

**Julie C. Libarkin**  
Geocognition Research Lab  
Michigan State University

Affiliations with MSU Centers and Programs: *Cognitive Science Program, Environmental Science and Policy Program, CREATE for STEM Institute*

**CONTACT:**

206 Natural Science Building Michigan State University East Lansing MI 48824	(517) 355-8369 <a href="mailto:libarkin@msu.edu">libarkin@msu.edu</a> <a href="https://geocognitionresearchlaboratory.wordpress.com">https://geocognitionresearchlaboratory.wordpress.com</a> Office: NAT SCI 115; Lab: NAT SCI 117
--	--

**CURRENT POSITION**

**Professor, Director of Geocognition Research Lab, Michigan State University.** Research focusing on geocognition, assessment of student learning, validity and reliability in assessment, curriculum and visual design, discipline-based education research (DBER). Overarching focus on access, inclusion, equity, and justice in STEM and academia.

**EDUCATION**

**Ph.D., 1999**      **The University of Arizona, Geosciences**  
**B.S., 1994**      **College of William and Mary, Dual major in Physics and Geology**

**PROFESSIONAL EXPERIENCE**

2016-present      **Professor**, Geocognition Research Lab, Michigan State University.  
2011-2015      **Assessment Advisor, Integrative Studies Assessment**, Associate Provost for Undergraduate Studies.  
2011-2014      **Director of Educational Research**, Center for Integrative Studies in General Science, Michigan State University.  
2011-2012      **Coordinator - Integrative Studies in Physical Science Laboratory**, Center for Integrative Studies in General Science, Michigan State University.  
2009-2016      **Associate Professor**, Michigan State University.  
2006-2009      **Assistant Professor**, Michigan State University.  
2003-2006      **Assistant Professor**, Department of Geological Sciences, Ohio University.  
2002-2003      **Research Associate**, Science Education Department and Science Media Group, Harvard-Smithsonian Center for Astrophysics.  
2000-2002      **National Science Foundation Postdoctoral Fellow in Science, Mathematics, Engineering, and Technology Education (PFSMETE)**, Science Education Department and Science Media Group, Harvard-Smithsonian Center for Astrophysics.  
Spring, 2000      **Adjunct Lecturer**, Department of Geosciences, University of Arizona.  
1999-2000      **National Science Foundation Postdoctoral Fellowship (PFSMETE)**, University Learning Center, University of Arizona.  
1994-1999      **Teaching/Research/Field Assistant**, Geosciences/Hydrology/Learning Center, University of Arizona.  
Summer, 1997      **Summer Intern**, Mobil Exploration and Producing, Houston, TX.  
1990-1994      **Junior Fellow**, United States Geological Survey (U.S.G.S.).

**HONORS and AWARDS** (postgraduate only)

- 2017 **James Hoeschele Endowed Excellence in Teaching Award**, College of Natural Science, MSU. *Recognition of excellence in teaching by faculty in the Center for Integrative Studies in General Science.*
- 2017 **Second Best New Idea**, Entrepreneurship & Engineering Innovation Division, ASEE 2017 Conference. *For Hirshfield, Huang-Saad, Libarkin, Mapping engineering outcomes to the Lean Launch curriculum in the context of design.*
- 2016 **Outstanding Paper Award**, Journal of Geoscience Education. *For Callahan, Libarkin, McCallum, and Atchison, 2015, Using the Lens of Social Capital to Understand Diversity in the Earth System Sciences Workforce.*
- 2016 **Second Best Research Paper**, Entrepreneurship & Engineering Innovation Division, ASEE 2016 Conference. *For Morton, Huang-Saad, and Libarkin, Entrepreneurship education for women in engineering: A systemic review of entrepreneurship assessment literature with a focus on gender.*
- 2016 **Outstanding Graduate Advisor Award**, College of Natural Science, MSU. *Recognition of exceptional expertise in advising graduate students.*
- 2015 **Fellow**, Geological Society of America. *Elected in recognition of distinguished contributions to the geosciences.*
- 2014-2015 **MSU Global Innovation Fellow**, MSU Global, Michigan State University.
- 2014 **MSU-AT&T Instructional Technology Award - First Place in the Fully Online Course Category**, Information Technology Services, Michigan State University. *Recognition for team development of ISB 202-731, Applications of Environmental and Organismal Biology.*
- 2012 **Teaching Excellence Recognition**, College of Natural Science, MSU. *Recognition of excellent contributions to teaching.*
- 2012 **Postdoctoral Mentoring Award**, College of Natural Science, MSU. *Recognition of effective mentoring to postdoctoral researchers in both professional development and holistic balance.*
- 2012 **Outstanding Paper Award**, Journal of Geoscience Education. *Inaugural award for Clark, Libarkin, Kortz, and Jordan, 2011, How well do non-science undergraduates understand basic plate tectonic concepts?*
- 2010 **Meritorious Faculty Award**, College of Natural Science, MSU. *Recognition of demonstrated excellence in the areas of teaching, research, and service.*
- 2008 **Lorena V. Blinn Endowed Teaching Award**, College of Natural Science, MSU. *Recognition of natural scientist who shows special care in teaching.*
- 2007 **Shea Award**, National Association of Geoscience Teachers (NAGT). *Exceptional contributions in writing and/or editing of Earth Science material.*
- 2005-2008 **Distinguished Speaker**, NAGT Distinguished Lecturer Series
- 1999 **Wakonse Teaching Conference Fellowship**, Arizona Chapter

**TEACHING EXPERIENCE** (Ohio University, Michigan State University)

*Undergraduate:* Introduction to Geology, Geodynamics, Solid Earth Geophysics,

Paleomagnetism, Climate Change, Natural Hazards, Humans and the Environment Lab

*Graduate:* College Student Cognition in Science, Teaching Methods in Geological Sciences,

Teaching, Learning, and Classroom Management for College Courses, Research Seminar

*Online curriculum development:* Introduction to Geology, Climate Change, Freshman Seminar on Critical Thinking, MOOC on Foundations of Science

**GRANT SUPPORT** (postgraduate only):

\$10 million total on 26 grants; \$4.6 million to home institutions

<b>Active Grants to Michigan State University (8)</b>					
<b>Title</b>	<b>Agency</b>	<b>Total</b>	<b>Inst. Total</b>	<b>Dates</b>	<b>Role and Details</b>
<i>Urban Agriculture and Local Environmental Governance: A Greater Lansing Case Study</i>	MSU S3	\$10,000	(internal)	11/16/17-11/15/18	Co-PI; Lead PI: L. Goralnik; co-PIs: M. Lopez, Z. Piso
<i>Assessment of the Ann Arbor Area Community Foundation's Community Scholarship Program</i>	AAACF	\$120,599	\$38,000	11/14/17-11/13/22	PI at MSU; Lead PI: C. McCallum at EMU
<i>GEOPATHS-IMPACT: The Geo Tech High School Academy: A combined program of experiential field learning and classroom instruction</i>	NSF-IUSE: GEOPATHS	\$300,000	\$136,755	9/15/15-8/31/18	PI at MSU; Lead PI: K. Ellins at UT-Austin; co-PI: K. McNeal
<i>Examining the Effect of Entrepreneurial Education Pedagogy on the Development of Women in STEM</i>	NSF-REE	\$463,822	\$98,343	9/1/15-8/31/18	PI at MSU; Lead PI: A. Huang-Saad at UM
<i>The Impact of Social Capital and Mentoring in Earth System Science Workforce Development</i>	NSF-CORE	\$481,795	\$481,795	9/1/15-8/31/18	PI; co-PIs: C. Atchison; C. Callahan; C. McCallum
<i>Cultivating Cultures of Ethical STEM in Collaborations between Climate Change Decision-Support Organizations and Indigenous Peoples</i>	NSF-CCE STEM	\$449,163	\$449,163	9/1/15-8/31/19	Co-PI at MSU; Lead PI: K. Powys White
<i>Applying Multidimensional Item Response Theory Models to Generate an Interconnected Bank of Items for Earth System Science</i>	NSF-IUSE	\$225,584	\$225,584	8/1/15-7/31/17	PI; co-PI: R. Bowles
<i>Investigating Entrepreneurship Education as a Means to Developing the 21st Century Engineer</i>	NSF-IUSE	\$249,944	\$78,115	6/15/15-5/31/17	PI at MSU; Lead PI: A. Huang-Saad at UM
<b>Previous Grants to Michigan State University (12)</b>					
<b>Title</b>	<b>Agency</b>	<b>Total</b>	<b>Inst. Total</b>	<b>Dates</b>	<b>Role and Details</b>
<i>Confronting the Challenges of Climate Literacy</i>	NSF-DRK12	\$2.8M	\$263,634	9/15/10-9/30/15	PI at MSU; Lead PI T. Ledley at TERC
<i>The Foundations of Science MOOC</i>	Gates Foundation D2L match	\$49,939 \$50,000	\$49,939	11/1/12-4/01/14	Co-PI; PI: S. Thomas
<i>Evaluation of spatial reasoning and its impact on learning in Organic Chemistry and Biochemistry</i>	MSU – CREATE4 STEM	\$40,000	(internal)	9/1/12-5/31/13	Co-PI; PI: T. Kim
<i>Cultural Validity of Geoscience Assessment</i>	NSF-GEOED	\$149,995	\$90,684	10/1/10-9/30/14	Co-PI/PI with E. Ward
<i>The Great Lakes Climate Change Science and Education Systemic Network (GLCCSESN)</i>	NSF-CCEP	\$1.0 M	\$338,000	09/15/10-09/14/11	PI at MSU; Lead PI at EMU
<i>Automated Analysis of Constructed Response Concept Inventories</i>	NSF-CCLI	\$382,601	\$382,601	9/1/10-8/31/14	Co-PI; PI: M. Urban-Lurain

<i>Building Global Climate Change Literacy Through Analogical Reasoning</i>	NSF-CCLI	\$175,342	\$81,848	08/31/10-08/30/13	Co-PI; PI: D. Sibley
<i>Earth System Science: A Key to Climate Literacy</i>	NASA-Global Education	\$280,000	\$15,000	08/31/09-08/30/12	Co-PI; Lead PI T. Ledley at TERC
<i>Investigation of alternative conceptions about Plate Tectonics across the expert-novice continuum— When a well-known theory isn't so well known</i>	NSF-CCLI	\$214,684	\$214,684	01/1/09-12/31/12	Co-PI/PI with S. Clark
<i>Learning across the Expert-Novice Continuum: Cognition in the Geosciences</i>	NSF-REESE	\$998,000	\$434,581	04/1/09-12/31/12	PI at MSU; Lead PI at Western Michigan Univ.
<i>Community Development of an Expanded Geoscience Concept Inventory: A Webcenter for Question Generation, Validation and Online testing</i>	NSF-CCLI	\$500,000	\$331,008	8/16/07-8/31/11	PI; Co-PI: S. Anderson, G. Kortemeyer
<i>Evaluating Student Learning in Geoscience Curricula that Employ Conceptests Using Electronic Student Response Systems</i>	NSF-CCLI	\$200,000	\$77,756	8/1/07-7/31/12	PI at MSU; Lead PI D. Steer at University of Akron.

