

Dr. Carol J. Ormand

Geoscience Education Associate, Science Education Resource Center
Carleton College, Northfield, MN 55057
cormand@carleton.edu (608) 213-1618

Professional Preparation

University of Minnesota Structural Geology Ph. D., 2000
Dissertation title: The kinematics of fault-related folding, inferred from microstructures
Advisor: Peter J. Hudleston

Carleton College Mathematics B. A., cum laude, 1989
Senior thesis title: Fermat's last theorem, for odd prime integers
Member, Sigma Xi

Professional Experience

Geoscience Education Associate	Science Education Resource Center	2005-present
Visiting Assistant Professor	Wittenberg University	2002-2005
Visiting Assistant Professor	St. Norbert College	2000-2002
Graduate Assistant	University of Minnesota	1992-2000
Adjunct Instructor (Tectonics)	Carleton College	1997
Instructor	University of Minnesota	1996-1997
Lab Instructor (Physical Geology)	Geological Society of Minnesota	1995-1996

Research Focus

Science education, with emphases on how geoscientists develop expertise in spatial thinking and on faculty professional development.

Funded Grants

2011-2016 Developing and Testing Materials to Improve Spatial Skills in Upper Division
Geoscience Courses, NSF-DUE 1044245, \$174,800.

2008-2011 Collaborative Research: Improving the Geoscience Major: Developing Community
Expertise in Curriculum Design and Assessment, NSF-DUE 0817353, \$224,132.

2004 Wittenberg University New Course Grant

2004 Wittenberg University Course Revision Grant

2003-2004 Wittenberg University Faculty Research Grant: Cleavage refraction in Baraboo, WI

2001-2002 St. Norbert College Student-Faculty Collaborative Research Grant: Developing a
course in quantitative problem-solving skills, for undergraduate math & science
majors

2000-2001 St. Norbert College Student-Faculty Collaborative Research Grant: Geometric
analysis of fault systems in an experimental stratigraphic basin

1996 J. David Love Field Geology Fellowship

1995 Geological Society of America Research Grant

1995 Sigma Xi Grants-in-Aid of Research

1994 U. of Minnesota Department of Geology & Geophysics Summer Research Grant

1993 U. of Minnesota Department of Geology & Geophysics Summer Research Grant

Professional Activities

- 2015-20 Project manager, Supporting and Advancing Geoscience Education in Two-Year Colleges: Faculty as Change Agents (SAGE 2YC)
- 2016-19 External evaluator, Field Based Professional Development for Environmental-STEM (ESTEM) Undergraduates
- 2019 Panelist: National Science Foundation proposal review panel
- 2019 Co-convener: SAGE 2YC Workshop for Change Agents, Cohorts 1 & 2
- 2018 Reviewer: Journal of Geoscience Education (1 article)
- 2018 Co-convener: Geological Society of America short course on Strengthening Students' Spatial Thinking Skills
- 2018 Convener: Earth Educators Rendezvous workshop on Supporting Spatial Thinking
- 2018 Co-convener: SAGE 2YC Workshop for Change Agents, Cohort 2
- 2018 Co-convener: SAGE 2YC Workshop for Change Agents, Cohort 1
- 2017 Co-convener: Workshop on Developing Competency in Teaching Computation using MATLAB
- 2017 Co-convener: SAGE 2YC Workshop for Change Agents
- 2017 Reviewer: Journal of Geoscience Education (2 articles)
- 2016 Co-convener: Earth Educators Rendezvous workshop on Spatial Reasoning in the Geosciences
- 2016 Co-convener: SAGE 2YC Workshops for Change Agents, March and June
- 2015 Co-convener: Geological Society of America session on Geoscience Education
- 2014 Co-convener: Geological Society of America session on Spatial Thinking in Geoscience Teaching, Learning, and Professional Practice
- 2014 Co-convener: Structural Geology & Tectonics Forum session on Geoscience Learning and Spatial Cognition
- 2014 Reviewer: Education component of 4 NSF grant proposals (CAREER/Atmospheric Chemistry)
- 2014 External reviewer: NIU Opportunity Grant proposal
- 2014 Reviewer: Journal of Geoscience Education (2 articles)
- 2014 Reviewer: International Journal of Science Education (1 article)
- 2013 Convener: Hedberg Conference, June, 2013: 3D Structural Geologic Interpretation: Earth, Mind, and Machine
- 2013 Reviewer: Journal of Geoscience Education (1 article)
- 2012 Co-convener: NSF/NAGT-sponsored *On the Cutting Edge* Workshop: Teaching About Time
- 2012 Co-convener: NSF/NAGT-sponsored *On the Cutting Edge* Spatial Thinking Journal Club
- 2012 Leader: Effective Teaching and Learning in the Large Classroom Setting (half-day workshop at the Fall AGU meeting)
- 2012 Co-convener: AGU session on Cognition: A Key Factor in Interpretation and Visualization?
- 2012 Reviewer: Journal of Geoscience Education (1 article)
- 2011 Co-convener: NSF/NAGT-sponsored *On the Cutting Edge* Temporal Learning Journal Club
- 2011 Co-convener: AGU session on Cognition and Learning in Geoscience Education (annual Fall meeting, San Francisco, CA)
- 2011 Co-convener: GSA session on Time, Events, and Places: Understanding Temporal and

- Spatial Learning in Geoscience Education (annual meeting, Minneapolis, MN)
- 2011 Reviewer: GSA Special Paper (1 article)
- 2011 Reviewer: GSA Today (1 article)
- 2010 Reviewer: NSF grant proposals (2, Geoscience Education)
- 2009 Co-convenor: GSA session on Spatial Skills in the Geosciences (annual meeting, Portland, OR)
- 2009 Reviewer: NSF grant proposals (1 Tectonics, 1 Ocean Sciences)
- 2008 Reviewer: NSF grant proposal (CAREER/Geophysics)
- 2002 Panelist: National Science Foundation proposal review panel
- 1995 Participant: Penrose Conference: Fault-Related Folding (Banff, Alberta)

Honors and Awards

1994-1995 Outstanding Teaching Assistant, Dept. of Geology & Geophysics, U. of Minnesota

Professional Society Memberships

American Geophysical Union
 Earth Science Women's Network
 Geological Society of America
 National Association of Geoscience Teachers

Publications

Books, chapters, and journal articles

- 2019 Luo, Wei, Thomas J. Smith, Kyle Whalley, Andrew Darling, **Carol Ormand**, Wei-Chen Hung, Jui-Ling Chiang, Jon Pelletier, and Kirk Duffin. Earth surface modeling for education: How effective is it? Four semesters of classroom tests with WILSIM-GC. *British Journal of Educational Technology*, v. 50, n.3, pp. 1462-1481. doi: 10.1111/bjet.12653.
- 2019 Macdonald, R. Heather, Rachel J. Beane, Eric M. D. Baer, Pamela L. Eddy, Norlene R. Emerson, Jan Hodder, Ellen R. Iverson, John R. McDaris, Kristin O'Connell, and **Carol J. Ormand**. Accelerating Change: The Power of Faculty Change Agents to Promote Diversity and Inclusive Teaching Practices. *Journal of Geoscience Education*. doi: <https://doi.org/10.1080/10899995.2019.1624679>.
- 2018 Gold, Anne U., Philip M. Pendergast, **Carol J. Ormand**, David A. Budd, Jennifer A. Stempien, Karl J. Mueller, and Katherine A. Kravitz (2018). Spatial Skills in Undergraduate Students -- Influence of gender, motivation, academic training, and childhood play. *Geosphere*, v. 14, n. 2, doi:10.1130/GES01494.1.
- 2018 Gold, Anne U., Philip M. Pendergast, **Carol J. Ormand**, David A. Budd, and Karl J. Mueller. Improving Spatial Thinking Skills among Undergraduate Geology Students through short online Training Exercises. *International Journal of Science Education*, DOI: 10.1080/09500693.2018.1525621.
- 2018 Goring, Simon James, Russell Graham, Shane Loeffler, Amy Myrbo, James S. Oliver III, **Carol J. Ormand**, and John W. Williams (2018). The Neotoma Paleocology Database: A Research-Outreach Nexus (Elements of Paleontology). Cambridge: Cambridge University Press. doi:10.1017/9781108681582.
- 2018 Luo, Wei, Thomas J. Smith, Kyle Whalley, Andrew Darling, **Carol Ormand**, Wei-Chen Hung, Jui-Ling Chiang, Jon Pelletier, and Kirk Duffin (2018). Earth Surface

