K E V I N C R O W L E Y

Learning Research & Development Center
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A C A D E M I C P O S I T I O N S

At University of Pittsburgh since 1997. Currently:

Professor and Chair, Learning Sciences and Policy, School of Education

Senior Scientist, Learning Research and Development Center

Director, University of Pittsburgh Center for Learning in Out-of-School Environments (UPCLOSE)

Training

Postdoctoral fellow, Psychology, University of California, Santa Cruz, 1994-1997

Ph.D., Psychology, Carnegie Mellon University, 1994

M.S., Psychology, Carnegie Mellon University, 1991

B.A., Psychology and Education, Swarthmore College, 1989

A W A R D S + F E L L O W S H I P S + V I S I T I N G

Adjunct Professor of Education, University of Oslo, Norway. 2016-2018

Visiting Professor of Education, University of Tokyo, Japan. Fall 2013.

William T. Grant Foundation Distinguished Fellow at the Carnegie Museum of Natural History. 2010-2013.

Visiting Professor, University of Tokyo, June 2006

Director of Research and Evaluation, Children's Museum of Pittsburgh, 2003-2006.

Roy L. Shafer Leading Edge Award, Association of Science and Technology Centers, in recognition of the UPCLOSE partnership with the Children's Museum of Pittsburgh, 2005.

MetLife Promising Practice award from the Association of Children's Museums, in recognition of the UPCLOSE partnership with the Children's Museum of Pittsburgh, 2004.

Visiting Professor, Nagoya University School of Education, Summer 2003

Japan Society for the Promotion of Science Visiting Fellow, Nagoya University

SELECTED SERVICE

Center for the Advancement of Informal Science Education (CAISE). Since 2007 I have been co-PI for a National Science Foundation-funded center that works to strengthen and connect the informal science education community by catalyzing conversation and collaboration across the entire field with a focus on improving practice, documenting evidence of impact, and communicating the contributions of informal science education.

www.informalscience.org. I founded, and for 10 years directed, the primary international location for sharing research and evaluation focused on informal learning. Now run through CAISE, the site hosts a repository of informal learning citations, a collection of white papers and policy documents, a database of informal science projects around the world, social networking for the field as well as archives of evaluation reports from National Science Foundation informal science education projects, and more.

National Academy of Sciences. Member of the National Academy of Sciences' Study Panel on Learning Science, Kindergarten through Eight Grade, 2004-2005. Invited speaker at National Academy of Sciences panels focusing on informal learning in 2015 (How People Learning II), 2014 (Out-of-School Time Learning), and 2005 (Learning Science in Informal Environments).

Member of the advisory board for Building a Collaborative Learning Research Agenda for Natural History Museums, a project of Kings College London and the Natural History Museum, London, United Kingdom. 2013-2016.

Member of a delegation from the Association of Science and Technology Centers and the National Science Foundation to Sri Lanka for meetings to plan the National Science Center of Sri Lanka, Colombo, Sri Lanka, January, 2014.

EDITOR

Visitor Studies, co-editor, since 2018.

Journal of the Learning Sciences, Founding editor of the out of school learning strand 2009 to 2012. Editorial board, 2015-present.

American Educational Research Journal: Section on Teaching Learning and Human Development, Associate Editor, 2001-2004

Guest editor with T. Okada, special issue on collaborative cognition, Cognitive Studies: The Bulletin of the Japanese Cognitive Science Society, 3 (4), 1996. (Issue awarded an Editorial Award by the Japanese Cognitive Science Society)

CONFERENCE ORGANIZER

Co-organizer, The Tokyo Symposium for Learning through Art, Tokyo, 2016

Co-organizer, Advancing Informal Science Learning NSF PI meetings, Washington DC, 2008; 2010; 2012; 2014; 2016; 2019

Advisory Board, International Conference of the Learning Sciences, Boulder, CO, 2014

Advisory Committee, The Learning Value of Children's Museums*:* Research Agenda Symposium, Washington, DC, 2013

Co-organizer, Activating Inspiration and Creativity: The Tokyo International Symposium for Informal Learning in Art, Science, and Technology. University of Tokyo, Japan. Nov, 2013.

Co-Chair, Practice and Research Convening for Informal STEM Education, Washington, DC, 2013

Executive Committee, 21st Century Learning in Natural History Museums, Smithsonian Museum of Natural History, Washington DC, 2012

Co-Chair, Visitor Studies Association annual meeting, 2006

Co-Chair, Creativity and Cognition, Modern Cermaic Art, Conference and Exhibition, Gifu, Japan. This conference led to mention as a collaborator on a G-Mark Good Design Award, Special Prize of the Chairman Jury awarded to NHK and the Museum of Modern Ceramic Art, 2003.

