

HEATHER L. PETCOVIC

Department of Geosciences and The Mallinson Institute for Science Education
Western Michigan University, Kalamazoo, MI 49008
Phone: (269) 387-5488; FAX: (269) 387-5513
Email: heather.petcovic@wmich.edu

PROFESSIONAL PREPARATION

- PhD**, Geology, Oregon State University, 2004. Dissertation: Feeder dikes to the Columbia River flood basalts: Underpinnings of a large igneous province.
- MS**, Geology, Oregon State University, 2000. Thesis: Partial melting of tonalite at the margins of a Columbia River Basalt dike, Wallowa Mountains, northeastern Oregon.
- BA**, *Magna cum laude* with High Honors, Geology, Smith College, 1995. Honors thesis: A petrographic and geochemical study of High Cascades volcanism in south-central Oregon.

APPOINTMENTS

- 8/11 to present **Associate Professor**, Western Michigan University, Earth Science Education. Joint appointment in Geosciences Department and The Mallinson Institute for Science Education.
- 8/04 to 8/11 **Assistant Professor**, Western Michigan University, Earth Science Education. Joint appointment in Geosciences Department and The Mallinson Institute for Science Education.
- 9/01 to 6/04 **Program Coordinator**, Science Connections, Oregon State University. Responsible for coordinating lectures, workshops, high school student research experience in university labs, and other K-12 outreach.
- Summer 01, 02, 03 **Instructor**, Geosciences Department, Oregon State University. Designed and taught four-week undergraduate course in volcanology.
- 7/00 to 6/01 **NSF GK-12 Teaching Fellow**, Oregon State University. Designed and taught inquiry-based science activities in a Portland, Oregon 6th grade.
- 10/97 to 12/99 **Teaching Assistant**, Geosciences Department, Oregon State University. Introductory geology, mineralogy, lithology, igneous petrology, volcanology, and field methods.
- 7/97 to 9/99 **Microprobe Technician**, Oregon State University. Prepared and analyzed geologic materials using a Cameca SX-50 Electron Microprobe.
- 5/95 to 9/95 **Geologist**, U.S. Geological Survey, Marlborough, MA. Collected and processed surface water and biologic samples for water quality assessment.
- 7/94 to 8/94 **Keck Geology Consortium Undergraduate Research**, Fish Lake, OR. Summer field research in Oregon Cascades leading to undergraduate thesis.
- 7/93 to 4/94 **Keck Geology Consortium Undergraduate Research**, Williamstown, MA. Summer field research in glacial deposits and geomorphology.

PEER-REVIEWED PUBLICATIONS

(*indicates current or former student)

- *Bentley, A. P. K., **Petcovic, H. L.**, & *Cassidy, D. (In review). Development and validation of the Anthropogenic Climate Change Dissenter Inventory. *Environmental Education Research*.
- *McNeal, P., **Petcovic, H. L.**, & Reeves, P. (In review). Enablers of hope: Investigating the motivations of passionate climate change educators. *Journal of Research in Science Teaching*.

- Baker, K. M., and **Petcovic, H. L.** (In press). Sensitivity to landscape features: A spatial analysis of geologists on the move. *Journal of Geoscience Education*.
- Petcovic, H. L.**, Ormand, C. J., and Krantz, R. W. (In press). Earth, mind, and paper: Field sketches as expert representations of the Hat Creek fault zone. In R. W. Krantz, C. J. Ormand, and B. Freeman (Eds), *3-D Structural Interpretation: Earth, Mind, and Machine: AAPG Memoir 111*, p. 173-189.
- Tarampi, M. R., Atit, K., **Petcovic, H. L.**, Shipley, T. F., and Hegarty, M. (In press). Spatial ability in expert geoscientists. In R. W. Krantz, C. J. Ormand, and B. Freeman (Eds), *3-D Structural Interpretation: Earth, Mind, and Machine: AAPG Memoir 111*, p.
- Baker, K. M., *Johnson, A. C., *Callahan, C. N., & **Petcovic, H. L.** (2016). Use of cartographic images by expert and novice field geologists in planning fieldwork routes. *Cartography and Geographic Information Science*, 43(2): 176-187. DOI: 10.1080/15230406.2015.1072735
- Petcovic, H. L.**, Stokes, A., & Caulkins, J. L. (2014). Geoscientists' perceptions of the value of undergraduate field education. *GSA Today*, 24(7), 4-10. DOI: 10.1130/GSATG196A.1
- Petcovic, H. L.**, Fyneweaver, H., Henderson, C., *Mutambuki, J. M., & *Barney, J. A. (2013). Faculty grading of quantitative problems: A mismatch between values and practice. *Research in Science Education* 43(2), 437-455. DOI: 10.1007/s11165-011-9268-8
- Koretsky, C. M., **Petcovic, H. L.**, & *Rowbotham, K. L. (2012). Teaching environmental geochemistry: An authentic inquiry approach. *Journal of Geoscience Education* 60, 311-324. DOI: 10.5408/11-273.1
- Baker, K. M., **Petcovic, H. L.**, *Wisniewska, M., & Libarkin, J. C. (2012). Spatial signatures of mapping expertise among field geologists. *Cartography and Geographic Information Science* 39(3), 119-132. DOI: 10.1559/15230406393119
- Henderson, C., Fyneweaver, H., **Petcovic, H.**, & *Bierma, A. (2012). Identifying the local impacts of national ATE Centers on their host institutions: An exploratory study. *Community College Review* 40(1), 3-24. DOI: 10.1177/0091552112436678
- Hambrick, D. Z., Libarkin, J. C., **Petcovic, H. L.**, Baker, K. M., Elkins, J., *Callahan, C. N., Turner, S. P., Rench, T. A., & LaDue, N. D. (2012). A test of the Circumvention-of-Limits hypothesis in scientific problem solving: The case of geological bedrock mapping. *Journal of Experimental Psychology: General*, 141(3), 397-403. DOI: 10.1037/a0025927
- Petcovic, H. L.**, Libarkin, J. C., & Baker, K. M. (2009). An empirical methodology for investigating geocognition in the field. *Journal of Geoscience Education* 57, 316-328.
- Petcovic, H. L.**, & *Ruhf, R. (2008). Geoscience conceptual knowledge of preservice elementary teachers: Results from the Geoscience Concept Inventory. *Journal of Geoscience Education* 56, 251-260.
- Petcovic, H. L.**, & Dufek, J. D. (2005). Modeling magma flow and cooling in dikes: Implications for the emplacement of Columbia River flood basalts. *Journal of Geophysical Research* 110 (B10201). doi: 10.1029/2004JB003432.
- Petcovic, H. L.**, & Grunder, A. L. (2003). Textural and thermal history of partial melting in tonalitic wallrock at the margin of a basalt dike, Wallowa Mountains, Oregon. *Journal of Petrology* 44, 2287-2312.
- Petcovic, H. L.**, Grunder, A. L., & Nielsen, R. L. (2001). Partial melting of tonalite at the margins of a Columbia River Basalt dike, northeastern Oregon. *Oregon Geology* 63, 71-76.

