

KRISTIN MICHOD GAGNIER

CURRICULUM VITAE

September 2017

CONTACT INFORMATION

Science of Learning Institute
Johns Hopkins University
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Baltimore, MD 21218-2685

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EDUCATION

Ph.D. University of Delaware, Cognitive Psychology (2011)
B.S. University of Arizona, Psychology and Biology (2003)

PROFESSIONAL EXPERIENCE

2015-present	Outreach & Evaluation Specialist Science of Learning Institute Johns Hopkins University, Baltimore, MD
2015-present	Assistant Research Scientist Department of Cognitive Science Johns Hopkins University, Baltimore, MD
2011-2015	Postdoctoral Research Fellow Spatial Intelligence and Learning Center, Department of Psychology Temple University, Philadelphia, PA
2005-2011	Graduate Research Assistant Department of Psychology, University of Delaware, Newark, DE
2003-2005	Research Assistant Visual Attention Laboratory, Brigham and Women's Hospital and Harvard Medical School, Boston, MA
2002-2003	Undergraduate Research Assistant Department of Psychology, University of Arizona, Tucson, AZ
2000-2001	Undergraduate Research Assistant National Science Foundation Drosophila Stock Center Department of Insect Science, University of Arizona, Tucson, AZ

CURRENT RESEARCH PROJECTS

My research spans the disciplines of the science of learning, cognitive science, educational psychology, and translational science. My work has two broad areas of focus: to understand the cognitive mechanisms that support learning and to translate science of learning research into formal and informal learning practices. In my first line of work, I have sought to understand basic cognitive processes underlying learning, such as attention and memory. In my second line of work, I partner with community organizations to identify learning needs, develop research-informed interventions to meet these needs, and evaluate the impact of the intervention on learning. Some of my recent projects include:

- **Spatially-Enhancing the Science Curriculum and Teacher Professional Development Supports (Partner: Prince George’s County Public School District, Curriculum Development).** This project brings research on the science of spatial thinking to the K-12 science classroom. The goal of this partnership is to advance evidence-based STEM educational student and teacher practices through new curriculum and professional development. The project has three specific aims: (1) to develop an evidence-informed, spatially-enhanced science curriculum for 3rd-grade students, (2) to develop spatial thinking teacher professional training modules to build spatial thinking knowledge and skills, and (3) to evaluate the impact of the spatially-enhanced curriculum and spatial thinking professional development modules on students’ spatial skills, academic achievement, and interest in STEM.
- **The Science of Teaching and School Leadership (Partner: Center for Transformative Teaching and Learning, St. Andrew’s Episcopal School).** Understanding how people learn has the potential to inform educational practice. However, research on learning is often not communicated to educators or translated to educational practice. This project seeks to develop and evaluate a novel teacher professional development training program called the Science of Teaching and School Leadership Academy. The aims of the Academy are to help educators and school leaders: (1) develop knowledge about Mind, Brain, and Education science, (2) identify ways in which MBE research may or may not inform educational practice, and (3) develop action research projects to implement MBE-informed strategies in classrooms and evaluate their effectiveness.
- **Road to Reading Translational Science Project (Partners: Children’s Museum of Manhattan, Port Discovery, B’More for Healthy Babies, and Enoch Pratt Library).** This project brings research on the science of language and literacy development to informal learning contexts through the development of science-informed exhibits for caregivers of children ages 0-5. This project a) examines caregivers’ knowledge, beliefs, attitudes, and behaviors around language and literacy development, b) uses these findings to develop targeted exhibit pieces to meet the learning needs of these caregivers and c) evaluates the impact of the exhibits on caregivers’ knowledge, attitudes, and behaviors.
- **Establishing a Casual Mechanism for the Role of Sketching in Problem Solving in Science (Partner: Temple University and the University of Illinois Chicago).** A growing body of research has shown that sketching can improve problem solving in Science, Technology, Engineering and Mathematics (STEM), yet a causal mechanism for why sketching supports STEM problem solving is all but absent. This project will test three hypotheses for why sketching improves spatial problem solving.
- **Exploring the Socio-emotional Benefits of Arts Education (Evaluation Project with the William Penn Foundation).** This project explores the differential impact of skills-focused versus exposure-focused after school arts education programs on children’s socio-emotional skills.

