



STRATEGIC PLAN

December 2022 - 2025

Executive Summary

The Center for Biological Research Collections (CBRC) is a consortium of research-based scientific collections at Indiana University, namely the IU Paleontology Collections in the Department of Earth and Atmospheric Sciences with more than 1.5 million fossil specimens including 1,000 unique type specimens representing more than 400 million years of Earth's history, and the W.R. Adams Zooarchaeology Collections in the Department of Anthropology, with holdings of over 10,000 modern comparative faunal remains inclusive of mammals, reptiles, amphibians and fish, as well as archaeological specimens from the North American Plains. The mission of the Center is to enhance collection-based research and education by providing shared infrastructure and data management support of Indiana University's natural history collections. CBRC trains graduate and undergraduate students and volunteers in curation, management, and digital platforms. CBRC thereby promotes inquiry-based science, promotes long-term preservation and stewardship of natural history specimens and associated metadata, and provides educational enhancement to create citizen science leaders for the State of Indiana. CBRC benefits from the financial support of administration in the College of Arts and Sciences and the Office of the Provost at Indiana University, and generous contributions of our alumni and private donors.

Strategic Planning Partners

The strategic planning team is composed of

- Claudia C Johnson (Director),
- P. David Polly (Director Emeritus; Chair, Department of Earth and Atmospheric Sciences),
- Andrea Wiley (Chair, Department of Anthropology),
- Ryan Kennedy (Assistant Professor, Department of Anthropology),
- Jackson Njau (Associate Professor, Department of Earth and Atmospheric Sciences),
- Jess Miller-Camp (Research Faculty and Collections Manager of the IU Paleontology Collections (IUPC) and the W.R. Adams Zooarchaeology Laboratory (WRAZL),
- Gary Motz (Affiliated Member; University Collections), and
- Research Associates (Henry Fulghum, and past and future Graduate Student Workers).

Key Stakeholders

CBRC staff, associates, and former associates, including Claudia C Johnson (Director), P. David Polly (Director Emeritus), Ryan Kennedy (Department of Anthropology), Jess Miller-Camp (Research Faculty and Collections Manager of the IUPC and WRAZL), Sam Couch (hourly worker and assistant collections manager, WRAZL), Gary Motz (Affiliated Member; University Collections), graduate student Research Associates, undergraduate interns and hourly student workers, volunteers.

Closely affiliated units:

- Department of Earth and Atmospheric Sciences (David Polly, Chair),
- Department of Anthropology (Andrea Wiley, Chair),
- University Collections (Heather Calloway, Executive Director, and especially Gary Motz who oversees digital data and facilitated our participation in Collections @ IU exhibitions).

- Assistant Dean for Library Technologies, John Dunn, overseer of information technology development and operations for the IU Libraries, including technical support, systems administration, software development, digitization, digital preservation, user experience, and digital collections services.
- Head of Sciences for the Libraries, Jennifer Simms, developed the Imago Biocollections repository.
- Funders, especially Indiana University's Office of the Provost,
- the College of Arts and Sciences,
- Department of Earth and Atmospheric Sciences,
- Department of Anthropology,
- the National Science Foundation (NSF),
- alumni donors, private contributors.
- Collectors of the specimens housed in collections with which the CBRC is affiliated; namely, the IUPC and WRAZL.
- Indiana University researchers, including graduate and undergraduate students working with specimens for their research projects, students and faculty requesting assistance with digitization of specimens for teaching and outreach.
- Researchers from outside the local area using CBRC's digital data or physical specimens as visitors to the collections or through loans to other research collections.
- Indiana Geological and Water Survey of Indiana University, especially Archives & Collections and Educational Outreach.
- Supporters, including faculty, alumni, and private citizens.
- The local community of amateur paleontologists, zooarchaeologists, and archaeologists.
- The State of Indiana's teachers and their students who use the specimens for lessons, field trips, coursework.

- Education & Outreach partners, including local high school and elementary school teachers and WonderLab, the local children's museum.

Audience for the Strategic Plan

Mission and Vision statements will be added prominently to the front-page of the CBRC website and will appear outside the front doors of the IUPC and WRZAL.

The document in its entirety or in part (e.g., without SWOT) will appear elsewhere on the CBRC website. The document is intended as an introductory document for new staff, including undergraduate interns. It is also intended as a demonstration to administrators and potential donors that the organization is aware of its organizational context, has recognized and is serving its stakeholders, and has a good sense of how to capitalize on its strengths in the future.

