

# JENNIFER ACKERFIELD

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I am a botanist.  
I am the Head Curator of Natural History Collections and Associate  
Director of Biodiversity Research at Denver Botanic Gardens,  
author of the *Flora of Colorado*,  
and I'm passionate about thistles.

## EDUCATION

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- PhD** *Colorado State University, Botany* 2014 to 2020  
Dissertation: "The Phylogeny and Evolution of the *Carduus-Cirsium* Group  
("thistles"; Cardueae: Compositae)"  
Committee: Dr. Mark Simmons (chair), Dr. Vicki Funk (Smithsonian Institution), Dr. David  
Steingraeber, Dr. Boris Kondratieff, Dr. Melinda Smith  
Research Objectives:
- Clarify phylogenetic and taxonomic relationships within North American thistles using traditional as well as cutting-edge, next-generation sequencing technology.
  - Construct a broadly-sampled phylogeny for the *Carduus-Cirsium* group to delimit monophyletic genera, reconstruct the evolution of pappus type, and infer the timing of dispersal to North America.
- MS** *Colorado State University, Botany* 1998 to 2001  
Thesis: "The Systematics and Biogeography of *Hedera* L., the Ivy Genus (Araliaceae)"  
Advisor: Dr. Jun Wen
- BS** *Colorado State University, Botany* 1993 to 1996  
Graduated Summa Cum Laude  
Minored in Horticulture

## CURRENT POSITION

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- Head Curator of Natural History Collections and Associate Director of  
Biodiversity Research, Denver Botanic Gardens** 2020 to present
- Direct the Kathryn Kalmbach Vascular Plant Herbarium, the Sam Mitchel Herbarium of Fungi, Denver Botanic Gardens Collection of Arthropods, and the Gardens Biorepository.
  - Oversee the growth and curation of both the physical and digital natural history and biorepository collections.
  - Develop and oversee collections policies and procedures for natural history collections.
  - Respond to inquiries from public and other agencies and organizations.

- Provide outreach and professional presentations on the work of the Gardens natural history collections to internal and external audiences including members of the public and professional societies.
- Secure and manage financial support for natural history collections and projects which build and utilize the collections.
- Develop new research projects which complements and enhance existing Gardens research and write grand proposals to support these new projects.
- Coordinate and lead collections-focused fieldwork, including but not limited to managing crews.

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## RELEVANT WORK EXPERIENCE

### **Assistant Curator, Charles Maurer Herbarium Collection**

(formerly the Colorado State University Herbarium)

1998 to 2020

- Managed the maintenance and direct the growth of the collections of the Charles Maurer Herbarium Collection of approximately 100,000 specimens. During this time, I oversaw the acquisition of the Forestry and Range Science Herbarium at Colorado State University (approximately 10,000 specimens) and the Miriam Denham Collection (approximately 15,000 specimens). I created a reference collection of Colorado plants for use in identification. I also verified the identification of all specimens in the collections.
- Provided a taxonomic authority for the local community and university, assisting with questions concerning the flora of Colorado and identifying plant specimens from Colorado and the world. I worked with many organizations and graduate students on campus to assist in identifying their field collections.
- Led collections-based field work. I worked with local organizations and land owners to provide floristic inventories, participated in bioblitzes as a taxonomic authority, and performed field work for my own research.
- Led tours of the herbarium for local school groups, CSU botany classes, organizations such as the Colorado Native Plant Society, and potential donors.
- Supervised 2–5 student interns and volunteers each semester. I began this program in 1999 and mentored over 75 students since its inception. I also provided mentorship for undergraduates through honor's thesis advising and undergraduate teaching assistantships.
- Mentored and obtained funding for graduate students' Masters floristic projects. Recent projects include the Flora of Soapstone and Red Mountain (Jenna McAleer), Flora of Gunnison County (Maddie Maher), and Flora of the Rabbit Ears Range (Austin Rosen).
- Managed herbarium operation and grant budgets.

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## PUBLICATIONS

### ***Books***

Ackerfield, J. 2015. *Flora of Colorado*. Bot. Res. Inst. Texas. 818 pp.

### ***Journal Publications***

Ackerfield, J. 2001. Trichome morphology in *Hedera* L. *Edinburgh Journal of Botany*. 58: 259-267.

