Scott Melnyk, Ph.D.

Curriculum Vitae

Postdoctoral Research Associate
Department of Geology and Geophysics
University of Utah
https://scottmelnyk.com

115 S 1460 E Fredrick A. Sutton Building
Salt Lake City, UT 84112, United States
Phone: 780.656.5580
scott.melnyk@utah.edu

Education

Ph.D. in Earth and Atmospheric Sciences, University of Alberta, 12/2023
Thesis: Investigating the occurrence and distribution of bioturbation in tidal sedimentary environments
Advisor*:* Dr. Murray K. Gingras

B.Sc. in Earth and Atmospheric Sciences with Specialization in Geology, University of Alberta, 12/2017
Thesis: Sedimentology and stratigraphy of the Cretaceous Clearwater Formation, Alberta, Canada
Advisor: Dr. Murray K. Gingras

Professional Experience

Postdoctoral Research Associate, University of Utah, Salt Lake City, United States, 03/2024 – present

Graduate Teaching/Research Assistant, University of Alberta, Edmonton, Canada, 05/2018 – 12/2023

Principal Instructor, University of Alberta, Edmonton, Canada, 01/2023 – 04/2023

Sessional Instructor, MacEwan University, Edmonton, Canada, 01/2022 – 04/2023

Geology Summer Student, APEX Geoscience, Nunavut, Canada, 05/2017 – 08/2017

Research

Fields of expertise:
Sedimentology and stratigraphy, process ichnology, modern depositional systems, photogrammetry, reservoir characterization, geologic carbon storage.

Research background:
My research is broadly centered on process sedimentology and animal-sediment interactions. It is multi-disciplinary and primarily field-based, involving studies of both modern depositional systems and outcrop exposures. In modern settings, I focus on developing novel drone-based photogrammetry techniques to build non-destructive, quantitative datasets for assessing sedimentary processes and biological distributions in coastal settings. Selective sediment sampling is then used to analyze grain size, pore-water content, total organic carbon, and elemental geochemistry. My outcrop work, which spans the Phanerozoic, combines photogrammetry and process-based sedimentology and ichnology to interpret a wide range of paleoenvironments, from continental to fully marine settings. Through this work I have become proficient in developing field itineraries, geologic mapping, measuring stratigraphic sections, and implementing varied sampling strategies. Lastly, my subsurface research involves the description and analysis of core, petrophysical, and geochemical data for the purpose of paleoenvironmental interpretation and sequence stratigraphic correlation.

Research projects:
[1]Primary role; [2]mentorship role; [3]supporting role
[*]Modern studies; [^]outcrop studies; [†]subsurface studies

[1,^] Sedimentology, stratigraphy reservoir characterization of an eolian system for subsurface carbon storage: Jurassic Entrada Formation, Utah, United States.

[3,†] Sedimentology and isotope geochemistry of wind-blown lithium-rich sediments in evaporites: Devonian Granite Wash Formation, Alberta, Canada

[1,*] Topographic controls on sedimentation dynamics and bioturbation in intertidal sandflats: White Rock, British Columbia, Canada.

[1,*] Relationship between sediment cohesion and bioturbation in intertidal flat environments: Bay of Fundy, Nova Scotia, Canada.

[3,*] Impact of cyanobacteria on trace metal sequestration in modern oceans: Laboratory experiments using cultured cyanobacteria, Alberta, Canada.

[1,^] Infaunal colonization patterns in tide-dominated shelf deposits: Cambrian Gog Group, Alberta, Canada.

[2,†] Sedimentology and ichnology of modern marginal-marine sediment cores for archeological prospecting: Offshore Oregon, United States.

[1,^] Bioturbation intensity as a proxy for sedimentation rate in tidal dune deposits: Eocene Baronia Formation, Lleida, Spain.

[2,†] Sedimentology, stratigraphy, and photogrammetry of fluvio-tidal outcrops: Cretaceous McMurray Formation, Alberta, Canada.

[2,†] Sedimentology, stratigraphy, and reservoir characterization of shoreface and delta deposits: Triassic Montney Formation, Alberta, Canada.

[3,^] Criteria for distinguishing shoreface *versus* deltaic conglomerates via outcrop modeling: Cretaceous Fahler Member, British Columbia, Canada.

[2,†] Influence of bioturbation on redox conditions during early animal life: Cambrian Mount Whyte Formation, Alberta, Canada.

[1,†] Conceptual model for refining paleoenvironmental interpretations of fluvio-tidal deposits: Cretaceous McMurray Formation, Alberta, Canada.

