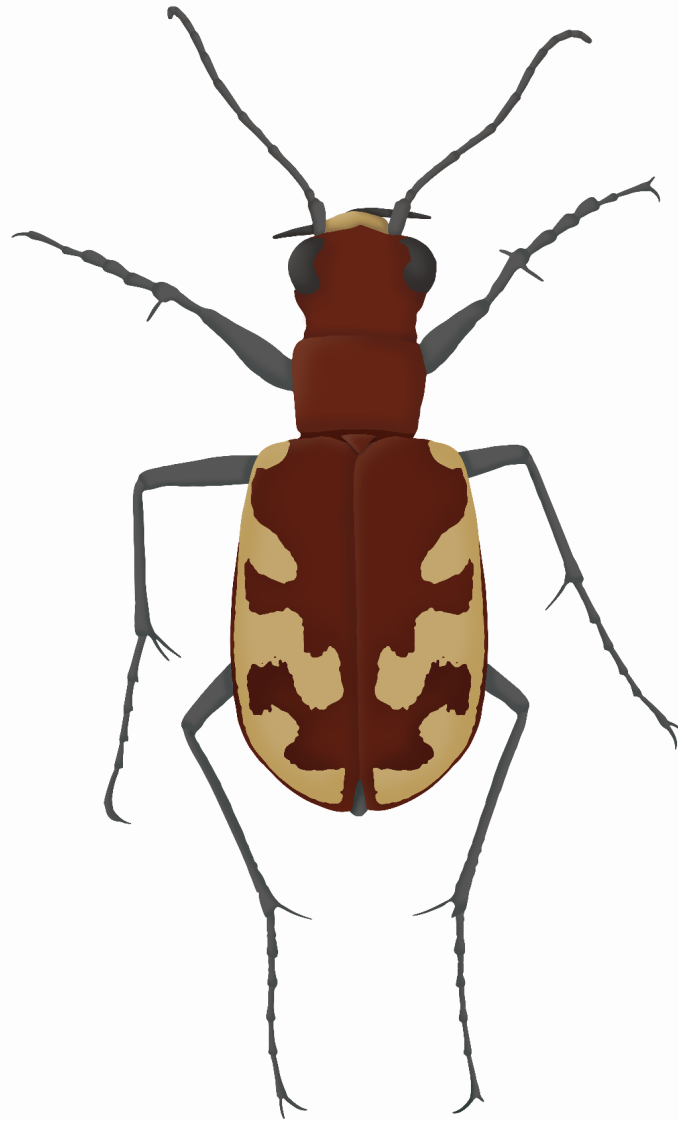


Strategic Plan for Colorado State University's  
Clarence P. Gillette Museum of Arthropod Diversity (2022–2025)



**C. P. GILLETTE**  
Museum of Arthropod Diversity

The collection logo depicts big sand tiger beetle (*Cicindela formosa formosa*)  
found in sandy habitats of the Great Plains

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## Executive summary

With 4.7 million specimens, C. P. Gillette Museum of Arthropod Diversity at Colorado State University (CSUC) **is the fourth largest arthropod research collection in the American West at a public university**, 16th largest in North America (out of 223), and 45th in the world. It is home to extensive holdings of specimens from the Rocky Mountains region and western United States with particular strengths in Lepidoptera (moths and butterflies), Orthoptera (crickets, grasshoppers, and kin), certain Hymenoptera (wasps), as well as aquatic insects. The museum also houses an important library of systematic entomology literature, the Bruner Family Library.

**Since its founding in the late 1800s** by internationally renowned entomologist Clarence P. Gillette, **the Museum has been advancing the three pillars of land-grant university mission** through its involvement in research, teaching, and extension by serving scientists, CSU faculty and students, and other stakeholders. The collection documents native and introduced arthropods, providing a record of emerging pests. It is an active and welcoming space for volunteers. As of this writing (December 2022), there are 16 active volunteers and student interns. The Museum provides specimens for teaching and research. In 2022 we made over 5,300 specimens available to researchers around the world through loans. The museum material has been used in numerous publications and has been the source of discovery of countless new species. The Museum is also a repository for 23 National Park Service sites and houses the Center for Disease Control mosquito collection. In 2018, the Museum moved into a new space that allows for expansion and is currently growing, adding 260,000 specimens in the last four years.