OTHER PUBLICATIONS

- Petcovic, H. L.**, Turner, S. P., Geraghty Ward, E., Cartwright, T., LaDue, N., Mogk, D., *Bentley, A. P. K., and Her, X. (2016). *Geo-Needs: Stakeholder needs assessment for broadening participation in the geoscience workforce* (Geo-Needs Focus Group Meetings Report). Available from Geo-Needs website: <http://serc.carleton.edu/geoneeds/index.html>

- Petcovic, H. L.**, LaDue, N. L., & Turner, S. P. (2016). Promoting geosciences at minority-serving and two-year colleges. *Eos*, 97, DOI:10.1029/2016EO045647.
- St. John, K., **Petcovic, H.**, Stokes, A., Arthurs, L., Callahan, C., Feig, T., Gates, A., Gray, K., Kortz, K., McNeal, K., Nagy-Shadman, E., Teed, R., & Van Hosen, J. (2016). Un-packaging manuscript preparation and review guidelines for Curriculum & Instruction and Research papers. *Journal of Geoscience Education* 64, 1-4.
- Libarkin, J. C., Baker, K. M., Hambrick, D. Z., & **Petcovic, H. L.** (2011). Practical lessons from research on field cognition and behavior. *In the Trenches* 1(4), 14-17. Retrieved from <http://nagt.org/nagt/publications/trenches/issues/oct11.html#sixth>
- Baker, K. M., *Simms, E. R., & **Petcovic, H.** (August, 2011). *Expertise as a predictor of time use during geologic field mapping*. Paper presented at the Proceedings of the International Association of Time Use Research 2011 Meeting, London, UK.
- Billington, J., Baisden, C., & **Petcovic, H.** (2010). Global warming: a current crisis? A greenhouse gas introduction. *Michigan Science Teachers Association Journal* 55, 71-79.
- Petcovic, H. L.**, Fyneweaver, H., Henderson, C., *Mutambuki, J. M., & *Barney, J. A. (2010). Faculty grading of quantitative problems: Are values consistent with practice? *Proceedings of the NARST 2010 Annual Meeting (Philadelphia, PA, USA)*, Paper #S6.5.11.
- Petcovic, H. L.**, & Libarkin, J. C. (2007). Research in science education: The expert-novice continuum. *Journal of Geoscience Education* 55, 333-339.
- Manduca, C., **Petcovic, H.**, & Linneman, S. (2007). Geoscience faculty discuss courses for future Earth Science teachers. *EOS, Transactions, American Geophysical Union* 88(42), 428.
- Martin, B. S., **Petcovic, H. L.**, & Reidel, S. P. (2005). *Goldschmidt Conference 2005: Field trip guide to the Columbia River Basalt Group*. Richland, WA: Pacific Northwest National Laboratory, PNNL-15221.
- Reidel, S. P., Martin, B. S., & **Petcovic, H. L.** (2003). The Columbia River flood basalts and the Yakima fold belt. In T. W. Swanson (Ed), *Western Cordillera and Adjacent Areas: Geological Society of America Field Guide 4*, (pp. 87-105). Boulder, CO: Geological Society of America.

PROFESSIONAL PRESENTATIONS AT CONFERENCES (PEER-REVIEWED)

- Voice, P., Howe III, T., and **Petcovic, H. L.** (2016). Incorporating technology into K-12 outreach: Lessons learned from an augmented reality sandbox. *Geological Society of America Abstracts with Programs* 48(5). DOI: 10.1130/abs/2016NC-275294
- Cartwright, T., **Petcovic, H.**, Turner, S., LaDue, N., Mogk, D. (2016). Geo-Needs: Ideal Models for broadening participation in the geosciences at two-year and minority-serving colleges. *American Association for the Advancement of Science, Envisioning the Future of Undergraduate STEM education (EnFUSE): Research and Practice Symposium*, Washington, DC, 27-29 Apr.
- Pope, A., *Tinigin, L., **Petcovic, H.**, Ormand, C., & LaDue, N. (2015). PIXELS: Using field-based learning to investigate students' concepts of pixels and sense of scale. Abstract ED21D-0846 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec.
- Her, X., Turner, S., LaDue, N., *Bentley, A., **Petcovic, H.**, Mogk, D., & Cartwright, T. (2015). Geo-Needs: Investigating models for improved access to geosciences at two-year and minority-serving colleges. Abstract ED23D-0873 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 Dec.
- Petcovic, H. L.**, Pope, A., *Tinigin, L., Ormand, C. J., & LaDue, N. D. (2015). PIXEL: Investigating students' concepts of pixels and sense of scale in the field. *Geological Society of America Abstracts with Programs* 47(7), 404. [INVITED]
- Petcovic, H. L.**, & Sexton, J. M. (2015). Mixed up about mixed methods? An overview of mixed methods research designs. *Geological Society of America Abstracts with Programs* 47(7), 253.
- *Bentley, A. P. K., **Petcovic, H. L.**, Turner, S. P., LaDue, N. D., Her, X., Cartwright, T., Mogk, D. W., & Ward, E. M. (2015). Geo-Needs: Ideal models for broadening participation in the geosciences at

