

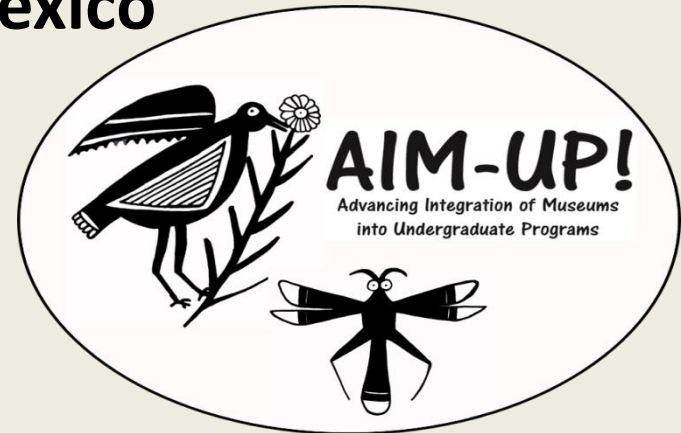
# Museum Collections on the Internet and in the Classroom

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# Education, Training, & Research



**Arctos**  
Multi-Institution, Multi-Collection Museum Database

[Search](#) [Portals](#) [My Stuff](#) [About/Help](#)

Access to 1,766,567 records

[Search](#) [Clear Form](#) [Use Last Values](#) See results as:

Type: any  Require Tissues?

**Identifiers** Customize Show More Options

Collection: Alaska Lepidoptera  
COA Birds  
COA Eggs  
COA Fishes  Catalog Number:

**Identification and Taxonomy** Show More Options

Current Identification CONTAINS  [ Help ]

**Locality** Show More Options

Any Geographic Element:  [Select on Google Map](#)

**Date/Collector** Show More Options

Help | Collector or Preparator

**Biological Individual** Show More Options

Part Name:  Define Add = for exact match

**Usage** Show More Options

Basis of Citation:  Define


**Media** Show More Options

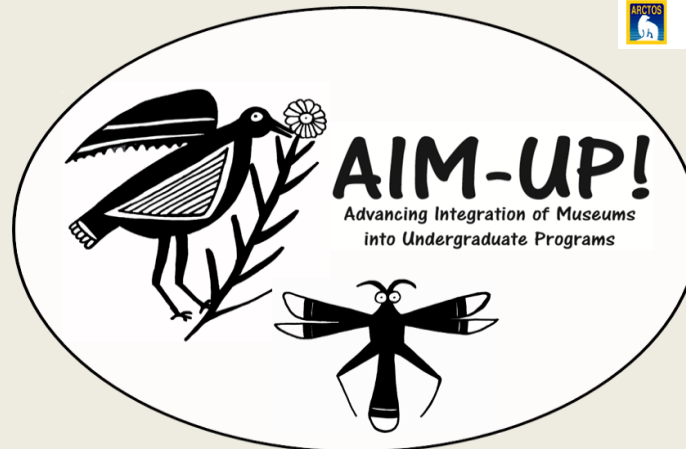
Media Type:  Define

**Relationships** Show More Options

Relationship:

[Search](#) [Clear Form](#) [Use Last Values](#) See results as: Specimen Records

 [Data Providers](#)  
[Report a bug or request support](#)



# Natural History Collections

- Scale—time and space
- Integration
  - biotic and abiotic
  - genomic to organismal to ecosystems
- Database
- Scientific Process
  - experiential vs passive



# Collections-based approaches and undergraduate education

- Complexity-multiple views
- Web-based discovery
- Linking genomic data and physical specimens



