

Curriculum Vitae — Mitchell McMillan

Contact information

Dr. Mitchell McMillan

Department of Earth and Atmospheric Sciences
Georgia Institute of Technology
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Current position

Postdoctoral Fellow, Georgia Institute of Technology

May 2022–present

Education

University of Toronto

Sep. 2017–May 2022

Ph.D., Department of Earth Sciences

University of West Florida

Jan. 2014–Jul. 2016

M.Sc., Department of Earth & Environmental Sciences

University of Alabama

Aug. 2007–May 2012

B.Sc. (Summa Cum Laude), Department of Geological Sciences

Research interests

Tectonic geomorphology

Rates, timing, and kinematics of mountain building.

Evolution of topography and relief in orogens.

Arid region surface processes.

Geodynamics

Orogenesis and lithospheric deformation.

Geodynamic/thermodynamic modelling (ASPECT, TerraFERMA, ThermoCodegen, Perple_X).

Professional activities

Co-convener AGU special session

Fall 2021: Lithospheric Foundering: Detection and Effects on Deformation, Topography, and Thermal/Compositional Structure of Continental Lithosphere

Reviewer for: *Geology* (1), *Geophysical Research Letters* (2), *CATENA* (2)

Member American Geophysical Union, since 2019

Publications

11. **McMillan, M.**, Schoenbohm, L. M., and Tye, A. (2023). Plateau formation controlled by lithospheric foundering under a weak crust. *Geophysical Research Letters* 50 (16), e2023GL103996. <https://doi.org/10.1029/2023GL103996>
10. **McMillan, M.** and Schoenbohm, L. M. (2023). Diverse styles of lithospheric dripping: Synthesizing gravitational instability models, continental tectonics, and geologic observations. *Geochemistry, Geophysics, Geosystems*, e2022GC010488. <https://doi.org/10.1029/2022GC010488>
9. **McMillan, M.**, Schoenbohm, L. M., Tye, A., McMillan, M. F., and Zhou, R. (2022). Eocene to Quaternary deformation of the southern Puna Plateau: Thermochronology, geochronology, and structural geology a hinterland basin (NW Argentina). *Tectonics* 41(6), e2022TC007252. <https://doi.org/10.1029/2022TC007252>
8. Tye, A., **McMillan, M.**, Schoenbohm, L. M. and Zhou, R. (2022). Late Cenozoic extensional formation of the Antofalla depression, southern Puna plateau, Argentina: An effect of lithospheric foundering? *Tectonics* 41(3), e2021TC006807. <https://doi.org/10.1029/2021TC006807>
7. Seagren, E., **McMillan, M.**, and Schoenbohm, L. M. (2022). Tectonic control on drainage evolution in broken forelands: Examples from NW Argentina. *Tectonics* 41(1), e2020TC006536. <https://doi.org/10.1029/2020TC006536>
6. Schoenbohm, L. M. and **McMillan, M.** (2021). Worldbuilding from tectonic first principles: Integrating and challenging undergraduate knowledge through a course project. *Journal of Geoscience Education* 70(1), 56–72. <https://doi.org/10.1080/10899995.2021.1908810>
5. **McMillan, M.** and Schoenbohm, L. M. (2020). Large-scale Cenozoic wind erosion in the Puna Plateau: the Salina del Fraile Depression. *Journal of Geophysical Research: Earth Surface* 125, e2020JF005682. <https://doi.org/10.1029/2020JF005682>
4. **McMillan, M.**, Liebens, J., and Bagui, S. (2018). A statistical model for streambank erosion in the northern Gulf of Mexico coastal plain. *CATENA* 165, 145–156. <https://doi.org/10.1016/j.catena.2018.01.027>
3. **McMillan, M.** and Hu, Z. (2017). A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature. *Geomorphology* 294, 146–161. <https://doi.org/10.1016/j.geomorph.2017.03.017>
2. **McMillan, M.**, Liebens, J., Metcalf, C. (2017). Evaluating the BANCS streambank erosion framework on the Northern Gulf of Mexico Coastal Plain. *Journal of the American Water Resources Association* 53(6), 1393–1408. <https://doi.org/10.1111/1752-1688.12572>
1. Liebens, J., Metcalf, C., and **McMillan, M.**, (2016). Development of regional bank erosion relationships for the Coastal Plain hydrophysiographic region. Final Report, grant 13058, State Wildlife Grants. Florida's Wildlife Legacy Initiative, Florida Fish and Wildlife Conservation Commission.