**Pre-MSU Grants (6)**

<b>Title</b>	<b>Agency</b>	<b>Total</b>	<b>Inst. Total</b>	<b>Dates</b>	<b>Role and Details</b>
<i>A Multi-Isotope Approach to Cosmogenic Paleoaltimetry</i>	Ohio Univ.	\$5000	(internal)	2005	PI
<i>The Origin and Evolution of Student Conceptions</i>	Ohio Univ.	\$6000	(internal)	2004	PI
<i>Miocene-Pliocene Paleoelevation of the Bolivian Altiplano</i>	NSF-GEO	\$213,310	\$50,000	2003-2006	Co-PI; PI: Garzione
<i>SGER: Oxygen and Cosmogenic Isotope Approaches to Paleoaltimetry of the Bolivian Altiplano</i>	NSF-SGER GEO	\$9300	(external)	2002-2004	Co-PI; PI: Garzione
<i>Conceptual Understanding of Earth Processes in General Education and Introductory Courses: Test Development and Validation</i>	NSF-DUE	\$498,984	\$498,984	2001-2005	PI; co-PI: S. Anderson
<i>The Science Education Assessment Project (SEAP): Dissemination of Effective Teaching Methods at the Undergraduate Level</i>	NSF-DGE PFSMETE	\$153,000	(external)	1999-2002	PI

**Proposals Under Review**

<b>Title</b>	<b>Agency</b>	<b>Total</b>	<b>Inst. Total</b>	<b>Dates</b>	<b>Role and Details</b>
<i>Community Engaged Food System Learning: STEM Identity, STEM Literacy, and Change Agency</i>	NSF-AISL	\$299972		Under review	Co-PI; Lead PI: L. Goralnik. Co-PI: L. Thorp

**SELECTED PROFESSIONAL SERVICE and ACTIVITIES** (postgraduate only)

***Disciplinary Service***

- 2017 Judge, ASEE, 2017 ENT Best Papers Competition
- 2016-present Totten Award Planning, Nominations, and Awards Committee, Geoscience Education Division, Geological Society of America.
- 2016 Report Coordinator, National Academies of Sciences, Engineering, and Medicine's Board on Science Education (NAS-BOSE) workshop summary on Service-Learning in Undergraduate Geosciences: A Workshop.
- 2015-2016 Past Chair, Geoscience Education Division, Geological Society of America
- 2015-2017 Member, Books Editorial Board, Geological Society of America
- 2014-present Guest Editor, GEOSPHERE Themed Issue: Human Dimensions in Geoscience. Published by Geological Society of America
- 2014-2015 Chair, Geoscience Education Division, Geological Society of America
- 2014-2015 Joint Technical Program Committee, Geological Society of America
- 2013-2014 Conference Organizing Committee, MOOCs in STEM: Exploring New Educational Technologies
- 2013-2014 First Vice-Chair, Geoscience Education Division, Geological Society of America
- 2013-2014 Joint Technical Program Committee, Geological Society of America
- 2012-2013 Second Vice-Chair, Geoscience Education Division, Geological Society of America
- 2012-present Advising Past Editor and Associate Editor, Journal of Geoscience Education
- 2009-2011 Advisor, Lawrence Hall of Science, Earth Science Curriculum for Middle School
- 2009-2011 Editor-in-Chief, Journal of Geoscience Education. Three year term, Jan. 1, 2009 through Dec. 31, 2011
- 2009-present External graduate student committee member at Purdue, University of South Florida, McGill, North Carolina State, Clemson, Plymouth University
- 2007-2012 Interviewer for Knowles Science Teaching Foundation Fellowships
- 2006-present Advising - backward design and assessment in college courses.
- 2006 Reviewer for AAAS Project 2061 Atlas of Scientific Literacy, Earth Resources Concept Map (Fall 2006)
- 2005-2012 Advisor for Harvard-Smithsonian Science Media Group productions, including *A Systems Approach to Environmental Science* and *The Habitable Planet*
- 2004-2005 Associate Editor for Special Issue of Journal of Geoscience Education on *Conceptions, Cognition, and Change: Student Thinking about the Earth*
- 2002-2008 Associate Editor, Journal of Geoscience Education
- 2001-2004 Advisor and Contributor, Harvard-Smithsonian Science Media Group (SMG), *Science in Focus: Energy and Motion; Essential Earth Science Series*
- 2001-2004 NARST Co-Coordinator (Curriculum, Evaluation, and Assessment)
- 2001-2006 Co-author of review series in Journal of Geoscience Education
- 2000-present Proposal reviews in select years for NSF (EHR, DUE, EAR, SBE), Keck Foundation, and NARST; Panel member in select years for EHR proposals

***University Service (MSU only)***

- 2017 Campus Champion, FAME (Fostering Academics, Mentoring Excellence)
- 2017 Chair, ESPP Director Search
- 2017 Informal mentor for three junior faculty in Community Sustainability, Biosystems

Engineering, and Lyman Briggs  
2017 Graduate student proposal reviews: ESPP and Center for Water Science  
2017 Member, ESPP 2018 Fate of the Earth Symposium Organizing Committee  
2015-2017 Member, ESPP Faculty Advisory Council (elected)  
2013-2016 Member, ESPP 2014, 2015, 2016 Fate of the Earth Symposium Organizing Committee  
2012-2015 CREATEforSTEM Colloquium Committee  
2013-2015 Chair, Integrative Studies Classroom Assessment Committee  
2011-2015 Member, Associate Provost for Undergraduate Education Committee on Integrative Studies  
2011-2012 Member, University Committee on Data Management  
2010-2011 Search Committee, Director, Institute for Mathematics and Science Education Research (now CREATEforSTEM)

***College/Department Service (MSU only)***

2016-present Awards Committee, Earth and Environmental Science  
2014-2016 Education Research Advisor, CISGS  
2014-2015 Member, Search Committee, CISGS/GLG joint hire  
2012-2015 Chair, Awards Committee, Geological Sciences  
2012-2014 Assessment Director, CISGS  
2011-2012 Member, Advisory Committee, Geological Sciences  
2010-2015 Co-Facilitator, Faculty Learning Community (FLC) on Assessment and Learning in Integrative Studies in General Science  
2011-2012 Search Committee, Disciplinary Science Education Research  
2010-2011 Search Committee, Integrated Studies Program – ISP Coordinator  
2009 CRCSTL Director Search Committee, MSU-CRCSTL  
2009 Ad Hoc Committee member for CNS Dean’s Budget Advisory Committee  
2009 Search Committee, Integrated Studies Program – ISB Coordinator  
2007-2011 Advisory Committee, MSU-CRCSTL  
2007-2008 Postdoctoral Fellows Committee, MSU-CRCSTL  
2007-2008 Seminar Series Committee and Organizer, Michigan State University Center for Research on College Science Teaching and Learning (CRCSTL)

***Community Service & Outreach (selected)***

2014-2016 Question & Answer sessions with high school classes  
2013-2014 Science Advisor for screenplay, Americana Films, LLC, My Worst Enemy, LLC.  
2013 Tsunami Activity, Haslett Robotics Club.  
2012 Rivers Activity, Pinecrest Elementary grade 2.  
2011 Café Scientifique, “Confusing Climate: The Role of Images in Conveying Climate Change”, presentation with Stephen Thomas.

***Selected External Evaluation Projects***

*Program Evaluation:* Black Hills State University - Physical Science Program; Michigan State University – Neuroscience Program

*Project Evaluation:* Quantitative Microbial Risk Assessment (NIH # PA-11-351); REU - Integrative Biology of Social Behaviors (NSF # 1153888); Ethics Education in Environmental Science (NSF # 1338614); Software Carpentry Workshop (at MSU); EDEMAME Workshop (x2 at MSU); Bioinformatics - Next-Generation Sequencing

Workshop (x4 at MSU)

**Journal Article Reviews:** Science Education, Journal of Engineering Education, Journal of Geoscience Education, McGill Journal of Science Education, Bulletin of the American Meteorological Society, Journal of Women and Minorities in Science and Engineering, Science & Education, International Electronic Journal of Elementary Education, Journal of Research in Science Teaching, Journal of Geography in Higher Education, Journal of Structural Geology, Oceanography, Geosphere

## **PUBLICATIONS**

### ***In Preparation – submission expected shortly***

Adhikari, U., Mitchell, J., Libarkin, J., Weir, M., *in preparation*, Evaluating the outcome of Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute using a conceptual model: *CBE Life Sciences Education*.

Kalafatis, S.E., Libarkin, J.C., *in preparation*, Professional geoscientists' perceptions of the diffusion of science into policy: *Geosphere*.

Kalafatis, S.E., Whyte, K.P., Libarkin, J.C., Caldwell, C., *in preparation*, Using a capabilities approach to explore and inform climate scientists' collaborations with Tribes: Global Environmental Change [submission expected Dec. 2017].

Libarkin, J.C., Gold, A., Harris, S., McNeal, K., Bowles, R., *in preparation*, Utilizing Rasch analysis to develop a measure of climate change understanding: *Climatic Change* [submission expected Dec. 2017].

Kirby, C.K., Haruo, C., Whyte, K.P., Libarkin, J.C., Caldwell, C., Edler, R., *in preparation*, Collaborations between Tribes and Climate Science Organizations: Benefits, Challenges, and Need for Training: *Society & Natural Resources* [submission expected Dec. 2017].

### ***In Review***

Shekhar, P., Huang-Saad, A., Libarkin, J.C., *in review*, Examining Differences in Students' Entrepreneurial Self-Efficacy in Curricular and Co-Curricular Entrepreneurship Education Programs: *Annals of Entrepreneurship Education and Pedagogy* [submitted 11/16/17].

Kalafatis, S.E., Libarkin, J.C., Whyte, K.P., Caldwell, C., *in review*, Revealing Gaps and Common Ground in Climate Collaborations Using Delphi Expert Elicitation: *Weather, Climate and Society* [submitted 10/27/17].

Kirby, C.K., Jaimes, P., Lorenz-Reaves, A.R., Libarkin, J.C., *in review*, Natural scientists' perceptions of social science: *PLOS One* [submitted 10/12/17].

Shekhar, P., Huang-Saad, A., Libarkin, J., *in review*, Conceptualizing student participation in entrepreneurship education programs: A Critical Review: *International Journal of Engineering Education* [submitted 10/3/17].

Shekhar, P., Huang-Saad, A., Libarkin, J.C., *in review*, Promoting Innovation by Women

through Engineering Entrepreneurship Courses: An Assessment of Entrepreneurial Self-Efficacy: *IEEE Transactions on Education* [submitted 9/13/17].

### **Peer-Reviewed Articles and Book Chapters**

1. Huang-Saad, A.Y., Morton C.S., **Libarkin, J.C.**, *in press*, Entrepreneurship Assessment in Higher Education: A Research Review for Engineering Education Researchers: *Journal of Engineering Education*.
2. Aksit, O., McNeal, K., Gold, A., **Libarkin, J.**, Harris, S., *in press*, The influence of instruction, prior knowledge, and values on climate change risk perception among undergraduates: *Journal of Research in Science Teaching*. [published online 11/ 29/17]
3. McCallum, C., **Libarkin, J.C.**, Callahan, C., Atchison, C., *in press*, Mentoring, social capital, and diversity in Earth System Science: *Journal of Women and Minorities in Science and Engineering*. [published online 11/30/17; DOI: 10.1615/JWomenMinorScienEng.2017018878]
4. Morton, C.S., Huang-Saad, A.Y., **Libarkin, J.C.**, 2017, Entrepreneurship education for women in engineering: A systemic review of entrepreneurship assessment literature with a focus on gender: *Journal of Engineering Entrepreneurship*, v. 8 (1), p. 17-31.  
*REPRINTED FROM:* Morton, C.S., Huang-Saad, A.Y., **Libarkin, J.C.**, 2016, Entrepreneurship education for women in engineering: A systemic review of entrepreneurship assessment literature with a focus on gender: ASEE 2016 Annual Conference, New Orleans, Louisiana. ***Awarded Second Best Research Paper in Entrepreneurship & Engineering Innovation Division.***
5. Stoltzfus, J.R., **Libarkin, J.C.**, 2016, Does the room matter? Active learning in traditional and enhanced lecture spaces: *CBE Life Sciences Education*, v. 15(4), ar68.
6. Staffend, N.A., **Libarkin, J.C.**, 2016, Understanding by design: Mentored implementation of backward design methodology at the university level: *Bioscene* v. 42(2), p. 44-52.
7. Drost, R., Casteel, M., **Libarkin, J.C.**, Thomas, S., Meister, M., 2016, Severe Weather Warning Communication: Factors impacting audience attention and retention of information during tornado warnings: *Weather, Climate, and Society*, DOI: <http://dx.doi.org/10.1175/WCAS-D-15-0035.1>.
8. Atchison, C., **Libarkin, J.C.**, 2016, Professionally held perceptions about the accessibility of the geosciences: *Geosphere*. doi:10.1130/GES01264.1
9. Anderson, S.W., **Libarkin, J.C.**, 2016, Conceptual mobility and entrenchment in introductory geoscience courses: New questions regarding physics' and chemistry's role in learning Earth Science concepts: *Journal of Geoscience Education*, v. 64, p. 74-86.
10. Thomas, S.R., Knott, J.L., **Libarkin, J.C.**, 2015, The Foundations of Science MOOC: A case study on community development of free-choice learning resources. In Corbeil, J.R., Corbeil, M.E., and Khan, B.H. (Eds.), *The MOOC Case Book: Case Studies in MOOC Design, Development and Implementation*: Linus Books.
11. **Libarkin, J.C.**, Thomas, S.R., Ording, G., 2015, Factor analysis of drawings: Application to college student models of the greenhouse effect: *International Journal of Science Education*, v. 37, n. 13, p. 2214-2236.
12. LaDue, N.D., **Libarkin, J.C.**, Thomas, S.R., 2015, Visual representations on high school biology, chemistry, earth science, and physics assessments: *Journal of Science Education and Technology*, v. 24(6), p. 818-834.
13. Drost, R., Trobec, J., Steffke, C., **Libarkin, J.**, 2015, Eye tracking: Evaluating the impact