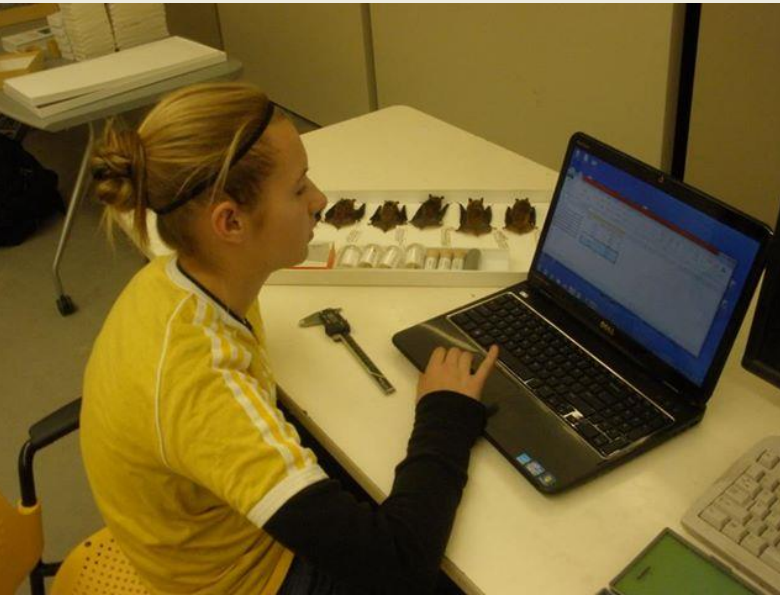
# Natural History Collections Data

- On-line databases
  - Global Biodiversity Information Facility
  - Taxonomic databases: MaNIS, Ornis, HerpNet, FishNet
  - Museum databases: Arctos (MVZ, UAM, MSB, many others), Field Museum, Smithsonian, American Museum of Natural History



# Integrating in the Classroom

- Students can access and use databases
- Address questions of local relevance
- Inquiry-based learning



# Challenges



- Few educators (& fewer students) seem to know:
  - about natural history collections
    - or their role in development of key concepts
  - how to access museum information
  - how to incorporate specimen data in teaching

# A Few More Challenges

Collections (and databases)  
have limitations

Specimen availability

Narrow view of possibilities (systematics)

Collections developed for research

Databases developed for collection  
management, not education.

How do we unleash potential for teaching?