- two-year and minority-serving colleges. *Geological Society of America Abstracts with Programs* 47(7), 108.
- *Bentley, A. P. K., Cassidy, D. P., & **Petcovic, H. L.** (2015). Anthropogenic climate change dissenter inventory: Demographic buy-ins. *Geological Society of America Abstracts with Programs* 47(7), 468.
- *McNeal, P., **Petcovic, H. L.**, & Reeves, P. (2015). Using online focus groups to reveal teacher perspectives on climate change education. *Geological Society of America Abstracts with Programs* 47(7), 254.
- Petcovic, H. L.**, Ormand, C. J., & Krantz, R. W. (2015). Using mixed methods to explore field sketching: An example from the Hat Creek Fault Zone. *Earth Educators Rendezvous*, Boulder, CO, USA. Abstract available from: http://serc.carleton.edu/earth_rendezvous/2015/program_table/abstracts/100852.html
- *Callahan, C. N., **Petcovic, H. L.**, and Baker, K. M. (2015). Rock, Paper, Hammer: Where do thoughts and actions count in making a geologic map? *Earth Educators Rendezvous*, Boulder, CO, USA. Abstract available from: http://serc.carleton.edu/earth_rendezvous/2015/program_table/abstracts/100888.html
- *McNeal, P. M., Reeves, P. L. and **Petcovic, H. L.** (2015). Climate change education: The perspective from middle school teachers. *Earth Educators Rendezvous*, Boulder, CO, USA. Abstract available from: http://serc.carleton.edu/earth_rendezvous/2015/program_table/abstracts/100870.html
- Petcovic, H. L.**, Voice, P. J., Cobern, W., Horvitz, B., Harrison, W. B. III, & *Bentley, A. P. K. (2015). Involving stakeholders in developing web-based outreach resources: An example from the MGRRE Education Portal. *Geological Society of America Abstracts with Programs* 47(5), 26.
- Voice, P. J., Gilchrist, A., **Petcovic, H. L.**, & Harrison, W. B. III (2015). A demonstration model of hydraulic fracturing: Hands-on analog to fracturing shale. *Geological Society of America Abstracts with Programs* 47(5), 26.
- Tarampi, M., Atit, K., **Petcovic, H.**, Shipley, T., & Hegarty, M. (2014). Spatial ability in expert geoscientists. *Abstracts of the Psychonomic Society* 19, 163.
- Petcovic, H. L.**, Ormand, C. J., & Krantz, R. W. (2014). Expert field sketches as visual representations of a complex fault zone. *Geological Society of America Abstracts with Programs* 46(6), 383.
- *Bentley, A. P. K., Jones, J., Lane, J. & **Petcovic, H. L.** (2014). An exploratory qualitative study of anthropogenic climate change skeptics' messages on YouTube. *Geological Society of America Abstracts with Programs* 46(6), 601.
- LaDue, N., **Petcovic, H.**, Libarkin, J., Hambrick, D. Z., & Baker, K. (2014). Visuospatial ability and geologic mapping: Experts and novices in the field. Presented at the *2014 Structure and Tectonics Forum*, Golden, CO, USA. [Invited]. Abstract available from: <http://serc.carleton.edu/NAGTWorkshops/structure/2014forumabstracts/82834.html>
- Petcovic, H. L.**, *Barone, S., & *Fulford, J. (2013). Teaching climate change to future teachers using "real" data: Challenges and opportunities. *Abstract ED31E-02 presented at the 2013 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.* [Invited].
- Caulkins, J. L., **Petcovic, H. L.**, & Stokes, A. (2013). Geoscientists' perceptions of the value of undergraduate field education. *Geological Society of America Abstracts with Programs* 45(7), 872.
- *Callahan, C. N., **Petcovic, H. L.**, Libarkin, J. C., & Baker, K. M. (2013). What would Chamberlin think? Experts map without multiple working hypotheses. *Geological Society of America Abstracts with Programs* 45(7), 471.
- Miller, A. E., Mattox, S. R., **Petcovic, H. L.**, Klawiter, M. F., & Gochis, E. E. (2013). "Inquiry Integration." The use of inquiry-based instruction throughout the MiTEP experience to support K-12 earth science education. *Geological Society of America Abstracts with Programs* 45(7), 659.