- of gesturing during televised weather forecasts: *Bulletin of the American Meteorological Society*, v. 96, p. 387–392.
14. McNeal, K.S., **Libarkin, J.C.**, Shapiro-Ledley, T., Bardar, E., Haddad, N., Ellins, K., Dutta, S., 2014, The role of research in on-line curriculum development: The case of EarthLabs climate change and Earth System modules: *Journal of Geoscience Education*, v. 62, p. 560-577.
  15. **Libarkin, J.C.**, 2014, Evaluation and Assessment of Civic Understanding of Planet Earth. In G. Roehrig, D. Dalbotten, & P. Hamilton (Eds.) *Future Earth: Advancing Civic Understanding of the Anthropocene*, p. 41-52.
  16. Orion, N., **Libarkin, J.C.**, 2014, Earth System Science Education. In N. Lederman (Ed.) *Handbook of Research on Science Education*, v. 2, p.481-496.
  17. **Libarkin, J.C.**, 2014, The role of scholarly publishing in geocognition and discipline-based geoscience education research. In V. Tong (Ed.) *Geoscience Research and Education: Teaching at Universities*, p. 69-76.
  18. **Libarkin, J.C.**, Jardeleza, S.E., McElhinny, T., 2014, The role of concept inventories in course assessment. In V. Tong (Ed.) *Geoscience Research and Education: Teaching at Universities*, p. 275-297.
  19. Lorenz, A.R., **Libarkin, J.C.**, Ording, G., 2014, Disgust in response to some arthropods aligns with disgust provoked by pathogens: *Global Ecology and Conservation*, v. 2, p. 248-254.
  20. Geraghty Ward, E.M., Semken, S., **Libarkin, J.C.**, 2014, The design of place-based, culturally informed geoscience assessment: *Journal of Geoscience Education*, v. 62 (1), p. 86-103.
  21. McElhinny, T.L., Dougherty, M.J., Bowling, B.V., **Libarkin, J.C.**, 2014, Genetics curriculum and assessment: The status of instruction for bioscience majors in the United States: *Science & Education*, v. 23 (2), p. 445-464.
  22. Atchison, C.L., **Libarkin, J.C.**, 2013, Fostering accessibility in geoscience training programs: *EOS*, v. 94 (44), p. 400.
  23. Hollinger, C., **Libarkin, J.C.**, Stickle, J.E., Hauptman, J.G, Henry, R., Doig, K., Scott, M.A., 2013, Effects of a curricular revision on educational outcomes in veterinary clinical pathology: *Journal of Veterinary Medical Education*, v. 40(2), p. 158-170.
  24. McCallum, C., Thomas, S.W., **Libarkin, J.C.**, 2013, AlphaMOOCS: Building a Massive Open Online Course one graduate student at a time, *eLearningPapers*, issue 33, <http://elearningeuropa.info/en/article/The-AlphaMOOC%3A-Building-a-Massive-Open-Online-Course-One-Graduate-Student-at-a-Time>.
  25. **Libarkin, J.C.**, Schneps, M.H., 2012, Elementary children’s retrodictive reasoning about earth science: *International Electronic Journal of Elementary Education*, v.5, p. 47-62.
  26. Baker, K.M., Petcovic, P., Wisniewska, M., **Libarkin, J.**, 2012, Spatial signatures of mapping expertise among field geologists: *Cartography and Geographic Information Science*, v. 39, n. 3, p. 119-132.
  27. Hambrick, D.Z., **Libarkin, J.C.**, Petcovic, H.L., Baker, K., Elkins, J., Callahan, C., Turner, S., Rench, T., LaDue, N., 2012, Scientific problem solving in the wild: A test of the circumvention-of-limits hypothesis in geological bedrock mapping: *Journal of Experimental Psychology: General*, v. 121, p. 397-403. doi: [10.1037/a0025927](https://doi.org/10.1037/a0025927)
  28. **Libarkin, J.C.**, Ording, G., 2012, The utility of writing assignments in undergraduate bioscience: *CBE-Life Science Education*, v. 11, p. 39-46.

29. Turner, S., **Libarkin, J.C.**, 2012, Novel applications of Tablet PCs to investigate expert cognition in the geosciences: *Computers & Geosciences*, v. 42, p. 162-167.
30. **Libarkin, J.C.**, Asghar, A., Crockett, C., Sadler, P., 2011, Invisible Misconceptions: Student understanding of ultraviolet and infrared radiation: *Astronomy Education Review*, v. 10, n.1, doi:10.3847/AER2011022.
31. Clark, S.K., **Libarkin, J.C.**, Kortz, K.M., Jordan, S.C., 2011, Alternative conceptions of plate tectonics held by nonscience undergraduates, *Journal of Geoscience Education*, v. 59, p. 251-262. **Journal of Geoscience Education Outstanding Paper Award 2012**
32. **Libarkin, J.C.**, Ward, E.M.G., Anderson, S.W., Kortemeyer, G., Raeburn, S.P., 2011, Revisiting the Geoscience Concept Inventory: A call to the community: *GSA Today*, v. 21, n. 8, p. 26-28.
33. Clark, S. K., **Libarkin, J.C.**, 2011, Designing a mixed-format research instrument and scoring rubric: Case study of a plate tectonics instrument. In A. Feig & A. Stokes (Eds.) *Qualitative Inquiry in Geoscience Education Research*. Boulder, CO: Geological Society of America Special Paper, p. 81-96.
34. **Libarkin, J.C.**, Ward, E.M.G., 2011, The qualitative underpinnings of quantitative concept inventory questions. In A. Feig & A. Stokes (Eds.) *Qualitative Inquiry in Geoscience Education Research*. Boulder, CO: Geological Society of America Special Paper, p. 37-48.
35. Ward, E.M.G., **Libarkin, J.C.**, Kortemeyer, G., Raeburn, S., 2010, The Geoscience Concept Inventory WebCenter provides new means for student assessment: *eLearningPapers*. <http://www.elearningpapers.eu/en/article/The-Geoscience-Concept-Inventory-WebCenter-provides-new-means-for-student-assessment>
36. Asghar, A.A., **Libarkin, J.C.**, 2010, Gravity, magnetism, and "down": Non-physics college students' conceptions of gravity: *The Science Educator*, v. 19, n. 1, p. 42-55.
37. Clark, S.K., Sibley, D., **Libarkin, J.C.**, Heidemann, M., 2009, A novel method to teaching and understanding transformations of matter in dynamic Earth systems: *Journal of Geoscience Education*, v. 57, n. 4, p. 233-241.
38. Petcovic, H.L., **Libarkin, J.C.**, Baker, K.M., 2009, An empirical methodology for investigation of geocognition in the field: *Journal of Geoscience Education*, v. 57, n. 4, p. 316-328.
39. Garzione, C.N., Hoke, G.D., **Libarkin, J.C.**, Withers, S., MacFadden, B., Eiler, J., Mulch, A., Ghosh, P., 2008, The rise of the Andes: Pulsed surface uplift in orogenic plateaus: *Science*, v. 320, p. 1304-1307.
40. **Libarkin, J.C.**, Anderson, S.W., 2007, Development of the Geoscience Concept Inventory, in Proceedings of the National STEM Assessment Conference, Washington DC, October 19-21, 2006, p. 148-158.
41. Riihimaki, C., **Libarkin, J.C.**, 2007, Terrestrial Cosmogenic Nuclides as Paleoaltimetric Proxies, in Reviews in Mineralogy and Geochemistry, v. 66: Paleoelevation: geochemical and thermodynamic approaches, Ed. M. Kohn, p. 269-278.
42. Coblenz, D., **Libarkin, J.C.**, Sussman, A., Chase, C.G., 2007, Paleolithospheric structure revealed by continental geoid anomalies: *Tectonophysics*, v. 443, p.106-120.
43. **Libarkin, J.C.**, Kurdziel, J.P., Anderson, S.W., 2007, College student conceptions of geological time and the disconnect between ordering and scale: *Journal of Geoscience Education*, v. 55, p. 413-422.
44. **Libarkin, J.C.**, Kurdziel, J.P., 2006, Ontology and the teaching of earth system science: *Journal of Geoscience Education*, v. 54, p. 408-413.

45. Farley, K.A., **Libarkin, J.**, Mukhopadhyay, S., Amidon, W., 2006, Cosmogenic  $^3\text{He}$  in apatite, titanite, and zircon: *Earth and Planetary Science Letters*, v. 248, p. 436-446.
46. **Libarkin, J.C.**, Anderson, S.W., 2006, The Geoscience Concept Inventory: Application of Rasch Analysis to Concept Inventory Development in Higher Education: *in Applications of Rasch Measurement in Science Education*, ed. X. Liu and W. Boone: JAM Publishers, p. 45-73.
47. Garzzone, C.N., Molnar, P., **Libarkin, J.C.**, MacFadden, B.J., 2006, Rapid Late Miocene rise of the Bolivian Altiplano: Evidence for removal of mantle lithosphere: *Earth and Planetary Science Letters*, v. 241, p. 543-556.
48. **Libarkin, J.C.**, Anderson, S.W., 2005, Assessment of learning in entry-level geoscience courses: Results from the Geoscience Concept Inventory: *Journal of Geoscience Education*, v. 53, p. 394-401.
49. Dahl, J., Anderson, S.W., **Libarkin, J.C.**, 2005, Digging into Earth Science: Alternative conceptions held by K-12 teachers: *Journal of Science Education*, v. 12, p. 65-68.
50. **Libarkin, J.C.**, Anderson, S., Dahl, J., Beilfuss, M., Boone, W., Kurdziel, J., 2005, College students' ideas about geologic time, Earth's interior, and Earth's crust: *Journal of Geoscience Education*, v. 53, n. 1, p. 17-26.
51. **Libarkin, J.C.**, Crockett, C., Sadler, P., 2003, Density on dry land: Demonstrations without buoyancy challenge student misconceptions: *The Science Teacher*, v. 70, no. 6, p. 46-50.
52. Chase, C.G., **Libarkin, J.C.**, Sussman, A., 2002, Colorado Plateau: Geoid and means of isostatic support: *International Geology Review*, v. 44, p. 575-587.  
*REPRINTED:* Chase, C. G., **Libarkin, J. C.**, Sussman, A. J., 2003, Colorado Plateau; geoid and means of isostatic support: *Lithosphere of western North America and its geophysical characterization*, Ernst, W.G. (Ed.) Columbia, MD: Bellwether Publishing for the Geological Society of America, p. 391-403.
53. **Libarkin, J.C.**, Quade, J., Chase, C.G., Poths, J., McIntosh, W., 2002, Measurement of ancient cosmogenic  $^{21}\text{Ne}$  in quartz from the 28 Ma Fish Canyon Tuff, CO: *Chemical Geology*, v. 186, p. 199-213.
54. Wood, D.A., Hart, J., DeToro, D., Tollefson, S., **Libarkin, J.C.**, 2001, The Role of Graduate Teaching Assistants in Undergraduate Education: Embracing a New Model of Teaching and Learning, in "Student Assisted Teaching and Learning: Strategies, Models, and Outcomes", ed. Miller, J.E., Groccia, J.E., and Dibasio, D., Anker Publishers, 250 pp.
55. **Libarkin, J.C.**, Mencke, R., 2001, Students teaching students: Peer training in undergraduate education: *The Journal of College Science Teaching*, v. 31, p. 235-239.
56. **Libarkin, J.C.**, 2001, Development of an assessment of student conception of the nature of science: *Journal of Geoscience Education*, v. 49, p. 435-442.
57. **Libarkin, J.C.**, Butler, R.F., Richards, D.R., Sempere, T., 1998, Tertiary remagnetization of Paleozoic rocks from the Eastern Cordillera and Sub-Andean Zone of Bolivia: *Journal of Geophysical Research*, v. 103, p. 30,417-30,429.

#### **Peer-Reviewed Conference Publications:**

*This section includes papers reviewed by scholarly peers and published in conference proceedings. Published conference abstracts are documented elsewhere.*

58. Shekhar, P., Huang-Saad, A., Libarkin, J.C., *accepted*, 'Is someone in your family an

- entrepreneur?' – Examining the influence of family role models on students' Entrepreneurial Self-Efficacy and its variation across gender: ASEE 125th Annual Conference.
59. Shekhar, P., Huang-Saad, A., **Libarkin, J.**, 2017, Defining Entrepreneurial Behaviour as a Learning Outcome of Engineering Entrepreneurship Programs. Research in Engineering Education Symposium, Bogota, Colombia.
  60. Adhikari, U., **Libarkin, J.**, Mitchell, J., Weir, M., 2017, Measuring the success of an educational program through box-and-arrow diagrams: A case study of the Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute. ASEE 124th Annual Conference, Columbus, OH.
  61. Weir, M.H., Mitchell, J., Mraz, A., **Libarkin, J.**, Rose, J.B., 2017, QMRA Wiki: An Educational Tool for Interdisciplinary Teaching of Risk Modeling in Engineering Curricula. ASEE 124th Annual Conference, Columbus, OH.
  62. Hirshfield, L., Huang-Saad, A., **Libarkin, J.**, 2017, Mapping engineering outcomes to the Lean Launch curriculum in the context of design. ASEE 124th Annual Conference, Columbus, OH.
  63. Shekhar, P., Huang-Saad, A., **Libarkin, J.**, Cummings, R., Tafurt, 2017, Assessment of Student Learning in an Entrepreneurship Practicum Course. ASEE 124th Annual Conference, Columbus, OH.
  64. Huang-Saad, A.Y., Morton, C.S., **Libarkin, J.C.**, 2016, Unpacking the Impact of Engineering Entrepreneurship Education that Leverages the Lean LaunchPad Curriculum. In Frontiers in Education Conference (FIE), p. 1-7. IEEE. [doi:10.1109/FIE.2016.7757373](https://doi.org/10.1109/FIE.2016.7757373)
  65. Sussman, A.J., Rogers, A., **Libarkin, J.C.**, 2005, Analysis and ranking of Earth Science story-books based on terminology, illustrations, and demographics: WEPAN/NAMEPA 2005 Conference Proceedings, <http://www.x-cd.com/wepan05/prof73.html>.