- Modeling for Education: How effective is it? Four semesters of classroom tests with WILSIM-GC. *British Journal of Educational Technology*.
- 2017 Gagnier, Kristin Michod, Kinnari Atit, **Carol J. Ormand**, and Thomas F. Shipley (2017). Comprehending Diagrams: Sketching to Support Spatial Reasoning. *Topics in Cognitive Science*, v.9, n. 4, pp. 883–901.
- 2017 Garnier, Bridget, Maria Chang, **Carol J. Ormand**, Bryan Matlen, Basil Tikoff, and Thomas F. Shipley (2017). Promoting Sketching in Introductory Geoscience Courses: CogSketch Geoscience Worksheets. *Topics in Cognitive Science*, v. 9, n. 4, pp. 943–969.
- 2017 **Ormand, Carol J.**, Thomas F. Shipley, Basil Tikoff, Cathryn A. Manduca, Barbara Dutrow, Laurel Goodwin, Thomas A. Hickson, Kinnari Atit, Kristin Michod Gagnier, and Ilyse Resnick (2017). The Spatial Thinking Workbook: A Research-Validated Spatial Skills Curriculum for Geology Majors. *Journal of Geoscience Education*, v. 65, n. 4, pp. 423-434.
- 2016 Gagnier, Kristin Michod, Thomas F. Shipley, Basil Tikoff, **Carol J. Ormand**, Kinnari Atit, Ilyse Resnick, and Bridget Garnier (2016). Training Spatial Skills in Geosciences: A Review of Tests and Tools, *in* Krantz, Robert W., Carol J. Ormand, and Brett Freeman, eds. *3D Structural Interpretation: Earth, Mind, and Machine*. AAPG Memoir 111.
- 2016 Krantz, Robert W., **Carol J. Ormand**, and Brett Freeman, eds. (2016). *3D Structural Interpretation: Earth, Mind, and Machine*. AAPG Memoir 111.
- 2016 Krantz, Robert W., **Carol J. Ormand**, and Brett Freeman (2016). Earth, Mind, and Machine: a Summary of the 2013 AAPG Hedberg Conference on 3D Structural Interpretation, *in* Krantz, Robert W., Carol J. Ormand, and Brett Freeman, eds. *3D Structural Interpretation: Earth, Mind, and Machine*. AAPG Memoir 111.
- 2016 Luo, Wei, Jon Pelletier, Kirk Duffin, **Carol Ormand**, Wei-chen Hung, David J. Shernoff, Xiaoming Zhai, Ellen Iverson, Kyle Whalley, Courtney Gallaher, and Walter Furness (2016). Advantages of computer simulation in enhancing students' learning about landform evolution: A case study using the Grand Canyon. *Journal of Geoscience Education*: v. 64, n. 1, pp. 60-73.
- 2016 Petcovic, Heather L., **Carol J. Ormand**, and Robert W. Krantz (2016). Earth, Mind, and Paper: Field Sketches as Expert Representations of the Hat Creek Fault Zone, *in* Krantz, Robert W., Carol J. Ormand, and Brett Freeman, eds. *3D Structural Interpretation: Earth, Mind, and Machine*. AAPG Memoir 111.
- 2015 Newcombe, Nora, Steven M. Weisberg, Kinnari Atit, Matthew E. Jacovina, **Carol J. Ormand**, and Thomas F. Shipley (2015). The Lay of the Land: Sensing and Representing Topography: The Baltic International Yearbook of Cognition, Logic, and Communication, v. 10: Perspectives on Spatial Cognition, n. 1, pp. 1-57.
- 2014 Jee, Ben. D., Dedre Gentner, David Uttal, Bradley Sageman, Kenneth B. Forbus, Cathryn Manduca, **Carol J. Ormand**, Thomas F. Shipley, & Basil Tikoff. Drawing on Experience: How Domain Knowledge is Reflected in Sketches of Scientific Structures and Processes: *Research in Science Education*. doi: 10.1007/s11165-014-9405-2.
- 2014 Krantz, Bob, **Carol Ormand**, and Brett Freeman (2014). Summary of the 2013 Hedberg Conference on 3D Structural Geologic Interpretation: Earth, Mind, and Machine. Hedberg Tackles 3D Interpretation: Geologists Get a Closer Look at Complexity: *AAPG Explorer*, Feb. 2014, pp. 30-34.
- 2014 **Ormand, Carol J.**, Cathryn A. Manduca, Thomas F. Shipley, Basil Tikoff, Cara L. Harwood, Kinnari Atit, and Alexander P. Boone (2014). Evaluating Geoscience Students'

- Spatial Thinking Skills in a Multi-Institutional Classroom Study: *Journal of Geoscience Education*, v. 62, n. 1, pp. 146-154. *JGE Paper of the Year*.
- 2013 Shipley, Thomas F., Basil Tikoff, **Carol J. Ormand**, and Cathryn A. Manduca (2013). Structural Geology practice and learning, from the perspective of cognitive science: *Journal of Structural Geology*, v. 54, pp. 72-84.
- 2010 Jee, Benjamin D., David Uttal, Dedre Gentner, Cathryn Manduca, Thomas Shipley, Brad Sageman, **Carol J. Ormand**, and Basil Tikoff (2010). Analogical thinking in geoscience education: *Journal of Geoscience Education*, v. 58, n. 1, pp. 2-13.
- 2010 Manduca, Cathryn A., David W. Mogk, Barbara Tewksbury, R. Heather Macdonald, Sean P. Fox, Ellen R. Iverson, Karin Kirk, John McDaris, **Carol Ormand**, and Monica Bruckner (2010). SPORE: Science Prize for Online Resources in Education: On the Cutting Edge: Teaching Help For Geoscience Faculty: *Science*, v. 327, no. 5969, pp. 1095-1096.
- 2008 Richardson, Randall M. and **Carol J. Ormand** (2008). Shared Goals and Challenges: Results of a National Survey of Geoscience Departments: *Eos*, v. 89, n. 27, p. 242-243.
- 2007 Czeck, Dyanna, and **Carol J. Ormand** (2007). Geometry and folding history of the Baraboo Syncline: Implications for the Mazatzal Orogeny in the north-central U.S.: *Precambrian Research*, v. 157, p. 203–213.
- 2003 **Ormand, Carol J.** and Peter J. Hudleston (2003). Strain paths of three small folds from the Appalachian Valley and Ridge, Maryland: *Journal of Structural Geology*, v. 25, p. 1841-1854.

