Camillia F. Matuk

Curriculum vitae

2 Metrotech Center
New York University
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EDUCATION

2010 PhD Learning Sciences, certificates in Cognitive Sciences and Animate Arts
Northwestern University (Evanston, IL)
Advisor: David H. Uttal
Committee members: Bruce Sherin, David Rapp, Robert Hariman

Used clinical interview and experimental methods to investigate novices' interpretations of visual science media, including scientific diagrams, cartoon animations, comic books, and invented representations. Applied theories of semiotics, art, cognition, learning sciences, and technology design to mixed methods analyses of clinical interviews. Designed and developed an interactive diagram to bridge novice and expert interpretations of phylogenetic representations.

2004 MSc Biomedical Communications, specialization in 3D Computer Animation
University of Toronto (Toronto, ON)
Supervisor: Nicholas Woolridge

Created a 3D computer animation to visualize cortical plasticity in the motor cortex when learning new skills. Involved research and consultation with neurosurgeons on the science content. Was advised by experts in biomedical visualization and film design. Development included creating concept art, story reels, animatics and storyboards; modeling, texturing, lighting, and animating in Autodesk Maya; and compositing 3D renders and video-recordings in Adobe After Effects.

2002 OCGC Computer Animation

Sheridan Institute of Technology and Advanced Learning (Oakville, ON)

2002 BSc Biological Sciences
The University of Windsor (Windsor, ON)
Undergraduate Dean's List Student for obtaining an annual GPA and major annual GPA of 11.0/13 or greater at the end of the academic year

2002 ARCT Piano Performance
The Royal Conservatory of Music
Teachers: Tim Brunet, E. Gregory Butler

1999 Advanced-levels, Art, Biology, Chemistry, English, French, Mathematics
King George V School (Hong Kong, China)

EMPLOYMENT

2014-present **Assistant professor**
Educational Communication and Technology
New York University (New York, NY)

2013-2014 **Lecturer**
Graduate School of Education
University of California, Berkeley (Berkeley, CA)

2010-2014 **Postdoctoral Scholar**
Graduate School of Education
University of California, Berkeley (Berkeley, CA)
Supervisor: Marcia C. Linn
Projects:
Visualizing to Integrate Science Understanding for All Learners (VISUAL)
Continuous Learning and Automated Scoring in Science (CLASS)
Collaborate with researchers, content-experts, educators, designers, and technology developers to create middle and high school science curricula and technology-enhanced inquiry scaffolds. Organize workshops for teacher professional development on using technology to support inquiry in the classroom. Advise the integration of technologies into middle and high school science curriculum units. Develop research plans, design and administer interview protocols with teachers and students, and conduct

classroom and user studies to advance project research goals. Design, prototype, and implement new technologies, user interfaces, and interactions to support student inquiry and teachers' decision-making. Perform quantitative and qualitative analyses of assessment, interview, observational, and logged data. Mentor graduate students, summer interns, and pre-service teachers on their independent research projects. Contribute to writing and maintaining large-scale grants, including dissemination of findings.

2007-2010 **Graduate student assistant**, Reference Department, Main Library, Northwestern University (Evanston, IL)

Supported librarians and assisted students, faculty, and the public to navigate and access materials in the university library collection.

2002-present **Medical illustrator**, freelance

1996-2010 **Pianist**, freelance

Accompanied singers, solo instrumentalists, and choirs at rehearsals, performances, auditions, and examinations. Provided background music at reunions of the Kellogg School of Business, Northwestern University.

2004-2006 **Medical Illustrator**, INVIVO Communications, Inc. (Toronto, ON)

Worked with a team of designers, animators, and content specialists to create scientifically accurate illustrations, animations, and interactive materials for pharmaceutical and biotechnology companies. Responsibilities included storyboarding, script writing, voice-over recording, video editing, compositing, illustrating, and interactive design of materials for educational and promotional purposes.

PUBLICATIONS

Refereed journal articles

Linn, M. C., Gerard, L., **Matuk, C.** & McElhaney, K. (accepted). Science Education. *Review of Research in Education 2016 Centennial Volume.*

Matuk, C., McElhaney, K., King Chen, J., Lim-Breitbart, Kirkpatrick, D. & Linn, M. C. (2016). Iteratively refining a science explanation tool through classroom implementation and stakeholder partnerships. *International Journal of Designs for Learning, 7*(2),

93-110.

Matuk, C. (2016). The learning affordances of augmented reality for museum exhibits on human health. *Museums and Social Issues, 11*(1), 73-87. DOI:10.1080/15596893.2016.1142815

Matuk, C., Gerard, L., Lim-Breitbart, J. & Linn, M. C. (2016). Gathering requirements for teacher tools: Strategies for empowering teachers through co-design. *Journal of Science Teacher Education, 27*(1), 79-110. DOI: 10.1007/s10972-016-9459-2

Diamond, J., Jee, B. **Matuk, C.** McQuillan, J. Spiegel, A., & Uttal, D. (2015) Museum monsters and victorious viruses: Improving public understanding of emerging biomedical research. *Curator, 58*(3), 299-311. doi: 10.1111/cura.12115

Gerard, L. **Matuk, C.**, McElhaney, K. Linn, M. C. (2015). Automated, adaptive guidance for K-12 education. *Educational Research Review, 15*, 41-58. doi:10.1016/j.edurev.2015.04.001

Matuk, C., Linn, M. C., & Eylon, B.-S. (2015). Technology to support teachers using evidence from student work to customize technology-enhanced inquiry units. *Instructional Science, 43*(2), 229-257. doi: 10.1007/s11251-014-9338-1

Novick, L., Pickering, J., MacDonald, T., Diamond, J., Ainsworth, S., Aquino, A., Catley, K., Dodick, J., Evans, E. M., **Matuk, C.**, Sacco, J. & Scott, M. (2014). Depicting the Tree of Life in museums: Guiding principles from psychological research. *Evolution: Education and Outreach, 7*(25). doi:10.1186/s12052-014-0025-0

Spiegel, A. N., McQuillan, J., Halpin, P., **Matuk, C.**, & Diamond, J. (2013). Engaging Teenagers with Science Through Comics. *Research in Science Education, 43*(6), 2309-2326. doi: 10.1007/s11165-013-9358-x

Matuk, C.F., & Uttal, D.H. (2010). When form contradicts content: The cognitive and communicative functions of cartoons for teaching evolution. In R.E. Griffin (Ed.), *Selected Readings from the Annual Conference of the International Visual Literacy Association* (pp. 161-166). Chicago: International Visual Literacy Association.