- Gochis, E. E., Rose, W. I., Vye, E. C., Hungwe, K., Mattox, S. R., & **Petcovic, H. L.** (2013). Increasing awareness of geoheritage sites & earth science literacy through teacher-developed Earthcaches. *Geological Society of America Abstracts with Programs* 45(7), 793.
- Klawiter, M. F., Rose, W. I., Miller, A. E., Vye, E. C., Engelmann, C. A., Mattox, S. R., & **Petcovic, H. L.** (2013). Implementing long-term professional development for urban earth science teachers: Insights from the Michigan Teacher Excellence Program (MiTEP). *Geological Society of America Abstracts with Programs* 45(7), 659.
- Petcovic, H. L.**, Baker, K. M., *Callahan, C. N., Hambrick, D. Z., Libarkin, J. C., Elkins, J., Turner, S. P., Rench, T. A., & LaDue, N. (2013). The role of visuospatial ability in developing mental models during geologic mapping. Presented at the American Association of Petroleum Geologists Hedberg Research Conference *3D Structural Geologic Interpretation: Earth, Mind, and Machine*, Reno, NV, USA.
- Petcovic, H. L.**, Stokes, A. & Caulkins J. L. (2013). Geoscientists' perceptions of the value of fieldwork. *Geological Society of America Abstracts with Programs* 45(4), 70.
- *Barney, J. A., **Petcovic, H. L.**, Fyneweaver, H., Henderson, C., & Mutambuki, J. M. (2013). Do our grading practices send the right message? *Geological Society of America Abstracts with Programs* 45(4), 70. [Best Graduate Student Oral Presentation Honorable Mention]
- *Barone, S. & **Petcovic, H. L.** (2013). Teaching paleoclimate and climate change to future teachers: An action research study. *Geological Society of America Abstracts with Programs* 45(4), 9. [GSA Best Graduate Student Poster Presentation Award]
- *Callahan, C. N., **Petcovic, H. L.**, & Baker, K. M. (2013). How a geologist can get led astray: A video log study examining how errors in observations and interpretations yield errors in geologic maps. *Geological Society of America Abstracts with Programs* 45(4), 70. [GSA Best Graduate Student Oral Presentation Award]
- *Rowbotham, K. L., **Petcovic, H. L.**, & Koretsky, C. M. (2013). Generating content knowledge gains that stick: Cracking the code in a field-based water quality course. *Geological Society of America Abstracts with Programs* 45(4), 70. [Best Graduate Student Oral Presentation Honorable Mention]
- Rudge, D. W., & **Petcovic, H. L.** (2013). Earth science in an on-line environment. *Geological Society of America Abstracts with Programs* 45(4), 21.
- Klawiter, M. F., Mattox, S. R., **Petcovic, H. L.**, Rose, W. I., Huntoon, J. E., Engelmann, C. A., Vye, E. C., Gochis, E. E., Miller, A. E., & McKee, K. F. (2013). Creating a model for improving earth science teaching nationwide: An overview of the Michigan Teacher Excellence Program (MiTEP) NSF Math-Science Partnership. *Geological Society of America Abstracts with Programs* 45(4), 5.
- Mattox, S., **Petcovic, H. L.**, Klawiter, M. F., Gochis, E. E., & Miller, A. E. (2013). Relevant, place-based professional development for urban teachers, Insights from the Michigan Teacher Education Program. *Geological Society of America Abstracts with Programs* 45(4), 5.
- Gochis, E. E., Rose, W. I., Hungwe, K., Klawiter, M. F., Mattox, S. R., **Petcovic, H. L.**, & Miller, A. E. (2013). Promoting geoscience skills and content knowledge by integrating field-based EarthCaches into teacher professional development. *Geological Society of America Abstracts with Programs* 45(4), 6.
- Grabemeyer, N. C., Young, J. L., Jenkins, J. H., Bryant-Kuiphoff, Y. E., Reed, M S., Mattox, S., **Petcovic, H.**, & Rose, W. I. (2013). Kalamazoo and Jackson (MI) K-12 teacher reflections from the Michigan Teacher Education Program. *Geological Society of America Abstracts with Programs* 45(4), 6.
- Ernstes, J. D., Ernstes, A. L., Kay, K. E., Selner, M D., Kahler, D., **Petcovic, H.**, Mattox, S., & Rose, W. I. (2013). Kalamazoo (MI) K-12 Teacher reflections from the Michigan Teacher Excellence Program. *Geological Society of America Abstracts with Programs* 45(4), 6.

- Petcovic, H. L., Baker, K. M., & *Callahan, C. N. (2013).** The role of mental models in navigation: The case of geologic mapping. *Proceedings of the 2013 Association of American Geographers Annual Meeting*, Los Angeles, CA.
- Baker, K. M., & **Petcovic, H. L. (2013).** Expert sensitivity to landscape features: Field researchers on paper and in practice. *Proceedings of the 2013 Association of American Geographers Annual Meeting*, Los Angeles, CA.
- *Callahan, C. N., **Petcovic, H. L., Baker, K. M., & *Barnard, G. J. (2013).** Constraining uncertainty in the process of geologic mapping. *Proceedings of the 2013 Association of American Geographers Annual Meeting*, Los Angeles, CA.
- *Barnard, G., Baker, K. M., **Petcovic, H. L., & *Callahan, C. N. (2013).** Locational confusion among novices: Quantifying misplacement of field strategies. *Proceedings of the 2013 Association of American Geographers Annual Meeting*, Los Angeles, CA.
- Petcovic, H. L., Koretsky, C. M., & *Rowbotham, K. L. (2012).** An authentic research approach to teaching environmental geochemistry. *Geological Society of America Abstracts with Programs* 44(7), 446.
- Petcovic, H. L. (2012).** Exam corrections: Helping students learn from their mistakes. *Geological Society of America Abstracts with Programs* 44(7), 112.
- *Barney, J. A., Gillespie, R., & **Petcovic, H. L. (2012).** Implementing formative assessment strategies into a lecture-based college geoscience classroom. *Geological Society of America Abstracts with Programs* 44(7), 113.
- *Barone, S. & **Petcovic, H. L. (2012).** Development and evaluation of an inquiry-based unit for teaching about paleoclimate and climate change. *Geological Society of America Abstracts with Programs* 44(7), 575.
- *Callahan, C. N., & **Petcovic, H. L. (2012).** Use of time and space in geologic mapping: A video log study. *Geological Society of America Abstracts with Programs* 44(7), 115.
- *Johnson, A., Baker, K., & **Petcovic, H. (2012).** Novice and experienced mapping strategies in proposing field routes during bedrock mapping. *Proceedings of the 2012 Association of American Geographers Annual Meeting*, New York, NY.
- Baker, K., & **Petcovic, H. (2012).** Spatial signatures of mapping expertise among field geologists. *Proceedings of the 2012 Association of American Geographers Annual Meeting*, New York, NY.
- Petcovic, H. L., Libarkin, J. C., Hambrick, D. Z., Baker, K. M., Elkins, J. T., *Callahan, C. N., Turner, S. P., Rench, T., & LaDue, N. (2011).** Novice to expert cognition during bedrock geologic mapping. *Abstract ED13C-0837 presented at the 2011 Fall Meeting, AGU, San Francisco, Calif., 3-9 Dec.*
- *Rowbotham, K. L., **Petcovic, H. L., & Koretsky, C. M. (2011).** Developing undergraduates' conceptual understandings of lake systems: a place-based learning success story. *GLSI Place-based Education Conference*, East Lansing, MI.
- Petcovic, H. L. (2011).** Strategies for confronting preservice elementary teachers' alternate conceptions. *Geological Society of America Abstracts with Programs* 43(5), 406. [INVITED]
- Petcovic, H. L., Caulkins, J. L., & Stokes, A. (2011).** Geologists' perceptions of the value of field camp. *Geological Society of America Abstracts with Programs* 43(5), 534.
- Mattox, S., Rose, W. I., Klawiter, M. F., Englemann, C. A., Huntoon, J. E., Vye, E., Gochis, E., & **Petcovic, H. L. (2011).** Implementing long-term professional development for urban earth science teachers, insights from the Michigan Institute for Teacher Excellence program. *Geological Society of America Abstracts with Programs* 43(5), 524.
- *Barney, J. A., & **Petcovic, H. L. (2011).** Discovering Michigan's geologic past: A hands-on activity for teaching regional geologic history. *Geological Society of America Abstracts with Programs* 43(5), 134.
- *Callahan, C. N., & **Petcovic, H. L. (2011).** Using think-aloud audio recordings to understand patterns of thoughts during geologic mapping. *Geological Society of America Abstracts with Programs* 43(5), 534.