Websites

One major component of my current position responsibilities is developing web resources for science faculty. For each of the websites listed below, I have compiled and organized the resources and written the web pages.

Building Strong Geoscience Departments: <http://serc.carleton.edu/departments/index.html>
 Geoscience Education Transdisciplinary Spatial Learning Network (GET Spatial Learning):

<https://serc.carleton.edu/getspatial/index.html>

On the Cutting Edge:

Preparing for an Academic Career in the Geosciences:

<http://serc.carleton.edu/NAGTWorkshops/careerprep/index.html>

Early Career Geoscience Faculty:

<http://serc.carleton.edu/NAGTWorkshops/earlycareer/index.html>

Developing Student Understanding of Complex Systems in the Geosciences:

<http://serc.carleton.edu/NAGTWorkshops/complexsystems/index.html>

The Role of Metacognition in Learning:

<http://serc.carleton.edu/NAGTWorkshops/metacognition/index.html>

Teaching About Rates and Time:

<http://serc.carleton.edu/NAGTWorkshops/time/index.html>

Spatial Thinking in the Geosciences:

<http://serc.carleton.edu/NAGTWorkshops/spatial/index.html>

Spatial Thinking Workbook: <http://serc.carleton.edu/spatialworkbook/index.html>

Starting Point: Teaching Entry Level Geoscience

The First Day of Class:

<http://serc.carleton.edu/introgeo/firstday/index.html>

Transforming Geoscience Preparation for K-8 Pre-Service Teachers:

<https://serc.carleton.edu/K8GeoTeachers/index.html>

Web-based Interactive Landform Simulation Model – Grand Canyon:

<https://serc.carleton.edu/landform/index.html>

Other publications

- 2016-2019 **Ormand, Carol J.** SAGE Musings: The SAGE 2YC Project Blog. Bi-weekly blog posts, during the academic year, addressing topics related to supporting students' academic success, facilitating students' professional pathways in the geosciences, broadening participation in STEM, and catalyzing change in academia.
- 2013 Macdonald, R. Heather, Rachel J. Beane, Richelle M. Allen-King, Ellen R. Iverson, Cathryn A. Manduca, **Carol Ormand**, David W. Mogk, Randall M. Richardson, Barbara J. Tewksbury, and Richard F. Yuretich. *On the Cutting Edge* Workshops and Web Resources for Early Career Geoscience Faculty, in *The Role of Scientific Societies in STEM Faculty Workshops: a Report of the May 3, 2012 Meeting*, Council of Scientific Society Presidents, American Chemical Society, Washington, DC, pp. 46-55.
- 2012 **Ormand, Carol J.** (2012). Learning to Think Spatially: In the Trenches, v. 2, n. 2, pp. 10-11.
- 2010 **Ormand, Carol J.** Teaching Activity: Guided Reading of Scientific Journal Articles. <http://serc.carleton.edu/NAGTWorkshops/structure/activities/47021.html>. Selected via peer review for the *On the Cutting Edge* Exemplary Teaching Collection.
- 2008 **Ormand, Carol J.** Teaching Activity: Plate Boundaries and Volcanoes. <http://serc.carleton.edu/introgeo/firstday/activities/21707.html>.
- 2004 **Ormand, Carol J.** Teaching Activity: Flood Frequency and Risk Assessment. <http://serc.carleton.edu/quantskills/activities/flooding.html>. Selected via peer review for the *On the Cutting Edge* Exemplary Teaching Collection.
- 2004 **Ormand, Carol J.** Teaching Activity: Using Play-doh to Understand 3D Flinn Plots. <http://serc.carleton.edu/NAGTWorkshops/structure04/activities/4400.html>.
- 2004 **Ormand, Carol J.** Course Description: Geology of the National Parks. <http://serc.carleton.edu/NAGTWorkshops/coursedesign/goalsdb/4298.html>.

Presentations at professional conferences

- 2019 Baer, Eric M.D., Robert H. Blodgett, Norlene R. Emerson, Jan Hodder, Ellen Iverson, John R. McDaris, R. Heather Macdonald, and **Carol J. Ormand** (2019). SAGE 2YC Regional Workshops: Disseminating Educational Practices, Developing Leadership, and Building Communities: Geological Society of America annual meeting (Phoenix, AZ).
- 2019 Dutrow, Barbara L. and **Carol J Ormand** (2019). The Complexity of Teaching Mineralogy: 3-D Visualization and Spatial Skills (Invited Presentation): Geological Society of America annual meeting (Phoenix, AZ).
- 2019 Hodder, Jan, R. Heather Macdonald, Eric Baer, Rachel Beane, Debra Bragg, Norlene Emerson, Ellen Iverson, John McDaris, Kristin O'Connell, **Carol J. Ormand** (2019). Engaging Two-year Geoscience College Faculty to Promote Diversity, Equity, and Inclusion: The SAGE 2YC Project: Association for the Sciences of Limnology and Oceanography meeting (Puerto Rico).
- 2019 Iverson, Ellen, Debra Bragg, Pamela Eddy, Kristin O'Connell, R. Heather Macdonald, Eric M.D. Baer, Norlene R. Emerson, Jan Hodder, John R. McDaris, and **Carol J.**

- Ormand** (2019). The Influence of SAGE 2YC Professional Development on Teaching, Leadership, and Campus and Regional Dissemination: Geological Society of America annual meeting (Phoenix, AZ).
- 2019 McDaris, John, Eric Baer, Norlene Emerson, Jan Hodder, R. Heather Macdonald, and **Carol J. Ormand** (2019). Synthesizing lessons for creating change in faculty, programs, institutions, and regional networks: SAGE 2YC Faculty as Change Agents: Earth Educators' Rendezvous (Nashville, TN).
- 2019 McDaris, John R., R. Heather Macdonald, **Carol J. Ormand**, Ellen R. Iverson, Eric M.D. Baer, and Jan Hodder (2019). Increasing Diversity, Equity, and Inclusion in Two-Year College Geoscience: Lessons Learned from the SAGE 2YC Project: American Geophysical Union Fall Meeting (San Francisco, CA).
- 2019 **Ormand, Carol J.**, John McDaris, R. Heather Macdonald, Eric Baer, Norlene Emerson, and Jan Hodder (2019). SAGE 2YC Materials for Faculty Professional Development Workshops: Earth Educators' Rendezvous (Nashville, TN).
- 2019 **Ormand, Carol J.**, R. Heather Macdonald, John R. McDaris, Jan Hodder, Eric M.D. Baer, and Norlene R. Emerson (2019). SAGE 2YC Virtual Professional Development for Geoscience Faculty in Two-Year Colleges: Engaging Faculty in Exploration of Evidence-Based Practices: Geological Society of America annual meeting (Phoenix, AZ).
- 2019 Orr, Cailin Huyck, Sean P. Fox, and **Carol J. Ormand** (2019). Teach the Earth: Portal for Geoscience Education Resources: Geoscience Alliance meeting (Phoenix, AZ).
- 2018 Awalt, Mitchell, Lisa Kempler, and **Carol J. Ormand** (2018). Using MATLAB to Teach Computational and Quantitative Thinking Skills in STEM Courses: Earth Educators' Rendezvous (Lawrence, KS).
- 2018 Iverson, Ellen, R. Heather Macdonald, Eric M. D. Baer, Debra Bragg, Pamela Eddy, Norlene R. Emerson, Jan Hodder, John R. McDaris, Kristin O'Connell, and **Carol J. Ormand** (2018). Building a Community of Practice Among Geoscience Two-Year College Faculty: A Framework to Support Individual Learning and Collective Change: Geological Society of America annual meeting (Indianapolis, IN).
- 2018 Macdonald, R. Heather, Eric M. D. Baer, Rachel J. Beane, Debra Bragg, Norlene R. Emerson, Jan Hodder, Ellen Iverson, John R. McDaris, Kristin O'Connell, and **Carol J. Ormand** (2018). Promoting Diversity, Equity, and Inclusion: Engaging SAGE 2YC Faculty to Transform Geoscience in Two-Year Colleges: Geological Society of America annual meeting (Indianapolis, IN).
- 2018 McDaris, John, **Carol J. Ormand**, Eric Baer, Jan Hodder, R. Heather Macdonald, and Norlene Emerson (2018). SAGE 2YC: Sustaining Faculty Learning: Earth Educators' Rendezvous (Lawrence, KS).
- 2018 **Ormand, Carol J.**, R. Heather Macdonald, Eric M. D. Baer, Rachel J. Beane, Jan Hodder, John R. McDaris, and Kristin O'Connell (2018). Diversity, Equity, and Inclusion: SAGE 2YC Resources for the Geoscience Community: Geological Society of America annual meeting (Indianapolis, IN).
- 2017 Beane, Rachel J., R. Heather Macdonald, Richelle M. Allen-King, Tessa M. Hill, **Carol J. Ormand**, Sarah Penniston-Dorland, Barbara J. Tewksbury, and Richard F. Yuretich (2017). Workshop for Early Career Geoscience Faculty: Teaching, Research, and Managing One's Career: Geological Society of America annual meeting (Seattle, WA).