### **Editor-Reviewed Publications**

*This section includes papers reviewed by journal editors, often with revision before acceptance.*

66. Callahan, C.N., **Libarkin, J.C.**, McCallum, C.M., Atchison, C.L., 2015, Using the lens of social capital to understand diversity in the Earth System Sciences workforce: *Journal of Geoscience Education*, v. 63 (2), p. 98-104. doi: <http://dx.doi.org/10.5408/15-083.1>.  
**Journal of Geoscience Education Outstanding Paper Award 2016**
67. Ellins, K.K., Shapiro-Ledley, T., Haddad, N., McNeal, K., Gold, A., Lynds, S., **Libarkin, J.**, 2014, EarthLabs: Supporting teacher professional development to facilitate effective teaching of climate science: *Journal of Geoscience Education*, v. 62 (4), p. 330-342.
68. Jardeleza, S.W., Cognato, A., Gottfried, M., Kimbirauskas, R., **Libarkin, J.**, Olson, R., Ording, G., Owen, J., Rasmussen, P., Stoltzfus, J., Thomas, S., 2013, The Value of Community Building: One Center's Story of How the AAC&U VALUE Rubrics Provided Common Ground: *Liberal Education*, v. 99(3), <http://www.aacu.org/liberaleducation/le-sul3/jardeleza.cfm>.
69. Ledley, T.S., Haddad, N., Bardar, E., Ellins, K., McNeal, K., **Libarkin, J.**, 2012, EarthLabs – An Earth System Science Laboratory Module to Facilitate Teaching About Climate Change: *The Earth Scientist*, v. 28, n. 3, p. 19-24.
70. **Libarkin, J.C.**, Geraghty Ward, E., 2011, Understanding Earth processes: Student alternative conceptions about geophysics concepts: *The Earth Scientist*, v. 27, n. 1, p. 27-

- 32.
71. **Libarkin, J.C.**, Stokes, A., 2011, The Moon has no gravity: Examples of idea mixing in explanations of physical processes, *Planet*, v. 24, P. 50-53.
  72. Stokes, A., King, H., **Libarkin, J.C.**, 2007, Research in Science Education: Threshold Concepts, *Journal of Geoscience Education*, v. 55, p. 434-438.
  73. Petcovic, H.L., **Libarkin, J.C.**, 2007, Research in Science Education: The Expert-Novice Continuum, *Journal of Geoscience Education*, v. 55, p. 333-339
  74. **Libarkin, J.C.**, Kurdziel, J.P., 2004, Research Methodologies in Science Education: Human Subjects and Education Research, *Journal of Geoscience Education*, v. 52, p. 199-203.
  75. Kurdziel, J. P., **Libarkin, J.C.**, 2003, Research Methodologies in Science Education: Training Graduate Teaching Assistants to Teach: *Journal of Geoscience Education*, v.51, p. 347-351.
  76. **Libarkin, J.C.**, Kurdziel, J., 2003, Research Methodologies in Science Education: Gender and the Geosciences: *Journal of Geoscience Education*, v.51, p. 446-452.
  77. **Libarkin, J.C.**, Kurdziel, J., Beilfuss, M., 2003, Research Methodologies in Science Education: Mental Models and Cognition in Education: *Journal of Geoscience Education*, v. 51, p. 121-126.
  78. **Libarkin, J.C.**, Chase, C.G., 2003, Comment on Timing of Colorado Plateau Uplift: Initial constraints from vesicular basalt-derived paleoelevations: *Geology*, v. 31, p. 191-192.
  79. Kurdziel, J., **Libarkin, J.C.**, 2002, Research Methodologies in Science Education: Undergraduate Research Mentoring, Teacher Workshops, and K-12 Outreach Activities: *Journal of Geoscience Education*, v. 50, p. 602-609.
  80. **Libarkin, J.C.**, Brick, C., 2002, Research Methodologies in Science Education: Visualization in the Geosciences: *Journal of Geoscience Education*, v. 50, p. 449-455.
  81. Kurdziel, J., **Libarkin, J.C.**, 2002, Research Methodologies in Science Education: Students' Ideas About the Nature of Science: *Journal of Geoscience Education*, v. 50, p. 322-329.
  82. **Libarkin, J.C.**, Kurdziel, J., 2002, Research Methodologies in Science Education: Qualitative Data: *Journal of Geoscience Education*, v. 50, p. 195-200.
  83. **Libarkin, J.C.**, Kurdziel, J., 2002, Research Methodologies in Science Education: The Qualitative/Quantitative Debate: *Journal of Geoscience Education*, v. 50, p. 78-86.
  84. Kurdziel, J., **Libarkin, J.C.**, 2001, Research Methodologies in Science Education: Assessing Students' Alternative Conceptions: *Journal of Geoscience Education*, v. 49, p. 378-383.
  85. **Libarkin, J.C.**, Kurdziel, J., 2001, Research Methodologies in Science Education: Strategies for Productive Assessment: *Journal of Geoscience Education*, v. 49, p. 300-304.

***Editorials, Reports, Non-Reviewed Articles, and other Writings***

86. Locke, S., **Libarkin, J.C.**, Chang, C., 2012, Editorial: Geoscience Education and Global Development: *Journal of Geoscience Education*, v. 60, p. 199-200.
87. St. John, K., **Libarkin, J.C.**, 2012, Editorial: ...Where We Are Headed: *Journal of Geoscience Education*, v. 60, p. 1-2.
88. **Libarkin, J.C.**, St. John, K., 2011, Editorial: Where We Have Been...: *Journal of Geoscience Education*, v. 59, p. 175.
89. **Libarkin, J.C.**, Baker, K., Hambrick, Z.D., Petcovic, H.L., 2011, Practical Lessons from

- Research on Field Cognition and Behavior: *In The Trenches*, v.1. n.4, p. 14-17.
90. **Libarkin, J.C.**, Finkelstein, N., 2011, Seeding DBER: Evaluating the early history of the National Science Foundation's Postdoctoral Fellowships in Science, Mathematics, Engineering and Technology Education (PFSMETE) as a pathway into Discipline Based Education Research: Commissioned by the National Research Council.
  91. **Libarkin, J.C.**, 2010, Editorial: Technology and the Future for JGE: *Journal of Geoscience Education*, v. 58, p. 252.
  92. **Libarkin, J.C.**, Elkins, J.T., McNeal, K., St. John, K., 2010, Editorial: What role do geoscientists play in society?: *Journal of Geoscience Education*, v. 58, p. 1.
  93. **Libarkin, J.C.**, Elkins, J.T., St. John, K., 2009, Editorial: Evolution of JGE: Responding to Our Community's Needs: *Journal of Geoscience Education*, v. 57, p. 165-167.
  94. **Libarkin, J.C.**, 2008, Concept Inventories in Higher Education Science. Prepared for the National Research Council Promising Practices in Undergraduate STEM Education Workshop 2 (Washington, D.C., Oct. 13-14, 2008).  
[http://www7.nationalacademies.org/bose/PP\\_Commissioned\\_Papers.html](http://www7.nationalacademies.org/bose/PP_Commissioned_Papers.html)
  95. **Libarkin, J.C.**, 2008, Acceptance Speech for 2007 Shea Award: *Journal of Geoscience Education*, v. 56, p. 191.
  96. Garzione, C.N., Molnar, P., **Libarkin, J.C.**, MacFadden, B.J., 2007, Reply to Comment on "Rapid late Miocene rise of the Bolivian Altiplano: Evidence for removal of mantle lithosphere" by Garzione et al. (2006), *Earth Planet. Sci. Lett.* 241 (2006) 543-556: *Earth and Planetary Science Letters*, v. 259, p. 630-633.
  97. **Libarkin, J.C.**, 2006, College student conceptions of geological phenomena and their importance in classroom instruction: *Planet*, v. 17, p. 6-9.  
*REPRINTED: Libarkin, J.C.*, 2007, College student conceptions of geological phenomena and their importance in classroom instruction: *First Break*, v. 25, p. 55-60.
  98. **Libarkin, J.C.**, 2006, Geoscience Education in the United States: *Planet*, v. 17, p. 60-63.  
*REPRINTED: Libarkin, J.C.*, 2007, Geoscience Education in the United States: *First Break*, v. 25, p. 49-53.
  99. Truscott, J.B., Boyle, A., Burkill, S., **Libarkin, J.**, Lonsdale, J., 2006, The concept of time: can it be fully realised and taught?: *Planet*, v. 17, p. 21-23.
  100. **Libarkin, J.C.**, 2005, Geoscience Educators in Geology Departments; Expectations and Experiences: NAS Workshop on Education Research in STEM Disciplinary Departments, Dec. 5, 2005. [http://www7.nationalacademies.org/cfe/STEM\\_Disciplines\\_Agenda.html](http://www7.nationalacademies.org/cfe/STEM_Disciplines_Agenda.html).
  101. **Libarkin, J.C.**, 2005, Conceptions, Cognition, and Change: Student Thinking about the Earth: *Journal of Geoscience Education*, v. 53, p. 342 (Editorial for the Special Issue on Conceptions, Cognition, and Change).  
<http://nagt.org/nagt/jge/columns/editorials.html#edv53n4>.
  102. **Libarkin, J.**, Farley, K., Spell, T., Garzione, C., 2005, Cosmogenic noble gases as potential paleoaltimeters: Paleoelevation Workshop Extended Abstract  
<http://www.ei.lehigh.edu/paleoelevation/abstracts.htm>.
  103. Garzione, C.N, **Libarkin, J.C.**, Ghosh, P., Eiler, J., 2005, Oxygen Isotope Paleoelevation from Paleosol Carbonates: An Example from the Northern Altiplano, Bolivia: Paleoelevation Workshop Extended Abstract  
<http://www.ei.lehigh.edu/paleoelevation/abstracts.htm>
  104. **Libarkin, J.C.**, 2002, Building a Research Paradigm, written for the Wingspread Conference: Bringing Research on Learning to the Geosciences,



[http://serc.carleton.edu/research\\_on\\_learning/workshop02/essays.html](http://serc.carleton.edu/research_on_learning/workshop02/essays.html).

105. McCartan, L., Weedman, S.D., Wingard, G.L., Edwards, L.E., Sugarman, P.J., Feigenson, M.D., Buursink, M.L., **Libarkin, J.C.**, 1995, Age and diagenesis of the Upper Floridan aquifer and the intermediate aquifer systems in southwestern Florida: *U.S. Geological Survey, Bulletin B-2122*, 62 pp.
106. Weedman, S.D., Scott, T.M., Edwards, L.E., Brewster-Wingard, G.L., **Libarkin, J.C.**, 1995, Preliminary analysis of integrated stratigraphic data from the Phred-#1 corehole, Indian River County, Florida: *U.S. Geological Survey Open File Report 95-824*, 63 p.

### **Books**

Book proposal accepted by GSA: PUTTING RESEARCH INTO PRACTICE: TEACHING ABOUT EARTH'S SYSTEMS by Julie Libarkin and Blake Colaianne [accepted, April 28, 2015]

### **Curricular Materials** (selected)

- |            |  |
|------------|--|
| 2014-15    | Co-development of freshmen research seminar on Science, Art and Communication Research   |
| 2014       | Co-development of online course for critical thinking  |
| 2013-2014  | Development of Global Climate Change course online   |
| 2012-2014  | Co-Leadership of team development of Foundations of Science MOOC   |
| 2011, 2012 | Earth-Human Interactions Lab: The Red Cedar River (w/ S. Turner, C. Steffke)   |
| 2010       | Multiple-choice questions for Introduction to Geology, Pearson.  |
| 2005, 2007 | Updating of Instructor's Manual to accompany Physical Geology, 11 <sup>th</sup> and 12 <sup>th</sup> editions, by Plummer, McGeary, and Carlson: McGraw-Hill Publishers. |
| 2004, 2005 | Introduction to Geology Laboratory Manual: Ohio University (revisions and additions).  |
| 2000       | Co-development of NATS 101: A Geological Perspective (course workbook): Department of Geosciences, University of Arizona.  |
| 1999       | Larson, H., and Libarkin, J., Teaching Teams Handbook: Improving Education Through Faculty-Student Collaboration: University of Arizona.                                 |

### **CONFERENCE ABSTRACTS and PRESENTATIONS**

#### ***Workshop Leadership and Invited Participation (selected)***

1. Libarkin, J., McCallum, C., Atchison, C., Callahan, C., Kurz, S., Jaimes, P., Wiley, L., 2017, Mentoring for Diversity, Geological Society of America annual meetings (Seattle WA, Oct. 25-26).
2. Libarkin, J., 2013, Evaluation of Computational Science Workshops for Biologists (Annapolis MD, July 8-9).
3. Libarkin, J., 2011, Getting Started with Assessment, University of Washington – Bothell (Bothell, WA, May 20, 2011).
4. Reed-Rhoads, T., and Libarkin, J., 2011, Facilitating Teaching and Learning: Concept Inventories, AAC&U “Engaged STEM Learning: From Promising to Pervasive Practice” (Miami, FL, March, 24, 2011).
5. Libarkin, J., 2011, They Think What?: Capturing and Using Student Ideas in Instruction, Chicago Symposium Series, Excellence in Teaching Mathematics and Science: Research and Practice (Chicago, IL, February, 2011).

