Caden J. Howlett

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Research interests: Tectonics, Orogenic Systems, Geologic Mapping, Thermochronology, Geochronology

EDUCATION

Ph.D. Geosciences, University of Arizona (*anticipated May 2024*)
M.S. Earth Sciences-Geology, Montana State University (2020)
B.S. Earth Sciences-Geology, *Honors*, Montana State University (2018)

RESEARCH EXPERIENCE

Ph.D. Dissertation, University of Arizona, August 2020-present
Advising Committee: Barbara Carrapa, Peter DeCelles, Susan Beck
Dissertation: in formulation

M.S. Thesis, Montana State University, June 2018-April 2020
Advising Committee: Andrew K. Laskowski, Devon A. Orme, David R. Lageson, Colleen Elliott
Thesis: Syn-orogenic magmatism, mid-crust exhumation, and placer gold deposition: The Anaconda metamorphic core complex of western Montana

B.S. Thesis, Montana State University, September 2017-May 2018
Advisor: Andrew K. Laskowski
Thesis: Detrital zircon U-Pb geochronology and GIS terrain analysis to determine provenance of gold placer deposits of the Pioneer District, Flint Creek Range, SW Montana.

FIELDWORK

2018 Anaconda-Pintler Wilderness, Montana. 8 weeks
2019 Flint Creek Range, western Montana. 1 week
2019 Tangra-Yumco Rift, southern Tibet. 4 weeks
2020 Northern Laramide, MT/WY. 4 weeks
2021 Little Belt Mountains, central Montana. 3 weeks
2022 South-central Andes (31-36°S). 10 weeks

PUBLICATIONS

(4) **Howlett, C. J.,** Reynolds, A. N., & Laskowski, A. K., 2021, Magmatism and extension in the Anaconda metamorphic core complex of western Montana and relation to regional tectonics. *Tectonics*, v. 40, 1-31, doi:10.1029/2020TC006431.

(3) **Howlett, C.J.,** and Laskowski, A.K., 2021, Determining the source of placer gold in the Anaconda metamorphic core complex supradetachment basin using detrital zircon U-Pb geochronology, Pioneer District, western Montana: *Geosphere*, v. 17, 154–170, doi:10.1130/GES02226.1.

(2) **Howlett, C.J.,** Reynolds, A.N., and Laskowski, A.K., 2020, Geologic Map of the Northern Half of the Pintler Lake 7.5' Quadrangle and the Southern Half of the Warren Peak 7.5' Quadrangle, southwestern Montana: Montana Bureau of Mines and Geology EDMAP portion of the National Geologic Mapping Program 13, 1 sheet, scale 1:24,000.

(1) **Howlett, C.J.**, 2020, Syn-orogenic magmatism, mid-crust exhumation, and placer gold deposition: the Anaconda metamorphic core complex of western Montana. MSc thesis, Montana State University, 140 p.

PUBLICATIONS IN PREPARATION

Howlett, C.J., Jepson, G., Carrapa, B., DeCelles, P.G., Late Cretaceous exhumation of the Little Belt Mountains in relation to regional development of the Helena salient, west-central Montana, USA, *in prep, GSAB.*

Sundell, K.E., Laskowski, A.K., **Howlett, C.J.**, Kapp, P., Ducea, M., Chapman, J.B., Ding, L., Episodic Late Cretaceous to Neogene crustal thickness variation in southern Tibet, *in review, Terra Nova.*

CONFERENCE PROCEEDINGS

Howlett, C.J., Jepson, G., Carrapa, B., DeCelles, P.G., Late Cretaceous exhumation of the Little Belt Mountains in relation to regional development of the Helena salient, west-central Montana, USA, Geological Society of America Abstracts with Programs. Vol 54, No. 5, October 2022. doi: 10.1130/abs/2022AM-382668. ***Poster***

Howlett, C.J., Ronemus, C.B., Building and Destroying An Orogenic Plateau in the Northern US Cordillera. 50th Annual University of Arizona GeoDaze symposium. Tucson, AZ, March 2022. ***Talk***