PUBLICATIONS

Ormand, C.J., Shipley, T. F., Tikoff, B., Dutrow, B., Goodwin, L., Hickson, T.A., Tikoff, B., Atit, K., **Gagnier, K.M.**, and Resnick, I. Resnick (forthcoming). The Spatial Thinking Workbook: A Research-Validated Spatial Skills Curriculum for Geology Majors. Manuscript accepted to the Journal of Geoscience Education.

Intraub, H., & **Gagnier, K. M.** (forthcoming). Expanding Space: Does Imagination affect Boundary Extension for Visual Scenes? In T. L. Hubbard (Ed.). *Spatial Biases in Perception and Cognition*. Cambridge, UK: Cambridge University Press.

Gagnier, K. M., Atit, K., Ormand, C. J., & Shipley, T. F. (2016). Comprehending diagrams: Sketching to support spatial reasoning. *Topics In Cognitive Science*, 1-19. DOI: 10.1111/tops.12233

Gagnier, K.M., & Shipley, T. F. (2016). Visual completion from 2D cross-sections: Implications for visual theory and STEM education and practice. *Cognitive Research: Principles and Implications*, 1(1), 1-18. DOI: 10.1186/s41235-016-0010-y

Gagnier, K.M., Atit, K. & Shipley, T.F. (2016). Understanding and Improving Reasoning of Spatial Representations:

Implications for Education. In David J. Cowen (Ed.), *STEM and GIS in Higher Education*. ESRI Press.

Gagnier, K.M., Shipley, T., F., Tikoff, B., Ormand, C.J., Atit, K., Resnick, I., & Garnier, B (2016). Training spatial skills in geosciences: A review of tools and tests. *AAPG Memoir: 3-D Structural Interpretation: Earth, Mind, and Machine*, 111, 7-23. DOI: 10.1306/13561983M1113668

Intraub, H., Morelli, F., & **Gagnier, K. M.** (2015). Visual, haptic and bimodal scene perception: Evidence for a unitary representation. *Cognition*, 138, 132-147.

Atit, K. **Gagnier, K.M.**, & Shipley, T.F. (2015). Student gestures aid penetrative thinking. *Journal of Geoscience Education*, 63(1), 66-72. DOI: <http://dx.doi.org/10.5408/14-008.1>

Gagnier, K., M., Dickinson, C. A., & Intraub, H. (2013). Fixating picture boundaries does not eliminate boundary extension: Implications for scene representation. *Quarterly Journal of Experimental Psychology*. DOI: 10.1080/17470218.2013.775595

Gagnier, K., & Shipley, T. F. (2013). Completion in the wild: Perception of 3D forms from cross-sections. *Proceedings of the 35th Annual Meeting of the Cognitive Science Society*. Berlin, Germany: Cognitive Science Society.

Gagnier, K., M & Intraub, H. (2012). When less is more: Line-drawings lead to greater boundary extension than color photographs. *Visual Cognition*, 20, 815-824. DOI: 10.1080/13506285.2012.703705

Gagnier, K., M., Intraub, H., Oliva, A. & Wolfe, J.M (2011). Why does vantage point affect boundary extension? *Visual Cognition*, 19, 234-257. DOI: 10.1080/13506285.2010.520680

Wolfe, J. M., Horowitz, T. S., Palmer, E. M., **Michod, K. O.**, & VanWert, M. J. (2010). Getting in to guided search. In V. Coltheart (Ed.), *Tutorials in Visual Cognition*. (pp. 93-120). Hove, Sussex: Psychology Press.

Michod, K.O., & Intraub H. (2009). Boundary Extension. *Scholarpedia*, 4(2):3324.