Manuscripts in preparation

1. **McMillan, M.**, Sim, S. J., and Wilson, C., *in preparation*, Reactive thermodynamics of crustal foundering.

Research awards granted

3. **NSF Division of Earth Science – Geophysics #2323318**
Eclogitization of continental lithosphere from subduction zone devolatilization
November 1, 2023–October 31, 2025
2. **Gulf Coast Association of Geological Societies (GCAGS) Research Grant**
Estimating stream bank erosion in the northern Gulf Coast: Improving practical methods
May 1, 2015–April 30, 2016
Secured funding for equipment purchase during my M.Sc. thesis.
1. **Geological Society of America (GSA) Research Grant #1121-15**
Estimating stream bank erosion in the northern Gulf Coast: Improving practical methods
April 1, 2015–March 31, 2016
Secured funding for additional field work during my M.Sc. thesis.

Research awards declined

2. **NSF Division of Earth Science – Tectonics**
Collaborative Research: Resolving the effects of lithospheric foundering on orogenesis: An example from the southern Puna plateau, Argentina
Panel summary: Competitive. **Resubmission in progress.**
1. **NSF EAR Postdoctoral Fellowship**
The effects of wind erosion on arid landscapes: Bridging spatial and temporal scales with landscape evolution models using Landlab
Panel summary: Competitive

Conference abstracts

13. **McMillan, M.**, Sim, S. J., and Wilson, C. (2023). Reactive thermodynamics of crustal foundering. AGU Fall Meeting 2023
12. **McMillan, M.**, Sim, S. J., and Wilson, C. (2022). Investigating the roles of fluids and bulk composition in eclogitization reactions involving continental lithosphere. AGU Fall Meeting 2022
11. Tye, A., **McMillan, M.**, and Schoenbohm, L. M. (2022). Lithospheric foundering recorded by the complex Miocene to Quaternary tectonic evolution of the Southern Puna Plateau, Argentina. Geological Society of America Abstracts with Programs 54(5). <https://doi.org/10.1130/abs/2022AM-379900>
10. **McMillan, M.**, Tye, A., and Schoenbohm, L. M. (2021). Lithospheric dripping under a weak crust: Geodynamic modelling of the Southern Puna Plateau, Argentina. AGU Fall Meeting 2021.
9. **McMillan, M.**, Tye, A., Schoenbohm, L. M., Zhou, R., and McMillan, M. F. (2020). Cenozoic tectonic evolution of the Antofalla Basin in the Puna Plateau, NW Argentina. AGU Fall Meeting 2020.

8. **McMillan, M.** and Schoenbohm, L. M. (2019). Deciphering a large-scale, wind-dominated landscape in the Central Andes: Aeolian topography in the Salina del Fraile Depression, Southern Puna Plateau. AGU Fall Meeting 2019.
7. **McMillan, M.** and Schoenbohm, L. M. (2019). Deformation and exhumation of the Salina del Fraile, NW Argentina: Anatomy of a hinterland basin. Geophysical Research Abstracts, 21, EGU2019-12341.
6. **McMillan, M.** and Schoenbohm, L. M. (2018). Synthesizing global lithosphere removal events: Scale, style, and surface deformation. Geophysical Research Abstracts, 18, EGU2018-10881.
5. Liebens, J. and **McMillan, M.** (2016). A practical streambank erosion model for the coastal plain of the northern Gulf of Mexico. Geological Society of America Annual Meeting. Denver, CO. September 25-26, 2016.
4. **McMillan, M.** and Liebens, J. (2016) Streambank erosion model for the northern Gulf of Mexico Coastal Plain. EcoStream 2016: From Ridgeline to Thalweg, Asheville, NC. August 22-25, 2016.
3. **McMillan, M.**, Liebens, J., and Metcalf, C. (2016). Predicting annual streambank erosion rates in the U.S. Gulf Coastal Plain: BEHI and beyond. Rocky Mountain Stream Restoration Conference. Breckenridge, CO. July 19-21, 2016.
2. **McMillan, M.** and Liebens, J. (2015). Streambank erosion modeling: Improving field methods. American Water Resources Association Conference. Denver, CO. November 16-19, 2015.
1. Liebens, J., **M. McMillan**, and Cambron, D. (2015). Predicting stream bank erosion on the northern Gulf of Mexico Coastal Plain: Pitfalls and solutions. National Association of Environmental Professionals. Honolulu, HI. April 13-16, 2015.