6. Invited Participant, 2009, Voices from the Community: A Workshop on Climate Change Education, AGU and NSF (Washington, D.C., July 29-31, 2009).
7. Libarkin, J., 2008, Developing Geoscience Concept Inventory Questions, GSA Annual Meeting (Houston, TX, October 4, 2008).
8. Libarkin, J., 2008, CCLI Conference Workshop: Development of Concept Inventory Questions: 2008 Course Curriculum and Laboratory Improvement (CCLI) PI Conference, (Washington, D.C., Aug. 13-18, 2008).
9. Invited Participant, 2007, Assessing the State of STEM Concept Inventories: A National Workshop (NSF-Sponsored, Washington, D.C., May, 2007).
10. Libarkin, J., 2006, Informal Workshop on Teaching Introductory Geology Laboratories, Kansas State University, Department of Geology (Feb. 8, 2006).
11. Invited Participant in Workshop on Education Research Positions in STEM Disciplinary Departments: Number 2 in the Series of CFE Symposia on Growing Human Capital in STEM Higher Education: *The National Academies*, Center for Education, Division of Behavioral and Social Sciences and Education (Washington, D.C.: December 5, 2005).
12. Libarkin, J., 2005, Designing Effective Geoscience Education Research: Qualitative and Quantitative Methods, Geological Society of America K-16 workshop (with J. Sexton; Oct. 16, 2005; 53 participants).
13. Libarkin, J., 2004, "They Think What?: Capturing and Using Student Ideas in the Classroom": Integrating Science and Mathematics Education Research into Teaching Conference, hosted by The Center for Science and Mathematics Education Research and The Maine Mathematics-Science Teacher Excellence Collaborative (MMSTEC) at The University of Maine, Orono ME (June 21, 2004). *Invited two-hour workshop*
14. Libarkin, J., 2004, "Development of Assessment Tools for Educational Research": Integrating Science and Mathematics Education Research into Teaching Conference, hosted by The Center for Science and Mathematics Education Research and The Maine Mathematics-Science Teacher Excellence Collaborative (MMSTEC) at The University of Maine, Orono ME (June 23&24, 2004). *Invited two-day workshop*
15. Invited Participant in *Wingspread Conference: Bringing Research on Learning to the Geosciences*, sponsored by National Science Foundation and Johnson Foundation (2002).
16. Libarkin, J., Finkelstein, N., and Luft, J., 2001, "Who Cares About Post-Doc's Anyway?", Invited discussion at the National Association for Research in Science Teaching Annual Conference.

### ***Professional Conference Contributions***

17. Libarkin, J.C., Gold, A.U., Harris, S.E., McNeal, K.S., Bowles, R., 2017, Relating understanding and risk perception with a validated measure of climate change conceptions, Geological Society of America Abstracts with Programs. Vol. 49, No. 6, doi: 10.1130/abs/2017AM-307676. *Invited*.
18. Rappolee, E., Libarkin, J.C., McCallum, C., Kurz, S., 2017, Pictures worth a thousand words: Drawing analysis uncovers geoscience careers influenced by social and cultural capital, Geological Society of America Abstracts with Programs. Vol. 49, No. 6, doi: 10.1130/abs/2017AM-304525.
19. Kirby, C.K., Libarkin, J.C., 2017, Understanding climate change behaviors using a modified theory of planned behavior, Geological Society of America Abstracts with Programs. Vol. 49, No. 6, doi: 10.1130/abs/2017AM-303415.



20. Libarkin, J.C., 2016, Teaching and assessing through drawing, Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-285474.
21. Kirby, C., Haruo, C., Libarkin, J.C., Caldwell, C., Whyte, K., Edler, R., 2016, Creating ethical climate science researchers: An analysis of interviews from tribal and scientist perspectives, Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-280957.
22. Ward, E.M.G., Semken, S., Libarkin, J.C., 2016, A mixed-methods approach to assessment design that incorporates culture and place, Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-284298.
23. Jaimes, P., Libarkin, J.C., McCallum, C., 2016, Using community cultural wealth to explore capital in minority and majority students in earth system science, Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-280950.
24. Ellins, K.K., Riggs, E.M., Serpa, L.F., Stocks, E., Shapiro Ledley, T., McNeal, K.S., Libarkin, J.C., Lavier, L.L., Samsel, F., Smith, R., Mandal, A., 2016, Teaching with online educational materials in the geoscience classroom: Examples from Texas and Jamaica, Geological Society of America Abstracts with Programs. Vol. 48, No. 7, doi: 10.1130/abs/2016AM-286397.
25. Lorenz-Reaves, A.R., Libarkin, J.C., Fisher, N.A., Ording, G.J., 2016, Integrating live insects as pets in elementary school classrooms, International Congress of Entomology, doi: 10.1603/ICE.2016.91553.
26. Libarkin, J.C., Gold, A., Harris, S., McNeal, K., Bowles, R., 2015, Psychometric principles in measurement for geoscience education research: A climate change example, AGU Fall Meeting 2014, ED21D-0849.
27. McNeal, K.S., Libarkin, J.C., Ledley, T., Gold, A., Lynds, S., Haddad, N., Ellins, K., Dunlap, C., Bardar, E., Youngman, E., 2015, Assessment of high-school students engaged in the EarthLabs climate modules using the climate concept inventory, AGU Fall Meeting 2014, ED33C-0943.
28. Callahan, C.N., Libarkin, J.C., McCallum, C., Atchison, C.L., 2015, The relationship between trust in mentor and career satisfaction in the Earth System Sciences, Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p. 685.
29. Ellins, K.K., Ledley, T., McNeal, K.S., Haddad, N., Libarkin, J.C., Bardar, E., Youngman, B., Dunlap, C., Lockwood, J., Mote, A., 2015, Supporting students understanding of change over time and space: The EarthLabs Climate Series, Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p. 468.
30. Yang, L., Libarkin, J., 2015, Measuring the Reliability and Validity of a Programmatic Assessment Survey for Undergraduate Students' General Education. Paper presented at the Annual Conference of American Educational Research Association (AERA). Chicago, IL, U.S.A. (April 16, 2015).
31. Atchison, C., Libarkin, J.C., 2014, How accessible are the geosciences? A study of professionally held perceptions and what they mean for the future of geoscience workforce development, AGU Fall Meeting 2014, ED31I-01. *Invited*.
32. Mote, A., Lockwood, J., Ellins, K., Haddad, N., Ledley, T., Lynds, S., McNeal, K., Libarkin, 2014, EarthLabs Climate Detectives: Using the science, data, and technology of IODP Expedition 341 to investigate the Earth's past climate, AGU Fall Meeting 2014, ED51C-3444.

33. Haddad, N., Ledley, T., Ellins, K., Bardar, E., Youngman, E., Dunlap, C., Lockwood, J., Mote, A., McNeal, K., Libarkin, J., Lynds, S., Gold, A., 2014, Preparing teachers to support the development of climate literate students, AGU Fall Meeting 2014, ED13C-3462.
34. Callahan, C.N., Libarkin, J.C., Bomzer, D., Smrecak, T.A., 2014, Jargon or gibberish?: How does science read to undergraduate students?, Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.245.
35. Ellins, K.K., Lockwood, J., Haddad, N., Ledley, T.S., Lynds, S., McNeal, K.S., Libarkin, J.C., Gold, A., 2014, IODP Expedition 341 Science Team, EarthLabs Climate Detectives: Curriculum based on IODP Expedition 342 on the Joides Resolution, Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.602.
36. Libarkin, J.C., Thomas, S.R., 2014, Best Practices in Visualization: The Case of Common Climate Change Images, Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.602.
37. Ward, E.M.G., Semken, S., Libarkin, J.C., 2014, Cultural Validation in Practice: Leveraging Place and Culture in Geoscience Assessment, Geological Society of America Abstracts with Programs. Vol. 46, No. 6, p.388.
38. Ledley, T.S., McNeal, K., Ellins, K., Libarkin, J., 2014, Confronting the Challenges of Climate Literacy, DRK-12 Meeting, August 5, 2014.
39. McCallum, C.M., Libarkin, J.C., 2014, Building a Culture of Assessment Across University Colleges, American Educational Research Association Annual Meeting.
40. Kidwell, K., Libarkin, J., Lucas, J., McCallum, C., 2014, Assessment for Change: Using Evidence to Guide Curriculum Reform, Association of American Colleges & Universities Conference on General Education and Assessment.
41. Libarkin, J.C., Miller, H., Thomas, S.R., 2013, Scientists' internal models of the greenhouse effect: AGU Fall Meeting 2013, ED32A-05. *Invited*.
42. Libarkin, J.C., Thomas, S.R., McCallum, C., 2013, Online Learning and Critical Thinking: Geological Society of America Abstracts with Programs, Vol. 45, No. 7, p. 284. *Invited*.
43. McNeal, K., Libarkin, J.C., Ledley, T.S., Gold, A.U., Lynds, S.E., Haddad, N., Ellins, K.K., Bardar, E., Dunlap, C., and Youngman, E., 2013, Development of a Climate Concept Inventory and Assessment of High-School Students Engaged in the EarthLabs Climate Modules, AGU Fall Meeting 2013, ED31D-06.
44. Lynds, S.E., Gold, A.U., McNeal, K., Libarkin, J.C., Buhr Sullivan, S., Ledley, T.S., Haddad, N., Ellins, K.K., Investigating Climate Science Misconceptions Using a Teacher Professional Development Workshop Registration Survey, AGU Fall Meeting 2013, ED33A-0766.
45. Forcino, F.L., Libarkin, J.C., 2013, Not Saying "Evolution" May Be the Key to Teaching Evolution, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.284.
46. Drost, R.E., Libarkin, J.C., Thomas, S.R., Casteel, M.A., Mesiter, M., 2013, Communicating Tornado Warnings, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.506.
47. Lee, C.I., and Libarkin, J.C., 2013, Draw-A-Geologist: Insight into student preconceptions, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.471.
48. Steffke, C.L., Libarkin, J.C., 2013, Which Colors Are Better?: An Eye Tacking Study of Color Ramp Symbolology, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.284.

49. Callahan, C.N., Petcovic, H.L., Libarkin, J.C., Baker, K., 2013, What Would Chamberlin Think? Experts Map without Multiple Working Hypotheses, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.471.
50. Ellins, K.K., Ledley, T.S., Haddad, N., McNeal, K., Gold, A.U., Lynds, S.E., Libarkin, J.C., Quartini, E., Thirumala, K., Cavitte, M., 2013, EarthLabs: Supporting Teacher Professional Development to Facilitate Effective Teaching of climate Science, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.502
51. Ebert, J.R., LaDue, N.D., Schmidt, R.W., Libarkin, J.C., Ellis, T.D., Kluge, S., 2013, Fanning the Flames of Student Interest: Dual Credit Courses and Recruitment of Geoscience Majors, Geological Society of America Abstracts with Programs. Vol. 45, No. 7, p.432.
52. Steffke, C., and Libarkin, J.C., 2013, Conveying Information With Maps: A Function of Symbology, Geological Society of America Abstracts with Programs. Vol. 45, No. 4, p. 70.
53. Martin, N., Libarkin, J.C., Geraghty Ward, E.M., and Jardeleza, S., 2013, Unintended Cuing in Test Design: College Student Data and Spatial Analysis of Eye-Tracking: Geological Society of America Abstracts with Programs. Vol. 45, No. 4, p. 71.
54. Libarkin, J.C., 2012, Geophysics Education Research: Practice and Potential: 6th International Conference on Applied Geophysics [Kanchanaburi Province, Thailand, 15-17 November 2012]. *Plenary Speaker*
55. Anderson, S.W., and Libarkin, J.C., 2012, Conceptual Mobility of Geoscience Concepts in Introductory College-Level Courses: Results from Pre- and Post-testing with the Geoscience Concept Inventory: AGU Fall Meeting 2012, ED11B-0725. *Invited*.
56. Libarkin, J.C., McNeal, K.S., and Templeton, C., 2012, Climate change communication: Barriers and knowing what students know: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 468. *Invited*.
57. Libarkin, J.C., and Thomas, S., 2012, Best Practices in Visualizing Science: Michigan Association of Laboratory Science Educators (MALSE). *Invited*.
58. Haddad, N., Ledley, T.S., Dunlap, C., Bardar, E., Youngman, B., Ellins, K.K., 2012, Climate Literacy: Supporting Teacher Professional Development: AGU Fall Meeting 2012, ED23A-0734.
59. Dougherty, M., McElhinny, T., Bowling, B. and Libarkin, J., 2012, Alignment and assessment problems in the undergraduate genetics curriculum: A view from the United States. American Society of Human Genetics, San Francisco, November 9, 2012.
60. Libarkin, J.C., and Atchison, C., 2012, Geoscientists' perceptions of people with disabilities: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 513.
61. McNeal, K., Libarkin, J., Ledley, T.S., Haddad, N., Ellins, K.K., 2012, The role of research in online curriculum development: The case of the EarthLabs climate change curriculum: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 469.
62. Haddad, N., McNeal, K., Ledley, T.S., Dunlap, C., Bardar, E., Youngman, B., Ellins, K.K., Buhr, S., Lynds, S., and Libarkin, J., 2012, EarthLabs workshops: Increasing teachers' understanding and ability to teach climate science: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 350.
63. Steffke, C., and Libarkin, J.C., 2012, Guiding symbology and display selection to produce more effective images for conveying information: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 113.