Wolfe, J.M., Horowitz, T.S., & **Michod, K.O.** (2007). Is visual attention required for robust picture memory? *Vision Research*, 47, 955-964. DOI: 10.1016/j.visres.2006.11.025

Michod, K.O., & Intraub H. (2007). Conceptual masking: Is concept the key or does layout play a role? In Castelhana, M., Franconeri, S., Curby, K., & Shomstein, S. Object Perception, Attention, and Memory 2007 Conference Report 15th Annual Meeting, Long Beach, California, USA. *Visual Cognition*, 16, 120-123.

Under Review

Davatzes. A., Gagnier. K.M., Resnick, I., & Shipley, T. F. A Cycle of Prediction, Comparison, and Feedback Supports Spatial Learning in Geoscience. Manuscript under review.

CONFERENCE PRESENTATIONS

Gagnier, K.M., Holochwost, S. J., Lewis, S., & Fisher, K. R. (2017). Developing a measure of caregiver knowledge, attitudes, and behaviors around language and literacy development for use with diverse populations. Paper presented at the biennial meeting of the Society for Research in Child Development, Austin TX.

Gagnier, K.M. (2017). Developing a Dissemination Plan. Paper presented at the annual meeting of the American Association for the Advancement of Science, Boston MA.

Holochwost, S. J., Wolf, D. P., Fisher, K. R., Gagnier, K. M. (2016, November). Alternatives to randomized control designs in program evaluation. Paper presented at the annual meeting of the American Evaluation Association, Atlanta, GA.

- Ormand, C.J., Shipley, T. F., Dutrow, B., Goodwin, L., Hickson, T.A., Tikoff, B., Atit, K., Gagnier, K.M., and Resnick, I. 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. Poster to be presented at the Geological Society of America annual meeting, Denver, CO.
- Gagnier, K. M., Fisher, K. R. & Holochwost, S. J. (2016). Translating science of learning research into practice: A model for scientist-practitioner partnerships to develop evidence-based practices for the community. Poster presented at Bringing Cognitive Science Research to the Classroom, Washington DC.
- Gagnier, K. M. (2015). Spatial thinking in the Geoscience. Lessons from an Interdisciplinary collaboration between cognitive scientist and geoscientists. Talk presented at the annual meeting of the Geological Society of America, Baltimore MD.
- Shipley, T. F. Atit, K., Weisberg, S. M., and Gagnier, K., M. (2015). Challenges to reasoning and learning about 3D spatial relations: Bridging the gap between lab-research and field-based education. Talk presented at the annual meeting of the Geological Society of America, Baltimore MD.
- Ormand, C.J., Shipley, T. F., Dutrow, B., Goodwin, L., Hickson, T.A., Tikoff, B., Atit, K., Gagnier, K.M., and Resnick, I. Resnick (2015). Teaching Spatial Thinking in Mineralogy, Structural Geology, and Sedimentology & Stratigraphy: Tools and Strategies from Cognitive Science Research: Earth Educators' Rendezvous (Boulder, CO).
- Gagnier, K.M., Atit, K., Ormand, C., & *Shipley, T., F. (2015). Using sketching to support students in developing rich 3D representations from STEM diagrams. Talk presented at the conference on Diagrams as Vehicles of Scientific Reasoning, Pittsburg, PA.
- Gagnier, K.M. (2015). Spatial Thinking in Science: Lessons from an Interdisciplinary Collaboration between Cognitive Scientists and Geoscientists. Talk presented at the Eastern Psychology Society Conference, Philadelphia, PA.
- Ormand, C.J., Shipley, T.F., Dutrow, B., Goodwin, L., Hickson, T., Tikoff, B., Atit, K., Gagnier, K.M., & Resnick, I. (2015). Teaching Spatial Thinking in Undergraduate Geology Courses Using Tools and Strategies from Cognitive Science Research. Talk presented at the annual meeting of the American Geophysical Union, San Francisco, CA.
- Ormand, C.J., Shipley, T.F., Tikoff, B., Dutrow, B., Goodwin, L., Hickson, T., Atit, K., Gagnier, K.M., & Resnick, I. (2014). Transforming Spatial Reasoning Skills in the Upper-Level Undergraduate Geoscience Classroom Through Curricular Materials Informed by Cognitive Science Research. Talk presented at the annual meeting of the American Geophysical Union, San Francisco, CA.
- Gagnier, K.M., Atit, K., Ormand, C., & Shipley, T., F. (2014). Comprehending diagrams: Sketching to support spatial reasoning from diagrams. Poster to be presented at the *International Mind Brain and Education Society*, Fort Worth, TX.
- Gagnier, K.M., Atit, K., Ormand, C., & Shipley, T., F. (2014). Understanding 3D: Generating diagrams from 3D models improves diagrammatic reasoning. Talk presented at the annual meeting of the *American Educational Research Association*, Philadelphia, PA.
- Gagnier, K. M., & Shipley, T.F. (2013). Biases in the perception of 3D forms from 2D cross-Sectional views. Poster presented at the annual meeting of the *Psychonomic Society*, Toronto, CA.
- Ormand, C.J., Shipley, T.F., Tikoff, B., Manduca, C., Dutrow, B., Goodwin, L., Hickson, T., Atit, K., Gagnier, K.M., & Resnick, I. (2013). Improving spatial visualization skills in the undergraduate geoscience classroom through interventions based on cognitive science research. Poster presented at *Geological Society of America* annual conference, Denver, CO.
- Gagnier, K.M., & Shipley, T.F. (2013). Completion in the wild: perception of 3D forms from 2D cross-sections.