Ackerfield, J. & J. Wen. 2002. A morphometric analysis of *Hedera* L. (the ivy genus, Araliaceae) and its taxonomic implications. *Adansonia*. 24 (2): 197-212.

Ackerfield J. & J. Wen. 2003. Evolution of *Hedera* (the ivy genus, Araliaceae): insights from chloroplast DNA data. *International Journal of Plant Sciences*. 164: 593-602.

Ackerfield, J. & W.F. Jennings. 2008. The genus *Abronia* (Nyctaginaceae) in Colorado, with notes on *Abronia bolackii* in New Mexico. *Journal of the Botanical Research Institute of Texas* 2(1): 419-423.

### ***Journal Papers in Press***

Ackerfield, J., A. Susanna, V. Funk, D. Kelch, D.S. Park, A.H. Thornhill, & T. Arabaci. 2020. A Prickly Puzzle: Generic delimitations in the *Carduus-Cirsium* group (Compositae: Cardueae: Carduinae). To be published in: *Taxon*.

### ***Journal Papers in Review***

Ackerfield, J., D.J. Keil, W.C. Hodgson, S.D. Fehlgberg, & V.A. Funk. 2020. Thistle be a mess: Untangling the taxonomy of *Cirsium* (Cardueae: Compositae) in North America. Submitted to: *Journal of Systematics and Evolution*.

### **AWARDS, FELLOWSHIPS, AND GRANTS**

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<b>Botanical Society of America J.S. Karling Graduate Student Research Award</b> Best graduate student research proposal for the BSA research award	2019
<b>Botanical Society of America Graduate Student Research Award</b> Phylogeography of hanging garden thistles (\$1500)	2019
<b>Colorado State University, Stavros Family Fund</b> Phylogenomic research on <i>Cirsium</i> in North America (\$1500)	2019
<b>Society of Systematic Biologists, Mini-Arts Grant</b> Preparation of a monograph of <i>Cirsium</i> for North America (\$2000)	2019
<b>Utah Native Plant Society Research Grant</b> Untangling the taxonomy of rare Utah thistles using phylogenomics (\$1000)	2019
<b>Colorado Mountain Club Foundation Research Grant</b> Speciation on sky islands: the evolution and systematics of the <i>Cirsium eatonii</i> complex in North America (\$1000)	2018
<b>Colorado Native Plant Society, Steinkamp Fund</b> Rare thistles of Colorado (\$1000)	2018

<b>Colorado State University, Harrington Fund</b> Phylogenomic research on <i>Cirsium</i> in North America (\$1800)	2018
<b>Smithsonian Institution Predoctoral Fellowship</b> Phylogenomic research on <i>Cirsium</i> in North America (\$4000)	2018
<b>American Society of Plant Taxonomists Graduate Student Research Award</b> Phylogenomic research on <i>Cirsium</i> in North America (\$1000)	2017
<b>Colorado Native Plant Society, Marr Grant</b> Systematics and evolution of <i>Cirsium</i> in Colorado (\$1000)	2016
<b>Colorado State University, Harrington Fund</b> Systematics and evolution of <i>Cirsium</i> in North America (\$1800)	2016
<b>Society of Herbarium Curators Student Research Award</b> Increasing collections of thistles from the Rocky Mountains (\$500)	2016
<b>National Science Foundation, Biological Research Collection Program</b> Digitizing the Colorado State University Herbarium (Award number 1055334; \$500,000)	2011
<b>Botanical Society of the British Isles Bequest Fund</b> Systematics and evolution of Hedera (English ivy; \$1000)	1999
<b>Linnaean Society of London, A. G. Side Fund</b> Systematics and evolution of Hedera (English ivy; \$2000)	1999

## RESEARCH EXPERIENCE

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<b>Evolution and Biogeography of <i>Cirsium</i> in North America</b> , Smithsonian Institution, Museum of Natural History, Washington, D.C. Advisor: Dr. Vicki Funk	2018 to 2020
<ul style="list-style-type: none"> <li>Performed next-generation sequencing using the Hyb-Seq approach. This technique involved using capture probes targeting a conserved ortholog set of loci identified from expressed sequence tags of the Compositae.</li> <li>DNA extraction and library preparation for next-generation sequencing.</li> </ul>	