[1,†] Sedimentology, ichnology, and sequence stratigraphy of marginal marine deposits: Cretaceous Clearwater Formation, Alberta, Canada.

Peer-Reviewed Publications

Link to Google Scholar profile

In revision or review:

2. Lazowski, C.N., Melnyk, S., Gutierrez Rueda, D., Wang, J., Tarhan, L., Hauck, T., Alessi, D., Konhauser, K.O., and Gingras, M.K. (in revision) Wind-blown lithium deposits in the Western Canada Sedimentary Basin. *GSA Bulletin*.

1. Lazowski, C.N., Kalderon-Asael, B., Asael, D., Arizaleta, M.L., Melnyk, S., Wilson, S., Alessi, D., Planavsky, N.J., Konhauser, K.O. and Gingras, M.K. (in revision) Lithium isotopes of the Peace River Arch in the Western Canada Sedimentary Basin. *GSA Bulletin*.

Published or in press:

12. Zonneveld, J-P., Britt, B., Brown, D., Corlett, H., Gingras, M.K., Kuwae, T., Melnyk, S., Naone, S. and Zonneveld, Z. (in press) Biogenic structures produced by foraging shorebirds and waterbirds in marginal marine and marginal lacustrine settings: implications for the rock record. *Journal of Paleontology*, Memoir.

11. Melnyk, S., Lazowski, C.N., Dashtgard, S.E. and Gingras, M.K. (2025) Topographic controls on the distribution of bioturbation in an intertidal sandflat. *Sedimentology*, 72(2), 613-630. https://doi.org/10.1111/sed.13245

10. Melnyk, S., Coutret, B., Brown, D., Zonneveld, J-P., Kavanaugh, J.L. and Gingras, M.K. Assessing Vertical Bioturbation Intensity from Bedding Planes (2025) *In* Bedding Surfaces: True Substrates and Earth Historical Archives (eds. Davies, N.S. and Shillito, A.P.). *Geological Society of London Special Publication*, 566. https://doi.org/10.1144/SP556-2024-7

9. Harris, B.S., Olariu, C., Melnyk, S., LaGrange, M.T., Konhauser, K.O., Gingras, M.K. (2024) New ichnogenus *Aratichnus*, Àger, Lleida, Spain. *Ichnos*, 31, 110-123. https://doi.org/10.1080/10420940.2024.2306975

8. Hao, W., Swaren, L., Baker, D., Melnyk, S., Owttrim, G.W., Hongbo, Z., Gingras, M.K., Alessi D.S. & Konhauser, K.O. (2023) The impact of aggregation between clay and phytoplanktonic cyanobacteria on trace elemental cycling in coastal environments. *Geochimica et Cosmochimica Acta* 360, 68-80. https://doi.org/10.1016/j.gca.2023.09.010

7. Melnyk, S., Lazowski, C.N. & Gingras, M.K. (2022) The sedimentological and ecological significance of an unusual biodeformational structure related to a feeding behavior in gulls (*Larus* sp.). *Ichnos*, 29(2), 84-92. https://doi.org/10.1080/10420940.2022.2067535

6. Melnyk, S., Cowper, A., Zonneveld, J-P. & Gingras, M.K. (2022) Applications of photogrammetry to neoichnological studies: The significance of shorebird trackway distributions at the Bay of Fundy. *Palaios*, 37(10), 606-621. https://doi.org/10.2110/palo.2021.055

5. Chen, Q., Shchepetkina, A., Melnyk, S. & Gingras, M.K. (2022) Integrating Facies Analysis with Dipmeter Data to Characterize Point Bars of the Lower Cretaceous McMurray Formation, Christina River, AB, Canada. *Marine and Petroleum Geology*, 136, 105449. https://doi.org/10.1016/j.marpetgeo.2021.105449

4. Feng, C., Melnyk, S., Ross, C., Shanley, K., Zonneveld, J-P. & Gingras, M.K. (2021) Lithofacies-dependent pore-throat radii and reservoir properties in the Lower Triassic Montney Formation, Puskwaskau Field, Alberta. *Marine and Petroleum Geology*, 131, 105157. https://doi.org/10.1016/j.marpetgeo.2021.105157

3. Swaren, L., Hao, W., Melnyk, S., Baker, D., Li, Y., Owttrim, G. W., Hongbo, Z., Gingras, M.K., Alessi, D.S. & Konhauser, K.O. (2021) Surface reactivity of the cyanobacterium *Synechocystis* sp. PCC 6803–Implications for trace metals transport to the oceans. *Chemical Geology*, 562, 120045. https://doi.org/10.1016/j.chemgeo.2020.120045