Matuk, C. (2007). Images of evolution. *The Journal of Biocommunication, 33*(3).

Matuk, C. (2006). Seeing the body: The Divergence of ancient Chinese and Western medical illustration. *The Journal of Biocommunication, 32*(1).

Book chapters

Matuk, C. (submitted, July 2015). Agreeing to disagree: Students negotiating visual ambiguity in scientific argumentation. To appear in K. Daniels (Ed.), *Towards a Framework for Representational Competence in Science Education.* Springer.

Matuk, C. Linn, M. C., Gerard, L. (2015). Supporting the WISE design process: Authoring tools that enable insights into technology-enhanced learning. In, R. Sottilare, A. Graesser, X. Hu & H. Holden (Eds.), Design Recommendations for Adaptive Intelligent Tutoring Systems: Authoring Tools (Volume 3). Orlando, FL: U.S. Army Research Laboratory.

Matuk, C. (2014). Argumentation Environments. In R. Gunstone (Ed.) *The Encyclopedia of Science Education*. Springer Dordrecht, Heidelberg, New York, London. DOI: 10.1007/978-94-007-6165-0_71-3 [PDF]

Matuk, C.F. & Uttal, D.H. (2011). Narrative spaces in the representation and understanding of evolution. In K. S. Rosengren, S. K. Brem, E. M. Evans, & G. M. Sinatra, (Eds.), *Evolution challenges: Integrating research and practice in teaching and learning about evolution*. Oxford, UK: Oxford University Press.

Conference proceedings

Matuk, C., Levy-Cohen, R. & Pawar, S. (2016). Questions as prototypes: Facilitating children's discovery and elaboration during game design. In *Proceedings of FabLearn 2016: 6th Annual Conference on Creativity and Making in Education.*

Uk, I., Matuk, C., & Linn, M. C. (2016). Students using graphs to understand the process of cancer treatment. In *Proceedings of the International Conference of the Learning Sciences,* (Vol. 2, pp. 721-728). Singapore: International Society of the Learning Sciences.

Matuk, C. & Linn, M. C. (2015). Examining the real and perceived impacts of a public idea repository on literacy and science inquiry. In CSCL'15: Proceedings of the 11th International Conference for Computer Supported Collaborative Learning, (Vol. 1, pp. 150-157), Gothenburg, Sweden: International Society of the Learning Sciences. **[Award for Best Design Paper]**

Matuk, C. & Linn, M. C. (2014). Exploring a digital tool for exchanging ideas during science

inquiry. In *ICLS'14: Proceedings of the 11th International Conference for the Learning Sciences*, (Vol. 2, pp. 895-902). Boulder: International Society of the Learning Sciences.

Matuk, C., McElhaney, K., Miller, D., King Chen, J., Lim-Breitbart, J., Terashima, H., Kwan, G., & Linn, M.C. (2013). Reflectively prototyping a tool for exchanging ideas. In *CSCL'13: Proceedings of the 10th International Conference on Computer Supported Collaborative Learning* (Vol. 2, pp. 101-104). Madison: International Society of the Learning Sciences. [PDF]

Matuk, C. F., McElhaney, K., King Chen, J., Miller, D., Lim-Breitbart, J., & Linn, M. C. (2012). The Idea Manager: A tool to scaffold students documenting, sorting, and distinguishing ideas in science inquiry. In *ICLS'12: Proceedings of the 10th international conference for the learning sciences*, (Vol 2., pp. 469-470). Sydney, Australia, 2012. International Society of the Learning Sciences.

McElhaney, K., Miller, D., Matuk, C., & Linn, M. C. (2012). Using the Idea Manager to promote coherent understanding of inquiry investigations. In *ICLS'12: Proceedings of the 10th international conference for the learning sciences*, Sydney, Australia, 2012. International Society of the Learning Sciences.

Matuk, C. F., & King Chen, J. (2011). The WISE Idea Manager: A tool to scaffold the collaborative construction of evidence-based explanations from dynamic scientific visualizations. In J. J. Shen & H.-Y. Chang (Eds.), *Symposium 3, Learning Interactions - Collaboration as Scaffolding: Learning Together with Dynamic, Interactive Scientific Visualizations and Computer Models, Proceedings of the 9th International Conference on Computer Supported Collaborative Learning CSCL2011: Connecting computer supported collaborative learning to policy and practice*. Hong Kong: The University of Hong Kong.

Matuk, C. F., Sato, E., & Linn, M. C. (2011). Agreeing to disagree: Challenges with ambiguity in visual evidence. *Proceedings of the 9th International Conference on Computer Supported Collaborative Learning CSCL2011: Connecting computer supported collaborative learning to policy and practice*, (Vol. 2, pp. 994-995). Hong Kong: The University of Hong Kong.

Matuk, C., & Uttal, D. (2010). Inventing a representation of relatedness. *Proceedings of the 9th International Conference of the Learning Sciences: Learning in the Disciplines.* (Vol.

2, pp. 222-223). Chicago: International Society of the Learning Sciences.

Forbus, K., Lovett, A., Lockwood, K., Wetzel, J., Matuk, C., Jee, B., & Usher, J. (2008). CogSketch *Proceedings of the 23rd National Conference on Artificial intelligence* (Vol. 3, pp. 1878-1879). Chicago: AAAI Press.