- *Johnson, A. C., Baker, K. M., & **Petcovic, H. L.** (2011). Expert-novice strategies in proposing field routes during bedrock mapping. *Geological Society of America Abstracts with Programs* 43(5), 594.
- *Rowbotham, K. L., **Petcovic, H. L.**, & Koretsky, C. M. (2011). Green, stinky, and sick: Undergraduates' conceptions of eutrophication. *Geological Society of America Abstracts with Programs* 43(5), 68.
- *Madle, B., Baker, K. M., & **Petcovic, H. L.** (2011). Patterns of movement in geologic field mapping exercises: Spatio-temporal strategies in geologic field mapping. *Proceedings of the 2011 Association of American Geographers Annual Meeting*, Seattle, WA.
- *Mutambuki, J. M., **Petcovic, H. L.**, Henderson, C., *Barney, J. A., & Fynewever, H. (2011). Faculty beliefs and grading practices on quantitative problem-solving across physics, chemistry, and earth science disciplines. *Proceedings of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers annual national conference*.
- *Rowbotham, K. L., **Petcovic, H. L.**, & Koretsky, C. M. (2011). Student conceptions of eutrophication and biogeochemical cycling in a field-based undergraduate course. *ASLO Aquatic Sciences Meeting Book of Abstracts*, 216.
- *Rowbotham, K. L., **Petcovic, H. L.**, & Koretsky, C. M. (2010). Student conceptions of eutrophication in a field-based undergraduate course. *Abstract ED21A-0661 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.*
- Petcovic, H. L.**, Elkins, J. T., & *Callahan, C. N. (2010). Do maps tell the whole story? Geologic mental models as expressed verbally and by maps. *Geological Society of America Abstracts with Programs* 42(5), 189.
- Petcovic, H. L.**, Henderson, C., Fynewever, H., Ritchie, L., & *Kryger, A. (2010). Opportunities for geosciences education researchers in two-year college technical education. *Geological Society of America Abstracts with Programs* 42(5), 589.
- Koretsky, C. M., *Rowbotham, K. L., & **Petcovic, H. L.** (2010). Teaching environmental geochemistry: An authentic field and laboratory research approach. *Geological Society of America Abstracts with Programs* 42(5), 440.
- *Callahan, C. N., **Petcovic, H. L.**, & Baker, K. M. (2010). Getting the inside track: head-mounted cameras give new perspective on process of bedrock mapping. *Geological Society of America Abstracts with Programs* 42(5), 191.
- Petcovic, H. L.**, *Callahan, C. N., Libarkin, J. C., Baker, K. M., & Hambrick, D. Z. (2010). Thinking, skills, and strategies of novice to expert geologists during bedrock mapping, *International Geoscience Education Organisation Quadrennial conference, Abstract volume*, 71.
- Fynewever, H., Henderson, C., **Petcovic, H.**, & Ritchie, L. (2010). Exploring program sustainability: Opportunities for chemical education research. *Biennial Conference on Chemical Education*, Paper #P617.
- Henderson, C. R., Fynewever, H., **Petcovic, H.**, & Ritchie, L. (2010). Improving technical education: Opportunities for physics educational researchers. *American Association of Physics Teachers*, Abstract 17240, retrieved from <http://aapt.org/AbstractSearch/FullAbstract.cfm?KeyID=17240> .
- Koretsky, C. M., *Rowbotham, K., & **Petcovic, H. L.** (2010). Development of a problem-based, service-learning environmental field geochemistry course. *Geochimica et Cosmochimica Acta* 74(11), Supplement A532.
- *Wisniewska, M., Baker, K., **Petcovic, H.**, & *Callahan, C. (2010). Field mapping strategies of novice and expert geologists. *Proceedings of the 2010 Association of American Geographers Annual Meeting*, Washington, DC.
- *Block, K. L., **Petcovic, H. L.**, & Koretsky, C. M. (2010). Investigating student conceptions of environmental systems in a field-based undergraduate course. *Michigan Academy of Science, Arts, & Letters*.
- Petcovic, H.L.** (2010). Alternative conceptions and the geoscience concept inventory, *Presented at the Overcoming Barriers to Learning in the Geosciences conference*, University of Birmingham (England), 1/20/10.

