KRISTIN MICHOD GAGNIER

CURRICULUM VITAE

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Contact Information

Science of Learning Institute
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Education

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

Professional Experience

Research 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
Advisors: Nora Newcombe and Thomas F. Shipley

2005-2011
Graduate Research Assistant
Department of Psychology, University of Delaware, Newark, DE
Advisor: Helene Intraub

2003-2005
Research Assistant
Visual Attention Laboratory, Brigham and Women's Hospital and Harvard Medical School, Boston, MA
Advisors: Jeremy Wolfe and Todd Horowitz

2002-2003
Undergraduate Research Assistant
Department of Psychology, University of Arizona, Tucson, AZ
Advisors: Mary Peterson and Robert Rauschenberger

2000-2001
Undergraduate Research Assistant
National Science Foundation Drosophila Stock Center
Department of Insect Science, University of Arizona, Tucson, AZ

Teaching Experience

2011 Spring
Visiting Instructor, *Cognition*
University of Delaware, Newark, DE

2010 Fall	Teaching Assistant, *Cognition* University of Delaware, Newark, DE
2009 Spring	Teaching Assistant, *Psychology of Language* University of Delaware, Newark, DE
2008 Fall	Teaching Assistant, *Cognition* University of Delaware, Newark, DE
2003-2004	Teaching Assistant, *Introduction to Brain and Cognitive Science*s Massachusetts Institute of Technology, Cambridge, MA
2002-2003	Clinical Psychology Mentor Program

Current Research

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:

- **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 will bring research on the science of language and literacy development to informal learning contexts through the development of science-informed exhibits. This project will a) examine caregivers' of children 0-3, knowledge, beliefs, attitudes, and behaviors around language and literacy development, b) use these findings to develop targeted exhibit pieces to meet the learning needs of these caregivers and c) evaluate the impact of the exhibits on caregivers' knowledge, attitudes, and behaviors.
- **Spatially-Enhancing the Science Curriculum for Baltimore County Schools (Partner: Baltimore County Public School District, Curriculum Development).** This project brings research on the science of spatial thinking to the K-12 science classroom. This project will develop and field test a spatially-enhanced version of BCPS's next generation science standard curriculum for 4th and 5th grades.
- **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.

Publications

Gagnier, K.M., Shipley, T., F., Tikoff, B., Ormand, C.J., Atit, K., Resnick, I., & Garnier, B. Training spatial skills in geosciences: A review of tools and tests. Manuscript accepted pending minor revisions to the *Hedberg Proceedings*.

Gagnier, K.M., Atit, K. & Shipley, T.F. (in press). Understanding and Improving Reasoning of Spatial Representations: Implications for Education. In David J. Cowen (Ed.), STEM and GIS in Higher Education. ESRI Press.

Intraub, H., Morelli, F., & **Gagnier**, K. M. (in press). Visual, haptic and bimodal scene perception: Evidence for a unitary representation. *Cognition*.

Atit, K. **Gagnier**, K.M., & Shipley, T.F. (2015). Student gestures aid penetrative thinking. *Journal of Geoscience Education*.

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 Castelhano, 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

Gagnier, K.M., & Shipley, T. F. Completion of Interior Structures: Perceiving 3D shape from 2D views. Manuscript under review.

Gagnier, K. M., Atit, K., Ormand, C. J., & Shipley, T. F. Comprehending diagrams: Sketching to support spatial reasoning. Manuscript under review.

In preparation

Davatzes. A., **Gagnier**. K.M., & Shipley, T. F. Prediction and comparison: A learning cycle for geoscience education. Manuscript in preparation.

Conference Presentations

Ormand, Carol, 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).

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., 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. Talked 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

Principal Investigator on National Science Foundation Grant, Inter-Science of Learning Centers Conference with Nora Newcombe (Co-PI), $114,962, 2013-2014.

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

University of Delaware Dissertation Fellowship, 2009-2010

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

Invited Talks

Eastern Psychological Association, March, 2015
University of Chicago, February 12, 2014
Northwestern University, February 11, 2014
Philadelphia Science Festival, April 21, 2013
Franklin Institute, March 17, 2013
Temple University, November 30th, 2010

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 Membership

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)

Professional Service

Science of Learning Workshop at IMBES Conference Chair, 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: PLOS ONE, National Science Foundation, Quarterly Journal of Experimental Psychology, Journal of Cognitive Psychology, International Conference on Spatial Cognition, Cognitive Processing, National Association of Research in Science Teaching

Professional References

Dr. Barbara Landau, landau@cogsci.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