Matuk, C. (2008). Animated cladograms: Interpreting evolution from diagrams. In G. Stapleton, J. Howse & J. Lee (Eds.), *Proceedings of the 5th international conference on Diagrammatic Representation and Inference* (pp. 395-397). Herrsching, Germany: Springer-Verlag.

Matuk, C. F. (2008). Animating trees of life: How animation influences the perception of evolution. In C. Hölscher (Ed.), *Spatial Cognition 2008: Poster Presentations* (pp. 25-28). Freiburg: Universität Bremen / Universität Freiburg.

Matuk, C. F. (2008). Animated cladograms: The perception and conception of evolution. *Proceedings of the EARLI Special Interest Group Text and Graphics Bi-Annual Conference: Exploiting the Opportunities – Learning with Textual, Graphical and Multimodal Representations* (pp. 100-103). Rotterdam: EARLI.

Matuk, C. F., & Uttal, D. H. (2008). Entertaining evolution: Understanding science from animations. *Proceedings of the 8th International Conference for the Learning Sciences* (Vol. 3, pp. 93-94). Utrecht, the Netherlands: International Society of the Learning Sciences.

Technical Reports

Visualizing to Integrate Science Understanding for All Learners (VISUAL). (2010, 2011, 2012). Annual Report submitted to the National Science Foundation, Award no. 0918743, Co-PIs: Linn, M. & Tinker, R. [Report contributor, Co-director]

Continuous Learning and Automated Scoring in Science (CLASS). (2012). Annual Report submitted to the National Science Foundation, Award no. 1119670, Co-PIs: Linn, M. & Tinker, R. Co-PIs: Linn, M. & Liu, O. $2,546,777. [Report contributor, Co-director]

Other publications

Matuk, C. (2016, August 23). Game design as a microcosm [Web log post]. Retrieved from

http://www.instituteofplay.org/2016/08/game-design-as-a-microcosm/

Gerard, L., **Matuk, C.** & Linn, M. C. (2016). Technology as inquiry teaching partner [editorial]. *Journal of Science Teacher Education.* DOI:10.1007/s10972-016-9457-4

Matuk, C. (2013). The pleasure of not knowing. [Review of the book *The Where, The Why, and The How: 75 Artists Illustrate Wondrous Mysteries of Science*, by J. Volvovski, J. Rothman, & M. Lamothe, *Science*, *339*, 523-524. Retrieved from http://www.sciencemag.org/content/339/6119/523.full

Matuk, C. (2012, October 19). A history of evolution in 230 trees. [Review of the book *Trees of life: A visual history of evolution*, by T. W. Pietsch]. *Science, 338*, 329. Retrieved from http://www.sciencemag.org/content/338/6105/329.full.pdf

Matuk, C. (2011, January 15). On becoming the next new smartphone: The life and times of educational innovations. Retrieved from http://cadrek12.org/resources/blogs/becoming-next-new-smartphone-life-and-times-educational-innovations-0

Matuk, C. (2006). Viewpoint: Mr. Oldenburg extends his invitation: A history of the scholarly journal. *The Journal of Biocommunication,* 32(2).

Matuk, C. (2006). Viewpoint: Master of all trades, doctor of none. *The Journal of Biocommunication,* 31(3).

Theses and graduate projects

Matuk, C. (2010). *Narratives in mind and media: A cognitive semiotic account of novices interpreting visual science media*. PhD Dissertation, Northwestern University, Evanston, IL.

Matuk, C. (2004). *The plastic brain: Understanding cortical reorganization during motor skills acquisition*. MSc 3D Computer Animation, University of Toronto, Canada.

Creative writing

Matuk, C. (2005). Undress me. [poem]. *TRANSverse: Creative Writing, 4*(30).

Matuk, C. (2003). The middle of orange. [poem]. *PRISM International, 41*(3), 40-43.

Matuk, C. (2002). Grocery pie. [poem]. *Comfusion, Summer 2002*.

Media and technologies

Online curricula

Matuk, C. (2012). *Genetics: Simple Inheritance*. [Redesign of a middle school life sciences unit in the Web-based Inquiry Science Environment].

Matuk, C. (2012). *Designing a detergent to clean marine pollution*. [Redesign of a high school chemistry unit in the Web-based Inquiry Science Environment].

Matuk, C. (2011). *What makes a good cancer medicine?: Observing mitosis and cell processes*. [Redesign of a middle school life sciences unit in the Web-based Inquiry Science Environment].

Matuk, C. (2008). How to build a cladogram. [Interactive Flash activities and animations]

Software

Matuk, C. (2011). Image Annotator. [Flash application]

Red Brain Inc. (Producer). (2009). The World of Viruses Interactive Comic Viewer. *The World of Viruses Project*. [Interactive games, graphic stories, and activities for the iPad]

Visual design

Matuk, C. & Breitbart, J. [Logo design]. (2012). *Web-based Inquiry Science Environment (WISE)*.

Matuk, C. [Logo design]. (2012). *Continuous Learning and Automated in Scoring in Science (CLASS).*

Canadian Breast Cancer Foundation. (2007, 2008). Ethnocultural Women and Breast Health Project. [PowerPoint presentation, brochure, magnet, and document designs].

Anastakis, D.J., Chen, R., Davis, K.D., and Mikulis, D. (2005). Cortical Plasticity Following Upper Extremity Injury and Reconstruction. Update on Hand Surgery, 32(4): 617-634.

(http://www.sciencedirect.com/science/article/B75HW-4H0YH0M-K/2/558b76b0f7d08129304411c3cb275978) [2 illustrations]

Corkum, L., (2010). Freshwater fishes of Lake Erie. Windsor: Essex County Field Naturalists' Club. (4 illustrations).