- 2017 Baer, Eric M. D., Robert H. Blodgett, Norlene R. Emerson, Jan Hodder, John R. McDaris, Heather Macdonald, **Carol J. Ormand** (2017). Adapting and Extending the *On the Cutting Edge* Model of Professional Development to Bring Workshops to Two-Year College Faculty: Geological Society of America annual meeting (Seattle, WA).
- 2017 Dutrow, Barbara L. and **Carol J. Ormand** (2017). Developing Spatial and Penetrative Thinking Skills Through Technology: Goldschmidt Conference (Paris, France).
- 2017 Iverson, Ellen, John McDaris, **Carol Ormand**, and R. Heather Macdonald (2017). Supporting and Advancing Geoscience Education in Two-Year Colleges (SAGE 2YC): Building a Foundation for Change through a Network of Regional Communities of Practice: Earth Educators' Rendezvous (Albuquerque, NM).
- 2017 LeMay, Lynsey E., Robyn Wright Dunbar, Sue C. Ebanks, Lisa A. Gilbert, R. Heather Macdonald, **Carol J. Ormand**, Catherine Riihimaki, Gary S. Weissmann (2017). Preparing for an Academic Career in the Geosciences Workshop: A Success of the *On the Cutting Edge* Program: Geological Society of America annual meeting (Seattle, WA).
- 2017 Macdonald, R. Heather, Eric M. D. Baer, Debra Bragg, Pamela Eddy, Norlene R. Emerson, Yi Hao, Jan Hodder, Ellen Iverson, John R. McDaris, and **Carol J. Ormand** (2017). Student Success in Geoscience: A SAGE 2YC Perspective: Geological Society of America annual meeting (Seattle, WA).
- 2017 Macdonald, R. Heather, Cathryn A. Manduca, Rachel J. Beane, Diane Doser, Sue Ebanks, Jan Hodder, John R. McDaris, and **Carol J. Ormand** (2017). Diversifying Geoscience by Preparing Faculty as Workshop Leaders to Promote Inclusive Teaching and Inclusive Geoscience Departments: American Geophysical Union annual fall meeting (New Orleans, LA).
- 2017 McDaris, John R., Eric M. D. Baer, R. Heather Macdonald, **Carol J. Ormand**, Jan Hodder, Norlene R. Emerson (2017). The SAGE 2YC Website: Updated Content to Support 2YC Faculty as Agents of Change: Geological Society of America annual meeting (Seattle, WA).
- 2017 **Ormand, Carol J.**, Eric M. D. Baer, Debra Bragg, Pamela Eddy, Norlene R. Emerson, Yi Hao, Jan Hodder, Ellen Iverson, and R. Heather Macdonald (2017). The Inventory of Educational Practices and the Inventory of Geoscience Department and Program Practices: Two New Instruments in Development from the SAGE 2YC Project: Geological Society of America annual meeting (Seattle, WA).
- 2017 Petcovic, Heather L., Laura Tinigin, Allen Pope, Natalie Bursztyn, **Carol J. Ormand**, and Nicole LaDue (2017). PIXELS: How Classroom-Based and Field-Based Learning Impact Students' Sense of Scale and Understanding of Remote Sensing Imagery: Geological Society of America annual meeting (Seattle, WA).
- 2016 Atkins, Rachel M., Karen S. McNeal, **Carol J. Ormand**, and Thomas F. Shipley (2016). Student Visual Navigation of Geologic Block Diagrams: Implications for Teaching Spatial Skills in the Undergraduate Classroom: Geological Society of America annual meeting (Denver, CO).
- 2016 Atit, Kinnari, **Carol J. Ormand**, Thomas F. Shipley, Basil Tikoff, Barbara Dutrow, Laurel Goodwin, Thomas A. Hickson, Kristin Michod Gagnier, and Ilyse Resnick (2016). Does context matter? Investigating the improvement of domain-general vs. domain-specific spatial skills in upper level geology courses: Spatial Cognition conference