**The purpose of this strategic plan is to allow the collection to better serve CSU's land-grant mission and advance intentional discovery, inclusive learning, and collaborative engagement** by building upon its current strengths, addressing weaknesses, and mitigating threats. We hope it will also increase institutional awareness and understanding of the Museum under new leadership.

Thanks to the new space and dedicated staff, the Museum has the opportunity to become the **primary repository of Rocky Mountain arthropods and a hub for intentional discovery**. To that end, it must keep open doors to researchers and the public, maintain trust of stakeholders, and grow sustainably by following best curatorial practices and prioritizing new acquisitions. The collection's strong volunteer base will be a foundation for **fostering inclusive learning** via structured research experiences for undergraduates program to meet the demand for **transformative student experiences at CSU**. We currently provide select pest identification services and will **strengthen our commitment to collaborative engagement by developing a sustainable outreach strategy** that will include publishing a newsletter, creating an outreach coordinator intern position, and strengthening relationships with extension entomologists. We will also assemble a reference collection of economically important insects and improve our capacity for pest identification.

## CSU land acknowledgment

Colorado State University acknowledges, with respect, that the land we are on today is the traditional and ancestral homelands of the Arapaho, Cheyenne, and Ute Nations and peoples. This was also a site of trade, gathering, and healing for numerous other Native tribes. We recognize the Indigenous

peoples as original stewards of this land and all the relatives within it. As these words of acknowledgment are spoken and heard, the ties Nations have to their traditional homelands are renewed and reaffirmed.

### Strategic planning partners

Amy Charkowski (Department Head), Paul Opler (Assistant Director), Crystal Cooke (Curator and Instructor), Chuck Harp (Research Assistant/Acting Collections Manager).

### Key stakeholders

- Museum staff: Marek Borowiec (director), Paul Opler (assistant director), Crystal Cooke (curator and instructor), Chuck Harp (collections manager)
- Others on the museum team: volunteer curators, student volunteers and paid interns, community volunteers
- Administrators: department head, dean, university leadership
- Funders: CSU's department of Agricultural Biology, College of Agricultural Sciences, US Forest Service, US Department of Agriculture, Colorado Department of Agriculture, individual donors.
- Researchers using the collection to conduct surveys, revisions, or other research
- Partners depositing specimens: Center for Disease Control, National Park Service, individual researchers and collectors
- CSU instructors and students using the collection
- CSU faculty and researchers in the departments of Biology; Fish, Wildlife, and Conservation Biology; Forest and Rangeland Stewardship; the Colorado Natural Heritage Program (CNHP) and the Center for Environmental Management of Military Lands (CEMML)
- Members of the local community visiting the museum
- Specimen data aggregators such as GBIF, SCAN, iDigBio

### Audience for the strategic plan

- Mission and Vision statements will be made clearly and prominently available in both the physical and virtual environment of the C. P. Gillette Museum.
- The strategic plan document will be available to download from the Museum website and will be available as an introductory document for current and new staff, volunteers, and visitors. In abbreviated form it is also to be handed to potential funders or donors to demonstrate the importance of the Museum and show that we have a strategy in place to achieve our mission and vision.



The museum exhibit room highlights show insects from Colorado and abroad

## Mission statement

Our mission is to discover, preserve, and promote arthropod diversity of the Rocky Mountain region and beyond through research, teaching, and extension.

## Vision statement

Our vision is to foster innovation in insect biodiversity science, be recognized as the most prominent research collection of Rocky Mountain arthropods, be a source of inspiration to students and members of the public, and advance Colorado State University's land grant mission.

## Core values

- Curiosity: we are driven to know, protect, and educate about the natural world around us.
- Excellence: we strive to do our best while learning, growing, and evolving.
- Inclusion: we celebrate diversity, not only biological, but also diversity of abilities, backgrounds, experiences, races, nationalities, and religious beliefs among our stakeholders.
- Community: we value and respect all our stakeholders, including the museum team, the international entomology research community, students, and the general public; we are committed to team-building, communication, outreach, and problem-solving.

## Strategy statement

C. P. Gillette Museum will leverage its resources for excellence in research, teaching, and extension and communicate the importance of arthropods to the ever-expanding audience of CSU administration, students, and community of Fort Collins, Colorado, and beyond.