Ngo, K. (2006). Colorimetric evaluation of facial skin and free flap donor sites in various ethnic populations. *Canadian Journal of Otolaryngology.* [2 illustrations]

Greenwald, A. (2005). *The ASCM II clinical skills handbook.* Toronto: The University of Toronto. [6 illustrations]

Molckovsky, A. and Pirzada, K. F. (Eds.), (2004). *Toronto Notes 2004*, (20th ed.). Toronto: Toronto Notes Medical Publishing, Inc. [4 illustrations]

Stamler, L. and Yiu, L. (2004). *Community health nursing: A Canadian perspective* (pp.156, 161, 166, 167, and 169). Toronto: Pearsons Education Canada. [5 illustrations]

Mrosovsky, N. (2003). *Predicting extinction: fundamental flaws in IUCN's Red List system exemplified by the case of sea turtles. Toronto: The University of Toronto Press.* [cover design]

Ngo, K. (2003). Canadian society of otolaryngology 57th Annual Meeting, May 25-28, 2003. (2 illustrations)

Colapinto, M. (2003). *The ASCM I clinical skills handbook.* Toronto: The University of Toronto Press. Soon available on the World Wide Web. [4 illustrations]

Lala, P., and A. Waddell, (Eds.), (2003). *MCCQE 2003 review notes.* (19th ed.). Toronto: Toronto Notes Publishing. Also available as a CD-ROM. [2 illustrations]

Ojha, D. (2002-2006). Illustrations and animations of flow dynamics in vascular disease (atherosclerosis and deep vein thrombosis).

AWARDS and RECOGNITION

2015 **Best Design Paper Award**, for:
Matuk, C. & Linn, M. C. (2015). Examining the real and perceived impacts of a public idea repository on literacy and science inquiry. In

CSCL'15: Proceedings of the 11th International Conference for Computer Supported Collaborative Learning, Gothenburg, Sweden: International Society of the Learning Sciences.

2013 **Early Career Workshop Participant** (2013, June 15-16). *Technologies to scaffold science inquiry teaching and learning.* Computer-supported Collaborative Learning conference (CSCL2013), Madison, WI, USA.

Was one of 10 early-career researchers selected for a series of career-building and networking opportunities in computer-supported collaborative learning.

2013 **AERA Design & Technology SIG Outstanding Research Presentation Award,** for the proposal:

Matuk, C. F. & Linn, M. C. (2013, April 27 - May 1). *Technology Integration to Scaffold and Assess Students' Use of Visual Evidence In Science Inquiry*. Paper presented at the American Educational Research Association Meeting (AERA2013): Education and Poverty: Theory, Research, Policy and Praxis, San Francisco, CA, USA.

2012 **Early Career Workshop Participant** (2012, July 2-3). International Conference of the Learning Sciences (ICLS2012), Hong Kong, China.

Was one of 15 early-career researchers selected for a series of career-building and networking opportunities in the Learning Sciences.

2010-2011 **CADRE Fellowship**, Discovery Research K-12 program, University of California, Berkeley

Was one of 10 early-career researchers selected for a series of career-building and networking opportunities in STEM education research and development. Attended the 2010 DR K-12 PI Meeting held December 1-3 in Washington, D.C. Participated in webinar series on building capacity as a researcher in education. Engaged in special interest and working groups. Contributed content to the CADRE website.

2008-2010 **Social Sciences and Humanities Research Council** (SSHRC) Doctoral Fellowship Award, Northwestern University.

2008-2009 **Darwin Fellowship**, One Book One Northwestern (OBONU) program, Northwestern University

Was nominated to coordinate programming around *The Reluctant Mr.*

Darwin, by David Quammen.

2003 **University of Toronto Fellowship**, University of Toronto**.**

2002-2003 **Ontario Graduate Scholarship** (OGS), Council of Ontario Universities, University of Toronto.

1999-2002 **University of Windsor Entrance Scholarship**, University of Windsor**.**

GRANTS and FUNDING

Under review **2016 EdLab Art Commission**, Columbia University. *Navigating the Cognitive Map Advancing neuroscience, education, and outreach using real-time visual interpretations of neural computations within a virtual reality learning experience*. Co-PIs: Matuk, C., Sas, A., Vikbladh, O.

2016 [Not funded] **Steinhardt Community Collaborative Award**, New York University, *Building co-design communities around learning, teaching, and play*. PI: Camillia Matuk; Co-Investigators: Bouwmeester, M., Milne, C., Plass, J. & Rufo-Tepper, R.

2015-2016 **University Research Challenge Fund**, New York University, Navigating the Cognitive Map: Advancing neuroscience, education, and outreach using real-time visualizations and neuroimaging within a mobile location-based learning experience [Category 1]. PI: Camillia Matuk; Co-Investigators: Oliver Vikbladh, André Fenton, Ken Perlin, Jan Plass. [PI]

2015-2019 **Cyberlearning: Transforming Education**, National Science Foundation Award, *Project Learning with Automated Networked Supports (PLANS)*. PI: Linn, M. [Grant contributor]

2014-2018 **Division of Research on Learning in Formal and Informal Settings**, National Science Foundation Award, *Graphing Research on Inquiry with Data in Science (GRIDS)*. PI: Linn, M. [Grant contributor]

Not funded **MOOCLab project**, Berkeley Resource Center for Online Education, University of California, Berkeley, *Innovative Designs for Educational Applications and Systems* (IDEAS). PI: Linn, M. [Co-PI]

Not funded **Division of Research on Learning in Formal and Informal Settings**, *Deepening Engineering and Science Inquiry with Guidance and Networking* (DESIGN). PI: Linn, M. [Grant contributor]

2011-2016 **Division of Research on Learning in Formal and Informal Settings**, National Science Foundation Award no. 1119670, *Continuous Learning and Automated Scoring in Science* (CLASS), Co-PIs: Linn, M. & Liu, O. USD$2,546,777. [Grant contributor, Subcontractor]

2012-2014 **National Leadership Grant**, Institute of Museum and Library Services. *The Tree Room: Teaching and learning about evolutionary relationships*. PI: Caldwell, R., Manager: Scotchmoor, J. USD$401,833. [Grant contributor, Key personnel, Advisor]

2009-2014 **Division of Research on Learning in Formal and Informal Settings**, National Science Foundation Award no. 0918743, *Visualizing to Integrate Science Understanding for All Learners* (VISUAL), Co-PIs: Linn, M. & Tinker, R. USD$2,836,718. [Co-director]

2008-2009 **Cognitive Science Graduate Fellowship for Interdisciplinary Research Projects,** Northwestern University (Evanston, IL). *Multimedia trees of life: The cognitively-informed design of a learning environment for teaching evolution.* [Student project leader]

Supporting the development of an interactive diagram to teach phylogenetics in evolutionary biology.