Program Committee, Fifth International Conference of the Learning Sciences, 2002

Co-Chair, Division C4b (out-of-school learning environments), Annual Meeting of the American Educational Research Association, April 2001

Co-Chair, Designing for Science, an invitational conference focused on the psychology of scientific thinking in everyday, classroom, and professional contexts. Learning Research & Development Center, University of Pittsburgh, April 1998

P E E R R E V I E W E R

American Educational Research Association (conference)

American Educational Research Association, Division K, Outstanding Dissertation Award Committee

American Educational Research Journal

British Journal of Educational Psychology

Child Development

Child Development Perspectives

Cognition & Instruction

Cognitive Psychology

Cognitive Science

Computer Human Interaction (conference)

Curator: The Museum Journal

Department of Education Institute for Education Sciences (grant panels)

Developmental Psychology

Discourse Processes

Equity & Excellence in Education

Human Development

Institute for Museum and Library Services (grant panels)

International Conference for the Learning Sciences

Journal of Cognition and Development

Journal of Creativity Research

Journal of Educational Psychology

Journal of Experimental Child Psychology

Journal of the Learning Sciences

Journal of Research on Science Teaching

Journal of Science Education and Technology

Merrill Palmer Quarterly

National Science Foundation (grant panels and site visits)

PLOS ONE

Science

Science Education

Social Development

Spencer Foundation (grants)

Visitor Studies Conference

Visitor Studies Journal

W.T. Grant Foundation (grants)

et al.

K E Y N O T E S

Facilitation group convening, Ecsite: The European network of science centres and museums Porto, Portugal, June 2017.

Facilitation group convening, Ecsite: The European network of science centres and museums Graz, Austria, June 2016.

Informal Science Education Association of Texas, 2016.

Adopting a Research Culture Conference at the Natural History Museum, London, March, 2014.

The Transformative Museum Conference, Roskilde University, Denmark. 2012.

Learning in Museums – the Role of Media Conference, Tübingen, Germany, November 2007.

Academies of Youth Scientists

I N V I T E D A D D R E S S E S

American Museum of Natural History

American Public Gardens Association

Australian Museum, Sydney, Australia

Association of Children's Museums

Association of Science & Technology Centers

Children's Museum of Pittsburgh

Carnegie Museum of Natural History

Conner Prairie Interactive History Park

ECSITE

ExperienceSTEM, University of Colorado

Indiana University

Jackson Hole Symposium
Nagoya University, Japan
National Academy of Sciences
Natural History Museum London, UK
Naturalis, Netherlands
New York Hall of Science
Northwestern University
Science Museum of Minnesota
Science Museum London, UK
Smithsonian Institute
Texas A&M University
University of Oslo, Norway
University of Tokyo, Japan
University of Washington, Seattle
University of Western England, UK
Et al.

ADVISORY BOARDS + CONSULTING

Astronomical Society of the Pacific
Association of Children's Museums
Bay Area Discovery Museum
Brown University
Carnegie Libraries of Pittsburgh
Carnegie Museum of Natural History
Chicago Children's Museum
Children's Discovery Museum of San Jose
Children's Museum of Pittsburgh
Children's Museum Research Center, Beijing, China
Conner Prairie Interactive History Park
Digital Promise
Family Communications, Inc.
Franklin Institute
Institute for Learning Innovation
Lawrence Hall of Science, University of California, Berkeley
Longitudinal Study of American Youth
Montshire Museum of Science

NASA

Natural History Museum London

New York Hall of Science

Oregon Museum of Science and Industry

Oregon State University

Scholastic, Inc.

Science Museum of Minnesota

Smithsonian Institute

SRI International

Stanford University

TERC

The Andy Warhol Museum

Twin Cities Public Television

William Penn Foundation

Et al.

ADMINISTRATIVE EXPERIENCE

Chair, Learning Sciences and Policy, University of Pittsburgh, 2015 – present.

Chair, Cognitive Studies, School of Education, University of Pittsburgh, 2002-2008.

Director, University of Pittsburgh Center for Learning in Out-of-School Environments, 2002-present.

Executive Committee, School of Education, University of Pittsburgh, 2015-present

Executive Committee, Learning Research and Development Center, University of Pittsburgh, 2003-2007; 2015-2017.
Director of Research and Evaluation, Children's Museum of Pittsburgh, 2003-2006.