- (Philadelphia, PA).
- 2016 Baer, Eric M.D., Norlene R. Emerson, Jan Hodder, R. Heather Macdonald, John R. McDaris, and **Carol J. Ormand** (2016). Community College Geoscience Faculty as Change Agents: Geological Society of America annual meeting (Denver, CO).
- 2016 Emerson, Norlene R., Eric M.D. Baer, R. Heather Macdonald, **Carol J. Ormand**, Karen M. Layout, and Jan Hodder (2016). Supporting Geoscience Students Through the 2YC to 4YCU Transfer Process: Geological Society of America annual meeting (Denver, CO).
- 2016 Garnier, Bridget, Maria Chang, **Carol J. Ormand**, Basil Tikoff, and Thomas F. Shipley (2016). CogSketch worksheets: Promoting sketching in the geosciences with interactive technology: Earth Educators' Rendezvous (Madison, WI).
- 2016 Garnier, Bridget C., Maria D. Chang, **Carol J. Ormand**, Bryan Matlen, Thomas F. Shipley, and Basil Tikoff (2016). Promoting Sketching in Introductory Geoscience Courses: An Interdisciplinary Approach to Designing and Developing CogSketch Geoscience Worksheets: Geological Society of America annual meeting (Denver, CO).
- 2016 Gold, Anne U., Philip Pendergast, **Carol J. Ormand**, David Budd, Karl Mueller, and Katherine Kravitz (2016). The Importance of Spatial Reasoning Skills in Undergraduate Geology Students and the Effect of Weekly Spatial Skill Trainings - With a Specific Focus on the Gender Gap: Geological Society of America annual meeting (Denver, CO).
- 2016 Gold, Anne, Philip Pendergast, Jennifer Stempien, and **Carol J. Ormand** (2016). The Importance of Spatial Reasoning Skills in Undergraduate Geology Students and the Effect of Weekly Spatial Skill Trainings: European Geosciences Union General Assembly (Vienna, Austria).
- 2016 Krantz, Bob, **Carol J. Ormand**, and Brett Freeman (2016). Learning From the 2013 3-D Interpretation AAPG Hedberg Conference: How Geoscientists See 3-D: AAPG Annual Convention (Calgary, Alberta, Canada).
- 2016 Macdonald, R. Heather, Eric M.D. Baer, Norlene R. Emerson, Jan Hodder, John R. McDaris, **Carol J. Ormand**, Pamela Eddy, Debra Bragg, Ellen Iverson, and Heather McCambly (2016). Working for Systemic Change in Geoscience Programs in Two-Year Colleges: Geological Society of America annual meeting (Denver, CO).
- 2016 **Ormand, Carol J.**, Thomas F. Shipley, and Basil Tikoff (2016). Ten Years of SILC Research on Spatial Thinking and Learning in Geoscience: What We've Learned and Produced: Geological Society of America annual meeting (Denver, CO).
- 2016 **Ormand, Carol J.**, Thomas F. Shipley, Basil Tikoff, Barbara L. Dutrow, Laurel B. Goodwin, Thomas A. Hickson, Kinnari R. Atit, Kristin Michod Gagnier, and Ilyse Resnick (2016). The Spatial Thinking Workbook: Developing Students' Spatial Thinking Skills in Upper-Level Undergraduate Geology Courses Through Curricular Materials Based on Cognitive Science Research: Geological Society of America annual meeting (Denver, CO).
- 2016 Petcovic, Heather L., Laura Tinigin, Allen Pope, Natalie Bursztyn, **Carol J. Ormand**, and Nicole LaDue (2016). PIXELS: Comparing Classroom-Based and Field-Based Learning to Investigate Students' Concepts of Pixels and Sense of Scale: Geological Society of America annual meeting (Denver, CO).
- 2015 Gagnier, Kristin Michod, Kinnari Atit, **Carol J. Ormand**, and Thomas F. Shipley (2015). Sketching to support student comprehension of 3-dimensional diagrams: Diagrams as Vehicles for Scientific Reasoning Conference (Pittsburgh, PA).
- 2015 Gold, Anne, Jennifer Stempien, **Carol Ormand**, David Budd, Karl Mueller, Katherine

- Kravitz, Alyssa Quintanilla, and Jennifer Stroh (2015). Differences in Spatial Reasoning Skills in Undergraduate Geology Students and the Effect of Weekly Spatial Skill Trainings: Earth Educators' Rendezvous (Boulder, CO).
- 2015 Luo, Wei, Jon Pelletier, Kirk Duffin, **Carol J. Ormand**, Wei-chen Hung, Ellen Iverson, Xiaoming Zhai, Kyle Whalley, Courtney Gallaher, Walter Furness, and David Shernoff (2015). Computer Simulation Significantly Enhances Students' Learning of Landform Evolution: AAG (Chicago, IL).
- 2015 Luo, Wei, Jon Pelletier, Kirk Duffin, Carol J. Ormand, Wei-Chen Hung, Ellen Iverson, David Shernoff, Xiaoming Zhai, Kyle Whalley, Courtney Gallaher, and Walter Furness (2015). Web-based Interactive Landform Simulation Model - Grand Canyon (WILSIM-GC) and Its Advantages in Enhancing Students' Learning: CSDMS Annual Meeting (Boulder, CO).
- 2015 **Ormand, Carol J.**, Thomas F. Shipley, Barbara Dutrow, Laurel Goodwin, Thomas A. Hickson, Basil Tikoff, Kinnari Atit, Kristin Michod Gagnier, and Ilyse Resnick (2015). Teaching Spatial Thinking in Mineralogy, Structural Geology, and Sedimentology & Stratigraphy: Tools and Strategies from Cognitive Science Research: Earth Educators' Rendezvous (Boulder, CO).
- 2015 **Ormand, Carol J.**, Thomas F. Shipley, Barbara Dutrow, Laurel Goodwin, Thomas A. Hickson, Basil Tikoff, Kinnari Atit, Kristin Michod Gagnier, and Ilyse Resnick (2015). Teaching Spatial Thinking in Undergraduate Geology Courses Using Tools and Strategies from Cognitive Science Research: American Geophysical Union annual fall meeting (San Francisco, CA).
- 2015 Petcovic, Heather, **Carol J. Ormand**, and Robert W. Krantz (2015). Using Mixed Methods to Explore Field Sketching: An Example from the Hat Creek Fault Zone: Earth Educators' Rendezvous (Boulder, CO).
- 2015 Petcovic, Heather, Allen Pope, Laura Tinigin, **Carol J. Ormand**, and Nicole D. LaDue (2015). PIXEL: Investigating Students' Concepts of Pixels and Sense of Scale in the Field: Geological Society of America annual meeting (Baltimore, MD).
- 2015 Pope, Allen, Laura Tinigin, Heather L. Petcovic, **Carol J. Ormand**, Nicole LaDue (2015). PIXEL: Investigating Students' Concepts of Pixels and Sense of Scale in the Field: American Geophysical Union annual fall meeting (San Francisco, CA).
- 2015 Whalley, Kyle, Wei Luo, Jon Pelletier, Kirk Duffin, **Carol Ormand**, Aaron Shelhamer, Andrew Darling, Wei-Chen Hung, David Shernoff, Xiaoming Zhai, Ellen Iverson, Walter Furness, Courtney Gallaher, Shannon MacCarragher, and Nicholas Lotter (2015). The Utilization of a Computer Simulation to Teach Landform Evolution: West Lakes Division of the Association of American Geographers regional meeting (Eau Claire, WI).
- 2014 Gagnier, Kristin Michod, Kinnari Atit, **Carol J. Ormand**, and Thomas F. Shipley (2014). Understanding 3D: Generating Diagrams from 3D Models Improves Diagrammatic Reasoning: 2014 American Educational Research Association Annual Meeting (Philadelphia, PA).
- 2014 Gagnier, Kristin Michod, Kinnari Atit, **Carol J. Ormand**, and Thomas F. Shipley (2014). Comprehending Diagrams: Sketching to Support Spatial Reasoning from Diagrams: 2014 International Mind, Brain and Education Society Conference (Fort Worth, TX).
- 2014 Garnier, Bridget, **Carol J. Ormand**, Maria Chang, Bryan Matlen, Basil Tikoff, Thomas F. Shipley, and Kenneth D. Forbus (2014). Testing CogSketch Geoscience Worksheets as an Effective Spatial Learning Tool in Introductory Geoscience Courses: Geological Society of America annual meeting (Vancouver, BC).

