

Tim M. O'Brien

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Education

PhD. Geological Science , Stanford University	2013 – 2017
MSc. Geoscience , University of Michigan	2009 – 2012
MSc. Earth and Environmental Science , University of Kentucky	2007 – 2009
B.S. Geology , University of Dayton	2002 – 2007

Professional Experience

Researcher VII , Akima Systems Engineering	02/13/2023 – present
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- Develop models for assessing future production, consumption, and supply risks of critical minerals and other mineral commodities.
- Develop mining and processing cost models for mineral commodity production.
- Collect, organize, and analyze data pertaining to critical mineral commodity production, trade, and consumption.
- Construct economic cost models for mine project evaluations and risk assessment.
- Generate large datasets, perform statistical analyses, and develop graphics for critical mineral commodity research.
- Compose reports and manuscripts for peer-reviewed international scientific journals.

Research Scientist , Huntington Ingalls Industries	04/01/2022 – 02/03/2023
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- Critical Mineral and Materials Subject Matter Expert.
- Lead investigations into Critical and Strategic Materials markets for acquisition for the National Defense Stockpile.
- Develop spreadsheets and large datasets for research into critical and strategic mineral production, consumption, and trade to assess supply risks.
- Research, evaluate, and promote novel critical mineral commodity processing and extractive metallurgical technologies for SBIR/STTR funding.
- Monitor trend for nonfuel mineral commodity use in manufacturing industries and technologies.
- Lead weekly program status meeting with Defense Logistics Agency – Strategic Materials.
- Perform statistical analysis and develop graphics and visualizations for reports and quick turn-around requests.

Geologist and Research Analyst , Leonardo Technologies Inc.	01/04/2021 – 03/31/2022
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- Spearhead studies pertaining to sustainable critical mineral commodity supply chain development.
- Critical mineral commodity production and geology Subject Matter Expert.
- Monitor trends for critical mineral commodity consumption in auto, aerospace, renewable energy, and electronic manufacturing industries and technologies.
- Lead efforts in construction of Dept. of Energy strategic plan for mineral sustainability.
- Assist in development and drafting of Congressional Reports about critical mineral commodities.
- Generate spreadsheets and large datasets, perform statistical analyses, and develop graphics for governmental reports and peer-reviewed international scientific journals.
- Collaborate with Federal agencies, academic institutions, and mineral industry corporations for governmental studies and reports.
- Review, summarize, and present results of submissions for DOE Request for Information (RFI).

Temporary Program Assistant, Loudoun School for Advanced Studies 08/20/2020 – 12/31/2020

Adjunct Professor, SUNY Cortland 01/01/20 – 08/01/2020

- Lecturing and aiding in field and laboratory courses for Geology and Education majors.
- Providing one-on-one instruction and support during office hours.
- Design, create, and execute all aspects of geospatial database development including: online data mining, production of large datasets, generation of numerous data layers using QGIS, and deployment.
- Perform advanced computation and statistical analyses for geospatial analysis and data visualization.

Analyst, EAG Laboratories 05/01/19 – 12/31/20

- Collaborate with scientists/managers/clients for interdisciplinary, multi-technique approaches.
- Perform and interpret statistical data for methods development and purity control.
- Operate and maintain PerkinElmer NexION ICP-MS for Laser Ablation (LA) ICP-MS.
- Research and methods development pertaining to LA-ICP-MS and digestion of complex matrices.
- Directly responsible for the operation and maintenance of a PerkinElmer 7300V ICP OES.

Research Associate, Syracuse University 08/01/18 – 05/01/19

- Perform statistical analyses and develop graphics for research manuscripts submitted to peer-reviewed international scientific journals.
- Coordinate with Supervisors and Staff to gather, analyze, and communicate recommendations regarding lab operations, scheduling, and budget.
- Compose scripts in NI LabVIEW and Python for data reduction calculations.
- Managed all phases of the design process for design and development of UHV parts and assemblies, including: measuring, drafting in Canvas and FreeCAD, dimensioning, and tolerance.

Faculty Research Assistant, Oregon State University 02/01/18 – 08/01/18

- Directly responsible for several aspects of geochronology services such as fieldwork, laboratory sample preparation, analytical analyses, and reviewing raw and corrected data.
- Oversight of program performance metrics for tracking program schedule, budget analysis, and data quality.
- Generate spreadsheets and datasets, perform statistical analyses, and develop graphics pertaining to mineral geochronology research.
- Compose manuscripts for submission to peer-reviewed international scientific journals.
- Maintain operation, troubleshooting, and repairing of vacuum and analytical equipment.
- Work professionally and efficiently in supervising lab technicians and ensuring a quality product.

Graduate Research Assistant, Stanford University 06/01/13 – 12/31/17

- Conduct several aspects of geologic fieldwork in Brooks Range (AK) and Basin and Range (ID, NV) including: field observations and documentation, rock and mineral identification, structural measurements, and geologic map construction.
- Utilize ArcGIS in the construction and compilation of geologic maps and geospatial databases, including: generation of shapefiles, plotting sampling areas, and digitizing topography.
- Prepare samples and perform analyses using a wide range of analytical equipment (gas source mass spectrometer, LA-ICPMS, SIMS, EMPA, SEM, FT-IR, and Raman spectroscopy).
- Generate spreadsheets and large datasets, perform statistical analyses, and develop graphics pertaining to mineral geochronology research.
- Utilize effective and excellent communication skills to present new results at laboratory group and yearly committee meetings in addition to professional international conferences.

- Constructed and compiled maps, analytical results, figures, and observations for technical reports and peer-reviewed international scientific journal publication.