## Goals and objectives

- Become the primary repository of Rocky Mountain arthropods
  - Develop a plan for funded annual taxonomist visits that would support curation efforts in most important groups. *2023, conditional on funding opportunities.*
  - Prioritize digitization efforts outside existing funded projects (LepNet, iDigBees, Montana Moths). *Summer 2023.*
  - Ensure that the research community is aware of opportunities for visiting the collection and can be hosted well. *Continuous.*
  - Secure current holdings and maintain curatorial excellence. *Continuous.*
  - Develop an NSF proposal for DBI - Capacity: Bio Collections program for expansion with upgrades to compactors. *Summer 2023.*
  - Develop a prioritization plan and conditions for acquiring, incorporating, and accessioning new specimens. *Spring 2023.*
  - Maintain uploads to data aggregators. *Continuous.*
  - Increase capacity for digitization and outreach with a new 3D macro imaging system. *Summer 2023.*
  - Research standards for type repositories and ensure the collection meets them. *Summer 2023.*
  - Overhaul type collection. *Summer 2024.*
  - Develop a prioritization plan (including geographic coverage) for expanding and maintaining holdings of the Bruner Family Library. *Summer 2023.*
  - Accession Bruner Family Library holdings and make them publicly available. *Summer 2024.*
  - Protect the collection by maintaining practices excluding pests, protecting from breakage, ensuring adequate liquid levels, and preventing theft. *Continuous.*
  - Estimate number of specimens in the collection, as well as percent digitized and imaged. *Continuous, annually.*
  
- Offer transformative undergraduate research experiences
  - Determine capacity of the collection for volunteer work (how many person hours per week is feasible and sustainable with current staff and space?). *Spring 2023.*
  - Codify guidelines for engaging with student volunteers and interns. *Spring 2023.* Develop a system for tracking volunteer and intern effort, collecting reflections on their experience, and history after museum experience. *Fall 2023.*
  - Develop and implement an evaluation process for student experiences in the collection. *Spring 2024.*
  - Recruit students for credit/paid internship work. *Continuous.*
  - Foster relationships and networking among staff and volunteers through team building events. *Continuous.*

- Ensure excellent experience for the students through focused training and mentorship. *Continuous.*
- Communicate about undergraduate research with the CSU administration. *Continuous.*
- Expand reach of the collection with the CSU students, instructors, administration, the Fort Collins and broader Colorado community, and donors/friends of the museum
  - Develop a strategic plan. *Fall 2022.*
  - Appraise stakeholders of collection activities through annual reports and quarterly newsletter. *Continuous.*
  - Catalog recurring outreach activities that the museum could participate in. *Spring 2023.*
  - Develop a plan of sustainable engagement with recurring outreach events. *Summer 2023.*
  - Redesign website to include a virtual tour, strategic plan, showcase specimens. *Summer 2023.*
  - Develop a synoptic collection of Colorado economically important arthropods. *Fall 2024.*
  - Communicate with CSU extension entomologists. *Continuous.*
- Ensure financial sustainability of the collection
  - Estimate operating expenses. *Fall 2022.*
  - Develop a prioritization plan for donations and endowments. *Fall 2022.*
  - Develop a system for tracking income and expenses. *Fall 2022.*
  - Develop a sustainable financial plan through insect identification services, merchandise sales, donations, and departmental support. *Fall 2023.*
  - Maintain and secure additional contract work with agencies such as US Forest Service and Colorado Department of Agriculture. *Summer 2023.*
  - Ensure that collections manager hired in 2023 has the expertise to perform contract work. *Fall 2023.*
  - Work with individual clients to provide identification services. *Continuous.*

## SWOT analysis

### Strengths

- Dedicated museum staff and volunteers
- Very strong regional representation of several taxa (Lepidoptera, aquatic insects, Orthoptera, aphids)
- Time-tested ability to run the collection with limited budget

- Space set up for tours and small exhibits
- Ability to control and regulate access to collection, library, and work areas
- Largest collection of arthropods in the state of Colorado
- Growing recognition as the repository for government reference collections (e.g., CDC, NPS)

### Weaknesses

- Lack of sustainable financial plan
- Lack of clear prioritization plan for expansion of holdings
- Poor awareness of the museum among CSU students, faculty, and administration
- Museum operations and revenue currently disproportionately rely on one person's good will and expertise
- Many taxa in need of expert curation
- Not connected with Fort Collins tourism
- Lack of dedicated visitor or volunteer parking
- Limited social media activity