# Undergraduate Experiences in Curation

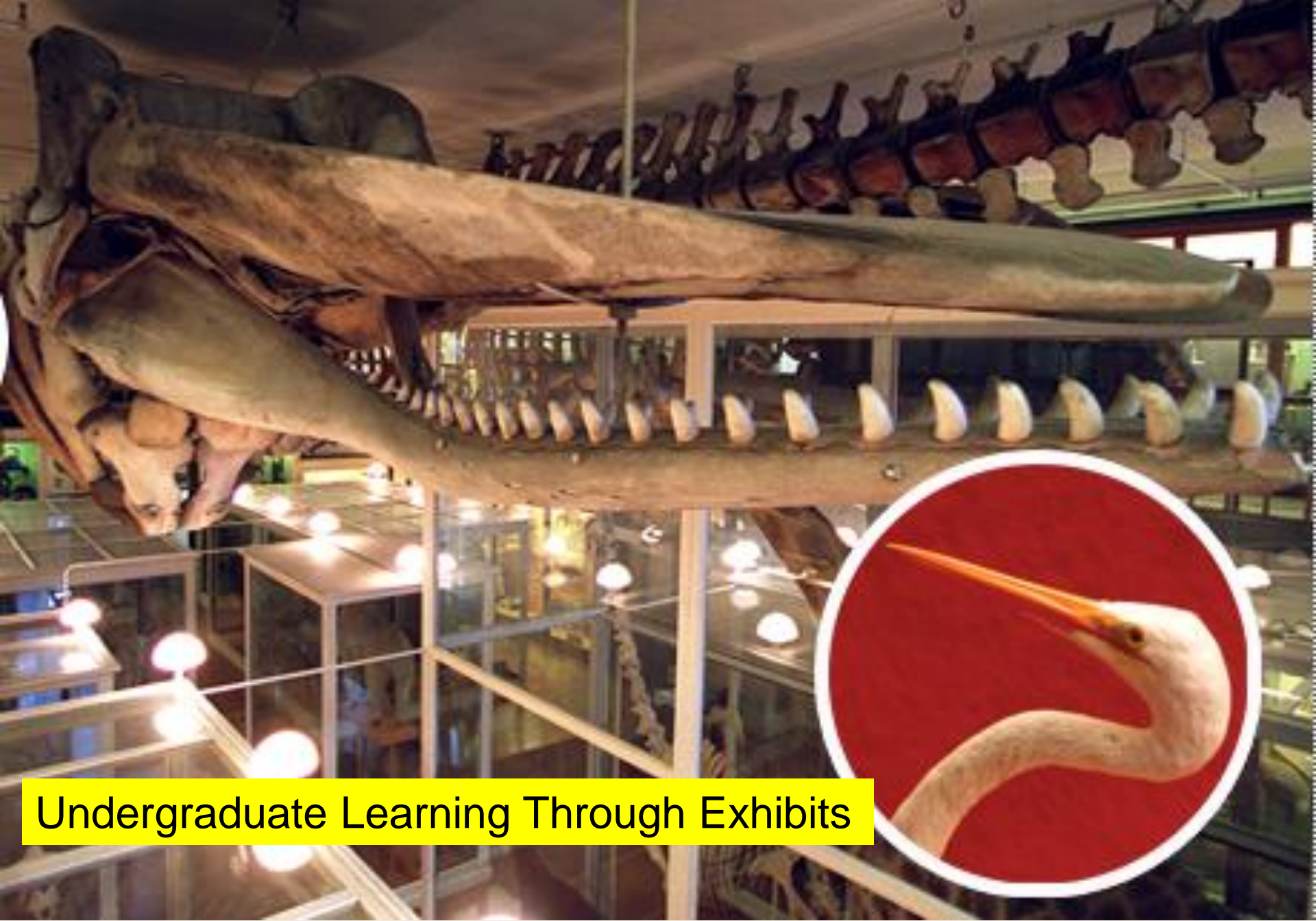




## Undergraduate Experiences in Museum Fieldwork







Undergraduate Learning Through Exhibits

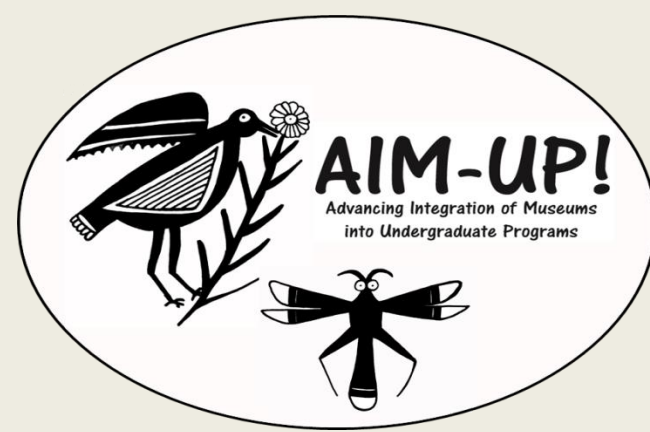


# Graduate and Undergraduate Research Experiences Based on Collections



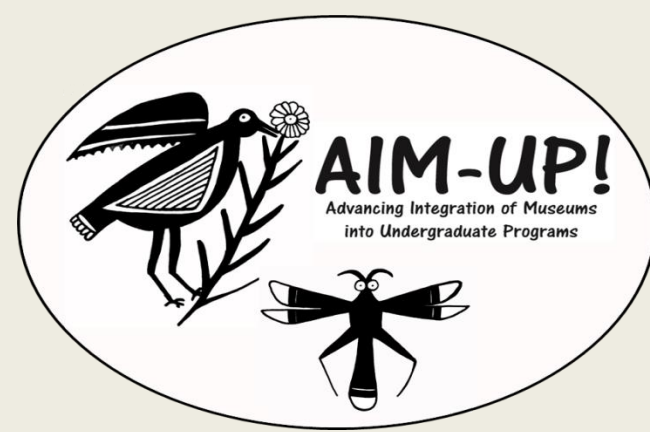


# Expand traditional museum experiences



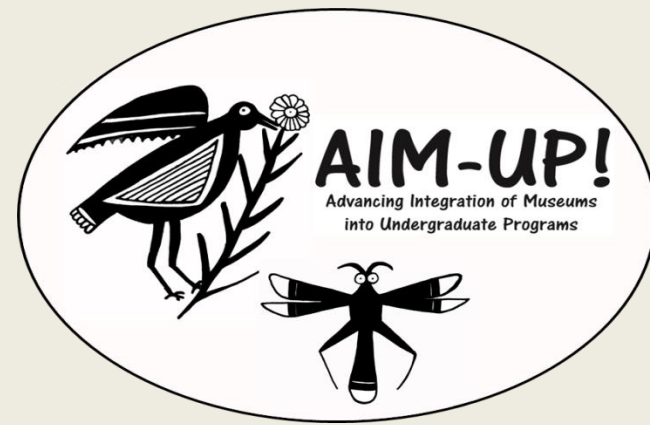
- Develop novel ways of using collections and data.