2. Melnyk, S., Packer, S., Zonneveld, J-P. & Gingras, M.K. (2021) A new marine woodground ichnotaxon from the Lower Cretaceous Mannville Group, Saskatchewan, Canada. *Journal of Paleontology*, 95(1), 162-169. https://doi.org/10.1017/jpa.2020.63

1. Melnyk, S. & Gingras, M.K. (2020) Using ichnological relationships to interpret heterolithic fabrics in fluvio-tidal settings. *Sedimentology*, 67(2), 1069-1083. https://doi.org/10.1111/sed.12674

Conference Presentations

7. Melnyk, S., Birgenheier, L.P., Vanden Berg, M.D., St. Pierre, G.A.E., Bailey, N. (2024) Evaluating the CO_2 Storage Potential of the Entrada Sandstone in the Eastern Uinta Basin, Utah. *AAPG Rocky Mountain Section Meeting, Park City, Utah* [oral presentation].

6. Melnyk, S., Lazowski, C.N. & Gingras, M.K. (2023) Burrow Distributions in an Active Intertidal Dune Field in White Rock, British Columbia, Canada. *International Association of Sedimentologists (IAS) Annual Meeting of Sedimentology, Dubrovnik, Croatia* [oral presentation].

5. Melnyk, S., Lazowski, C.N. & Gingras, M.K. (2023) Factors Influencing the Distribution of Endobenthic Animals in Intertidal Environments. *ATLAS Research Symposium, Edmonton, Canada* [oral presentation].

4. Melnyk, S., Zonneveld, J-P. & Gingras, M.K. (2020) Compound Dune Distributions in the Intertidal Zone of the Bay of Fundy, Nova Scotia. *Shell Enhanced Learning Symposium, Edmonton, Canada* [poster presentation].

3. Melnyk, S. & Gingras, M.K. (2019) Interpreting Heterolithic Fabrics Using Ichnological Relationships: Case Study from the McMurray Formation, Alberta, Canada. *American Association of Petroleum Geologists (AAPG) Annual Convention and Exhibition, San Antonio, United States* [oral presentation].

2. Melnyk, S. & Gingras, M.K. (2018) Facies Analysis and Stratigraphic Framework of the McMurray Formation in Township 98, Range 8W4. *McMurray Geology Consortium Annual Meeting, Calgary, Canada* [poster presentation].

1. Melnyk, S., Prenoslo, D. & Gingras, M.K. (2017) Sedimentology, Ichnology, and Stratigraphy of the Cretaceous Clearwater Formation. *ATLAS Undergraduate Research Symposium, Edmonton, Canada* [poster presentation].

Teaching Experience

Lectures – postdoc, principal instructor, or sessional instructor *(n = 3.5):*
Sedimentology and Stratigraphy (co-instructor), University of Utah, 2024
Sedimentology and Stratigraphy, MacEwan University, 2023
Geology of Western Canada (online), University of Alberta, 2023
Introduction to Physical Science, MacEwan University, 2022

Field courses – teaching assistant *(n = 5):*
4x Geology Field School, University of Alberta, 2018, 2019, 2021, 2022
Geology Field Techniques, University of Alberta/Nanjing University, Summer 2021

Laboratory sessions – teaching assistant or sessional instructor *(n = 12):*
Sedimentology and Stratigraphy, MacEwan University, 2023
4x Advanced Sedimentology, University of Alberta, 2019, 2020, 2021, 2022

2x Introduction to Physical Science, MacEwan University, 2022
Introduction to Environmental Earth Science, MacEwan University, 2022
Advanced Geobiology, University of Alberta, 2022
Sedimentary Systems, University of Alberta, 2021
2x Engineering Earth Science, University of Alberta, 2018

Laboratory coordination – teaching assistant *(n = 1):*
Engineering Earth Science (9 lab sessions; 250 students), University of Alberta, 2023

Pedagogical Materials

Lecture Materials Developed:

Geology of Western Canada, University of Alberta: designed quizzes, practice exams, and exams; modified lecture notes.

Sedimentology and Stratigraphy, MacEwan University: designed lecture assignments, active learning exercises, interactive review sessions, practice exams, and exams; modified lecture notes.

Introduction to Physical Science, MacEwan University: designed lecture notes, active learning exercises, interactive review sessions, practice exams, and exams.

Laboratory Materials Developed:

Sedimentology and Stratigraphy, MacEwan University: modified pre-lab presentations and lab assignments, including curating new rock samples.

Advanced Sedimentology, University of Alberta: designed pre-lab presentations and lab assignments using personally-curated digital outcrop and core datasets.

Engineering Earth Science, University of Alberta: modified full-course lab manual, pre-lab presentations, lab assignments, and lab exams.