2004 **Vesalius Trust Scholarship**, University of Toronto (Toronto, ON). *The plastic brain: Understanding cortical reorganization during motor skills acquisition.* [Student project leader]

Supporting research and education in visual communications for the medical and life sciences.

2003 **Canadian Society of Plastic Surgeons Scholarship**, University of Toronto (Canada). *The plastic brain: Understanding cortical reorganization during motor skills acquisition*. [Student project leader]

Supporting collaborative research in Biomedical Communications.

INVITED PRESENTATIONS

2015 Matuk, C. (2015, July 8). How teachers customize technology-enhanced science inquiry. Google for Education Brown Bag series. Google, New York, NY.

2014 Matuk, C., Linn, M., & Eylon, B. (2014, June 23-27). Technology to support teachers using evidence from student work to customize technology-enhanced inquiry units. Invited poster session presented at the 11th International Conference on the Learning Sciences, ICLS2014, Boulder, CO.

2013 Designing curriculum-integrated technologies that scaffold and assess science inquiry. Invited talk at the Berkeley Institute of Design (BiD), University of California, Berkeley, CA, USA [December 17].

2013 Designing a tool to support the collaborative exchange of ideas during science inquiry. Guest talk organized by the Education Research Leadership Chair at the Faculty of Education, University of Windsor, ON. [April 16].

2012 The Web-based Inquiry Science Environment: Design principles for classroom technologies. Guest lecture for the undergraduate-level course, *Building Your Next Generation Education Technologies*. Instructors: Dawn Song & Kristin Stephens, University of California, Berkeley, CA. [September 19].

2012 WISE 4 Forum. Online discussion facilitation for the masters-level course, *Technology in the Mathematics and Science Classroom*, Instructor: Samia Khan, University of British Columbia, Vancouver, BC. [February 15-17].

2011 The WISE Idea Manager. Invited presentation for the doctoral course *Innovative Technology in Mathematics and Science Education*, Instructor: Ji Shen, Department of Mathematics & Science Education, University of Georgia, Athens, GA. [September 7].

2009 Interpretation, invention, and interaction: Learning to reason with the Tree of Life. Invited presentation at the Graduate School of Education, University of California, Berkeley, Berkeley, CA. [December 14].

2009 Interpretation, invention, and interaction: Ideas to scaffold learning about the

Tree of Life. Invited presentation at the Graphic Visualization meeting, Director: Chia Shen, Harvard University, Cambridge, MA. [November 12].

CONFERENCE ACTIVITY/PARTICIPATION

Papers presented

2015 Yiu, L. & Matuk, C. (2015, June 22-24). Designing Community Health Nursing Interventions with an Online Digital Annotation Tool: An Innovative Educational Application. The 10th National Community Health Nurses of Canada (CHNC) Conference, Winnipeg, MB, Canada.

2015 Matuk, C. Gerard, L., Lim-Breitbart, J. & Linn, M. C. (2015, April 16-20). *Gathering Design Requirements During Participatory Design: Strategies for Teachers Designing Teacher Tools*. Paper presented at the American Educational Research Association Meeting, Chicago, IL, USA.

2014 Matuk, C. & Linn, M. C. (2014, June 23-27). Exploring a digital tool for exchanging ideas during science inquiry. Paper presented at the 11th International Conference for the Learning Sciences (ICLS2014), Boulder, CO, USA.

2014 Matuk, C. & McElhaney, K. (2014, April 3-7). *Investigating a Digital Annotation Tool for Distinguishing Visual Evidence in Science Inquiry*. Paper presented at the American Educational Research Association Meeting, Philadelphia, PA, USA.

2013 Matuk, C., McElhaney, K., Miller, D., King Chen, J., Lim-Breitbart, J., Terashima, H., Kwan, G., & Linn, M.C. (2013, June 15-19). *Reflectively prototyping a tool for exchanging ideas*. Paper presented at the 10th International Conference on Computer Supported Collaborative Learning (CSCL2013), Madison, WI, USA.

2013 Matuk, C. F. & Linn, M. C. (2013, April 27 - May 1). *Technology Integration to Scaffold and Assess Students' Use of Visual Evidence In Science Inquiry*. Paper presented at the American Educational Research

Association Meeting (AERA2013): Education and Poverty: Theory, Research, Policy and Praxis, San Francisco, CA, USA.

2012 McElhaney, K., Miller, D., Matuk, C., & Linn, M. C. (2012, July 2-6). Using the Idea Manager to promote coherent understanding of inquiry investigations. Paper presented at *The 10th International Conference for the Learning Sciences*, Sydney, Australia, 2012. International Society of the Learning Sciences.

2011 Matuk, C. F., Sato, E., & Linn, M. C. (2011, July 4-8). *Agreeing to disagree: Challenges with ambiguity in visual evidence*. Paper presented at the 9th International Conference on Computer Supported Collaborative Learning CSCL2011: Connecting computer supported collaborative learning to policy and practice, July 4-8, Hong Kong, China.

2011 Matuk, C. (2011, June 2-4). *Persuading with visual evidence in scientific argumentation: Two middle school students' dispute over global temperature change*. Paper presented at the 41st Annual Meeting of the Jean Piaget Society, Berkeley, CA.