# Expand traditional museum experiences



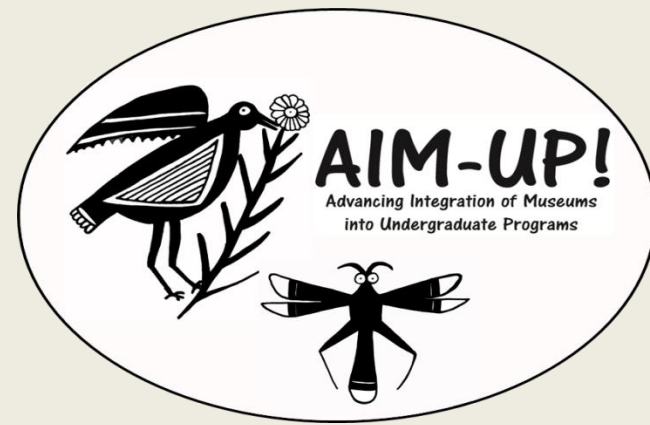
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- Increase accessibility of natural history collections to educators/public through databases.

# Expand traditional museum experiences



- Develop novel ways of using collections and data.
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- Partner with other non-traditional museum users (e.g., Behavior, Geography, Art)

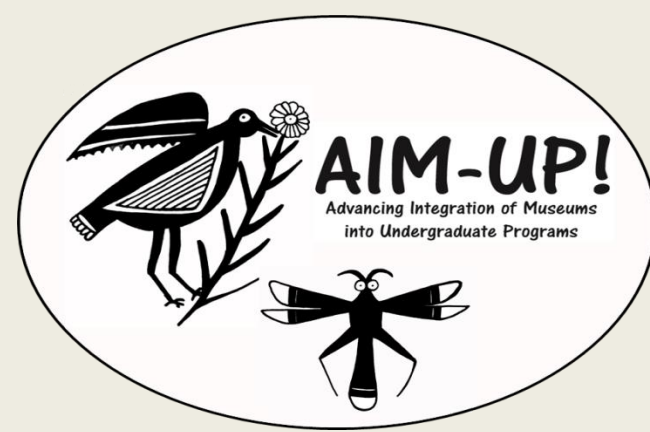
# Expand traditional museum experiences



- Develop novel ways of using collections and data.
- Increase accessibility of natural history collections to educators/public through databases.
- Partner with other non-traditional museum users (e.g., Behavior, Geography, Art)
- Implement education modules that use museum collections and data



## Modules should:



- Provide all background material for instructors
- List key concepts and skill sets
- Be easy to incorporate to already established curricula
- Be easy to modify to better fit an instructor's particular needs.

# Educational Modules

## Island Biogeography: Species Richness Across a Northern Archipelago



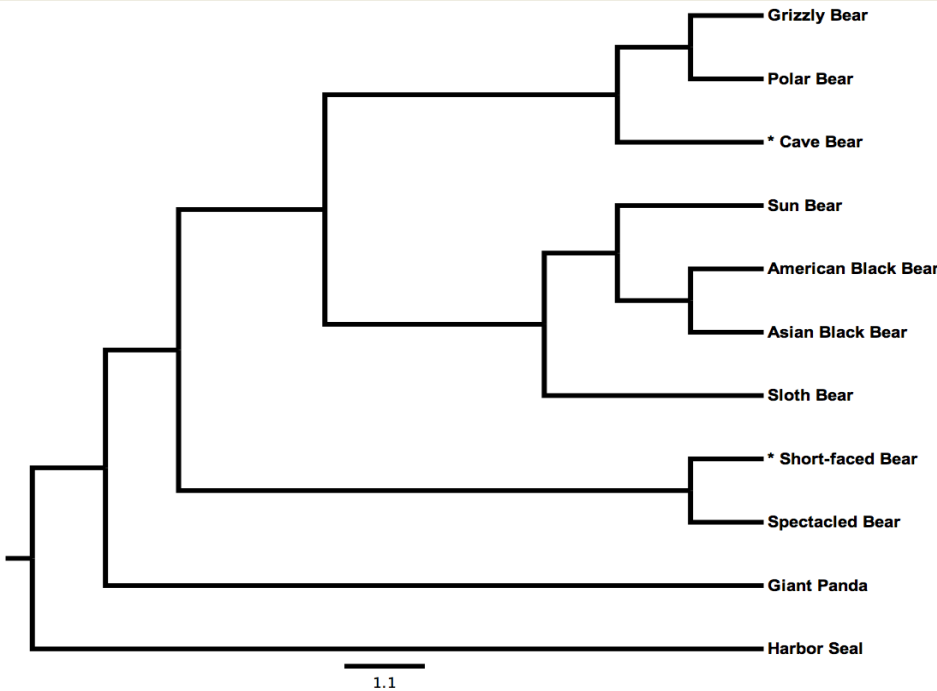
### Key Concepts and Skills: Evolution & Ecology