TEACHING + TRAINING

University Courses Taught:

Practitioner Inquiry (EdD)

Informal Learning: Theory and Foundations (EdD)

Learning Sciences and Educational Change (PhD)

Informal Learning: Contemporary issues (PhD)

Professional Writing Seminar (PhD)

Applied Cognitive Science (PhD)

Instructional Explanations (PhD)

Instruction and Learning (PhD)

Museums as an Educational Resource (MEd/MAT)

Educational Psychology (MEd/MAT)

Designing & Using Informal Learning Environments in Science (MEd/MAT)

Technology for Elementary Education (MEd/MAT)

Growing up with New Media (MEd/MAT)

Cognitive Development (BA)

Introduction to Child Development (BA)

Ph.D. students:

Lisa Scott, 2000

Roger Taylor, 2004

Jodi Galco Fender, 2004

Kyung Youn Kim, 2009

Catherine Eberbach, 2009

Camellia Sanford, 2009

Debra Bernstein, 2010

Sasha Palmquist, 2012

Lisa Brahms, 2014

Lauren Allen, 2016

Mary Ann Steiner, 2016

Kaleen Povis, 2016

Rachel Bonnette (expected 2020)

Marijke Hecht (expected 2021)

Undergraduate mentoring: 4 theses chaired, more than 25 undergraduate research interns trained.

2nd and 3rd grade teaching intern, The School in Rose Valley, Rose Valley, PA, 1988

P U B L I C A T I O N S (* indicates student author)

Akiva, T., Russell, J., Hecht, M., & Crowley, K. (2018). Leadership in Out-of-School Learning: The Educational Doctorate Program at the University of Pittsburgh. International Journal for Research on Extended Education

Eberbach, C.E.* & Crowley, K. (2017) From Seeing to Observing: How Parents and Children Learn to See Science in a Botanical Garden, Journal of the Learning Sciences, 26:4, 608-642.

Louw, M., Barbuto, N., & Crowley, K. (2017). Designing Learning Pathways in a Complex Learning Ecology: A Research Practice Partnership Focused on Parent Brokering. In B. DiSalvo, J. Yip, E. Bonsignore, & C. DiSalvo (Eds), Participatory Design for Learning: Perspectives from Research and Practice. New York, NY: Routledge. pp. 93-112.

Dorph, R., Schunn, C., & Crowley, K. (2017). Crumpled molecules and edible plastic: Science learning Activation in Out-of-School Time. *Afterschool Matters,* 25, pp. 18-28.

Russell, J. L., Kehoe, S.* & Crowley, K. (2017). Linking in and out-of-school learning. In K. Peppler (Ed.), *Encyclopedia of Out-of-School Learning.* Thousand Oaks, CA: Sage Publications.

Allen, L. B.* & Crowley, K. (2017). Moving beyond scientific knowledge: Leveraging participation, relevance, and interconnectedness for climate education. *International Journal of Global Warming*. 12 (3 & 4), 299-312.

Allen, L.B.* & Crowley, K. (2017). From acquisition to inquiry: Supporting informal educators through iterative implementation of practice. In P. Patrick (Ed), Preparing Informal Educators: Perspectives from Science Communication and Education. New York: Springer.

Knutson, K, Lyon, M., Crowley, K., & Giarratani, L. (2016). Flexible interventions to increase family engagement at Natural History museum dioramas. *Curator: The Museum Journal*. 59 (4), 339-352.

Knutson, K. & Crowley, K. (2016). Learning in art museums: Creating and responding to art. In K. Nakakoji, H. Shindo, Y. Yamamoto, & T. Okada (Eds.), *Museums that inspire: In search of new possibilities for public cultural spaces*. Kyoto: Airi Shuppan. [in Japanese]

Knutson, K. & Crowley, K. (2016) Collaborating across the university/informal boundary: Broader impacts through informal science education. In L. Avraamidou & W.-M. Roth (Eds.), Intersections of formal and informal science. New York, NY: Routledge.

Stein, M.K., Crowley, K., & Resnick, L.B. (2016). Education policy and the learning sciences: The case for a new alliance. In M. Evans, M. Packer, & K. Sawyer (Eds.), Reflections on the Learning Sciences. Cambridge: Cambridge University Press.

Brahms, L.* & Crowley, K. (2016). Learning to make in the museum: The role of Maker educators. In K. Peppler, E. Rosenfeld Halverson, & Y. B. Kafai (Eds). Makeology: Makerspaces as learning environments. New York: Routledge.

Brahms, L.* & Crowley, K. (2016). Making sense of making: Defining learning practices in MAKE Magazine. In K. Peppler, E. Rosenfeld Halverson, & Y. B. Kafai (Eds). Makeology: Makers as Learners. New York: Routledge.