64. Libarkin, J.C., 2011, Visual Scientific Literacy and Learning: Gordon Research Conference - Chemistry Education Research. *Plenary Speaker*.
65. Libarkin, J.C., 2011, Visual Scientific Literacy and Learning: Chicago Symposium Series, Excellence in Teaching Mathematics and Science: Research and Practice. *Plenary Speaker*.
66. Templeton, C.M., McNeal, K.S., and Libarkin, J.C., 2011, Misconceptions Surrounding Climate Change: A Review of the Literature: AGU Fall Meeting 2011, ED11B-0774.
67. McNeal, K.S., Libarkin, J., Ledley, T., Dutta, S., Templeton, M., and Geroux, J., Blakeney, G.A., 2011, Understanding Student Cognition about Complex Earth System Processes Related to Climate Change: AGU Fall Meeting 2011, ED11B-0777.
68. Petcovic, H.L., Libarkin, J., Hambrick, D.Z., Baker, K.M., Elkins, J.T., Callahan, C.N., Turner, S., Rench, T.A., LaDue, N., 2011, Novice to Expert Cognition During Geologic Bedrock Mapping: AGU Fall Meeting 2011, ED13C-0837.
69. Libarkin, J., Singer, T., Drost, R.E., McNeal, K.S., and Ledley, T.S., 2011, Search efficiency and usability in an online climate change curriculum: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 535.
70. Clark, S.K., Thomas, S., and Libarkin, J., 2011, Improving communication of geologic concepts through effective information design: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 534.
71. LaDue, N., Sibley, D.F., Goldwater, M., Libarkin, J., and Gentner, D., 2011, Causality in analogies generated by expert and novice geoscientists: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 533.
72. Ward, E.M.G., Semken, S., and Libarkin, J., 2011, Collaborative development of place-based, culturally informed geoscience assessment: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 75.
73. Ruetenik, G., Steffke, C., Thomas, S., and Libarkin, J., 2011, Analyzing visual representations of climate change: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 571. *Best Paper Award – Science & Society Division*
74. LaDue, N., Thomas, S., and Libarkin, J., 2011, Earth Science graphics: What students are expected to do with scientists' representations: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 594.
75. McNeal, K.S., Libarkin, J., Ledley, T., Dutta, S., Templeton, M., and Geroux, J., 2011, Measures of high school students understanding of temporal and spatial thinking related to Earth System Science: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 184.
76. Steffke, C., and Libarkin, J., 2011, Quantifying point datasets (eye tracks) using ESRI ArcGIS spatial analyst and geostatistical analyst extensions: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 637.
77. Turner, S., Steffke, C., Person, D., and Libarkin, J., 2011, Development of a semester-long, accessible field laboratory: Geological Society of America Abstracts with Programs, Vol. 43, No. 5, p. 256.
78. Libarkin, J.C., and Asghar, A., 2011, Conceptually eleven?: The disconnect between expectations and undergraduate conceptual understanding of Earth and related sciences: National Association for Research in Science Teaching Spring Meeting 2011, S13.4.2.
79. Geraghty Ward, E.M., and Libarkin, J.C., 2010, Temporal signatures of geological working memory: Geological Society of America Abstracts with Programs
80. Sibley, D., Gentner, D., and Libarkin, J.C., 2010, Analogical reasoning and global change

- literacy: Geological Society of America Abstracts with Programs
81. Richardson, K., and Libarkin, J.C., 2010, Training matters: Eye-tracking insights into the role of training on map viewing behavior: Geological Society of America Abstracts with Programs
  82. Gulich, L., Libarkin, J.C., McNeal, K., and Ledley, T., 2010, High school student understanding of the cryosphere: Geological Society of America Abstracts with Programs
  83. Drost, R., Geraghty Ward, E.M., Libarkin, J.C., 2010, The role of emotion during geologic field mapping: Relationships between emotion, performance, and demographics: Geological Society of America Abstracts with Programs
  84. Libarkin, J.C., Clark, S.K., and Simmon, R., 2010, The color of confusion in an expert world: Geological Society of America Abstracts with Programs
  85. Libarkin, J.C., 2009, Geocognition: An International Discipline: Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract ED44A-03. *Invited*.
  86. Libarkin, J., 2009, Building a Community for Geoscience Education, NAGT-ES Spring Conference (May16, 2009; Sterling VA). *Keynote Speaker*.
  87. Libarkin, J.C., Petcovic, H.L., and Hambrick, D.Z., 2009, Geoscientific expertise and spatial visualization: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 196.
  88. Jordan, S.J., Libarkin, J.C., and Clark S.K., 2009, Too much, too little or just right? An investigation of confidence, demographics, and correctness: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 667.
  89. Ward, E. M. G., Libarkin, J.C., Kortemeyer, G., and Raeburn, S., 2009, The GCI WebCenter: A tool for community-wide concept inventory development: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 27.
  90. Baker, K.M., Wisniewska, M.K., Petcovic, H.L., and Libarkin, J.C., 2009, Characterizing space-time signatures of novices and experts in geologic field mapping: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 711.
  91. Callahan, C.N., Petcovic, H.L., Baker, K.M., and Libarkin, J.C., 2009, Tracking expert and novice geocognition during field mapping: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 250.
  92. Petcovic, H.L., Libarkin, J.C., Hambrick, D.Z., Baker, K.M., Callahan, C.N., Rench, T.A., Turner, S.P., and Wisniewska, M.K., 2009, Geology expertise: Evidence from field and laboratory geocognition research: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 250.
  93. Turner, S.P., Libarkin, J.C., Hambrick, D.Z., and Petcovic, H.L., 2009, Analyzing geoscientific expertise through novel application of common technologies: Geological Society of America Abstracts with Programs, v. 41, no. 7, p. 251.
  94. Anderson, S.W., and Libarkin, J.C., 2008, Mobility of College-level Student Ideas as Revealed by the Geoscience Concept Inventory: Implications for Teaching Introductory Courses: Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract ED41B-01. *Invited*
  95. Ledley, T.S., Libarkin, J., McNeal, K., Ellins, K., Barstow, D., Bardar, E., Comer, C., 2008, Facilitating Students Understanding Change in the Earth System on Multiple Time Scales: Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract ED21B-0627.
  96. Libarkin, J., and Clark, S., 2008, The Relationship Between Students' Confidence and Conceptual Understanding of Plate Tectonics: Geological Society of America Abstracts with Programs, abstract 274-11.

97. Clark, S., and Libarkin, J., 2008, Post-Instruction Alternative Conceptions about Plate Tectonics Held by Non-Science Majors: Geological Society of America Abstracts with Programs, abstract 248-14.
98. Petcovic, H.L., Libarkin, J.C., and 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, abstract 244-1.
99. Stokes, A., King, H., Libarkin, J., 2008, Threshold Concepts: Unstuffing the Geoscience Curriculum: Geological Society of America Abstracts with Programs, abstract 221-6.
100. Clark, S.K., Heidemann, M., Libarkin, J.C., and Sibley, D.F., 2008, A Novel Conceptual Methodology for Teaching and Learning Dynamic Processes In the Geological Sciences: Geological Society of America Abstracts with Programs, abstract 175-5.
101. Rossman, S.L., Libarkin, J.C., and Clark, S.K., 2008, Missing Connections in Student Conceptions of Global Change: Geological Society of America Abstracts with Programs, abstract 175-4.
102. King, H., Clark, S., Libarkin, J., and Stokes, S., 2008, The Emerging Field of Geocognition: Geological Society of America Abstracts with Programs, abstract 274-2.
103. Libarkin, J., and Anderson, S., 2008, CCLI Conference Poster: The Geoscience Concept Inventory: 2008 Course Curriculum and Laboratory Improvement (CCLI) PI Conference, (Washington, D.C., Aug. 13-18, 2008).
104. Libarkin, J., and Baker, K., 2007, Analysis of student conceptions of global earthquake and volcano occurrence: Geological Society of America Abstracts with Programs, v. 39, p. 578.
105. Anderson, S.W., and Libarkin, J., 2007, The Geoscience Concept Inventory: Phase One findings and future development: Geological Society of America Abstracts with Programs, v. 39, p. 578.
106. Baker, K., Libarkin, J., Petcovic, H., 2007, Geologic mapping strategies of novices and experts as evidenced through GPS track and map analysis: Geological Society of America Abstracts with Programs, v. 39, p. 557.
107. Petcovic, H., Baker, K., and Libarkin, J., 2007, Behavioral cognitive processes of novices and experts during field mapping activities: Geological Society of America Abstracts with Programs, v. 39, p. 579.
108. Stokes, A., King, H., and Libarkin, J., 2007, Threshold concepts: A new approach to understanding the way we think and practice in the geosciences?: Geological Society of America Abstracts with Programs, v. 39, p. 552.
109. Libarkin, J.C., and Asghar, A., 2007, Gravity, Magnetism, and 'Down': College Students' Conceptions of Gravity, presented at NARST (April 17: New Orleans).
110. Anderson, S.W., and Libarkin, J.C., 2007, Alternative Planetary Science Conceptions Exhibited by College-Educated Americans: Results from Questionnaires and the Geoscience Concept Inventory: 38th Lunar and Planetary Science Conference, (Lunar and Planetary Science XXXVIII), held March 12-16, 2007 in League City, Texas. LPI Contribution No. 1338, p.1396.
111. Libarkin, J., Riihimaki, C.A., Farley, K.A., 2006, Terrestrial Cosmogenic Nuclides as Paleoaltimeters: New Approaches and Future Potential: 16th Annual V.M. Goldschmidt Conference 2006 (Aug. 27-Sept. 1, 2006: Melbourne, Australia). *Invited*
112. Libarkin, J.C., 2006, The Geoscience Concept Inventory: Physics Education Research Conference (PERC; July 27, 2006: Syracuse, NY). *Plenary Speaker*
113. Libarkin, J., and Asghar, A., 2006, Gravity, magnetism, and "down": College student's

