Optimize digitization workflows; (5) Conduct digitization training and produce online training materials; (6) Enhance and broaden exposure to digitization tools and resources such as Georeferencing, Augmenting Optical Character Recognition (AOCR), Natural Language Processing (NLP), Authority Files, optimized digitization workflows, and crowdsourcing; (7) Evaluate, document and publish analysis related to digitization hardware and software tools; (8) Identify significant technological gaps in digitization capabilities that require additional resource investment in order to ensure the success of Advancing Digitization of Biodiversity Collections (ADBC), (9) Conduct activities as required to improve Thematic Collections Network (TCN) efficiencies, resolve TCN problems, remove roadblocks; and (10) Provide user services related to digitization questions from the community.

What is the impact on technology transfer?

iDigBio Education and Outreach activities are focused on general digitization curricula development, stakeholder identification, and public speaking engagements to achieve the following objectives: (1) Identify target audiences, including university students, downstream user groups and other stakeholders, and assess their needs; (2) Engage the general public through informational resources, compelling deliverables, and opportunities to participate that highlight the importance of biodiversity collections and digitization; (3) Develop educational resources for K-12 students related to digitization and biodiversity; (4) Foster project awareness within the professional community; and (5) Measure the geographic distribution of impact and success of intended learning outcomes.

Existing relationships between iDigBio and the collections/research community provide an informal mechanism for iDigBio to achieve the following objectives: (1) Engage the research community to market and build interest in using iDigBio services, including both data access services and collaboration tools; (2) Seek opportunities for integration of iDigBio specimen data and data access services with key data and research services from other projects and organizations; and (3) Produce detailed Use Cases for research applications of specimen data, and provide these Use Cases to the cyberinfrastructure team.

What is the impact on society beyond science and technology?

Integrated Digitized Biocollections (iDigBio) is the national resource for digitized information about existing, vouchered natural history collections within the context established by the community strategic plan for the Network Integrated Biocollections Alliance (NIBA) and is supported through funds from the NSF program Advancing Digitization of Biodiversity Collections (ADBC). As such, iDigBio serves as the administrative home for the national digitization effort; fosters partnerships and innovations; facilitates the determination and dissemination of digitization practices and workflows; establishes integration and interconnectivity among the data generated by collection digitization projects; and promotes the uses of biological/paleontological collections data by the scientific community and stakeholders including government agencies, educational institutions, non-governmental organizations (NGOs), and other national and international entities to benefit science and society through enhanced research, educational, and outreach activities. iDigBio provides these services to all stakeholders with clarity, simplicity, transparency, intuitive methodology, and intuitive design.

Changes/Problems

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them
Nothing to report.

Changes that have a significant impact on expenditures
Nothing to report.

Significant changes in use or care of human subjects
Nothing to report.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.
Nothing to report.