- 2014 Goodwin, Laurel, **Carol J. Ormand**, Kristin Michod Gagnier, and Kinnari Atit (2014). New Approaches to Teaching Spatial Thinking in the Context of Structural Geology: Structural Geology and Tectonics Forum (Golden, CO).
- 2014 Krantz, Robert W., **Carol J. Ormand**, and Brett Freeman (2014). How Geoscientists See 3D: Learning From the 2013 3D Interpretation Hedberg Conference: Geological Society of America annual meeting (Vancouver, BC).
- 2014 Luo, Wei, Jon Pelletier, Kirk Duffin, **Carol J. Ormand**, Wei-chen Hung, Ellen Iverson, David Shernoff, Xiaoming Zhai, and Kyle Whalley (2014). Web-Based Interactive Landform Simulation Model - Grand Canyon (WILSIM-GC): Geological Society of America annual meeting (Vancouver, BC).
- 2014 **Ormand, Carol J.**, Thomas F. Shipley, and Basil Tikoff (2014). Applying Cognitive Science Research to Improve Geoscience Teaching and Learning: Structural Geology and Tectonics Forum (Golden, CO).
- 2014 **Ormand, Carol J.**, Thomas F. Shipley, Charles Kiven, J. Steve Davis, Dale Klopfer, and Peter Vrolijk (2014). The Geologic Block Cross-Sectioning Test: Insights Into the Novice-Expert Spectrum in Visual Penetrative Ability: Geological Society of America annual meeting (Vancouver, BC).
- 2014 **Ormand, Carol J.**, Thomas F. Shipley, Barbara Dutrow, Laurel Goodwin, Thomas Hickson, Basil Tikoff, Kinnari Atit, Kristin Gagnier, and Ilyse Resnick (2014). Transforming Spatial Reasoning Skills in the Upper-Level Undergraduate Geoscience Classroom Through Curricular Materials Informed by Cognitive Science Research: American Geophysical Union annual fall meeting (San Francisco, CA).
- 2014 Petcovic, Heather, **Carol J. Ormand**, and Robert W. Krantz (2014). Expert Field Sketches as Visual Representations of a Complex Fault Zone: Geological Society of America annual meeting (Vancouver, BC).
- 2013 Asher, Pranoti, R. Heather Macdonald, **Carol J. Ormand**, and Christopher Keane (2013). The role of professional societies in supporting Earth and space science departments: Geological Society of America annual meeting (Denver, CO)
- 2013 Atit, Kinnari, Tilbe Goksun, **Carol J. Ormand**, Cathryn A. Manduca, Ilyse Resnick, Thomas F. Shipley, and Basil Tikoff (2013). Spatial Gestures Point the Way: A Broader Understanding of the Gestural Referent: Proceedings of the 35th Annual Meeting of the Cognitive Science Society. Manuscript submitted for publication.
- 2013 Atit, Kinnari, Barbara Dutrow, **Carol Ormand**, and Thomas F. Shipley (2013). Gesture and Three-Dimensional Visualization: AAPG Hedberg Conference on 3D Structural Geologic Interpretation (Reno, NV).
- 2013 Garnier, Bridget, **Carol J. Ormand**, Maria Chang, Kenneth Forbus, Thomas F. Shipley, and Basil Tikoff (2013). Improving Visualization and Spatial Reasoning Using Sketching Software and a Virtual Tutor: AAPG Hedberg Conference on 3D Structural Geologic Interpretation (Reno, NV).
- 2013 Garnier, Bridget, **Carol J. Ormand**, Maria D. Chang, Thomas F. Shipley, Basil Tikoff, and Kenneth D. Forbus (2013). Using Sketching Software with a Virtual Tutor to Increase Sketching and Spatial Skill Development in a Classroom Environment: Geological Society of America annual meeting (Denver, CO).
- 2013 Luo, Wei, Jon D. Pelletier, Kirk Duffin, **Carol J. Ormand**, Wei-chen Hung, Ellen A. R. Iverson, David Shernoff, Xiaoming Zhai, and Anjana Chowdary (2013). Web-based Interactive Landform Simulation Model -- Grand Canyon: American Geophysical Union annual fall meeting (San Francisco, CA).

- 2013 Macdonald, R. Heather, Cathryn A. Manduca, David W. Mogk, Barbara J. Tewksbury, Sean Fox, Rachel J. Beane, David A. McConnell, Katryn Wiese, Michael E. Wyssession, and the **SERC Webteam** (2013). *On the Cutting Edge: A Decade of Transforming Geoscience Education*: Geological Society of America annual meeting (Denver, CO).
- 2013 **Ormand, Carol J.**, Cathryn A. Manduca, Thomas F. Shipley, and Basil Tikoff (2013). *Developing and Testing Materials to Improve Spatial Skills in Upper Division Geoscience Courses*: TUES/CCLI PI Conference (Washington, DC).
- 2013 **Ormand, Carol J.**, Thomas F. Shipley, Basil Tikoff, Cathryn A. Manduca, Barbara Dutrow, Laurel Goodwin, Thomas Hickson, Kinnari Atit, Kristin Gagnier, and Ilyse Resnick (2013). *Improving Spatial Reasoning Skills in the Undergraduate Geoscience Classroom through Interventions Based on Cognitive Science Research*: AAPG Hedberg Conference on 3D Structural Geologic Interpretation (Reno, NV).
- 2013 **Ormand, Carol J.**, Thomas F. Shipley, Basil Tikoff, Cathryn A. Manduca, Barbara L. Dutrow, Laurel B. Goodwin, Thomas Hickson, Kinnari Atit, Kristin M. Gagnier, and Ilyse Resnick (2013). *Improving Spatial Visualization Skills in the Undergraduate Geoscience Classroom Through Interventions Based on Cognitive Science Research*: Geological Society of America annual meeting (Denver, CO).
- 2013 **Ormand, Carol J.**, Thomas F. Shipley, Basil Tikoff, Cathryn A. Manduca, Barbara L. Dutrow, Laurel B. Goodwin, Thomas Hickson, Kinnari Atit, Kristin Michod Gagnier, and Ilyse Resnick (2013). *Transforming Spatial Reasoning Skills in the Undergraduate Geoscience Classroom Through Interventions Based on Cognitive Science Research*: American Geophysical Union annual fall meeting (San Francisco, CA).
- 2013 Shipley, Thomas F., Cathryn A. Manduca, **Carol J. Ormand**, and Basil Tikoff (2013). *Spatial Thinking in 3D and 4D Geology Visualization*: AAPG Hedberg Conference on 3D Structural Geologic Interpretation (Reno, NV).
- 2013 Tikoff, Basil, Cathryn A. Manduca, **Carol J. Ormand**, and Thomas F. Shipley (2013). *How the Outcomes of Cognitive Science Research Can Make You a Better Geologist*: AAPG Hedberg Conference on 3D Structural Geologic Interpretation (Reno, NV).
- 2012 Gagnier, Kristin, Kinnari Atit, **Carol Ormand**, and Thomas F. Shipley (2012). *Teaching Penetrative Thinking via Progressive Alignment and Directed Sketching*: Geological Society of America annual meeting (Charlotte, NC).
- 2012 Gagnier, Kristin, Kinnari Atit, Thomas F. Shipley, and **Carol Ormand** (2012). *Improving Penetrative Thinking Skills for Geoscience Education*: inter-Science of Learning Center (iLSC) Conference (San Diego, CA).
- 2012 **Ormand, Carol J.**, Cathryn A. Manduca, Steven C. Semken, Erica Crespi (2012). *Teaching About Rates and Time: Challenges and Resources*: American Geophysical Union fall meeting (San Francisco, CA).
- 2012 Shipley, Thomas F., Kinnari Atit, Cathryn A. Manduca, **Carol J. Ormand**, Ilyse Resnick, and Basil Tikoff (2012). *Understanding geological processes: Visualization of rigid and non-rigid transformations*: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 Cervato, Cinzia, Cathryn Manduca, David Mogk, **Carol Ormand**, Thomas Shipley, and Trisha Smrecak (2011). *Rates, Dates, and Geologic Time: A Journal Club Report on Teaching About Temporal Aspects of Geoscience*: Geological Society of America annual meeting (Minneapolis, MN).
- 2011 Fox, Sean, Ellen Iverson, Cathryn Manduca, Karin Kirk, John McDaris, **Carol Ormand**, and Monica Bruckner (2011). *Supporting Faculty Learning About Teaching: The On the Cutting Edge Website*: American Geophysical Union fall meeting (San Francisco, CA).