## TEACHING EXPERIENCE

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<b>Colorado State University</b> , Fort Collins, CO <b>Instructor</b> , Department of Biology	2003 to 2020
<ul style="list-style-type: none"> <li>Taught Plant Identification (BZ223), an undergraduate course averaging 150 students per year, covering the following topics: taxonomy, systematics, and recognition of the major flowering plant families occurring in western North America</li> <li>Developed a lab manual, plant collection project, iNaturalist observation assignment, quizzes, exams, and homework</li> </ul>	

- Coordinated grading and labs with a team of two teaching assistants
- Secured funding through CSU technology fees to improve laboratory facilities and equipment for students
- Incorporated engaging activities such as interactive quizzes, games, and botanical costume contests to connect with students

**Awards Received**

Colorado State University faculty and staff excellence in undergraduate teaching and/or mentoring award (2009, 2018)

**MENTORING**

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I mentored two to five interns in the Colorado State University Herbarium each Semester. Each intern completed a project related to natural history collections. This totaled approximately 75 students. 1999 to 2019

I mentored several students completing floristic projects at Colorado State University:

**Floristic Study of Baca Ranch**, Honor’s Undergraduate Thesis Project 2008  
Student: Elin Franzen

**Floristic Study of Soapstone and Red Mountain Open Spaces**, Master’s Project 2011 to 2013  
Student: Jenna McAleer

**Floristic Study of Gunnison County**, Master’s Project 2016 to 2018  
Student: Madelaine Maher

**Floristic Analysis of Lake County Wetlands**, Honor’s Undergraduate Thesis Project 2017  
Student: Brandi Thomas

**Floristic Study of the Rabbit Ears Range**, Undergraduate Research Project 2018 to 2019  
Student: Austin Rosen

**SELECTED SPEAKING PRESENTATIONS AND INVITED LECTURES**

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**Keynote Address**

“The Flora of the Future,” Colorado Native Plant Society annual meeting, 2013

**Speaking Presentations**

“Rare Plants of Colorado,” Colorado Native Plant Society Fort Collins Chapter, 2005

“Online Resources for Botanical Research,” Colorado Native Plant Society Fort Collins Chapter, 2010

“Update on the Flora of Colorado,” Colorado Native Plant Society Annual Meeting, 2014

“The Flora of Colorado,” Denver Botanic Gardens, 2015

“Botany is Not Dead but This Plant Is: The Importance of Natural History Collections,” Colorado Native Plant Society Annual Meeting, 2016

“Alpine Plants of Colorado,” American Rock Garden Society Annual Meeting, 2016

“Native and Non-native Thistles in Colorado,” Colorado Weed Management Association, 2016

“Herbarium Link, a method of barcoding and digitizing herbarium collections,” Society for the Preservation of Natural History Collections, 2017

“The Importance of Science and Science Communication,” Denver Science March, 2017

“When Citizen Science and Natural History Collections Collide,” Colorado Native Plant Society Annual Meeting, 2018

“A Prickly Puzzle: The Evolution and Systematics of the *Carduus-Cirsium* Group,” Botany Conference, 2018

“Prickly Puzzles: The Study of the Flora of Colorado and *Cirsium* in the Rocky Mountains,” University of Wyoming Center for Biodiversity Lecture Series, 2018

“A Prickly Puzzle: Disentangling Relationships Among North American *Cirsium*,” Smithsonian Institution Department of Botany Seminar Series, 2019

“A Prickly Puzzle: The Evolution and Systematics of the *Carduus-Cirsium* Group,” University of Northern Colorado Biology Department Seminar Series, 2019

“Speciation on Sky Islands: Unraveling the taxonomy of the *Cirsium eatonii* complex in North America,” Botany Conference, 2019

“Importance of Natural History Collections in a Changing World,” Invited lecture, Systematic Zoology, Colorado State University, 2019, 2020

“Incorporating Natural History Collections Into Systematic Research,” Invited lecture, Evolutionary Biology, Colorado College, 2020

### **Webinar Presentations**

“Denver EcoFlora Project,” Denver Botanic Gardens docents and interns, 2020

“Fantastic Wildflowers and Where to Find them,” Crested Butte Wildflower Festival, 2020