Poster presented at the *Cognitive Science Society*, Berlin, Germany.

- Ormand, C.J., Shipley, T.F., Tikoff, B., Manduca, C., Dutrow, B., Goodwin, L., Hickson, T., Atit, K., Gagnier, K.M., & Resnick, I. (2013). Improving spatial reasoning skills in the undergraduate geoscience classroom through interventions based on cognitive science research. Talk presented at *AAPG Hedberg Research Conference*, Reno, NV.
- Gagnier, K.M., Atit, K., Ormand, C., & Shipley, T., F. (2013). The inside story: Using alignment & sketching to help students make inferences about diagrams. Poster presented at *Improving Middle School Science Instruction Using Cognition Science*, Washington DC.
- Gagnier, K.M., Atit, K., Ormand, C., & Shipley, T., F. (2012). Improving penetrative thinking via progressive alignment and directed sketching. Talk presented at the annual meeting of the *Geological Society of America*, Charlotte, NC.
- Gagnier, K.M., Boone, A., & Shipley, T., F. (2012). Looking behavior and penetrative thinking: Examining the relationship between eye movements and performance. Poster presented at the annual meeting of the *Geological Society of America*, Charlotte, NC.
- Gagnier, K. M. (2012). Gesture and sketching: Indicators of knowledge. Talk presented at the *Association of Science and Technology Centers*, Columbus, OH.
- Gagnier, K. M., Atit, K., Shipley, T.F., Ormand, C., Manduca, C., & Tikoff, B. (2012). Improving penetrative thinking skills for geoscience education. Presented at the *Inter-Science of Learning Centers* conference, San Diego, CA.
- Michod K.O. (2010). Remembering unseen space: Evidence that scene representation goes beyond the visual input. Talk presented at *The International Conference on Spatial Cognition*, Portland, OR. August 19, 2010.
- Michod K.O., & Intraub, H. (2009). Don't look! Fixating occluded objects distorts scene memory. Poster presented at the annual meeting of the *Vision Sciences Society*, Naples, FL.
- Michod K.O., Dickinson, C.A., & Intraub, H. (2008). Multiple fixations do not lead to better spatial memory. Poster presented at the annual meeting of the *Vision Sciences Society*, Naples, FL.
- Michod K.O., & Intraub, H. (2007). Conceptual Masking: Is concept the key or does layout play a role? Talk presented at the annual *Object Perception, Attention and Memory* meeting, Long Beach, CA.
- Michod K.O., & Intraub, H. (2007). Conceptual masking: Is it really all about the concept or does layout matter? Poster presented at the annual meeting of the *Vision Sciences Society*, Sarasota, FL.
- Michod K.O., Horowitz, T.S., & Wolfe, J.M. (2005). Picture memory demands attention. Poster presented at the annual meeting of the *Vision Sciences Society*, Sarasota, FL.
- Kunar, M.A., Michod, K.O., & Wolfe, J.M., (2005). When we use the context in contextual cueing: Evidence from multiple target locations. Poster presented at the annual meeting of the *Vision Sciences Society*, Sarasota, FL.
- Michod, K.O., Wolfe, J.M, Horowitz, T.S., & Palmer E.M. (2004). Does guidance take time to develop during a visual search trial? Poster presented at the annual meeting of the *Vision Sciences Society*, Sarasota, FL.