- conceptions of gravity: American Association of Physics Teachers Summer Meeting (July 26, 2006: Syracuse, NY). *Invited*
114. Libarkin, J., 2006, Magnetic Gravity, Equatorial Volcanoes, and State Tectonics: Student Ideas about the Earth, Subject Centre for Geography, Earth & Environmental Sciences (GEES) (<http://www.gees.ac.uk>) Annual Conference (June 26-27th in Plymouth, England). *Keynote Speaker*
  115. Libarkin, J., 2006, North American Perspective of Geoscience Education Research, Subject Centre for Geography, Earth & Environmental Sciences (GEES) (<http://www.gees.ac.uk>) Annual Conference (June 26-27th in Plymouth, England). *Invited*
  116. Anderson, S.W., and Libarkin, J.C., 2006, What do educated Americans believe? Alternative geoscience conceptions discovered through research using the Geoscience Concept Inventory, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract PA51A-0802.
  117. Libarkin, J.C., 2006, Building a Model of Conceptual Change for the Geosciences: *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 458.
  118. Withers, S., Libarkin, J.C., Garzione, C., and MacFadden, B.J., 2006, Magnetostratigraphy of 5-10 Ma sediments of the Corque Syncline, Bolivia: *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 352.
  119. Sekula, T., and Libarkin, J.C., 2006, The effects of vocabulary interventions on ninth graders' understanding of plate tectonics: *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 458.
  120. Garzione, C., Libarkin, J.C., Withers, S., and MacFadden, B.J., 2006, Sediment accumulation and surface uplift in the Altiplano Basin: *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 346
  121. Libarkin, J.C. and Anderson, S.W., Innovative approaches to concept inventory development in higher education: Rasch analysis and the development of the Geoscience Concept Inventory: National STEM Assessment Conference (October 19-21, 2006: Washington, D.C.).
  122. Farley, K.A., Libarkin, J., Mukhopadhyay, S., and Amidon, W., Cosmogenic  $^3\text{He}$  in Apatite, Titanite, and Zircon: 16th Annual V.M. Goldschmidt Conference 2006 (Aug. 27-Sept. 1, 2006: Melbourne, Australia).
  123. Withers, S., Libarkin, J.C., Garzione, C.N., and MacFadden, B., 2006, Magnetostratigraphy of the late Miocene Corque Syncline sediments, Bolivia: *Geological Society of America Abstracts with Programs*, v. 38, no. 4, p. 66.
  124. Zickefoose, M., and Libarkin, J.C., 2006, Intelligent Design and alternative conceptions, *GSA Abstracts with Programs North-Central Section 40th Annual Meeting* (April 20-21, 2006).
  125. Wunderle, M., Libarkin, J.C., and Zickefoose, M., 2006, Investigation of alternative conceptions among pre- and in-service science educators, *National Science Teacher Association* (Anaheim, CA: April 7, 2006).
  126. Libarkin, J.C., Garzione, C.G., Farley, K., and Spell, T., 2005, Cosmogenic Paleoaltimetry, Paleoelevation Workshop (Lehigh University, Lehigh, PA: June 6, 2005). *Invited*
  127. Garzione, C.G., Libarkin, J.C., Ghosh, P., and Eiler, J., 2005, Oxygen Isotope Paleoaltimetry from Paleosol Carbonates: An Example from the Northern Altiplano, Bolivia, Paleoelevation Workshop (Lehigh University, Lehigh, PA: June 6, 2005). *Invited*
  128. Libarkin, J.C., and Anderson, S.W., 2005, Assessment of Diverse Geoscience Courses Through Rasch Development of Geoscience Concept Inventory Sub-Tests, *Geological*

- Society of America Abstracts with Programs, v. 37, n. 7, p. 119. *Invited*
129. Garzione, C. N., Ghosh, P., Eiler, J. M., Libarkin, J. C., MacFadden, B. J.,<sup>s</sup> Withers, S., 2005, Oligocene - Miocene Rise of the Bolivian Altiplano and Eastern Cordillera: Implications for Andean Lithospheric Evolution, *Eos Trans. AGU*, 86 (52), Fall Meet. Suppl., Abstract T31E-04.
  130. Libarkin, J.C., Kurdziel, J.P., and Anderson, S.W., 2005, College Student Conceptions of Geologic Time, *Geological Society of America Abstracts with Programs*, v. 37, n. 7, p. 148.
  131. Libarkin, J.C., and Anderson, S.W., 2005, Use of Student Drawings to Document Conceptual Change in Large Entry-Level Geoscience Courses, *Geological Society of America Abstracts with Programs*, v. 37, n. 7, p. 263.
  132. Wunderle, M., and Libarkin, J.C., 2005, Investigation of alternative conceptions among pre- and in-service science educators, *Geological Society of America Abstracts with Programs*, v. 37, n. 7, p. 84.
  133. Sussman, A., Rogers, A., and Libarkin, J., 2005, Analysis and Ranking of Earth Science Story-Books Based on Terminology, Illustration, and Demographics: WEPAN / NAMEPA 2005 Joint National Conference (Las Vegas, NV: April 12, 2005).
  134. Libarkin, J., 2004, "A Tale of Three Theories: Development of the Geoscience Concept Inventory": Integrating Science and Mathematics Education Research into Teaching Conference, hosted by The Center for Science and Mathematics Education Research and The Maine Mathematics-Science Teacher Excellence Collaborative (MMSTEC) at The University of Maine (June 20-22, 2004). *Invited*
  135. Garzione, C.N., and Libarkin, J.C., 2004, Oxygen isotope evidence for rapid Late Miocene uplift of the Altiplano, Bolivia, *Geological Society of America Abstracts with Programs*, v. 36, No. 5, p. 48.
  136. Wunderle, M., Libarkin, J.C., and Rudders, E.C., 2004, Identifying alternative Earth Science conceptions in community college students, *Geological Society of America Abstracts with Programs*, v. 36, No. 5, p. 218.
  137. Rogers, A., Sussman, A.J., and Libarkin, J.C., 2004, Analysis and ranking of Earth Science story books based on terminology, illustrations, and demographics, *Geological Society of America Abstracts with Programs*, v. 36, No. 5, p. 217.
  138. Libarkin, J.C., and Anderson S.W., 2004, A Tale of Three Theories: Developing and Implementing the Geoscience Concept Inventory: Invention and Impact: Building Excellence in Undergraduate Science, Technology, Engineering and Mathematics, A Conference of the Course, Curriculum, and Laboratory Improvement (CCLI) Program, National Science Foundation (Washington, D.C.: April 16-17, 2004).
  139. Libarkin, J.C., and Kurdziel, J.P., 2004, Time is Everything: Geologic Time as a Linchpin to a Complete Understanding of the Earth, submitted as part of a Multiple Paper Set led by S. Brem, "Telling Time: How Science Affects (Mis)Conceptions of the Past, Present, and Future". Paper presented at the National Association for Research in Science Teaching Annual Conference (Vancouver, British Columbia: April 1-4, 2004).
  140. Beilfuss, M., Dickerson, D., Libarkin, J., and Boone, W., 2004, Exploring conceptual understandings of groundwater through student's interviews and drawings. Paper presented at the National Association for Research in Science Teaching Annual Conference (Vancouver, British Columbia: April 1-4, 2004).
  141. Ruhf, R., Beilfuss, M., Libarkin, J. C., and Boone, W., 2004, A conceptual inventory:



- Earth's hydrologic system through students' interviews and drawings. Paper presented at the National Association for Research in Science Teaching Annual Conference (Vancouver, British Columbia: April 1-4, 2004).
142. White, O.L., Beilfuss, M., Boone, W., and Libarkin, J., 2004, Analyzing student perceptions of geological time through the use of graphic timelines, Paper presented at the National Association for Research in Science Teaching Annual Conference (Vancouver, British Columbia: April 1-4, 2004).
  143. Boone, W., Libarkin, J.C., and Anderson, S., 2004, Kick it up a notch: Moving beyond vanilla cookbooks in the development of assessments that help science teacher educators. Paper presented at the Association for the Education of Teachers of Science (AEST) 2004 Annual international Conference (Nashville, Tennessee: Jan. 8-11, 2004).
  144. Libarkin, J., and Anderson, S., 2003, The Geoscience Concept Test: Linking Grounded Theory, Scale Development, and Item Response Theory: *Eos Trans. American Geophysical Union*, v. 84 (46), Fall Meet. Suppl., Abstract ED22E-06. *Invited*
  145. Anderson, S., and Libarkin, J., 2003, The retention of geologic misconceptions: Alternative ideas that persist after instruction: *Eos Trans. American Geophysical Union*, v. 84 (46), Fall Meet. Suppl., Abstract ED22E-07. *Invited*
  146. Libarkin, J., 2003, "Impact of classroom assessment on teaching and learning", Project Kaleidoscope Workshop "Linking Insights about How People Learn to Curricular Reform" (Richmond VA: Nov. 1, 2003). *Plenary Speaker*
  147. Dahl, J., Anderson, S., and Libarkin, J., 2003, Digging into Earth Science: Teachers' Alternative Conceptions in the Geosciences, *Eos Trans. American Geophysical Union*, v. 84 (46), Fall Meet. Suppl., Abstract ED31B-1166.
  148. White, O.L., Beilfuss, M., Boone, W., and Libarkin, J., 2003, Analyzing student perceptions of geological time through the use of graphic timelines: *Eos Trans. American Geophysical Union*, v. 84 (46), Fall Meet. Suppl., Abstract ED21C-1219.
  149. Libarkin, J.C., Beilfuss, M., and Kurdziel, J.P., 2003, Student cognition about the earth system, Paper presented at the National Association for Research in Science Teaching Annual Conference (New Orleans: March 23-26, 2003).
  150. Beilfuss, M., Pratt, L., and Libarkin, J., 2003, Exploring views of the global hydrologic cycle through interviews and drawings: *Geological Society of America Abstracts with Programs*, v. 35, No. 6, p. 155.
  151. Beilfuss, M., Libarkin, J.C., and Boone, W., 2003, Exploring views of the earth system through student's drawings, Paper presented at the National Association for Research in Science Teaching Annual Conference (New Orleans: March 23-26, 2003).
  152. Boone, W., Libarkin, J.C., Anderson, S., and Beilfuss, M., 2003, Exploring Earth Science misconceptions of introductory and non-science majors through the development of the GCT (Geoscience Concept Test), Paper presented at the National Association for Research in Science Teaching Annual Conference (New Orleans: March 23-26, 2003).
  153. Kurdziel, J.P., Libarkin, J.C., Beilfuss, M., 2003, College students' conceptions of evolutionary processes: Probing beyond natural selection, Paper presented at the National Association for Research in Science Teaching Annual Conference (New Orleans: March 23-26, 2003).
  154. Beilfuss, M., Stoltman, D., and Libarkin, J., 2003, Analysis of students' spatial knowledge and misconceptions related to earthquakes and volcanoes, Paper presented at the American Association of Geographers Conference (New Orleans, March 3-8, 2003).

155. Boone, W., Libarkin, J.C., Beilfuss, M., and Anderson, S., 2003, Exploring Earth Science misconceptions, Hoosier Association of Science Teachers (February 2003).
156. Libarkin, J.C., Anderson, S.W., Boone, W., Beilfuss, M., <sup>s</sup> Dahl, J., 2002, The Geoscience Concept Test: A New Assessment Tool Based on Student Misconceptions: *Eos Trans. American Geophysical Union*, v. 83 (47), Fall Meet. Suppl., Abstract ED11B-0047.
157. Beilfuss, M., and Libarkin, J.C., 2002, Exploring Views of the Earth System Through Student's Drawings, North Central AETS meeting (October 2002).
158. Libarkin, J.C., Renne, P.R., <sup>s</sup> Knight, K.B., Farley, K., 2002, Cosmogenic isotopes as potential paleoaltimeters: GSA Abstracts With Programs, Paper # 22-11 (October 2002).
159. Chase, C.G., Sussman, A., Libarkin, J.C., 2002, Isostatic support of the Colorado Plateau: GSA Abstracts With Programs, Paper # 113-8 (October 2002).
160. Beilfuss, M., Libarkin, J.C., and Kurdziel, J.P., 2002, Analysis of college students' ideas about the earth through interviews and open-ended questionnaires: GSA Abstracts With Programs, Paper # 154-13 (October 2002).
161. Garzione, C., and Libarkin, J.C., 2002, Carbonate oxygen isotope paleoaltimetry: Calibrating  $d^{18}O$  vs. altitude gradients and quantifying the associated errors: GSA Abstracts With Programs, Paper # 22-6 (October 2002).
162. Anderson, S.W., Libarkin, J., Beilfuss, M., Dahl, J., and Boone, W.J., 2002, Analysis of College Students' Ideas about Geologic Time: Questionnaires and Interviews from Four Institutions, *Eos, Transactions*, v.83, p. S115.
163. Libarkin, J.C., Asghar, A., and Crockett, C., 2002, Invisible Misconceptions: Student Understanding of Ultraviolet and Infrared Radiation. Paper presented at the National Association for Research in Science Teaching Annual Conference (New Orleans).
164. Libarkin, J.C., and Anderson, S.W., 2002, Developing an assessment tool for geology: Stage one, student interviews, *Eos, Transactions*, v.82, p. F250.
165. Libarkin, J.C., 2001, Multiple isotope cosmogenic paleoaltimetry, GSA Abstracts With Programs, p. A259.
166. Asghar, A., Libarkin, J.C., and Crockett, C.D., 2001, Invisible misconceptions: Student understanding of ultraviolet and infrared radiation, GSA Abstracts With Programs, p. A371.
167. Libarkin, J.C., and Meisner, E., 2001, Comparison of Traditional Introductory Biology Laboratories and General Education Geology Workshops. Paper presented at the National Association for Research in Science Teaching Annual Conference.
168. Libarkin, J., 2000, "Evaluation of Attitude and Conception of Science in General Education and Introductory Science Courses", Associated Colleges of the South, Science Education for Non-Science Majors Workshop (San Antonio TX: June 9-11). *Invited*
169. Libarkin, J.C., and Sussman, A., 2000, Evaluation of proposed mechanisms for Colorado Plateau uplift: Constraints on pre-orogenic crust and mantle lithosphere thickness, GSA Abstracts With Programs, p. A42.
170. Libarkin, J.C., and Garcia, C., 2000, Relationship between student characteristics and science attitudes and conceptions, GSA Abstracts With Programs, p. A353.
171. Libarkin, J.C., 1999, The Science Education Assessment Project (SEAP): Evaluation of Science Teaching in Undergraduate Courses for Non-Majors, GSA Abstracts With Programs, p. A410.
172. Libarkin, J.C., 1999, Inquiry-Based Instruction in the General Education Laboratory, National Association of Research in Science Teaching Final Program and Abstracts, v. 72,

- p. 200.
173. Libarkin, J.C., Chase, C.G., Quade, J., Poths, J., and McIntosh, W.C., 1998, Cosmogenic  $^{21}\text{Ne}$  in quartz as a potential paleoaltimeter: Case study from the 27 Ma Fish Canyon Tuff, CO, *Eos, Transactions*, v.79, #45, p. F875-876.
  174. Libarkin, J.C., Richards, D.R., and Butler, R.F., 1996, Tertiary remagnetization of Paleozoic strata of the Eastern Cordillera and Sub-Andean Zone, Bolivia: *Eos, Transactions, AGU* vol. 77, #46, p. F160.
  175. Chase, C.G., Quade, J., Libarkin, J.C., and Poths, J., 1996, Cosmogenic  $^{21}\text{Ne}$  in quartz as a paleoaltimeter: *Eos, Transactions, AGU* vol. 77, #46, p. F644.
  176. Davis, G.H., Crosswhite, J.A., Libarkin, J.C., Ojha, T.P., Riley, B.C., Tindall, S.E., Woodburne, K.L., 1996, Laramide tear faulting and layer-parallel shearing as accommodations to thrust surge in the Huachuca Mountains, southeastern Arizona: *Geological Society of America Abstracts with Programs*, v. 28, p. 60.
  177. Libarkin, J. C., 1993, The application of downhole geophysics in a cross section of Cenozoic carbonates and siliciclastics in south-central Florida: *GSA Abstracts with Programs*, v. 25, #4, p.50.