Howlett, C.J., Jepson, G., Carrapa, B., Low-temperature thermochronology of the Little Belt Mountains of central Montana with implications for models of Laramide tectonism. 14th International Conference on Thermochronology. Sante Fe, NM. doi:10.1002/essoar.10508006.1. ***Talk***

Howlett, C.J., Jepson, G., Carrapa, B., Low-temperature thermochronology of the Little Belt Mountains of central Montana. 49th Annual University of Arizona GeoDaze symposium. Tucson, AZ, April 2021. *Best graduate talk award.* ***Talk***

Howlett, C.J., Reynolds, A.N., Laskowski, A.K., Farallon slab removal as a driving force of Cordilleran metamorphic core complex formation: details from the Anaconda Range of western Montana, Geological Society of America Abstracts with Programs. Vol 52, No. 6, 2020, doi:10.1130/abs/2020AM-355195. ***Talk***

Howlett, C.J., and Laskowski, A.K., Using detrital zircon U-Pb geochronology to determine the source of placer gold: a case-study from the Pioneer District, western Montana, Geological Society of America, Phoenix, AZ, September 2019. doi:10.1130/abs/2019AM-335775. ***Talk***

Howlett, C.J., Reynolds, A.N., Laskowski, A.K., Geologic Map of the Northern Half of the Pintler Lake 7.5' Quadrangle and the Southern Half of the Warren Peak 7.5' Quadrangle, Southwestern Montana, Geological Society of America, Phoenix, AZ, September 2019. doi:10.1130/abs/2019AM-331565. ***Poster***

Howlett, C.J., Investigating the Anaconda Metamorphic Core Complex of western Montana—Insights into the extension dynamics of convergent orogenic belts. Himalaya-Karakorum-Tibet (HKT) Conference, Bozeman, MT, June 2019. doi:10.5281/zenodo.3238707. *Best student poster award.* ***Poster***

Howlett, C.J., Determining the relationship between magmatism and exhumation in the Anaconda Metamorphic Core Complex using igneous zircon U-Pb geochronology, western Montana, 2019 Montana State University Earth Sciences Colloquium. ***Talk***

Howlett, C.J., and Laskowski, A.K., Detrital zircon U-Pb geochronology and GIS terrain analysis to determine provenance of gold placer deposits of the Pioneer District, Flint Creek Range, SW Montana**,** 2018 Undergraduate Scholars Program Student Research Celebration. **Poster**

Howlett, C.J., and Laskowski, A.K., Determining the source of placer gold in the Anaconda Metamorphic Core Complex supradetachment basin using detrital zircon geochronology, Pioneer District, Western Montana. Geological Society of America, Indianapolis, IN, October 2018. Abstract #286-12. *Talk by Laskowski.*

BOOK IN PREPARATION

Howlett, C.J., Life & Space, Philosophical and scientific fragments

GRANTS/AWARDS

2018 **Undergraduate Scholars Program Research Grant**, Montana State University ($900)
2019 **Foster Scholarship,** Tobacco Root Geological Society ($1000)
2019 **Donald L. Smith Memorial Scholarship,** Montana State University Earth Sciences ($2100)
2019 **Graduate Student Grant,** Geological Society of America ($2000)
2019 **GSA Travel & Short Course Grants,** Structural Geology & Tectonics Division-Geological Society of America ($140)
2020 **ISGC Student Travel Award,** Society for Sedimentary Geology (conference cancelled due to COVID-19)
2021 **Best Graduate Talk (GeoDaze),** University of Arizona Department of Geosciences ($500)
2021 **Sibanye-Stillwater/Wheaton Precious Metals Scholar,** Tobacco Root Geological Society ($1000)
2021 **Bert Butler Scholarship,** University of Arizona Geosciences ($1500)
2022 **Galileo Circle Scholar,** University of Arizona College of Science ($1000)
2022 **William and Clara Sulzer Scholarship,** University of Arizona Geosciences ($2000)
2022 **GSA Connects Travel Grant,** Geological Society of America Rocky Mountain Sector