Mission Statement

The Center for Biological Research Collections, College of Arts and Sciences, provides shared infrastructure and data management to enhance collection-based research and education in biodiversity, zooarchaeology, paleontology and related disciplines for Indiana University's natural history collections.

Vision Statement

Indiana University's Center for Biological Research Collections supports the College of Arts and Sciences' vision of creating leaders and thinkers by developing digital infrastructure to advance a collaborative biodiversity platform, facilitate research on IU's biological and paleontological specimen collections, and promote educational enhancement to create citizen science leaders for the State of Indiana.

Strategy Statement

With knowledge of the value of the uniqueness of natural history collections, coupled with managerial and curatorial skills with which we care for the collections, and digital technology with which we preserve the specimens, we protect the history of the Earth embedded in these collections, and use and share these

resources with researchers within and outside of the State of Indiana to introduce natural history and biological evolution of the Earth to the public.

CORE VALUES

- Encourage and facilitate inquiry-based science
- Push the boundaries of understanding to reveal Earth's biological evolution
- Share digital infrastructure platforms
- Promote long-term preservation and stewardship of natural history specimens and associated metadata
- Embrace enjoyment by framing activities that spark curiosity, excitement, and joy
- Respect relationships by giving time, attention, and care to communicate, problem-solve, and build trust
- Articulate standards for inclusive and respectful shared activities and spaces

Goals and Objectives

1. Digitize all physical specimens in the IU Paleontology Collections and the W.R. Adams Zoological Laboratory

- Maintain coherency of physical specimens with their associated metadata. Continuous
- Develop workflow for photogrammetry. 2022 – Accomplished
- Develop a workflow for the FaroArm. Spring 2023
- Continue to train undergraduate and graduate students on photogrammetry methods. Continuous
- Prepare digital data access to researchers. Continuous with sections completed in yearly increments
- Make and update website for CBRC. Continuous

2. Prioritize Equipment for Digitization Efforts

- Order computers and associated equipment for photogrammetry for IUPC and WRAZL. 2022 – complete in Spring 2023
- Set up new equipment in IUPC and WRAZL. 2022/Spring 2023

3. Utilize the Specify framework for our collections.

- Get Specify up and running. Continuous
- Update taxonomy. Continuous
- Develop catalogues for each collection – the IUPC and WRAZL. Continuous
- Develop catalogues for each subset of collections within the IUPC (i.e, invertebrates, etc.) within WRAZL (amniotes, reptiles, mammals, etc.). Continuous. First goal 2023 and yearly thereafter.
- Subdivide physical specimens and define distinct collections within the IUPC for digitization priority. Identify a subset on which to focus each year. Continuous. First goal 2023 and yearly thereafter.
- Identify invertebrates, vertebrates and plants, as well as donated collections that are in boxes. Continuous
- Integrate researchers' specimens from field collections and from donations. Continuous

4. Involve and train next generation of graduate and undergraduate students and volunteers

- Develop an onboarding process workflow. Continuous. Started 2022, update each semester
- Develop a sample specimen kit to introduce students to taxonomic and morphologic description, and collections management. Continuous. Started 2022, update each semester
- Encourage undergraduate and graduate workers to develop research goals. Continuous, each academic semester.

- Set a goal of encouraging and then assisting 50% of our volunteers and hourly undergraduate workers to develop research and present at our annual spring semester departmental research conference. Continuous, but begin in the Fall semester for Spring presentations

5. Expand involvement with the scientific community to increase our recognition in the natural history community

- Connect with professional scientific societies through workshop presentations
- Host conferences pertaining to digitization of natural history collections
- Chair symposia at professional society conferences

SWOT ANALYSIS

Strengths

- World-class collection of Paleozoic fossil specimens curated and available for use by researchers and community members
- Integrated natural history collections across fields of vertebrate and invertebrate paleontology, biology, and zooarchaeology storing information of Earth's history
- Support of the departmental Chairs, College Dean, and Campus Provost to maintain and further CBRC's digitization efforts
- Associated with newly-established university exhibit space that is open to the public – CBRC provided specimens for the first Collections @ Indiana University exhibit in January, which has been frequently cited as a favorite by patrons, and will be part of a new intercollegiate exhibit in 2023
- Financial support of administration and private donors to maintain collections
- Training for graduate and undergraduate students for research and scientific outreach careers
- Physical space is large and well-suited for browsing and formulating research questions