- 2011 Iverson, Ellen, Sabra Lee, **Carol Ormand**, Geoffrey Feiss, Heather Macdonald, Cathryn Manduca, and Randall Richardson (2011). Building Strong Geoscience Departments: Case Studies and Findings from Six Years of Programming: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 Macdonald, Heather, Cathryn Manduca, **Carol Ormand**, Robyn Dunbar, Rachel Beane, Monica Bruckner, Timothy Bralower, Geoffrey Feiss, Barbara Tewksbury, and Kathryn Wiese (2011). Preparing Future Geoscience Professionals: Needs, Strategies, Programs, and Online Resources: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 Manduca, Cathryn, Timothy Bralower, Diane Clemens-Knott, Diane Doser, P. Geoffrey Feiss, R. Heather Macdonald, **Carol Ormand**, Dallas Rhodes, Randall M. Richardson, and Mary Savina (2011). Bringing Together Design and Evaluation to Understand Student Learning: Geological Society of America annual meeting (Minneapolis, MN).
- 2011 Manduca, Cathryn, David Blockstein, Timothy Bralower, Diane Doser, Anne Egger, P. Geoffrey Feiss, David Gosselin, Pamela Matson, David McConnell, and **Carol Ormand** (2011). InTeGrate-ing Geoscience Learning in Undergraduate Education: Geological Society of America annual meeting (Minneapolis, MN).
- 2011 Manduca, Cathryn, David Mogk, Kim Kastens, Basil Tikoff, Thomas Shipley, **Carol Ormand**, and David McConnell (2011). Geoscience Education Research: The Role of Collaborations with Education Researchers and Cognitive Scientists: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 Murphy, Rachel, **Carol Ormand**, Laurel Goodwin, Thomas Shipley, Cathryn Manduca, and Basil Tikoff (2011). Improving Students' Visuo-Penetrative Thinking Skills Through Brief, Weekly Practice: Geological Society of America annual meeting (Minneapolis, MN).
- 2011 **Ormand, Carol**, Thomas Shipley, Cathryn Manduca, and Basil Tikoff (2011). Improving Geoscience Students' Spatial Thinking Skills: Applying Cognitive Science Research in the Classroom: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 **Ormand, Carol**, Cathryn Manduca, Heather Macdonald, Timothy Bralower, Diane Clemens-Knott, Diane Doser, Geoffrey Feiss, Dallas Rhodes, Randall Richardson, and Mary Savina (2011). Building Strong Geoscience Departments Through the Visiting Workshop Program: American Geophysical Union fall meeting (San Francisco, CA).
- 2011 Savina, Mary, Cherry Danielson, Deborah Gross, and **Carol Ormand** (2011). Imagining the "Ideal Student": Helping Faculty Focus on What's Really Important to Assess: Association of American Colleges and Universities meeting on General Education and Assessment 3.0: Next-Level Practices Now (Chicago, IL).
- 2011 Shipley, Thomas, Cathryn Manduca, **Carol Ormand**, and Basil Tikoff (2011). Spatiotemporal Thinking in the Geosciences: American Geophysical Union fall meeting (San Francisco, CA).
- 2010 Atit, Kinnari R., Cathryn Manduca, **Carol Ormand**, Ilyse Resnick, Thomas Shipley, and Basil Tikoff (2010). Reasoning About Sequences of Spatial Events: How Do Geologists Know What Happened First?: Geological Society of America annual meeting (Denver, CO).
- 2010 **Ormand, Carol**, Cathryn Manduca, Thomas Shipley, and Basil Tikoff (2010). Students' Spatial Thinking Skills: Structural Geology and Tectonics Forum (Madison, WI).
- 2010 **Ormand, Carol**, Cathryn Manduca, R. Heather Macdonald, Geoffrey Feiss, Randall

- Richardson, Sabra Lee, and Ellen Iverson (2010). Impacts of the Building Strong Geoscience Departments Visiting Workshop Program: Geological Society of America annual meeting (Denver, CO).
- 2010 **Ormand, Carol**, Cathryn Manduca, Thomas Shipley, and Basil Tikoff (2010). Geoscience Students' Spatial Thinking Skills: Results From Multi-Institutional Classroom Studies: Geological Society of America annual meeting (Denver, CO).
- 2010 **Ormand, Carol**, Cathryn Manduca, and R. Heather Macdonald (2010). The Role of Geoscience Departments in Preparing Future Geoscience Professionals: American Geophysical Union fall meeting (San Francisco, CA).
- 2010 Richardson, Randall M., **Carol Ormand**, R. Heather Macdonald, Robyn Wright Dunbar, Richelle Allen-King, Cathryn Manduca (2010). Launching an Academic Career: On the Cutting Edge Resources for Geoscience Graduate Students, Post-doctoral Fellows, and Early Career Faculty: American Geophysical Union fall meeting (San Francisco, CA).
- 2009 Harwood, Cara L., **Carol Ormand**, Cathryn Manduca, and Thomas F. Shipley (2009). Differences in Development of Spatial and Object Visualization Ability in Undergraduate Geoscience Courses: Geological Society of America annual meeting (Portland, OR).
- 2009 Kirk, Karin, Cathryn Manduca, **Carol Ormand**, and John McDaris (2009). Resources for Designing, Selecting, and Teaching with Visualizations in the Geoscience Classroom: American Geophysical Union fall meeting (San Francisco, CA).
- 2009 Manduca, Cathryn, R. Heather Macdonald, **Carol J. Ormand**, and P. Geoffrey Feiss (2009). Strengthening Geoscience Departments Through Shared Knowledge: Geological Society of America annual meeting (Portland, OR).
- 2009 **Ormand, Carol J.**, Dedre Gentner, Benjamin Jee, Thomas F. Shipley, Basil Tikoff, David Uttal, and Cathryn Manduca (2009). Finding Fault: Laboratory Experiments and Classroom Studies on Identifying Faults in Images: Geological Society of America annual meeting (Portland, OR).
- 2009 **Ormand, Carol J.**, Cathryn Manduca, Jenefer Husman, Katrien Kraft, David Mogk, and Karl Wirth (2009). Teaching Metacognition: A Summary of Successful Strategies from the 2008 *On the Cutting Edge* Workshop: Geological Society of America annual meeting (Portland, OR).
- 2009 **Ormand, Carol J.**, Cathryn Manduca, and R. Heather Macdonald (2009). New Resources on the Building Strong Geoscience Departments Website: American Geophysical Union fall meeting (San Francisco, CA).
- 2008 Manduca, Cathryn, R. Heather Macdonald, P. Geoffrey Feiss, Randall M. Richardson, Timothy J. Bralower, Carolyn H. Eyles, and **Carol J. Ormand** (2008). Geoscience Departments and the Workforce: Bringing Together Student Interests and Industry Needs: Geological Society of America annual meeting, 2008 (Houston, TX).
- 2008 Manduca, Cathryn, Dedre Gentner, Mark P. Holden, **Carol J. Ormand**, Benjamin Jee, Bradley B. Sageman, Thomas F. Shipley, Basil Tikoff and David H. Uttal (2008). Geoscience Perception: Expert and Novice Experience of Graphs, Outcrops, and Landscapes: Geological Society of America annual meeting, 2008 (Houston, TX).
- 2008 **Ormand, Carol**, Karin Kirk, R. Heather Macdonald, Cathryn Manduca, and Barbara Tewksbury (2008). NEW Online Resources for Teaching Introductory-Level Geoscience Courses: Geological Society of America annual meeting (Houston, TX).
- 2007 Macdonald, R. Heather, **Carol J. Ormand**, Cathryn Manduca, Robyn Wright-Dunbar, and Richelle Allen-King. Getting Started in Academic Careers: *On the Cutting Edge*