WORK EXPERIENCE

Teaching/Research Assistant, August 2020-Present
University of Arizona

- Classes TA'd: Physical Geology (GEOS251); Historical Geology (GEOS255); Geological Hazards (GEOS218); Sedimentology & Stratigraphy (GEOS302)

Teaching Assistant, August 2018-May 2020
Montana State University

- Classes TA'd: Introduction to GIS (GPHY284, twice); Advanced GIS & Spatial Analysis (GPHY384); Sedimentary Petrology (GEO443, twice)

Geologic Mapping, June-August 2018
EDMAP/USGS, Montana Bureau of Mining and Geology

- Eight weeks mapping quadrangle for USGS.

@cadenhowlett blog, Spring 2016-Present

- Science communication platform focused on topics in geoscience, astrophysics, field-based scientific research, and travel/exploration. Current following of over 100,000 people. (@cadenhowlett).
- Recurring weekly column in *MSU Exponent* (university newspaper), September 2019-May 2020, *23 published articles*.

Space Public Outreach Team (SPOT) Presenter, February 2016-August 2018
Montana Space Grant Consortium/NASA, Bozeman, MT

- Give presentations to K-12 public schools designed to educate and spark enthusiasm for NASA related endeavors through the Montana Space Grant Consortium (MSGC). *(~100 hours of science presentation total).*

SERVICE, EXTRACURRICULAR, AND PROFESSIONAL DEVELOPMENT

University of Arizona
Department of Geosciences, head of social media (August 2021-Present)
UA GeoDaze Organizing Committee, social media/public outreach (2021, 2022)
Montana State University
Geology Club, President, (2015-2018)
MSU Earth Sciences Department Colloquium Committee, chair social media/marketing (2018-2020)
MSU Earth Sciences Department Party Planning Committee, public relations (2019-2020)
Quaternary Interest Group, (2016-May 2017)
Field Trips and Short Courses

Western Interior US (MT, ID, WY, UT, AZ)—Numerous field trips (2014-2022)
2018 Charles Bradley Inaugural Field Trip (Death Valley, CA), Montana State University
ExxonMobil Petroleum Reservoir Characterization course, Boise, ID (October 2018)
Scanning Electron Microscopy Short Course, Imaging and Chemical Analysis Laboratory, Montana State University (January 2019)
Detrital Zircon Geochronology: U-Pb Data Acquisition, Reduction, Analysis, and Archiving, GSA, Phoenix, AZ (September 2019)
Thermal History Modeling Short Courses (HeFTy+QTQt), Thermo2021, Sante Fe, NM (September 2021)
Chemical Evolution of the Earth Field Trip (UA Grad Course), Hawaiian Islands, October 2021

Member
Geological Society of America (GSA), (2018-Present)
American Association of Petroleum Geologists (AAPG), (2014-Present)
Tobacco Root Geological Society (2019-Present)
Arizona Geological Society (2021-Present)
Society of Economic Geologists (2019-2020)
Montana Brewers Association, (2017-2020)
Montana State University Geology Club (2014-2020)

Certifications
Level 3 Swiftwater Rescue Certified (ACA)
Advanced first aid/CPR (American Red Cross)

TECHNICAL EXPERIENCE

ANALYTICAL AND LABORATORY

Apatite fission track, ap+zr (U-Th)/He thermochronology
Laser-ablation ICP-MS for U-Pb dating and Hf isotopes
Scanning electron microscopy for BSE and CL imaging
X-Ray diffraction, X-ray fluorescence

SCIENTIFIC SOFTWARE

Esri ArcMap & ArcGIS Pro, DZMix, DZNMF, MOVE, HeFTy, QTQt

MEDIA (hyperlinked)

Future Perfect: Montana State University Mountains & Minds, Fall 2018
Daily Interlake Profile: Daily Interlake, March 2019
MSU Students Study North America's Middle Crust: Montana State University, September 2021