- Working relationship with WonderLab, Bloomington's children's science museum via a shared employee, which has included a rotating exhibit in 2022 and repeated participation in programming such as their annual summer camp.
- The diversity of demographics represented by our staff and students increases the inclusivity and strength of our output

Weaknesses

- Lack of core documents for CBRC
- Only a small component of fossil specimens have been digitized and there is no organized work plan to do the remainder
- Small and inadequately-trained workforce for the complexity and size of the job
- Still recovering from two years of building renovation, resulting in moving tens of tons specimens back into their positions in cabinets multiple times and dealing with repeated issues from problems with careless contractors and inadequate offsite storage.
- High number of person-hours dedicated to managing multiple massive file migrations made mandatory by university-level changes in data storage.
- Ineffective advertising of availability of specimens for researchers

Opportunities

- Showcase our Center's mission and vision to external review committee members in Spring 2023
- Become more integrated into the digitization community to learn and share new techniques and their applications
- Wrangle institutional memory from individual faculty members and associate it with physical specimens
- Continuous training of graduate and undergraduate students in advanced digitization techniques
- Use of physical specimens and digitized metadata for students' expanded research usage

- Potential for expansion with intake and accession of new collections
- Integration of digitization techniques in university classes across disciplines
- Communicate availability of specimens and metadata through social media outlets

Threats

- External decree of dissolution of the Center before we can prove our value to the research community
- Loss of metadata associated with digitized specimens
- Need for institutional memory to be associated with unlabeled specimens
- Maintaining stability of digitization expertise in an academic setting as students rotate in and out with the semesters
- Maintaining an open line of communication between the Center and new university administrators from Chair to Dean to Provost to Vice President levels

SUSTAINABILITY

Maintaining Strengths

CBRC's core strengths are in providing digital data infrastructure for integrated natural history collections across fields of vertebrate and invertebrate paleontology and zooarchaeology. Our graduate and undergraduate students are trained for research and scientific outreach careers. Our physical space is well-suited for browsing and formulating research questions.

Addressing Weaknesses

CBRC's most significant weaknesses center on recovering from building renovations, developing a prioritized work plan for the large volume of fossil and zooarchaeology specimens that remain to be digitized, and advertising the availability of specimens for researchers. In spring 2023 transfer of specimens to the collections space will be completed, and a prioritized work plan that the strategic planning committee is developing can be enacted. Graduate students

are already at work testing photogrammetric techniques and developing digitization workshops using select specimens.

Capitalizing on Opportunities

CBRC is uniquely positioned to share digital infrastructure resources for an expanded audience within Indiana University. We continue to train graduate and undergraduate students in advanced digitization techniques and have opportunities for expansion into university classes across natural history disciplines. We have expertise and potential to integrate more firmly into the digitization community to learn and share new techniques and their applications to reveal Earth's biological patterns and processes.

Mitigating Threats

CBRC's most significant threat is the possible dissolution of the Center by a new administrative structure. The need to effectively communicate the goals and objectives of the Center from a multitude of voices – researchers, graduate students, undergraduates, departmental chairs – in personal interviews and written documents, will be essential in securing the future of the Center.

EVALUATION

The logic model to accompany this document can be found in Appendix A. We developed this model to document activities that lead to outcomes, metrics, benchmarks and milestones for outputs and outcomes. These activities are derived from our first four goals in the Goals and Objectives section. Our logic model is developed to evaluate our highest priority goals within a three-year period, December 2022-2025. In essence, CBRC's goals are to digitize all physical specimens in the IU Paleontology Collections and the W.R. Adams Zoological Laboratory, prioritize equipment for digitization efforts, utilize the Specify framework for our collections, and involve and train the next generation of graduate and undergraduate students and volunteers.

Acknowledgements: This strategic plan was produced as part of the activities of a course sponsored by the Society of Herbarium Curators and iDigBio and co-taught by Austin Mast, David Jennings, and guest-instructor Shari Ellis.

Ideas presented benefited from conversations with the 2022 strategic planning course participants; namely, Jacki Airoso, Tina Ayers, Aly Baumgartner, Marek Borowiec, Beth Chambers, Claudia Ciotir, Joshua Der, Dana Ehret, Grace Hancock, Juliet Hook, Tammy Horton, Sharon Jansa, Laura Ladwig, Tin Hui NG, Alison Vaughan, Laura Vietti, and Elizabeth Wommack.