- Resources for Graduate Students, Postdoctoral Fellows, and Early Career Faculty: American Geophysical Union fall meeting, 2007 (San Francisco, CA). Eos Trans. AGU, 88 (52), Fall Meeting Supplement, Abstract ED11B-0475.
- 2007 Manduca, Cathryn, R. Heather Macdonald, P. Geoffrey Feiss, Randall Richardson, and **Carol J. Ormand**. Learning From One Another: On-line Resources for Geoscience Departments: American Geophysical Union fall meeting, 2007 (San Francisco, CA). Eos Trans. AGU, 88 (52), Fall Meeting Supplement, Abstract ED34A-01.
- 2007 **Ormand, Carol J.**, R. Heather Macdonald, Cathryn Manduca, Geoff Feiss, and Tim Bralower (2007). The Changing Landscape of Geoscience Careers and Education: New Online Resources from Building Strong Geoscience Departments: Geological Society of America annual meeting (Denver, CO).
- 2006 **Ormand, Carol J.**, R. Heather Macdonald, and Cathryn Manduca (2006). Managing Your Career: New 'On the Cutting Edge' Online Resources for Graduate Students, Post-Doctoral Fellows, and Early-Career Faculty: Geological Society of America annual meeting (Philadelphia, PA).
- 2005 Czeck, Dyanna, and **Carol J. Ormand** (2005). Using cleavage refraction, microstructural analysis, and mineralogy to learn about rheology in the Baraboo Quartzite: Geological Society of America annual meeting (Salt Lake City, UT).
- 2004 **Ormand, Carol J.** (2004). Keeping it real: making the geology of the national parks relevant for non-science majors: Geological Society of America annual meeting (Denver, CO).
- 2004 **Ormand, Carol J.** and Dyanna Czeck (2004). Three dimensional geometry and strain of the Baraboo Syncline: kinematic implications: Institute on Lake Superior Geology annual meeting (Duluth, MN).
- 2004 Tullis, J., P. Campbell, D. Czeck, M. Harrison, C. Kopf, **C. Ormand**, L. Reinen, A. Sussman, B. Torrez, and S. Wojtal (2004). Why and how to include grain-scale deformation mechanisms, microstructures, and rheology in undergraduate structural geology courses: Geological Society of America annual meeting (Denver, CO).
- 2003 **Ormand, Carol J.** and Dyanna Czeck (2003). Structure and kinematics of the Baraboo Syncline: a three-dimensional analysis: Geological Society of America annual meeting (Seattle, WA).
- 2001 **Ormand, Carol J.** and Pam Olson (2001). An analysis of fault systems in an experimental stratigraphic basin, with a comparison to the Mid-Continent Rift System": Geological Society of America annual meeting (Boston, MA).

Workshop Support

One major component of my current position responsibilities is supporting professional development workshops for science faculty. For each of the workshops listed below, I provided organizational and technical support.

- 2019 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2018 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2017 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2016 Earth Educators' Rendezvous
- 2016 Transforming Geoscience Preparation for K-8 Pre-Service Teachers
- 2015 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2015 Teaching Geoscience with MATLAB

- 2015 Using the Neotoma Database in the Classroom
- 2015 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2015 Earth Educators' Rendezvous
- 2015 Preparing for an Academic Career in the Geosciences
- 2014 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2014 Preparing for an Academic Career in the Geosciences
- 2013 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2012 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2012 Building Strong Geoscience Departments Visiting Workshop Program
- 2012 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2012 Programs that Bring Together Geoscience and Sustainability
- 2011 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2011 Building Strong Geoscience Departments Visiting Workshop Program
- 2011 Teaching Mineralogy, Petrology, and Geochemistry in the 21st Century
- 2011 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2010 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2010 Building Strong Geoscience Departments Visiting Workshop Program
- 2010 Preparing for an Academic Career in the Geosciences
- 2010 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2010 Developing Student Understanding of Complex Systems in the Geosciences
- 2009 Workshop for Heads and Chairs of Earth and Space Sciences Departments
- 2009 Building Strong Geoscience Departments Visiting Workshop Program
- 2009 Preparing for an Academic Career in the Geosciences
- 2009 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2009 Strengthening Your Geoscience Program: A Practical Workshop with Ideas and Examples
- 2009 Assessing Geoscience Programs: Theory and Practice
- 2008 Strategic Persuasion: Effective Negotiations, Problem Solving, and Conflict Resolution
- 2008 The Role of Metacognition in Teaching Geoscience
- 2008 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2008 Urban Students, Urban Issues: Opportunities and Challenges for Teaching Geoscience Courses
- 2008 Teaching with New Geoscience Tools: Visualizations, Models, and Online Data
- 2007 Strategies for Successful Recruitment of Geoscience Majors: Conceptual Framework and Practical Suggestions
- 2007 Preparing for an Academic Career in the Geosciences
- 2007 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2007 Connecting Geoscience Departments to the Future of Science: New Structures for Research and Curriculum
- 2007 The Role of Departments in Preparing Future Geoscience Professionals
- 2006 Preparing for an Academic Career in the Geosciences
- 2006 Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career

Courses Taught

Physical Geology, Geology of the National Parks, Structural Geology, Tectonics, Field Methods;

Seminars: Geology of Death Valley, Geology of Big Bend, Geology Gone Wrong, Geology of the Great Lakes Region, Natural History and Folk Culture of the Southern Appalachians

Professional Development

- 2004 NSF/NAGT Workshop: Teaching Structural Geology in the 21st Century
- 2003 Introduction to ArcGIS: a 4-day workshop at Wittenberg sponsored by NSF-CCLI
- 2003 NSF/NAGT Workshop: Designing Effective and Innovative Courses in the Geosciences
- 2002 NSF/NAGT Workshop: Teaching Quantitative Skills in the Geosciences
- 2002 St. Norbert College Faculty Development Workshop: The Liberal Arts at St. Norbert
- 2001 NSF/NAGT Workshop: Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career
- 2001 St. Norbert College Faculty Development Workshop: Innovative Teaching

Service

- 2004-2005 Advisor, Wittenberg University Geology Club
- 2000-2002 Member, St. Norbert College Natural Sciences Building Committee
- 2000-2002 Advisor, St. Norbert College Geology Club

Outreach

- 2005 Girl Scout Science Night, Wittenberg University
- 2004 Girl Scout Science Night, Wittenberg University
- 2003 Graham High School visit, Wittenberg University
- 2003 WISE (Wittenberg Invites Student Explorations) camp faculty
Residential academic program for high-achieving middle school students
- 2003 Girl Scout Science Night, Wittenberg University
- 2002 Science Day, Wittenberg University
- 2002 Graham High School visit, Wittenberg University