Researcher, SLAC National Accelerator Laboratory 06/01/12 – 06/01/13

- Communicate with Supervisors monthly progress reports.
- Work collaboratively with researchers and safety team on proper procedures for handling hazardous materials.
- Meticulously prepared soil samples in an oxygen-free environment and analyzed using XRF and Total Organic Carbon Chromatography.
- Assisted in the preparation of a peer-reviewed international scientific published manuscript.

Graduate Research Assistant, Univ. of Michigan 09/01/09 – 04/31/12

- Conduct several aspects of geologic fieldwork, including: field observations and documentation, rock and mineral identification, structural measurements, and collection of glass and clay material.
- Perform centrifuge grain-size separations of clay material for analyses.
- Generate digital topographic and geologic maps using ArcGIS.
- Digitize chemical data reported in various formats into highly accurate digital maps
- Generate spreadsheets and datasets, perform statistical analyses, and develop graphics pertaining to mineral geochronology research.
- Prepare data visualizations for manuscripts submitted to peer-reviewed scientific journals and presentations at laboratory meetings and conferences.
- Preparation of course material and instruct upper-level undergraduate courses (Structural Geology and Geologic Field Mapping).

Graduate Teaching Assistant, University of Kentucky 08/01/07 – 04/31/09

- Conduct several aspects of geologic fieldwork, including: field observations and documentation, rock and mineral identification, structural measurements, and geologic map construction.
- Compiled geologic data and GPS coordinates for the production of a 1:24,000 scale quadrangle map using ArcGIS.
- Utilize ArcGIS to generate a large geospatial datasets of geochronology/geochemistry data to develop models for tectonic reconstructions of the northern Appalachians
- Preparation of course material and instruct undergraduate courses (Petrology, Mineralogy, Structural Geology and Introduction to Geologic Field Mapping).

Publications

O'Brien, T., Alonso, E., and Nassar, N., *In Prep*, Simplified cost estimate model for Rare Earth mining and recovery projects: *In prep for Mineral Economics*.

O'Brien, T., Grove, M., 2020 Subduction accretion, thermal overprinting, and exhumation of high-pressure/low-temperature metasedimentary rocks of the south-central Brooks Range: *International Geology Review*, DOI: 10.1080/00206814.2020.1841684.

O'Brien, T., Miller, E.L., Pease, V., Hayden, L., Fisher, C., Hourigan, J., Vervoort, J., 2018, Provenance, U-Pb detrital zircon geochronology, Hf isotopic analyses, and Cr-spinel geochemistry of the northeast Yukon Koyukuk Basin, AK: Implications for Alaska interior basin development and sedimentation in Alaska: *Geological Society of America Bulletin*, v 130, p. 825-847.

Miller, E.L., Meisling, K.E., Akinin, V.V., Brumley, K., Coakley, B.J., Gottlieb, E.S., Hoiland, C.W.,

O'Brien, T.M., Soboleva, A., and Toro, J., 2017, Circum-Arctic Lithosphere Evolution (CALE) Transect C: Displacement of the Arctic-Alaska – Chukotka microplate toward the Pacific during opening of the

Amerasia Basin of the Arctic, in Pease, V., and Coakley, B., eds., Circum-Arctic Lithosphere Evolution: Geological Society, London, Special Publications, v. 460, <https://doi.org/10.1144/SP460.9>.

Massey, M.A., Moecher, D.P., Walker, T.B., **O'Brien, T.M.**, Rohrer, L.M., The role and extent of dextral transpression and lateral escape on the post-Acadian tectonic evolution of south-central New England: *American Journal of Science*, v. 317, p. 34-94.

O'Brien, T., Miller, E., Benowitz, J., Meisling, K., Dumitru, T., (2016) Dredge samples from the Chukchi Borderland: Implications for paleogeographic reconstruction and tectonic evolution of the Amerasia Basin of the Arctic: *American Journal of Science*, v. 316, p. 873-924

Janot, N., Lezama Pacheco, J. Pham, D., **O'Brien, T.**, Hausladen, D., Noël, V., Lallier, F., Maher, K., Fendorf, S., Williams, K., Long, P., Bargar, J., (2015) Physico-chemical heterogeneity of organic-rich sediments in the Rifle aquifer, CO: Impact on uranium biogeochemistry: *Environmental Science and Technology*, v. 50, p. 46-53.

O'Brien, T., Miller, E., (2014) Continuous zircon growth during long-lived granulite facies metamorphism: A microtextural, U-Pb, Lu-Hf and trace element study of Caledonian rocks from the Chukchi Borderland, Arctic Ocean: *Contributions to Mineralogy and Petrology*, v. 168, p. 1-19.

O'Brien, T., van der Pluijm, B.A., (2012) Timing of Iapetus Ocean rifting from Ar geochronology of pseudotachylytes in the St. Lawrence rift system of southern Quebec: *Geology*, v. 40, p. 443-446.

Drafted Reports

U.S. Department of Energy, Office of Fossil Energy and Carbon Management, *Multi-Year Program Plan for Division of Minerals Sustainability*. October, 2021.
https://www.energy.gov/sites/default/files/2021-10/MSD%20Multi-Year%20Program%20Plan%202021_0.pdf

U.S. Department of Energy, Office of Fossil Energy and Carbon Management, *Wyoming State Critical Mineral Resource Opportunities in a Decarbonized Economy Study*.

The Pennsylvania State University Center for Critical Minerals, [*Secondary Cobalt and Manganese Resources in Pennsylvania: Quantities, Linkage with Mine Reclamation, and Preliminary Flowsheet Evaluation for the U.S. Domestic Lithium-Ion Battery Supply Chain*](#).

U.S. Department of Energy, Office of Fossil Energy and Carbon Management, *Report: Evaluating the Development of Advanced Separation Technologies for the Extraction and Recovery of Rare Earth Elements and other Critical Minerals from Coal and Coal Byproducts*.