2011 Matuk, C., McElhaney, K., & Breitbart, J. (2011, March 8-9). *Animating ideas with the Flipbook Animator.* Paper presented at the Cyberlearning Tools for STEM Education Conference, Berkeley, CA.

2009 Matuk, C.F. & Uttal, D.H. (2009, October 6-9). When form contradicts content: The cognitive and communicative functions of cartoons for teaching evolution. Paper presented at the International Visual Literacy Association. Chicago, IL.

2009 Matuk, C.F., Diamond, J., & Uttal, D.H. (2009, October 6-9). Heroes, villains and viruses: How graphic narratives teach science. Paper presented at the International Visual Literacy Association (IVLA2009). Chicago, IL.

2009 Matuk, C. F., & Uttal, D. H. (2009, August 16-18). *Interpretation, invention, and interaction: How students (mis)understand cladograms.* Paper presented at the Understanding the Tree of Life Harvard Conference, Cambridge, MA.

2009 Matuk, C. F., & Uttal, D. H. (2009, May 4). *Animating narratives of evolution: A case of diagrammatic interpretation with cladograms*. Paper presented at the Conference on Research and Training in Spatial Intelligence, Evanston, IL.

2009 Matuk, C. F., & Uttal, D. H. (2009, April 13-17). *Countering diagrammatic narratives: The effects of animation on the interpretation of evolution.* Paper presented at the American Educational Research Association Meeting, San Diego, CA.

2009 Matuk, C. F., & Uttal, D. H. (2009, February 5-7). *Countering narratives of evolution: How animation influences the spatial temporal metaphors interpreted from cladograms*. Paper presented at the International Spatial Learning Center conference, Seattle, WA.

2008 Matuk, C. F. (2008, August 27-29). *Animated cladograms: The perception and conception of evolution.* Paper presented at the EARLI Special Interest Group Text and Graphics Bi-Annual Conference: Exploiting the Opportunities – Learning with Textual, Graphical and Multimodal Representations, Tilburg, the Netherlands.

Workshops and symposia

2016 Matuk, C., Cocco, F., Linn, M. C. (2016, June 20-24). A teacher-centered approach to designing a real-time display of classroom activity. In Dillenbourg, P. (discussant), C. Matuk & Tissenbaum, M. (co-organizers). *Real-Time Visualization of Student Activities to Support Classroom Orchestration.* Symposium conducted at the International Conference for the Learning Sciences, Singapore.

2015 Matuk, C., Linn, M. C. & Eylon, B. S. (2015, April 16-20). Technology to support teachers using evidence from student work to customize technology-enhanced inquiry units. In Y. Kali, S. McKenney, & O. Sagy, *Teachers as designers of technology enhanced learning*. Interactive poster session conducted at the Annual Meeting of the American Educational Research Association. Chicago, IL. [participant][poster]

2011 Matuk, C., & King Chen, J. (2011, March 8-9). *WISE Ideas: A technology-enhanced curriculum to scaffold students' generating data, managing evidence, and reasoning about the seasons.* Teacher design focus group presented at the Cyberlearning Tools for STEM Education Conference. Berkeley, CA. [co-organizer]

2010 Matuk, C., & Uttal, D. (2010, June 29-July 2). *Inventing a representation of relatedness, In K. Rosengren (Discussant), Symposium: Learning to understand the Tree of Life.* Paper presented at the 9th International Conference of the Learning Sciences: Learning in the Disciplines, Chicago. [co-organizer]

2009 Matuk, C. F., & Uttal, D. H. (2009, October 16-17). *Re-telling the tree: How viewers spatialize folk theories of evolution. In K. S. Rosengren (Discussant), Symposium: Creationism is not the (only) issue: Developmental constraints on an understanding of evolution.* Paper presented at the Biennial Meeting of the Cognitive Development Society, San Antonio, TX. [presenter]

2008 Matuk, C. F. (2008, September 13-14). *Mapping Narrative Spaces: The perception and conception of evolution*. Presentation at the NSF International Workshop on Spatial Cognition, Freiburg, Germany. [presenter]

2008 Matuk, C. F. (2008, May 23-26). *Persuasive displays: Science, art, and power in natural history exhibits. In R. Hariman (Respondent), Symposium: Displays of Science, Knowledge, and Argument within the Museum Context.* Paper presented at the Conference of the Rhetoric Society of America, Seattle, WA. [co-organizer]

Posters presented

2016 Matuk, C., Gerard, L., Lim-Breitbart, J., & Linn, M. C. (2016, April 8-12). Teachers' reflections on the uses of real-time data in their instruction. Poster presented at the American Educational Research Association Meeting, Washington, DC, USA.

2015 Wichmann, A., Matuk, C., Sato, E., Gerard, L., Madhok, J., & Linn, M. C. (2015, August 25-29). Critiquing Peer Ideas during

Technology-Enhanced Science Inquiry Learning. Poster presented at the *16th Biennial Conference of the European Association for Research on Learning and Instruction* (EARLI), Limassol, Cyprus.

2014 Wichmann, A., Matuk, C., Sato, E., Gerard, L., Madhok, J., & Linn, M. C. (2014, August 18-20). Critiquing Peer-Generated Ideas during Inquiry Learning. Poster presented at *The Biennial Meeting of the EARLI SIG20 Computer Supported Inquiry Learning*, Malmö, Sweden.

2012 Matuk, C. F., McElhaney, K., King Chen, J., Miller, D., Lim-Breitbart, J., & Linn, M. C. (2012, July 2-6). The Idea Manager: A tool to scaffold students documenting, sorting, and distinguishing ideas in science inquiry. Poster presented at *The 10th International Conference for the Learning Sciences*, Sydney, Australia, 2012. International Society of the Learning Sciences.

2011 Matuk, C. F., & King Chen, J. (2011, July 4-8). *The WISE Idea Manager: A tool to scaffold the collaborative construction of evidence-based explanations from dynamic scientific visualizations, Symposium 3, Learning Interactions - Collaboration as Scaffolding: Learning Together with Dynamic, Interactive Scientific Visualizations and Computer Models*. Poster presented at the 9th International Conference on Computer Supported Collaborative Learning CSCL2011: Connecting computer supported collaborative learning to policy and practice, Hong Kong.