***Department and Other Colloquia (selected)***

1. 2017, Commentary, Panel & Conversation on Religion, Philosophy, Theology & the Anthropocene at Michigan State: Investigating critical, Indigenous and decolonial research on history, humanity, futurity, & the environment, Michigan State University (Oct, 18, 2017).
2. 2017, Sexual Harassment in Academia: A Call To Action, SPS, Michigan State University (January 23, 2017).
3. 2017, Sexual Harassment in Academia: A Call To Action, Physics Education Research Group, Michigan State University (January 18, 2017).
4. 2017, Achieving Equity in Earth Science Through the Sharing of Social Capital, University of Michigan (Jan. 6, 2017).
5. 2017, Sexual Harassment in Academia: A Call To Action, University of Michigan (Jan. 6, 2017).
6. 2016, Analysis of Student Drawings – Quantitative Approaches, University of Plymouth, UK (October 19, 2016).
7. 2015, Identifying Conceptual Models in Student Drawings, Clemson University (April 10, 2015).
8. 2015, Identifying Conceptual Models in Student Drawings, Eastern Michigan University (April 8, 2015).
9. 2014, Expert-novice differences in geologic field mapping and related cognition, Montana Tech, School of Mines and Engineering (October 9, 2014).
10. 2014, Communicating Science: Best Practices for Visualizations, TerreWEB, University of British Columbia (Feb. 27, 2014).
11. 2014, Communicating Science: Best Practices for Visualizations, University of Illinois at Chicago (Feb. 6, 2014).
12. 2014, Visual Communication of Science, North Carolina State University (Jan. 13, 2014).
13. 2013, From Geocognitive Expertise to Student Learning, Arizona State University (March 28, 2013).
14. 2013, Concept Inventories as Research Instruments, Arizona State University (March 28,

- 2013).
15. 2013, *Communicating Science: Best Practices for Visualizations*, University of British Columbia (Mar. 14, 2013).
  16. 2012, *Global Warming and Climate Change: Communication Challenges and Mitigation*: Thaksin University, Thailand (Nov. 21, 2012).
  17. 2012, *Global Warming and Climate Change: Communication Challenges and Mitigation*: Prince of Songkhla University, Thailand (Nov. 20, 2012).
  18. 2012, *Visual Scientific Literacy in Geoscience*, Grand Valley State University (Sept. 2012).
  19. 2011, *Magnetic Continents and Other Conundrums: Student Ideas about the Earth*, University of Bayreuth, Germany (Dec. 2011).
  20. 2011, *Community Development of Concept Inventories: Working Together for Best Practice in Assessment*, University of Michigan – Dearborn (Oct. 2011).
  21. 2011, *Eye-Tracking Climate: The role of imagery in climate change cognition*, Rochester Institute of Technology (Sept. 2011).
  22. 2011, *Assessment in Science*, University of Washington – Bothell (May 2011).
  23. 2011, *Concept Inventories in Science*, University of Washington, Biology Education Research Group (May 2011).
  24. 2009, *Spatial visualization and geocognition*, Department of Earth Sciences, University of Rochester (Sept, 2009).
  25. 2008, *Comparison of expert and novice behavior during field mapping: Insight into best practices for undergraduate field experiences*, Department of Earth Sciences, Northern Colorado University (Feb. 1, 2008).
  26. 2007, *Comparison of expert and novice behavior during field mapping: Insight into best practices for undergraduate field experiences*, Center for Research in College Science Teaching and Learning (CRCSTL), Michigan State University (Nov. 29, 2007).
  27. 2007, *Translating Earth: The State of Geoscience Education in the 21<sup>st</sup> Century*: Department of Geological Sciences, NAGT Distinguished Lecturer Series, University of South Florida (April 6, 2007).
  28. 2006, *Magnetic Continents and Other Conundrums: Development of the Geoscience Concept Inventory*, Towson State University, Department of Geological Sciences (Dec. 12, 2006).
  29. 2006, *Magnetic Continents and Other Conundrums: Development of the Geoscience Concept Inventory*, University of Colorado, Department of Geological Sciences (Nov. 15, 2006).
  30. 2006, *Asking the Right Questions About Wrong Answers: Scientific Models and Student Ideas*, NAGT Distinguished Lecturer Series, Purdue University, Department of Earth and Atmospheric Sciences (Mar. 2, 2006).
  31. 2006, *Translating Earth: The State of Geoscience Education in the 21st Century*, ADVANCE Distinguished Lecture Series, Kansas State University, Department of Geology (Feb. 7, 2006).
  32. 2006, *Asking the Right Questions About Wrong Answers: Improving Student Learning in College Geoscience*, NAGT Distinguished Lecturer Series, Western Michigan University, Department of Geology (Feb. 6, 2006).
  33. 2005, *When Wrong Answers Ask the Right Questions about Student Learning: Conceptual Change and Assessment in College Science Classrooms*: Department of Geology, Bowling Green State University (Nov. 30, 2005).

34. 2005, Rasch Analysis and the Development of the Geoscience Concept Inventory: Physics Education Research Group, Department of Physics, Ohio State University (Nov. 21, 2005).
35. 2005, Asking the Right Questions about Wrong Answers: Department of Geology, Miami University of Ohio (Nov. 16, 2005).
36. 2004, A Tale of Three Theories: Lessons Learned from the Development of the Geoscience Concept Test: Math Education Seminar, Ohio University (March 11, 2004).
37. 2004, Using the Wrong Answers to Ask the Right Questions about Student Learning: Conceptual Change and Assessment in College Science Classrooms: University of Akron (Mar. 16, 2004).
38. 2004, A Tale of Three Theories: Development of the Geoscience Concept Inventory: Department of Astronomy, University of Arizona (Mar. 29, 2004).
39. 2003, Student Ideas about the Earth: Comparing Community Colleges with Other Institutions of Higher Education, Spokane Community College
40. 2003, Women in the Geosciences: From the Classroom to the Professorate: MIT, Dept. of Earth, Atmospheric, and Planetary Sciences.
41. 2001, Muon-production of  $^{38}\text{Ar}$ : Evidence and Applications: University of Rochester, Dept. of Earth and Environmental Sciences.

*Memberships:* Geological Society of America (GSA), American Geophysical Union (AGU), National Association for Research in Science Teaching (NARST), International Geoscience Education Organization (IGEO)

***Current Students, Visiting Scholars, and Postdoctoral Fellows (Michigan State University)***

- Scott Kalafatis, Postdoctoral Fellow, Philosophy.
- Patricia Jaimes, PhD student, Earth & Environmental Science with specialization in Environmental Science & Policy. (June 2015-present).
- Caitlin Kirby, PhD student, Earth & Environmental Science with specialization in Environmental Science & Policy. (August 2015-present).
- Amanda Lorenz, PhD student, Entomology with specialization in Cognitive Science. Co-Advised with Gabe Ording. (August 2013-present).

***Former Students, Visiting Scholars, and Postdoctoral Fellows (Michigan State University)***

- Caitlin Callahan, Postdoctoral Fellow, Geological Sciences and CREATE for STEM. (7/2013-8/2015). *Assistant Professor of Geology, Grand Valley State University.*
- Christy Steffke, MS student, Geological Sciences. (8/2010-8/2015).
- Robert Drost, PhD student, Geological Sciences with specialization in Environmental Science & Policy. (8/2009-5/2014). *Instructor, Michigan State University, Southern New Hampshire State University.*
- Frank Forcino, Postdoctoral Fellow, Geological Sciences and BEACON. (5/2013-5/2014). *Assistant Professor of Geosciences and Natural Resources, Western Carolina University.*
- Carmen McCallum, Postdoctoral Fellow/Research Associate, Collaboration with Associate Provost for Undergraduate Education and Directors of the Centers for Integrative Studies. (8/2012-8/2013). *Assistant Professor of Counseling and Higher Education, Buffalo State University.*
- Thomas Kim, Sabbatical Scholar with CREATE for STEM. (8/2012-5/2013). *Biochemist from Rochester Institute of Technology.*

- Sheldon Turner, PhD student, Geological Sciences with specialization in Environmental Science & Policy (7/2008-7/2013). *Assistant Professor, Triton College.*
- Nicole LaDue, PhD student, Geological Sciences with specialization in Cognitive Science (8/2009-7/2013). *Assistant Professor of Geology and Environmental Science, Northern Illinois University.*
- Sarah Jardeleza, Postdoctoral Fellow/Research Associate, Center for Integrative Studies in General Science (8/2011-8/2012). *Evaluator, Salisbury University.*
- Terri McElhinny, Postdoctoral Fellow/Research Associate, Geological Sciences and CRCSTL (8/2010-8/2012). *Assistant Professor of Zoology, Michigan State University.*
- Emily Ward, Postdoctoral Fellow/Research Associate, Geological Sciences and CRCSTL (8/2009-7/2011). *Assistant Professor of Geology, Rocky Mountain College, Montana.*
- Onchira Chittasirinuwat, Visiting Scholar, PhD student at Mahtidol University, Thailand (10/2010-6/2011). *Deceased.*
- Scott Clark, Postdoctoral Fellow/Research Associate, Geological Sciences and CRCSTL (8/2007-7/2010). *Assistant Professor of Geology, University of Wisconsin-Eau Claire.*
- Juli [Moore] Grettenberger, Graduate Student, Geological Sciences (8/2007-6/2009). *Geologist, Devon Energy, Houston, TX.*
- Suttida Rakkapoa, Visiting Scholar, PhD student at Mahtidol University, Thailand (7/2008-6/2009). *Instructor of Physics, Prince of Songkhla University, Songkhla, Thailand*

### ***Graduate Theses Supervised***

- Christy Steffke, M.S., 2015. Geological Sciences, Michigan State University: MEASURING THE UTILITY OF COLOR RAMPS IN EARTH SYSTEM SCIENCE DISCIPLINES: A STUDY OF CONTINUOUS DATA SYMBOLOGY.
- Robert Drost, Ph.D., 2014. Geological Sciences with Specialization in Environmental Science & Policy, Michigan State University: COMMUNICATING NATURAL HAZARD RISK: WARNINGS, DECISIONS AND PRECAUTIONARY BEHAVIOR.
- Nicole LaDue, Ph.D., 2013. Geological Sciences with Specialization in Cognitive Science, Michigan State University: INTEREST, SKILLS, AND ABILITY IN THE GEOSCIENCES.
- Sheldon Turner, Ph.D., 2013. Geological Sciences with Specialization in Environmental Science & Policy, Michigan State University: THE IMPACT OF VISUALIZATIONS IN PROMOTING INFORMED NATURAL RESOURCE DECISIONS.
- Marcus Wunderle, M.S., 2007. Geological Sciences, Ohio University: INVESTIGATING IN-SERVICE TEACHERS' AND UNDERGRADUATES' MENTAL TECTONIC MODELS.
- Tim Sekula, M.S., 2006. Geological Sciences, Ohio University: THE EFFECTS OF VOCABULARY INTERVENTION ON NINTH GRADERS' UNDERSTANDING OF PLATE TECTONICS.