- Petcovic, H. L.,** Libarkin, J. C., Hambrick, D. Z., Baker, K. M., *Callahan, C. N., Rench, T. A., Turner, S. P., & Wisniewska, M. K. (2009). Geology expertise: Evidence from field and laboratory geocognition research. *Geological Society of America Abstracts with Programs* 41(7), 250.
- Baker, K. M., *Wisniewska, M. K., **Petcovic, H. L.,** & Libarkin, J. C. (2009). Characterizing space-time signatures of novices and experts in geologic field mapping. *Geological Society of America Abstracts with Programs* 41(7), 711.
- *Block, K. L., **Petcovic, H. L.,** & Koretsky, C. M. (2009). Investigating student conceptions of environmental systems in a field-based undergraduate course. *Geological Society of America Abstracts with Programs* 41(7), 316.
- *Callahan, C. N., **Petcovic, H. L.,** Baker, K. M., & Libarkin, J. C. (2009). Tracking expert and novice geocognition during field mapping. *Geological Society of America Abstracts with Programs* 41(7), 250.
- Libarkin, J. C., **Petcovic, H. L.,** & Hambrick, D. Z. (2009). Geoscientific expertise and spatial visualization. *Geological Society of America Abstracts with Programs* 41(7), 196.
- *Ludwig, M. A., & **Petcovic, H. L.** (2009). Exploring connections between assessment, motivation, and metacognition. *Geological Society of America Abstracts with Programs* 41(7), 602.
- Turner, S. P., Libarkin, J. C., Hambrick, D. Z., & **Petcovic, H. L.** (2009). Analyzing geoscientific expertise through novel application of common technologies. *Geological Society of America Abstracts with Programs* 41(7), 251.
- Petcovic, H. L.,** & *Ruhf, R. J. (2008). Preservice elementary teachers' conceptual knowledge of the Earth: Results from the Geoscience Concept Inventory. *Geological Society of America Abstracts with Programs*, paper 274-1. [INVITED]
- Petcovic, H. L.,** Libarkin, J. C., & Baker, K. M. (2008). Problem-solving in the field: Novice to expert geologic mapping strategies, behavior, and cognition. *Geological Society of America Abstracts with Programs*, paper 244-1.
- *Ludwig, M., **Petcovic, H. L.,** & Fynewever, H. (2008). Classroom observation methodologies to assess student engagement. *Geological Society of America Abstracts with Programs*, paper 248-6.
- Petcovic, H. L.,** Libarkin, J. C., & Baker, K. M. (2007). Behavioral cognitive processes of novices and experts during field mapping activities. *Geological Society of America Abstracts with Programs* 39, 579.
- Baker, K. M., Libarkin, J. C., & **Petcovic, H. L.** (2007). Geologic mapping strategies of novices and experts as evidenced through GPS track and map analysis. *Geological Society of America Abstracts with Programs* 39, 557.
- *Barney, J. A., **Petcovic, H. L.,** & Kominz, M. (2007). Assessing the efficacy of student response technology in an ocean science course. *Geological Society of America Abstracts with Programs* 39, 552.
- Petcovic, H. L.,** & Nagy-Shadman, E. (2006). Teaching laboratory-based earth science classes to future elementary teachers. *Geological Society of America Abstracts with Programs* 38, 396.
- Nagy-Shadman, E., & **Petcovic, H. L.** (2006). Teaching lecture-based earth science classes to future elementary teachers. *Geological Society of America Abstracts with Programs* 38, 396.
- Petcovic, H. L.,** Lillie, R. J., & Haak, M. D. (2004). Discovery Days: A model for informal K-8 science education and engagement. *Geological Society of America Abstracts with Programs* 36, 216.
- Petcovic, H. L.,** Dufek, J., Grunder, A. L., & Bergantz, G. (2003). Field and modeling constraints on the thermal history of a swarm of Columbia River Basalt dikes, Cornucopia Stock, NE Oregon. *Geological Society of America Abstracts with Programs*, 226-8.
- Petcovic, H. L.,** Grunder, A. L., & Taubeneck, W. H. (2002). Dike-wallrock interactions in granitoids of the Willowa Mountains, NE Oregon. *Geological Society of America Abstracts with Programs* 34, 39.
- Petcovic, H. L.,** Grunder, A. L., & Taubeneck, W. H. (2001). Distribution and geometry of feeder dikes from Columbia River Basalt subswarms, NE Oregon and W Idaho. *Geological Society of America Abstracts with Programs* 33, 148.

- Petcovic, H. L.,** Grunder, A. L., & Nielsen, R. L. (1999). Amphibole and biotite breakdown during progressive partial melting of granodiorite by basalt, Wallowa Mountains, OR. *Geological Society of America Abstracts with Programs* 31, 164.
- Bloomer, S. H., Falloon, T. J., **Petcovic, H. L.,** Nielsen, R. L., & Duncan, R. A. (1998). Petrology and geochemistry of volcanic and plutonic rocks from the Tonga forearc, Southwest Pacific. *Eos, Transactions, American Geophysical Union* 79, 420.
- Petcovic, H. L.** (1995). A petrographic and geochemical study of High Cascades volcanism in south-central Oregon. *The Eighth Keck Research Symposium in Geology (Abstracts Volume)*, 53-56.
- Butler, J., & **Petcovic, H. L.** (1994). Surficial mapping and glacial history of Notch Brook Valley, North Adams, MA. *The Seventh Keck Research Symposium in Geology (Abstracts Volume)*, 181-184.