2011 Matuk, C. F., Sato, E., & Linn, M. C. (2011, July 4-8). *Agreeing to disagree: Challenges with ambiguity in visual evidence*. Poster presented at the 9th International Conference on Computer Supported Collaborative Learning CSCL2011: Connecting computer supported collaborative learning to policy and practice, July 4-8, Hong Kong, China.

2011 Matuk, C., Cottingham, I., Farrell, K., Angeletti, A., & Diamond, J. (2011, March 8-9). *The World of Viruses interactive comic viewer*. Hands-on demonstration presented at the Cyberlearning Tools for STEM Education Conference. Berkeley, CA.

2010 Matuk, C., McElhaney, K., & Linn, M. (2010, December 1-3). *Using visualizations to link atomic views of matter to students' everyday ideas about science. In K. Perkins, Interactive poster session: Interactive visualizations, simulations, and games for science and math learning:*

Comparing goals, affordances, and challenges across approaches. Poster presented at the Discovery Research K-12 PI Meeting, Washington, DC.

2010 Linn, M., Tinker, R., Chiu, J., King Chen, J., Matuk, C., McElhaney, K., Miller, D., Swanson, H., & Zhang, H. (2010, December 1-3). *Visualizing to Integrate Science Understanding for All Learners (VISUAL).* Poster presented at the Discovery Research K-12 PI Meeting, Washington, DC.

2010 Matuk, C. F., & Uttal, D. H. (2010, April 30-May 4). *All have tails, but only two have horns: Inventing an intuitive representation of relatedness.* Poster presented at the American Educational Research Association Meeting, Denver, CO.

2010 Matuk, C. F., & Uttal, D. H. (2010, April 30-May 4). *The rhetorical functions of visual devices: Understanding evolution from museum animations.* Poster presented at the American Educational Research Association Meeting, Denver, CO.

2009 Donovan, S., Matuk, C.F., MacDonald, T., Diamond, J., Uttal, D., Dodick, J., Evans, E.M., Caldwell, R., Scotchmoor, J., Palmquist, S. (2009, November 11-14). *Understanding the tree of life*. Poster presented at the National Association of Biology Teachers (NABT) Professional Development Conference, Denver, CO.

2009 Matuk, C.F., & Uttal, D.H. (2009, August 6-9). *Collages of meaning: Creating understanding of evolution from animation*. Poster presented at the American Psychological Association (APA) Convention. Toronto, ON.

2009 Matuk, C. F., & Uttal, D. H. (2009, August 6-9). *Collages of meaning: Creating understanding of evolution from animation*. Paper presented at the American Psychological Association (APA) Convention, Toronto, ON.

2009 Matuk, C. F. (2009, June 10-12). *Reconstructing evolutionary histories: A game about the tree of life.* Poster presented at the Games, Learning and Society Conference 5.0, Madison, WI.

2008 Matuk, C. (2008, September 19-21). *Animated cladograms: Interpreting evolution from diagrams.* Poster presented at the 5th International Conference on Diagrammatic Representation and Inference, Herrsching,

Germany.

2008 Matuk, C. F. (2008, September 15-19). *Animating trees of life: How animation influences the perception of evolution*. Poster presented at the International Conference on Spatial Cognition, Freiburg, Germany.

2008 Matuk, C. F., & Uttal, D. H. (2008, June 23-28). *Entertaining evolution: Understanding science from animations.* Poster presented at the 8th International Conference for the Learning Sciences, Utrecht, the Netherlands.

TEACHING EXPERIENCE

Graduate

Spring + Fall 2015 *Foundations of Cognitive Science (EDCT-GE 2174)*
Educational Communication and Technology, New York University

Fall 2015 *Masters Thesis (EDCT-GE 2095)*
Educational Communication and Technology, New York University

2014 *Technology in the Secondary English Classroom*
Multicultural Urban Secondary English (MUSE)
Graduate School of Education, University of California, Berkeley
Instructor

2013 *Scientific Thinking and Learning*
Masters and Credential in Science and Mathematics Education (MACSME)
Graduate School of Education, University of California, Berkeley
Instructor

2013-2014 *Science and Mathematics Education Colloquium Series*
Graduate School of Education, University of California, Berkeley
Instructor

2012 *Science and Mathematics Education: Designing Educational Technologies*
Graduate School of Education, University of California, Berkeley

Co-Instructor with Linn, M. and Clancy, M.

Helped design a review of emerging educational technologies. Led themed classroom discussions and guided graduate students to design prototypes of innovative technologies for science and mathematics education.

Undergraduate

2007, 2009 *Learning and Understanding: A Cognitive Science Approach*
School of Education and Social Policy, Northwestern University
Teaching Assistant for Sherin, B. [2009], Uttal, D. [2007]

Mentored undergraduate student teams on clinical interview methods for researching expert/novice cognition. Advised on the analysis of interview data and guided students along quarter-long project milestones.

Other

1999-2009 **Piano teacher, via The Royal Conservatory of Music**
Instructor of piano performance, music theory, and music history

Mentored individual students (aged 4-adult) in musical practice, discipline, and the development of piano performance skills. Taught technique, musicality, theory, and history following the Royal Conservatory of Music program and by customizing lesson plans. Led master classes and organized studio recitals. Gave lessons from home, and from The Artist's Journey, Inc., and Labonte's School of Music (both in Windsor, ON, Canada).

RESEARCH EXPERIENCE

2007-present Research collaborator and interactive design consultant
The World of Viruses project, PI: Diamond, J.
Northwestern University, University of California, Berkeley.

Designed, conducted, and performed qualitative analyses of clinical interviews with teenagers. Helped lead a team of programmers and artists, and developed storyboards and Flash prototypes for a suite of

interactive iPad stories and activities. Presented findings at conferences. Currently collaborating on a journal article.