Supervisorial Experience

Undergraduate Field/Research Assistants:
N. Bailey: Outcrop characterization of the Jurassic Entrada Formation, University of Utah, 2024

Undergraduate Thesis Advisees:
A. Cowper: Sedimentology of the Cretaceous McMurray Formation, University of Alberta, 2019-2020
C. Shan: Geochemical Analysis of Cambrian Trace Fossils, University of Alberta, 2018-2019

Awards and Scholarships

External ($2,925 CAD):
SEPM Student Travel Grant, 2023
CSPG Regional Graduate Scholarship in Geology, 2021

Internal, University of Alberta ($41,600 CAD):
4x CAPP Graduate Scholarship in Geology, 2019, 2021, 2022, 2023
3x Evelyn Wigham (nee Linke) PhD Scholarship in Geology, 2020, 2022, 2023
University of Alberta FGSR Graduate Student Travel Grant, 2023
University of Alberta GSA Academic Travel Grant, 2023
2x Alberta Graduate Excellence Scholarship, 2019, 2020
APEGA Fund in Geology and Geophysics, 2016
Jason Lang Scholarship, 2016

Bill Elder Scholarship in Geology, 2016
Jimmy Marshall Scholarship in Science, 2016

Internal, MacEwan University ($2,000 CAD):
2x Jason Lang Scholarship, 2013, 2014

Professional Development

Graduate Teaching and Learning Program Level 2: Practicum (02/2022): Hybrid workshop at the University of Alberta consisting of 17 hours of instruction in addition to the development of a lesson plan, teaching philosophy, preliminary e-portfolio, teaching development plan, and the design and delivery of two microteaching presentations.

Graduate Teaching and Learning Program Level 1: Foundations (01/2022): 23-hour workshop at the University of Alberta with seminars including: mapping learning objectives and outcomes; the art of lesson planning; fundamentals of evaluation and assessment; supporting an environment for student motivation; circular communication in the classroom; the policy and practices of classroom inclusion; teaching presentation skills; ethical principles in teaching; effective teaching in the lab; indigenizing and decolonizing the academy.

Professional Activity

Oral Session Judge, *AAPG Rocky Mountain Session Meeting (10/2024)*: Evaluated presenter performances, including the clarity of research communication, scientific rigor, and overall presentation effectiveness during technical sessions.

EAS Mentorship Program, *University of Alberta (09/2021 – 04/2023)*: Met regularly with undergraduate students enrolled in the Earth and Atmospheric Sciences mentorship program. Provided guidance and facilitated discussions about academics, careers, and life as a geoscientist.

Webmaster, *Ichnology Research Group (08/2019 – 04/2023)*: Built, designed, and maintained the research group website during my graduate studies: https://cms.eas.ualberta.ca/ichnology.

Vice President External, *AAPG University of Alberta Student Chapter (09/2020 – 08/2022)*: Coordinated fundraising activities and acted as the liaison between the chapter and its sponsors.

Field Trip Leader, *AAPG University of Alberta Student Chapter (09/2019)*: Raised funding for and organized a 9-day field seminar with 17 participants. Focused on the sedimentology and ichnology of the Bay of Fundy, Canada. Co-led by Dr. Murray Gingras and Dr. John-Paul Zonneveld.

Field Trip Co-Leader, *Geobiology Society Conference, Banff, Canada (09/2019)*: Organized a 1-day field seminar with 24 participants. Focused on Cambrian trace fossils and their significance in understanding early animal evolution. Led by Dr. Murray Gingras and co-led by Dr. Maya LaGrange.

Science Olympics Judge, *Association of Professional Engineers and Geoscientists in Alberta (04/2017 – 04/2020)*: Tested, organized, supervised, and judged science competitions for K-12 students.

Editorial Service

Editorial Assistant, *Journal of South American Earth Sciences* (04/2023).

Peer Reviewer, *Sedimentology* (06/2021).

Outreach

Interviewee, *The Griff* (01/2023) What a Geologist wants: https://thegriff.ca/what-a-geologist-wants/

Interviewee, *The Gateway* (01/2021) U of A Graduate Student's Trace Fossil Find Leads to Naming of New Marine Animal: https://thegatewayonline.ca/2021/01/u-of-a-graduate-students-trace-fossil-find-leads-to-naming-of-new-marine-animal/

Interviewee, *University of Alberta Faculty of Science* (08/2020). Graduate student names new trace fossil discovered during coursework: https://www.ualberta.ca/en/earth-sciences/about-the-department/news/2020/august/graduate-student-names-new-trace-fossil-discovered-during-coursework.html