INVITED PRESENTATIONS

- Encouraging Networks between Geoscience and Geoscience Education (ENGAGE) workshop, Arlington, VA, *Oh What a Ride: The Ups and Downs of Collaborative Interdisciplinary Geoscience Education Research*, 1/19/15 [Keynote address]
- Smith College, Geosciences Department seminar, *Geoscience Education Research and Perceptions of Fieldwork*, 11/13/14
- Western Michigan University, Geosciences Department seminar, *Why Fieldwork? Geoscientists' Perceptions of the Value of Undergraduate Field Education*, 11/25/13
- Central Michigan University, Geography Department seminar, *Faculty Grading of Quantitative Problem-Solving: Are We Sending Students a Consistent Message?* 2/3/12
- University of Wisconsin Eau Claire, Geology Department seminar, *The Nature of Geologic Expertise: Evidence from Field and Laboratory Geocognition Research*, 4/22/11 [NAGT Distinguished Lecture]
- University of Delaware, Department of Geological Sciences seminar, *Understanding the Nature of Geologic Expertise from Field and Laboratory Geocognition Research*, 3/19/10
- Western Michigan University, Geosciences Department seminar, *The Nature of Geologic Expertise: Evidence from Field and Laboratory Geocognition Research*, 1/25/10
- Overcoming Barriers to Learning in the Geosciences conference, University of Birmingham (England), *Learning Across the Expert-Novice Continuum: Cognition in the Geosciences*, 1/20/10 [Keynote address]
- University of Plymouth (England), Geography, Earth, and Environmental Science Department seminar, *Learning Across the Expert-Novice Continuum: Cognition in the Geosciences*, 1/18/10
- University of Northern Colorado, Earth Science Program seminar, *Faculty Grading of Quantitative Problems: Are We Sending Students a Consistent Message?* 10/16/09
- Western Michigan University, Geography Department colloquium, *What Do They Think They Know? Earth Science Misconceptions among Pre-service Elementary Teachers*, 2/1/07
- Southern Illinois University, Carbondale, Geology Department Seminar Series, *Eruption and Emplacement of the Columbia River Flood Basalts: Constraints from Field Data and Modeling Magma Flow in Dikes*, 9/28/06
- Michigan State University, Geoscience Department seminar series, *Estimating Eruption Rates of the Columbia River Flood Basalts: Field Data and Modeling of Dike-Wallrock Interactions*, 9/8/05
- Michigan State University, informal seminar, *What Do They Think They Know? Misconceptions among Introductory Geoscience Students*, 9/8/05
- Grand Valley State University, Geology Department seminar series, *Using Dike-Wallrock Interactions to Estimate Eruption Rates of the Columbia River Flood Basalts*, 2/21/05
- Michigan Basin Geological Society meeting, *The View from Below: Using Dike-Wallrock Interactions to Estimate Eruption Rates of the Columbia River Flood Basalts*, 12/8/04

FUNDED GRANTS

5/15/16-4/30/17, *Michigan Space Grant Consortium Fellowship*, Michigan Space Grant Consortium (NASA), \$16,000, Co-PI [\$5000 to support doctoral student Andrew Bentley]

1/1/16-6/30/16, *Experiencing Research for Teachers in Earth Science (ExpeRT-Earth)*, WMU College of Arts & Sciences Interdisciplinary Research Initiative Award, \$5,000, PI

1/1/15-12/31/16, *Collaborative Research: Geo-Needs – Stakeholder Needs Assessments for Broadening Participation in the Geoscience Workforce*, National Science Foundation - IUSE, \$115,240 at WMU (\$392,547 total award), lead institution PI

1/1/15-12/31/17, *Michigan Science Teaching and Assessment Reform (Mi-STAR)*, The Herbert H. and Grace A. Dow Foundation (subaward through Michigan Technological University), \$39,814, PI

7/1/13-8/31/14, *MGRRE Education Portal Planning Workshop*, WMU College of Arts & Sciences Interdisciplinary Research Initiative Award, \$5,000, PI

8/15/08-8/31/14, *Improving the STEM workforce by improving community college teachers of science*, National Science Foundation - S-STEM, \$458,700, Co-PI (PI Bill Cobern)

9/15/08-6/30/13, *Collaborative Research: Learning across the Novice-Expert Continuum: Cognition in the Geosciences*, National Science Foundation - REESE, \$563,653 at WMU (\$998,236 total award), lead institution PI

9/1/08-8/31/11, *Development and evaluation of a problem-based, field and laboratory environmental geochemistry course*, National Science Foundation – Geoscience Education, \$134,534, PI

10/1/08-7/30/11, *Developing Technology Educator – Educational Researcher partnerships towards improving capacity in technology education research*, National Science Foundation - ATE (subaward through University of Colorado, Boulder), \$102,428, Co-PI (PI Charles Henderson)

8/1/08-7/31/09, *Course-Embedded Formative Assessment as a Tool to Enhance the Preparation of Pre-service Elementary Teachers in Earth System Science*, Michigan Space Grant Consortium Teacher Training Program (NASA), \$610, PI

9/1/07-6/30/09, *Alignment of Secondary Science Teacher Practice and Materials in the Battle Creek Region*, Michigan Department of Education Title II Part A(3), \$215,287, Co-PI (PI Herb Fynewever)

7/1/07-6/30/08, *Field-Based Cognition among Expert Geoscientists: A Pilot Study*, WMU Faculty Research and Creative Activities Fund (FRACA), \$5,000, PI

GRANT CONSULTING

2013-2015; External evaluator, *Building Analytical Competence for Geoscience Students through use of Spectroscopic Tools*, NSF-TUES grant to Smith College (Brady, PI)

2011-2014; Consultant, *Michigan Teacher Excellence Program (MiTEP)*, NSF-MSP grant to Michigan Tech (Huntoon, PI)

2010-2012; Advisory board member, *Confronting the Challenges of Climate Literacy*, NSF-DRK12 grant to TERC (Ledley, PI)

PROFESSIONAL ACTIVITIES

2014-2016; Editor, Curriculum & Instruction, *Journal of Geoscience Education*

2014-2016; Elected member of the National Association of Geoscience Teachers - Teacher Education Division management board (2014-15 President; 2015-17 Past President); volunteer member of the organizing committee (2013-14)

2006-2016; National Science Foundation panel member and ad hoc proposal reviewer – reviewed proposals and served on review panels for various programs in the Education and Human Resources (EHR) and Geosciences (GEO) Divisions

April 2016; Co-convenor of webinar entitled *Supporting Elementary Teachers with the NGSS*, hosted by the National Association of Geoscience Teachers and American Geosciences Institute

November 2015; Co-convenor of Geological Society of America annual meeting topical session, *Field-based Educational Research: Insights from Field Camps, Field Trips, and Field-based Courses*

July 2015; Co-convenor of the *Getting your Education Work Published* workshop presented at the Earth Educators Rendezvous national meeting, Boulder, CO