Scholarships

2017–21	Ontario Trillium Scholarship	Government of Ontario
2020	Cameron Allen Explorers Graduate Fellowship	University of Toronto, Earth Sciences
2015	Outstanding Graduate Student Scholarship	University of West Florida, EES
2012	Undergraduate Research Scholarship	University of Alabama, Geology

Awards

2023	Outstanding Paper (with L.M. Schoenbohm)	Journal of Geoscience Education
2021	Best Paper	University of Toronto Mississauga, CPS
2017	Outstanding Master's Thesis	University of West Florida

Teaching experience

6. **ERS402: Advanced Structural Geology (University of Toronto Mississauga)**
Guest lecture: Fall 2021
Designed and delivered 50-minute exercise on numerical modelling (available online at github.com/mitchellmcm27/sandbox-extension-exercise)
5. **ERS302: Tectonics (University of Toronto Mississauga)**
Teaching assistant: Spring 2019, Fall 2020
Third-year tectonics course for Earth science majors.
Co-developed and published an innovative capstone project with Lindsay Schoenbohm (McMillan & Schoenbohm, 2021).
4. **ERS202: Dynamic Earth (University of Toronto Mississauga)**
Teaching assistant: Spring 2019, Spring 2020
3. **ERS 111: Earth, Climate & Life (University of Toronto Mississauga)**
Teaching assistant: Fall 2019
2. **ERS101: Planet Earth (University of Toronto Mississauga)**
Teaching assistant: Spring 2018
1. **GLY2010: Physical Geology (University of West Florida)**
Teaching assistant: Spring 2015

Mentoring and supervision

2022 Undergraduate REU student co-supervised with Dr. Shi Joyce Sim
2014–16 Supervised 28 undergraduate and graduate students on field work (>500 hrs. total)

Other information

Industry: Geologist, Longleaf Energy Group, Inc., 2012–2013
Carbonate microfacies analysis. Exploration geology.

Media: Wind erosion research: November 9, 2020, Education News Canada
<https://educationnewscanada.com/article/education/category/research/100/865004/university-of-torontonovember-9-2020-where-the-wind-blows-u-of-t-study-shows-how-a-powerful-force-sculpts-argentina-s-landscape>

Media: Wind erosion research: October 2020, UTM News
<https://www.utm.utoronto.ca/main-news/where-wind-blows-new-study-shows-powerful-forces-sculpting-argentinas-landscape>
<https://phys.org/news/2020-11-powerful-sculpting-argentina-landscape.html>

Media: Structural geology software: May 22, 2019, UTM News
<https://www.utm.utoronto.ca/vp-research/news/tools-trade-multi-million-dollar-software-donation-provides-geologists-peek-past>

Science writing: McMillan, M. Pangea's Handiwork. Mobile Bay Magazine, January 2015 issue (available online at mobilebaymag.com/pangeas-handiwork).

Open-source software: github.com/mitchellmcm27

Founder: Cool Font LLC, 2016–present

We develop apps for iPhone, Android, and Windows with a focus on utilizing the internal sensors of modern smartphones (www.coolfont.co).

Homepage: www.mitchell-mcmillan.com