Curriculum Vitae for
Emily A. Baker

PERSONAL DETAILS

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Google Scholar Profile: https://scholar.google.com/citations?user=ZFz0pVQAAAAJ&hl=en
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Personal Website: https://emilyabaker.weebly.com/

EDUCATION

2015 – 2019 **Doctor of Philosophy** – Earth Sciences
Syracuse University, Syracuse, NY
Dissertation Title: Surface Water – Groundwater Interactions in a Proglacial Alpine Catchment: Applications of Heat Tracing, Modeling, and Remote Sensing Methods

2011 – 2015 **Bachelors** – Geology
Bachelors – Statistics (minor)
Magna cum laude with Honors in Geology
Mount Holyoke College, South Hadley, MA
Honors Thesis Title: Calcite-Graphite Isotope Thermometry of Marble in the Bancroft Shear Zone

RESEARCH & WORK EXPERIENCE

2023 **Scientist II (Hydrogeologist)** (6 months), Wisconsin Geological & Natural History Survey, University of Wisconsin-Madison, Madison, WI

2020 – 2022 **Postdoctoral Research Associate**, Department of Civil Engineering & Architecture, Department of Mathematics, University of Pavia, Pavia, Italy

2019 – 2020 **Term Hydrologist** (6 months), United States Geological Survey, Denver, CO

2018 **Environmental Consulting Intern**, Geosyntec, Seattle, WA (Summer-8 weeks)

2015 – 2019 **PhD Research Assistant/Fellow**, Department of Earth Sciences, Syracuse, NY

2014 – 2015 **Undergraduate Thesis Research**, Mount Holyoke College, South Hadley, MA

2013 **Summer Research Intern**, Cary Institute of Ecosystem Studies, Millbrook, NY

PEER REVIEWED PUBLICATIONS

(7) **Baker**, E.A., L. Tamellini, S. Todeschini, G. Sangalli, A. Reali, S. Manenti. (2023 - Accepted, In Press). Combining noisy well data and expert knowledge in a Bayesian calibration of a flow model under uncertainties: an application to solute transport in the Ticino basin, *International Journal on Geomathematics*. http://arxiv.org/abs/2210.17388

(6) Cappato, A., **Baker**, E.A., A. Reali, S. Todeschini, S. Manenti. (2022). The role of modeling scheme and input uncertainty in the analysis and mitigation of backwater induced urban flood-risk, *Journal of Hydrology*, 614: Part B, https://doi.org/10.1016/j.jhydrol.2022.128545

(5) **Baker**, E.A., A. Cappato, S. Todeschini, L. Tamellini, G. Sangalli, A. Reali, S. Manenti. (2022). Combining the Morris Method and Multiple Error Metrics to Assess Aquifer Characteristics & Recharge in the Lower Ticino Basin, Italy, *Journal of Hydrology*, 614: Part A, https://doi.org/10.1016/j.jhydrol.2022.128536

(4) **Baker**, E.A., L.K. Lautz, J.M. McKenzie, C. Aubry-Wake. 2019. Improving the accuracy of time-lapse thermal infrared imaging for hydrologic applications, *Journal of Hydrology*, 571, 60-70. https://doi.org/10.1016/j.jhydrol.2019.01.053

(3) Caldwell, S., C. Kelleher, E. **Baker**, L. K. Lautz. 2019. Stream temperature dynamics from above: using thermal infrared imagery to observe and model stream temperature, *Science of the Total Environment*, 661, 364-374. https://doi.org/10.1016/j.scitotenv.2018.12.457

(2) **Baker**, E.A., L.K. Lautz, C. Kelleher, J.M. McKenzie. 2018. The importance of incorporating diurnally fluctuating stream discharge in stream temperature energy balance models. *Hydrological Processes*, 32, 2901-2914. https://doi.org/10.1002/hyp.13226

(1) Glose, A.M., L.K. Lautz, E.A. **Baker**. 2017. Stream heat budget modeling with HFLUX: model development, verification, and applications across contrasting sites and seasons. *Environmental Modeling & Software*, 92, 213-228. https://doi.org/10.1016/j.envsoft.2017.02.021

OTHER PUBLICATIONS

Baker, E.A. 2020. Tools of the Trade: Measuring stream temperature using thermal infrared imagery, *Nature Reviews Earth & Environment*. https://doi.org/10.1038/s43017-020-0050-1

GRANTS & FELLOWSHIPS

2020 – 2022	Borsa di studio per attività di ricerca (Research Fellowship), University of Pavia
2018	EMPOWER Seed Grant (~$900)
2017 – 2018	Syracuse University Water Fellowship
2017	Northeast GSA Travel Grant Recipient
2017	EMPOWER Seed Grant (~$4100)
2016 – 2017	Energy Model Program on Water-Energy Research, NSF NRT Fellowship
2016	Northeast GSA Travel Grant Recipient
2016	CNYAPG Grant for Student Research Recipient ($1000)