July/August 2015; Co-facilitator of the Mi-STAR (Michigan Science Teaching and Assessment Reform) summer curriculum development hub at WMU responsible for creating a 6th grade integrated science unit

2014-2015; Western Michigan University Academic Leadership Academy participant

Oct 2014; Lead convenor of Geological Society of America annual meeting topical session, *Spatial Thinking in Geoscience Teaching, Learning, and Professional Practice*

Oct 2014; Lead convenor of Geological Society of America annual meeting topical session, *Geoscience Field Education: The Implications of Research and Practice for Workforce Development*

2010-2014; Associate Editor for Research, *Journal of Geoscience Education*

May 2013; Lead convenor of Geological Society of America North-Central section meeting topical session, *Research in Earth Science Education*

2011-2013; Summer workshop instructor (Michigan Teacher Excellence Program) - created and taught a week-long professional development workshop for Kalamazoo/Jackson area K-12 teachers focusing on enhancing content knowledge in earth science through local field trips

Oct 2012; Co-convenor of Geological Society of America annual meeting topical session, *Formative Assessment in Geoscience Education*

2010-2011; National Association of Geoscience Teachers (NAGT) Distinguished Lecturer

2007-2009; Co-led a two-year professional development workshop for Battle Creek area secondary science teachers, focusing on action research and alignment of science curricula with state content expectations

2004-2008; Elected member of the Geological Society of America Geoscience Education Division management board (2nd Vice-chair, 2004-05; Vice Chair 2005-06; Chair 2006-07; Past Chair 2007-08)

May 2007; Co-convenor of NSF-funded workshop at the Science Education Resource Center (SERC), Carleton College, *Geoscience Courses That Prepare Future Teachers*

Oct 2006; Lead co-convenor of Geological Society of America annual meeting topical session, *Preparing Future K-12 Teachers of Earth Science*

May 2005; Co-leader of Goldschmidt Society annual meeting field trip, *Columbia River Flood Basalts*

Oct 2003; Co-convenor of Geological Society of America annual meeting special session, *The Columbia River Flood Basalts: New Insights in the Volcanism, Petrology, and Tectonism of a Large Igneous Province* and co-leader of field trip, *Columbia River Basalt and Yakima Fold Belt*

COURSES TAUGHT

GEOS 1000, Dynamic Earth
 GEOS 1500, Earth Hazards and Disasters
 GEOS 2900, Earth Systems: Issues and Applications
 GEOS 3010, Minerals and Rocks
 GEOS 4380, Field Studies in Geology
 GEOS 5020, Geologic Excursions
 SCI 6160, Theories of Teaching and Learning
 SCI 6170, Science Education Early Research Practicum
 SCI 6180, Methods of College Science Teaching

GRADUATE STUDENT ADVISING

Dissertation/Thesis Committee Chair:

Andrew Bentley, PhD Science Education – Geosciences (in progress)
Peggy McNeal, PhD Science Education – Geosciences (in progress)
Laura Tinigin, PhD Science Education – Geosciences (in progress)
Caitlin Callahan, PhD Science Education, 2013. Dissertation: An embodied perspective on expertise in solving the problem of making a geologic map.

Nathan Charlton, MS Geosciences (in progress)
Laura Tinigin, MS Geosciences (in progress)
Steven Barone, MS Geosciences, 2013. Thesis: Development and evaluation of an inquiry-based unit for teaching about paleoclimate and climate change.

Dissertation/Thesis Committee Member:

Raina Khatiri, PhD Science Education (in progress)
Cathy Northcutt, PhD Science Education (in progress)
Cody Williams, PhD Science Education (in progress)
Chaiphath Plybour, PhD Science Education, 2015
Ramòn Barthelemy, PhD Science Education, 2014
Lloyd Mataka, PhD Science Education, 2014
Kathleen Quardokus, PhD Science Education, 2014
Kevin Weakly, PhD Science Education, 2010
Robert Ruhf, PhD Science Education, 2006
Patrick Meyer, PhD Science Education, 2005

Anthony Boxleiter, MS Geosciences, 2015
Jonathan Haynes, MS Geosciences, 2015
William Mamudi, MS Physics, 2012

Danielle Dupuis, Undergraduate Honors Thesis, 2015
Benjamin Oversbeek, Undergraduate Honors Thesis, 2012
Magdalena Wisniewska, Undergraduate Honors Thesis, 2009

Primary Advisor:

Keith Lang, MA Earth Science, 2014
Jeffrey Barney, MA Earth Science, 2010

PROFESSIONAL AFFILIATIONS

American Geophysical Union (AGU), member since 1998
Geological Society of America (GSA), member since 1997
Geological Society of America - Geoscience Education Division (GSA Geo-Ed), member since 2002
The International Association for Geoscience Diversity (IAGD) – member since 2013
Michigan Earth Science Teachers Association (MESTA), member since 2004
NARST: A Worldwide Organization for Improving Science Teaching and Learning Through Research, member since 2004
National Association of Geoscience Teachers (NAGT), member since 2004
National Association of Geoscience Teachers- Division of Geoscience Education Research (NAGT-GER), member since 2014
National Association of Geoscience Teachers - Teacher Education Division (NAGT-TED), member since 2014

HONORS

- 2009 Geosciences Department Faculty Award, Western Michigan University
- 2002 Outstanding Student Oral Presentation Honorable Mention, Geological Society of America
Cordilleran Section
- 2001 Jess Johnson Student Writing Award, Geosciences Department, Oregon State University
- 2000 NSF GK-12 Teaching Fellow, Oregon State University
- 1998-1999 Outstanding Graduate Teaching Assistant Award, Geosciences Department., Oregon State
University
- 1999 Geological Society of America Research Grant
- 1997 Oregon Sports Lottery Scholarship for academic achievement
- 1995 *Magna cum laude* with High Honors graduate, Smith College
- 1995 Sigma Xi Society Member, Smith College
- 1994 *American Mineralogist* Undergraduate Award
- 1991-1995 Dean's List First Group Scholar, Smith College