- Body size on islands
- Competitive exclusion/release
- Isolation and Divergence
- Island biogeography

Conservation biology  
Scientific process & hypothesis testing  
Statistical methods  
Management & analyses of large-scale databases

# Educational Modules

## Reading, Constructing, & Using Phylogenies



### Key Concepts and Skills

Learn about scientific process

Gain appreciation for evolutionary connections across the Tree of Life

Interpret a phylogeny

Learn how phylogenetic trees are constructed

Introduce the different ways to study evolutionary relationships

Learn how comparative phylogenetics is used to understand the biology of organisms



# More Educational Modules

Climate change

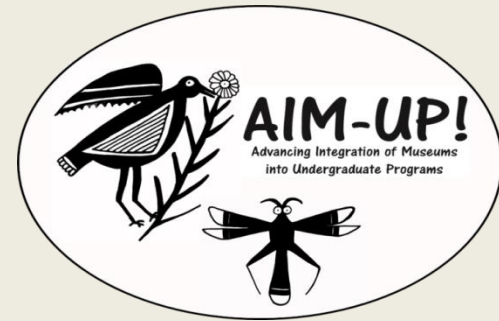
Adaptable to local flora and fauna

Activities for other disciplines (art, geography, etc.)

Scalable – high school and undergraduate

Develop Spanish-language Modules

**Need suggestions for use, modification,  
and development of new modules**

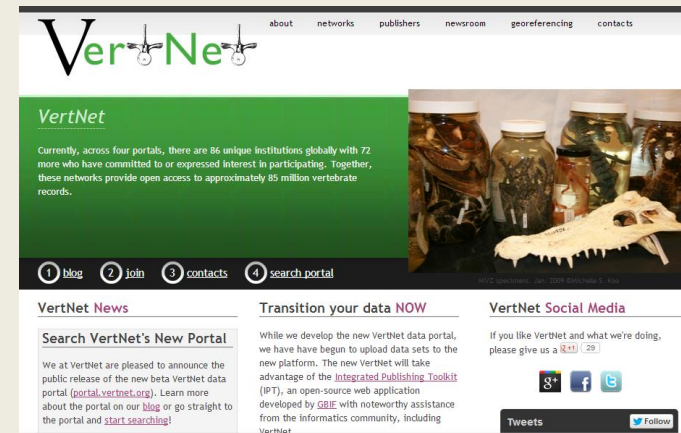




# Digital Collections!

Having collections available on-line make these educational opportunities possible.

Emphasize the value of collections to an audience that otherwise may not even know they exist.



The image shows the homepage of the Global Biodiversity Information Facility (GBIF). The background is a green map of the world. In the top left corner, there is the GBIF logo, which consists of three stylized leaves. The main heading is 'Global Biodiversity Information Facility' in large white text, with the subtitle 'Free and open access to biodiversity data' below it. In the top right corner, there are links for 'Data', 'News', 'Community', and 'About'. Below the heading, there are four statistics: '417,165,184 OCCURRENCES', '1,426,888 SPECIES', '11,964 DATASETS', and '577 DATA PUBLISHERS'. At the bottom, there are three columns of text describing the facility's mission: 'Sharing biodiversity data for re-use', 'Providing evidence for research and decisions', and 'Collaborating as a global community'. Each column has a link to learn more.