AWARDS & HONORS

2019 Newton E. Chute Award, for outstanding graduate scholarship
2019 Student Publication Award, Syracuse Department of Earth Sciences
2019 Director's Citation for Excellence, EMPOWER Program
2018 Outstanding Student Presentation Award, AGU Conference
2017 Chairman's Award, for service to the department and professional promise

TEACHING EXPERIENCE

2021 **Guest Lecturer** – Continuum Mechanics
Department of Civil Engineering & Architecture, University of Pavia, Pavia, Italy

2019 **Teaching Assistant** – Oceanography (EAR 117) – Spring semester
Department of Earth Sciences, Syracuse University, Syracuse, NY

2018 **Teaching Assistant** – Water and Our Environment (EAR 205) – Fall semester
Department of Earth Sciences, Syracuse University, Syracuse, NY

2015 **Teaching Assistant** – Earth Science (EAR 105) – Fall semester

2015 **Teaching Assistant** – Igneous & Metamorphic Petrology (GEO 322) – Spring semester
Department of Geology, Mount Holyoke College, South Hadley, MA

2014 **Teaching Assistant** – Rocks & Minerals (GEO 201) – Fall semester
Department of Geology, Mount Holyoke College, South Hadley, MA

2013 **Teaching Assistant** – Elementary Data Analysis and Experimental Design (STAT 240)
Department of Statistics, Mount Holyoke College, South Hadley, MA

TECHNICAL SKILLS

Field Equipment: Current/Flow Meter, Total Station, SuperSting Electrical Resistivity Meter, HOBO Water Level Data Loggers, iButton Temperature Loggers, Jenoptik HD Thermal Infrared Camera, Vantage Pro2 Meteorological Station, YSI pH/conductivity multi-meter

Software: Python, MATLAB, Visual MODFLOW, ModelMuse, FloPy, QGIS, ArcGIS, AquaChem, AQTESOLV, Adobe Illustrator, Microsoft Excel, PowerPoint, AQUARIUS

Laboratory Skills: ICS 2000 Ion Chromatograph (IC), Picarro L2130-I Water Isotope Analyzer, Inductively Coupled Plasma Optical Emission Spectrometer (ICP-OES)

Languages: English (native), Italian (B2/C1 – Upper Intermediate)

WORKSHOPS & SHORT COURSES

2019 Introduction to Python for Hydrologists, USGS
2019 Application of Python and FloPy to Groundwater Modeling, USGS
2018 Water – Energy Field Course: International Field Experience, Rwanda
2017 Implicit Bias and Inclusive Practices
2017 Sequence Stratigraphy from outcrop to the subsurface: Kevin Bohacs, Exxon Mobil
2017 Water – Energy Field Course: Domestic Field Experience, Northeastern U.S.
2017 Level I Infrared Thermography Training Course, Infrared Training Center
2017 Applied Geochemical Methods for Mountain Hydrology Workshop, McGill University
2016 GSA: Practical Techniques for Using Temperature as a Tracer in Hydrologic Research
2016 AAAS Workshop

SERVICE & LEADERSHIP

Fall 2019 **Volunteer**, AGU Conference Student Volunteer

Spring 2018 **Faculty Representative**, Syracuse Geology Graduate Organization (GeoGo)

2016 – 2017 **President**, Syracuse University Geology Club

2015 – 2016 **Vice President**, Syracuse University Geology Club

CONFERENCE ABSTRACTS

Baker, E.A., P. Michael, D. Hart. Groundwater transport in the Wisconsin Central Sands region. North-Central Section GSA. Geological Society of America Abstracts with Programs. Vol. 55, No. 3, 2023, doi: 10.1130/abs/2023NC-386995, May 4-5, 2023: Grand Rapids, Michigan. **Oral**

Baker, E.A., A. Cappato, A. Bressan, L. Tamellini, A. Reali, G. Sangalli, S. Manenti. The Impact of Parameter Uncertainty on Groundwater Flow Modeling of the Lower Ticino Basin. SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS21), June 21 - 24, 2021. **Online Oral**

Baker, E.A., L.K. Lautz, J.M. McKenzie, C. Kelleher. Illuminating the unseen: resolving how reflection impacts stream temperature observations from time-lapse, ground-based IR cameras. Canadian Geophysical Union Annual Meeting, June 2018: Niagara Falls, New York. **Poster**

Baker, E.A., L.K. Lautz, J.M. McKenzie. Improving the accuracy of stream temperatures acquired through ground-based time-lapse thermal infrared imagery. Proceedings of the America Geophysical Union Annual Meeting, December 2018: Washington, D.C. H11H-1561. **Poster**

Baker, E.A. L.K. Lautz, J.M. McKenzie, B.G. Mark. Methods for correcting ground-based time-lapse infrared imagery. Geological Society of America Abstracts with Programs. Vol. 49, No. 6, doi: 10.1130/abs/2017AM-305398, October 22-25, 2017: Seattle, Washington. **Poster**

Baker, E.A. L.K. Lautz, C. Kelleher, J.M. McKenzie. The importance of diurnal fluctuations in stream discharge for determining groundwater inflow. Gordon Research Conference on Catchment Science, June 25-30, 2017: Lewiston, Maine. **Poster**