FUNDING

Co-Principal Investigator, *Developing a Spatially-enhanced Elementary Curriculum and Teacher Training Series to Improve Science Achievement*. Funder: Institute of Education Sciences. \$1,398,481, 2017-2021

Core Researcher, *Evaluating the Science of Teaching and Learning Academy*. Funder: E.E. Ford Foundation, (PI: The Center for Transformative Teaching and Learning). \$114,234, 2017-2020.

JHU Co-Project Director, *Science in Action*. Funder: E.E. Ford Foundation, (PI: The Center for Transformative Teaching and Learning). \$20,640, 2017-2018.

JHU Project Director, *All the Way To K*. Funder: W.K. Kellogg Foundation, (PI: Children's Museum of Manhattan), \$25,000, 2017-2018.

Principal Investigator, *Inter-Science of Learning Centers Conference*. Funder: National Science Foundation Grant, (Co-PI: Nora Newcombe), \$114,962, 2013-2015.

Core Researcher, Developing and Testing Materials to Improve Spatial Skills in Upper Division Geoscience Courses. Funder: National Science Foundation Grant, Transforming Undergraduate Education Program. (PI: Carol Ormand), \$174,800, 2011-2014.

University of Delaware Dissertation Fellowship, 2009-2010

University of Delaware, Department of Psychology Research Fellowship, 2005-2006

DISSEMINATION AND OUTREACH PRESENTATIONS AND INVITED TALKS

Science in Action Day, Johns Hopkins University, July 2017

Prince George's Community College, March, 2017

Baltimore City Public Schools, January, 2017

Connelly School of the Holy Child, November, 2016

Severna Park Elementary School Parent Workshop Series, October, 2016

Network for Transforming Educator Preparation at the Council of Chief State School Officers, October, 2016

Smart Baby Outreach Event, Nanyang Technological University, Singapore, September, 2016

Family Literacy Coalition, Baltimore City Health Department, June 2016

Alliance for Excellent Education, May 2016

National Collaborative on Education and Health, May 2016

Family Literacy Coalition, Baltimore City Health Department, May 2016

Ideas Festival, Center for Transformative Teaching and Learning, April 2016

B'More for Health Babies Initiative, Baltimore City Health Department, March 2016

Please Touch Museum, April 2015

Franklin Institute, April 2015

Eastern Psychological Association, March 2015

University of Chicago, February 2014

Northwestern University, February 2014

Philadelphia Science Festival, April 21, 2013

Franklin Institute, March 2013

Temple University, 2010

SERVICE TO COMMUNITY

Advisory Board, *All the Way to K and Beyond*, Children's Museum of Manhattan, New York, NY, 2017-2019

Design Team Advisor, Teaching and Learning Academy, St. Andrew's Episcopal School, Potomac, MD, 2016-2019

Consultant for Baltimore Grade Level Reading Campaign, 2016

Spatial Thinking in STEM Education, Workshop for K-5 Science and Math Teachers, Philadelphia, PA, 2015

Spatial Thinking in Early Childhood Education, Workshop for PK-2 Teachers, Philadelphia, PA, 2015

Spatial Thinking in Science Technology, Engineering and Mathematics, Workshop for K-12 Science and Math Teachers, Philadelphia, PA, 2014

Brainiacs, Workshop for the general public on cognitive science research, Philadelphia PA, 2014.

Why did vision evolve? Presentation for general public on the sense of vision, Philadelphia PA, 2013.