The image shows the search interface of the Arctos Multi-Institution, Multi-Collection Museum Database. The header features the Arctos logo, which is a silhouette of a bear, and the text 'Arctos Multi-Institution, Multi-Collection Museum Database'. Below the header, there is a search bar with a 'Search' button and a 'Clear Form' button. The search results are displayed in a table format. The first row is 'Identifiers' and shows a list of collections: 'Alaska Lepidoptera', 'COA Birds', 'COA Eggs', and 'COA Fishes'. The second row is 'Identification and Taxonomy' and shows a search for 'Identification (scientific name)' with options for 'Include previous IDs?' and 'Match Type'. The third row is 'Locality' and shows a search for 'Any Geographic Element' with a 'Select on Google Map' button. The fourth row is 'Date/Collector' and shows a search for 'Collector or Preparator'. The fifth row is 'Biological Individual' and shows a search for 'Part Name'. The sixth row is 'Usage' and shows a search for 'Basis of Citation'. The seventh row is 'Media' and shows a search for 'Media Type'. The eighth row is 'Relationships' and shows a search for 'Relationship'.

# Join us!

AIM-UP! is recruiting people to join the network.

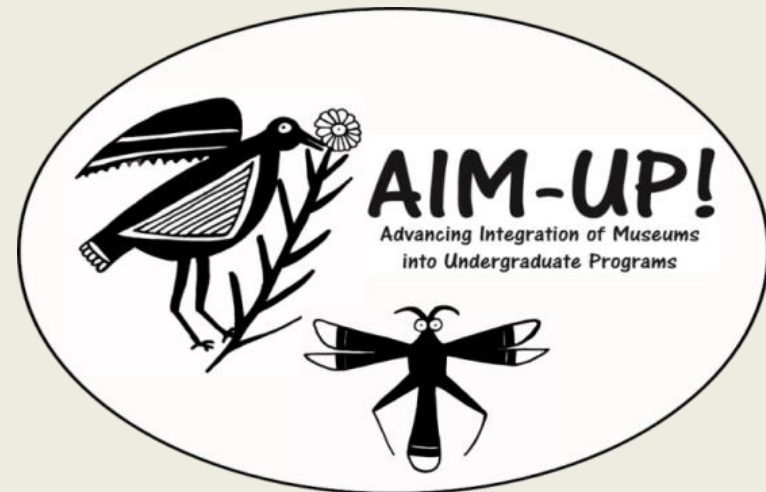
The network is looking for people interested in implementing modules and developing new modules.

## Contact:

Joe Cook, [tucojoe@gmail.com](mailto:tucojoe@gmail.com)

Kayce Bell, [kayce.bell@gmail.com](mailto:kayce.bell@gmail.com)

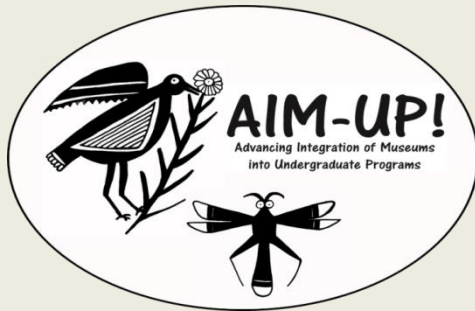
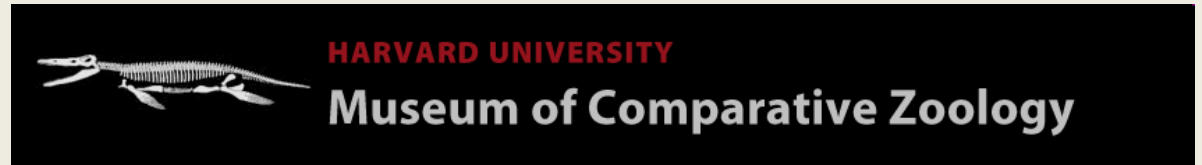
[www.aim-up.org](http://www.aim-up.org)



# Funding and Participation



National Science Foundation  
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University of New Mexico; University of Alaska, Fairbanks; Harvard University; University of California, Berkeley; Texas A&M University; City University of New York; Occidental University; University of Nevada, Reno; Arizona State University; University of Ohio; Florida Natural History Museum; University of Illinois, Champaign-Urbana; College of Southern Nevada; Northern Michigan University; University of Michigan; Massachusetts College of Liberal Arts; University of Colorado, Boulder; Denver Museum of Nature & Science; United States Geological Survey; United States Department of Agriculture