2006-2010 Graduate student researcher
Spatial Intelligence Learning Center (SILC)
PI: Newcombe, N., Co-PIs: Gentner, D., Goldin-Meadow, S., Hedges, L., Levine, S., Northwestern University and University of California, Berkeley.
Contributed research to advance the project goals of a multi-site, NSF-funded Science of Learning Center. Communicated findings at advisory board meetings, site visits, and an NSF-funded conference.

2007-2010 Core project team member
Understanding the Tree of Life (UToL) project
PI: MacDonald, T., Co-PIs: Uttal, D., Diamond, J., Northwestern University.
Contributed findings from clinical interviews and experimental studies on the impacts of visual and interactive design features on students' understanding of phylogenetic trees. Designed and developed an interactive pedagogical diagram informed by research findings. Contributed to NSF annual reports and presented to an audience of museum professionals at the UToL conference.

2002 Laboratory assistant
Corkum Lab
Director: Corkum, L., Department of Biological Sciences, University of Windsor.
Collected and identified mayflies from Colchester Harbour, Lake Erie, to monitor mass emergence of adults. Identified and labeled specimens. Prepared data for analysis.

SERVICE TO PROFESSION

2001-present **Ad hoc reviewer** for the American Educational Research Association (SIG-Technology, Instruction, Cognition & Learning), CBE-Life Sciences Education, The Cognitive Science Society, Computers & Education, FabLearn 2014, International Electronic Journal of Elementary Education, International Journal of Computer Supported Collaborative Learning, International Journal of Social Media and Interactive Learning

Environments, Merrill-Palmer Quarterly, Science Books and Films (SB&F), Science Education, EARLI SIG 20 Computer-Supported Inquiry Learning 2014.

2013 **Invited participant** (April 29, 2013), Players & Professors: Exploring the Future of Digital Media & Learning, The Exploratorium, San Francisco, CA.

Represented the Web-based Inquiry Science Environment (WISE) and SURGE at a convention of leading researchers in education and key innovators and investors from technology and social media sectors. Participated in interactive brainstorming activities and demo showcases focused on bringing great ideas to scale and into the commercial market, better understanding digital literacies and how to best measure the effects of digital products on learning.

2013-2014 **Co-coordinator of local arrangements**, Rethinking Language and Communicative Development. 44th Annual Meeting of the Jean Piaget Society, San Francisco, CA.

2011 **Data Visualization Workshop participant** (June 11, 2011)
The Exploratorium New Media Studio**,** San Francisco, CA.

Was one of 16 participants invited to contribute to a Data Visualization Workshop. Collaborated with data visualization experts and museum exhibit designers to brainstorm and prototype novel exhibits to engage visitors in inquiry surrounding ocean predators migration.

2010, 2011, 2012 **Co-organizer and session facilitator**, Annual teacher professional development workshop, Technology Enhanced Learning in Science (TELS) center, University of California, Berkeley.

Co-led the design, planning, coordination, and facilitation of sessions for a yearly 3-day workshop offered as teacher professional development. Communicated research findings, designed and led group activities focused on building and integrating technology-enhanced science inquiry curriculum materials into middle and high school science classrooms. Conducted focus groups with teachers, researchers, and developers, on building collaborative communities of practice.

2006-2011 **Recent graduate member**
Accreditation Review Committee for the Medical Illustrator (ARC-MI),

Northwestern University and University of California, Berkeley.

2008-2009 **Student representative**, Joint Computer Science & Learning Sciences faculty search committee, Northwestern University.

2008-2009 **Art contest and exhibit organizer,** One Book One Northwestern program, Northwestern University.

Conceived of and planned a campus-wide art competition and exhibit entitled *The Art of Evolution* to celebrate Darwin's birthday.

2008 **Leader and facilitator**, Workshop on digital image manipulation for developing an Engineering Design and Communication portfolio
Segal Design Institute, Northwestern University.

Designed and led a 1.5-hour workshop for undergraduate students in *Engineering Design and Communications.* Introduced techniques for preparing portfolio pieces using the open-source software, GIMP.

2008, Fall **Co-organizer,** Brown Bag research presentations, Learning Sciences, Northwestern University.

Coordinated weekly speaker series for students and faculty of the department of the Learning Sciences. Communicated with internal and external speakers.

2007, Fall **Co-organizer,** First year student orientation, Learning Sciences, Northwestern University.

Planned and facilitated orientation activities and informational sessions for incoming graduate students. Coordinated the participation of existing faculty and graduate students.

COMMUNITY INVOLVEMENT/OUTREACH

2007-2008 **Organizer of student volunteers**
Hilda's Place Meals for the Homeless program (Evanston IL)

Coordinated student volunteers within the Learning Sciences department to participate in monthly meal service to the homeless. Planned and participated in shopping, cooking, plating, serving, and clean up.

RELATED PROFESSIONAL SKILLS

Data analysis software
Atlas.ti, Microsoft Excel, JMP, R, SPSS, PSPP, Weft QDA

Online curriculum development platforms
Web-integrated Inquiry Science Environment (WISE)

Graphics software
Adobe Creative Suite 5 (After Effects, Flash, Illustrator, InDesign, Photoshop), Autodesk Maya, Studio 3D Max

Programming languages
Working knowledge: Actionscript 3, HTML
Learning: ds.js, R

LANGUAGES

Native: English

Fluent: French

Learning: Arabic, Cantonese, Mandarin, Spanish

PROFESSIONAL MEMBERSHIPS/AFFILIATIONS

2008-present International Society for the Learning Sciences (ISLS)

2006-present American Educational Research Association (AERA)

2009-2010 International Visual Literacy Association (IVLA)

2009-2010 Cognitive Development Society (CDS)

2004-2007 Association of Medical Illustrators (AMI)

2008-2009 Rhetoric Society of America (RSA)

REFERENCES

Available upon request