Baker, Emily, L.K. Lautz, J.M. McKenzie, C. Aubry-Wake, L. Somers, O. Wigmore, A. Glose, R.L. Glas, B.G. Mark. Infrared imaging and modeling of proglacial stream temperature in the Cordillera Blanca, Peru. Proceedings of the Northeastern Section of the Geological Society of America, March 21-23, 2016: Albany, NY. **Oral**

Baker, E.A., L.K. Lautz, J.M. McKenzie, A. Glose, C. Kelleher. The effect of channel geometry and diurnal discharge fluctuations on modeled stream temperatures. Proc. of the AGU Annual Meeting, Dec. 12-16, 2016: San Francisco, California. H33B-1543. **Poster**

Baker, E.A., L.K. Lautz, J.M. McKenzie, A. Glose. How do amplitude and phase shift of diurnal discharge fluctuations affect stream temperature models? Geological Society of America Abstracts with Programs. Vol. 48, No. 7, September 2016: Denver, Colorado. **Oral**

Baker, E.A., L.K. Lautz, J.M. McKenzie, C. Aubry-Wake, O. Wigmore, B.G. Mark. Infrared imaging of proglacial stream temperature in the Cordillera Blanca, Peru. Central NY Association of Professional Geologists Meeting, September 15, 2016: Syracuse, NY. **Oral**

Baker, EA, LK Lautz, C Aubry-Wake, JM McKenzie, RL Glas, BG Mark. Infrared Imaging and Modeling of Proglacial Stream Temperature in the Cordillera Blanca, Peru. Proc. of the AGU Annual Meeting, December 14-18, 2015: San Francisco, California. H23H-1670. **Poster**

ASSOCIATED ABSTRACTS

Markley, M., Dunn, S.R., **Baker**, E. Shear zones and Ottawan deformation in the central metasedimentary belt of the Grenville province of southern Ontario, Canada. Geological Society of America Abstracts with Programs. Vol. 54, No. 5. https://doi.org/10.1130/abs/2022AM-379877, October 9-12, 2022: Denver, Colorado.

Newman, C., E., **Baker**, S., Paschke, Z., Kisfalusi. Multi-component geochemical characterization to support hydrologic modeling in an urban aquifer system, fountain creek alluvial aquifer, El Paso County, Colorado. Goldschmidt Virtual, June 21-26, 2020.

Baker, E.A., L.K. Lautz, J.M. McKenzie, C. Kelleher. Illuminating the unseen: resolving how reflection impacts stream temperature observations from time-lapse, ground-based IR cameras. Canadian Geophysical Union Annual Meeting, June 10-14, 2018: Niagara Falls, New York.

McKenzie, J.M., R.L. Glas, L.K. Lautz, B.G. Mark, O. Wigmore, M. Baraer, E.A. **Baker**. Hydrologic transformation of the glacierized watersheds in Peruvian Andes: From glaciers to groundwater. Proceedings of the American Geophysical Union Annual Meeting, December 12-16, 2016: San Francisco, California. H13L-1588.

Glas, R.L., L.K. Lautz, J.M. McKenzie, E.A. **Baker**, L.D. Somers, C. Aubry-Wake, O. Wigmore, B.G. Mark, R. Moucha. Integrating multiple geophysical methods to quantify alpine

groundwater-surface water interactions: Cordillera Blanca, Peru. Proceedings of the American Geophysical Union Annual Meeting, December 12-16, 2016: San Francisco, CA. NS43C-1937.

Glas, R.L., L.K. Lautz, J.M. McKenzie, C. Aubry-Wake, E.A. **Baker**, L. Somers, B.G. Mark, O. Wigmore. Characterization of aquifer structure using seismic refraction tomography in the Cordillera Blanca, Peru. Foro Internacional de Glaciares y Ecosystemas de Montana. August 10-13, 2016: Huaraz, Peru.

McKenzie, J.M., C. Aubry-Wake, E.A. **Baker**, L.K. Lautz, O. Wigmore, M. Baraer, B.G. Mark. Hot and Hotter: Temperature as an indicator of environmental change and a tracer of hydrologic processes. Proceedings of the Canadian Geophysical Union, May 29-June 2, 2016: Fredericton.

Glas, R.L., L.K. Lautz, J.M. McKenzie, E.A. **Baker**, C. Aubry-Wake, L. Somers, O. Wigmore. Constraining subsurface structure and composition using seismic refraction surveys of proglacial valleys in the Cordillera Blanca, Peru. Proceedings of the Northeastern Section of the Geological Society of America, March 21-23, 2016: Albany, New York.

Glas, R.L., L.K. Lautz, J.M. McKenzie, E.A. **Baker**, C. Aubry-Wake, L. Somers. Constraining Subsurface Structure and Composition Using Seismic Refraction Surveys of Proglacial Valleys in the Cordillera Blanca, Peru. Proceedings of the American Geophysical Union Annual Meeting, December 14-18, 2015: San Francisco, California.