### Opportunities

- Large new space with room for substantial expansion of holdings and accommodating many workers/volunteers
- Central location on main campus allows easy access for student volunteers and interns
- Engaged community of volunteers with more potential interest among CSU students and local citizens
- Commitment of support from the college and department (\$5,000 base budget and collections manager position)
- Several potential partners with excellent outreach spaces exist in the region, including the Butterfly Pavilion, The Butterfly House at the Gardens on Spring Creek, Fort Collins Museum of Discovery, Fort Collins Natural Areas Program, Denver Museum of Nature and Science, Museum of Natural History - University of Colorado Boulder
- Substantial potential for expanding holdings and collaboration with CSU faculty and local federal researchers (USGS, USDA)
- Past and ongoing funding for digitization means that a good number of specimen data are available to the public (LepNet for Lepidoptera, iDigBees for bees)
- Potential for closer collaboration with the extensive network of CSU extension staff and faculty
- Sharing museum expertise through the publication series: "Contributions of the C. P. Gillette Museum"

## Threats

- Damage due to natural disasters, especially flooding (collection in basement and campus has flooded several times in the last 50 years); no sprinkler system
- Pests
- Loss of specimens through theft and unreturned loans
- Loss of expertise bringing in revenue from contracts for pest identification
- Withdrawal of support from college and/or department under future leadership

## Sustainability

### Maintaining strengths

The collection's core strengths include dedicated staff and volunteers and being the largest collection of Colorado arthropods. Carrying out the collection's goals and objectives involves nurturing a healthy work culture to improve and maintain staff morale, striving for best practices in specimen curation and digitization, continued expansion of holdings in focal taxa and regional arthropods in general, and maintaining student volunteer and researcher engagement.

### Addressing weaknesses

The core weaknesses of the museum include the lack of financial and prioritization plan for accessioning and incorporating new specimens, as well as lack of name recognition within the university and the local community. In 2022 the strategic planning team will develop a sustainable financial plan. We will also establish priorities for taxa and regions to be incorporated with collection growth. To this end we will revisit and leverage the existing list of requirements specimen donations must meet in order to be incorporated. Addressing these weaknesses will allow sustainable growth and status improvements of the collection. Another core weakness is poor name recognition within CSU and the broader community. We will address this by working to include information in the university marketing materials, designing a special traveling exhibit, and promoting the museum on social media.

### Capitalizing on opportunities

With the large space, active volunteers, and pledged financial support the museum is very well positioned to continue growth in terms of holdings and impact. We will leverage these to expand our capacity to engage students and the general public through recruitment and special traveling exhibits. We will also work to bring in external funding for a compactor system that would house our large and growing Lepidoptera collection. We will work to strengthen our relationships with federal agencies and extension agents for improved research and extension capacities.

## Mitigating threats

The most significant threats to the museum include infrastructure damage, loss of specimens and expertise, and revoking of institutional support. The choice of space for the collection is beyond our control and we have to balance our needs for a central location on the main campus with flooding risk. The latter is mitigated by floodplain management plans for CSU and the city of Fort Collins developed after the devastating flood of 1997. We prevent loss of specimens by pursuing loan returns and balancing accessibility and security of the space. We institute 2-week freezer quarantine for all incoming specimens and although pests have not been an issue in the new space, the security could be improved by adding freezer space and periodic, targeted re-freezing of pinned material. Improved capacity for contract identification work will be achieved with hiring of a collections manager. Last but not least, we recognize that continued communication of the collections strengths, achievements, and impact to university administrators and the broader community is crucial for success. Our commitment to this strategic plan positions us well to improve this communication through a variety of outlets.



Insects from the collection. From left to right: bumelia borer (*Plinthocoelium suaveolens*), Colorado hairstreak (*Hypaurotis chrysalus*; the state insect; top and bottom), and great crested grasshopper (*Tropidolophus formosus*). Photos by Hanna Royals and Todd Gilligan

## Acknowledgments

This strategic plan was written through activities of the 2022 Strategic Planning for Biodiversity Collections course from iDigBio, co-taught by David Jennings and Austin Mast. We would like to thank the instructors and participants for sharing their work. The resources, structure, and feedback given was essential to completing this plan.

We thank the members of the current C. P. Gillette team, as well as all the volunteers, curators, donors, and researchers who have built the collection over the course of more than a century.

Questions and comments about this strategic plan should be addressed to Dr. Marek Borowiec, [marek.borowiec@colostate.edu](mailto:marek.borowiec@colostate.edu).