“Identification Tools in Your Identification Toolbox,” Crested Butte Wildflower Festival, 2020

### **Poster Presentations**

“Trichome Morphology in *Hedera*,” International Botanical Congress, 1999

“The Flora of Colorado,” Botany Conference, 2016

“Ecological Niche Modeling of an Adaptive Radiation,” Botany Conference, 2017  
**Award received:** best graduate student poster presentation, ecology section

#### **WORKSHOPS PRESENTED**

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“How to identify plants using a dichotomous key,” Colorado Native Plant Masters, 2015

“Brassicaceae of Colorado,” Colorado Native Plant Society, 2015

“*Astragalus* of Colorado,” Colorado Native Plant Society, 2016

“Botany in Half a Day,” Crested Butte Wildflower Festival, 2017, 2018, 2019

“Identifying Chenopodiaceae in Colorado,” Colorado Native Plant Society, 2017

“Asters, Brassicas, and Grasses,” Boulder County Nature Association, 2018

“Asteraceae Family in Colorado, an identification how-to,” Colorado Native Plant Society, 2018

“Grasses and Grass-like Families,” Colorado Native Plant Society, 2019

“Defining a Species,” Colorado Native Plant Society, 2020

#### **PROFESSIONAL TRAINING**

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##### **Futureproofing Natural History Collections: Creating Sustainable Financial Models for Research Resources Webinar**

American Alliance of Museums, online, 2020

Description: Explored projects that have created steady income streams, as well as short-term projects that nurture long-term relationships and cultivate fans for museums and their research collections.

##### **Phylogenomic Bioinformatics Workshop**

University of Memphis, Tennessee, 2019

Description: Learned how to process phylogenomic data, including use of the programs Trimmomatic, Hyb-Piper, and PHYLUCE.

##### **Strategic Planning for Herbaria Webinar Series**

iDigBio, online, 2018

Description: Produced a strategic plan addressing the vision, mission, stakeholders, strategies, goals, objectives, evaluation, and sustainability of the CSU Herbarium.

##### **Ecological Niche Modeling Workshop**

Pam Soltis, Denver, Colorado, 2017

Description: Learned the techniques for generating ecological niche maps for plant species and how to evaluate them.

### **Next-generation Sequencing Workshop**

Botany Conference, Ft. Worth, Texas, 2017

Description: Learned techniques for visualizing and analyzing next-generation sequencing data.

### **PROFESSIONAL SERVICE**

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#### **Peer-Reviewed Articles for:**

- *Flora of North America*
- *American Journal of Botany*
- Botanical Research Institute of Texas
- *Molecular Phylogenetics and Evolution*
- *Taxon*

### **COMMUNITY SERVICE**

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#### **Girl Scouts of America**

Field trip leader; 2003, 2004

#### **Bioblitz Taxonomic Expert**

Participated in a bioblitz at Soapstone Ranch, documenting all vascular plants, 2007

#### **Bioblitz Taxonomic Expert**

Participated in a bioblitz at J.E. Canyon ranch, documenting all vascular plants, 2011

#### **Bioblitz Taxonomic Expert**

Participated in a bioblitz at Colorado State University land for the College of Natural Resources, documenting all vascular plants, 2013

#### **Boy Scouts of America**

Field trip leader; 2016, 2017

#### **Colorado College Botany Course**

Field trip leader; 2018, 2019

#### **Colorado Native Plant Masters**

Instructor and field trip leader; 2015, 2016

#### **Colorado Native Plant Society**

Field trip leader; 2011, 2013, 2014, 2015, 2016, 2017, 2018

#### **Crested Butte Wildflower Festival**

Field trip leader; 2016, 2017, 2019

#### **Girls & Science event at the Denver Museum of Science**

Provided hands-on activities for children to inspire them to pursue careers in the STEM fields; 2017

#### **Rocky Mountain National Park**



Plant identification training for field crews; 2016, 2017

**City Nature Challenge, Denver**

Assisted in coordinating the City Nature Challenge and provided identifications on iNaturalist; 2020

**PROFESSIONAL AFFILIATIONS**

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- American Society of Plant Taxonomists
- Botanical Society of North America
- Colorado Native Plant Society
- Graduate Women in Science
- Society for the Preservation of Natural History Collections
- Society of Herbarium Curators