SERVICE TO PROFESSION

- Catalyzing a Paradigm Shift: Research Translation for Advancing Science *and* Society Roundtable Organizer, Society for Research in Child Development (SRCD), 2017
- Communicating Science to Non-scientific Audiences Workshop Chair, the American Association for the Advancement of Science (AAAS), 2017
- Science of Learning Workshop Chair, International Mind, Brain, and Education Society (IMBES) 2014
- Inter-Science of Learning Center (iSLC) Conference Chair, 2013
- Advisory Board, *Creating Communities of Learners for Informal Cognitive Science Education*, NSF Grant, Museum of Science, Boston, MA. Term: November 2011-2016
- SILC Coordinator for the Philadelphia Science Festival 2012, 2013, 2014
- Philadelphia Science Festival Educator Workshop developer, 2014, 2015

Ad-Hoc Reviewer:

Journal of Experimental Psychology: Human, Perception and Performance,
PLOS ONE
National Science Foundation
Quarterly Journal of Experimental Psychology
Cognitive Research: Principles and Implications
Mind, Brain, and Education
Journal of Cognitive Psychology
International Conference on Spatial Cognition, Cognitive Processing,
National Association of Research in Science Teaching
Empirical Studies of the Arts
Mind, Brain, and Education
Geosphere

PROFESSIONAL SOCIETIES

Society for Research in Child Development
American Association for the Advancement of Science (AAAS)
Society for Research in Educational Effectiveness (SREE)
American Psychological Association (APA)
Association for Psychological Science
NSF Spatial Intelligence Learning Center
Cognitive Science Society
American Education Research Association (AERA)
National Association of Research in Science Teaching (NARST)
International Mind Brain and Education Society (IMBES)
Association of Science and Technology Centers (ASTC)
Vision Science Society (VSS)
Geological Society of America (GSA)

TEACHING AND MENTORSHIP

2017 -2018	Intendent Study Student Advisor Johns Hopkins University
2016 -2017	Science for Public Consumption Professional Development Series Johns Hopkins University
2016 Spring	Bryn Mawr Senior Thesis Program Mentor Johns Hopkins University, Baltimore, MD
2015-2016	Distinguished Science of Learning Fellowship Program coordinator Johns Hopkins University, Baltimore, MD
2011 Spring	Visiting Instructor, <i>Cognition</i> University of Delaware, Newark, DE
2010 Fall	Teaching Assistant, <i>Cognition</i> University of Delaware, Newark, DE
2009 Spring	Teaching Assistant, <i>Psychology of Language</i> University of Delaware, Newark, DE
2008 Fall	Teaching Assistant, <i>Cognition</i> University of Delaware, Newark, DE
2003-2004	Teaching Assistant, <i>Introduction to Brain and Cognitive Sciences</i> Massachusetts Institute of Technology, Cambridge, MA
2002-2003	Clinical Psychology Mentor Program

AWARDS AND HONORS

Gift of Play, Research Award, Hasbro International (2/6/2012)
SILC Travel Award, International Conference on Spatial Cognition (8/19/2010)
University Dissertation Fellows Award, University of Delaware (9/1/2009-8/31/2010)
Department of Psychology Competitive Research Assistantship, University of Delaware (9/1/2005 – 8/31/2006)
Dean's List with Distinction - University of Arizona (2001, 2003)
Psi Chi – National Honor Society (2002-2003)

PROFESSIONAL REFERENCES

Dr. Barbara Landau, landau@cogsci.jhu.edu
Dr. Amy Shelton, ashelton@jhu.edu
Dr. Kelly Fisher, kelly.fisher@jhu.edu
Dr. Nora Newcombe, newcombe@temple.edu
Dr. Thomas Shipley, tshipley@temple.edu
Dr. Helene Intraub, intraub@psych.udel.edu
Dr. Kathy Hirsh-Pasek, khirschpa@temple.edu
Dr. Carol Ormand, cormand@carleton.edu
Dr. Jeremy Wolfe, wolfe@search.bwh.harvard.edu