Tison Povis, K. * & Crowley, K. (2015). Family learning in object-based museums: The role of joint attention. *Visitor Studies*. 18 (2), 168-182.

Crowley, K., Barron, B.J., Knutson, K., & Martin, C. (2015). Interest and the development of pathways to science. In Interest in Mathematics and Science Learning. In K. A. Renninger, M. Nieswandt, and S. Hidi (Eds.). Washington DC: AERA.

Crowley, K., Pierroux, P., & Knutson, K. (2014). The museum as learning environment. In K. Sawyer (Ed.), The Handbook of the Learning Sciences, 2nd Edition.

Snyder, S., Hoffstadt, R. M., Allen, L. *, Crowley, K., Bader, D., & Horton, R. (2014). City-wide collaborations for urban climate education. In Hamilton, P. (Ed.), *Future Earth: Advancing Civic Understanding of the Anthropocene,* Geophysical Monograph Series, Vol. 197, American Geophysical Union, Washington, DC.

Allen, L. B. * & Crowley, K. (2014). How museum educators change: Changing notions of learning through changing practice. *Science Education*, 98 (1), 84-105.

Steiner, M.A. * & Crowley, K. (2013). The natural history museum: Taking on a learning research agenda. *Curator: The Museum Journal*. 56(2): 267-272.

Russell, J., Knutson, K., & Crowley, K. (2013). Informal learning organizations as part of an educational ecology: Lessons from collaboration across the formal/informal divide. *Journal of Educational Change* 14(3): 259-281.

Louw, M. & Crowley, K. (2013). New ways of looking and learning in natural history museums: The use of gigapixel imaging to bring science and publics together. *Curator: The Museum Journal* 52(1): 87-104.

Giarrantani, L., Parikh, A. *, Di Salvo, B., Knutson, K. & Crowley, K. (2011). Click!: Pre-teen girls and a mixed reality role playing game for science and technology. *Nordic Journal of Digital Literacy,* 3.6, 121-138.

Knutson, K., Crowley, K., Russell, J., & Steiner, M.A. * (2011). Approaching art education as an ecology: Exploring the role of museums. *Studies in Art Education*, 52 (4), 310-322.

Knutson, K. & Crowley K. (2011). Construindo uma ponte entre Museus e Visitantes. Bienal do Mercosul. Mediaçao traçando o territorio. Porto Allegre, 43-45. Portuguese translation of: Knutson, K. & Crowley, K. (2006). Bridging the gap between museums and visitors. *Visitor Studies Today*, 9 (3): 16-17.

Kim, K.Y. * & Crowley, K. (2010). Negotiating the goal of museum inquiry: How families engineer and experiment. M.K. Stein & L. Kucan (Eds). Instructional Explanations in the Disciplines. New York: Springer, pp. 51-65.

Knutson, K. & Crowley, K. (2010). Connecting with Art: How families talk about art in a museum setting. M.K. Stein & L. Kucan (Eds). Instructional Explanations in the Disciplines. New York: Springer, pp. 189-206.

Eberbach, C.E. * & Crowley, K. (2009). From Everyday to Scientific Observation: How Children Learn to Observe the Biologist's World. *Review of Educational Research*, 79 (1), 39-69.

Bernstein, D. * & Crowley, K. (2009). Can robots think for themselves? Identifying spaces for the exploration of children's ideas about robots. In the proceedings of Computer Human Interaction.

Knutson, K. & Crowley, K. (2006). Bridging the gap between museums and visitors: A response to Meszaros's 'The evil “Whatever” interpretation.' *Visitor Studies*, 9(3), 16-17.

DiSalvo, B.J., Crowley, K. & Norwood, R. * (2008). "Learning in Context: Digital games and young black men." *Games and Culture* 3, 131-141.

Bernstein, D. * & Crowley, K. (2008). Searching for Signs of Intelligent Life: An Investigation of Young Children's Beliefs About Robot Intelligence. *Journal of the Learning Sciences*, 17:2, 225-247.

Sanford, C. *, Knutson, K., & Crowley, K. (2007). We Always Spend Time Together on Sundays: Grandparents and Informal Learning. *Visitor Studies*, 10(2), 136-151.

Palmquist, S.D. * & Crowley, K. (2007). From teachers to testers: How Parents Talk to Novice and Expert Children in a Natural History Museum. *Science Education*, 91(5), 712-732.

Fender, J. G. * & Crowley, K. (2007). How parent explanation changes what children learn from everyday scientific thinking. *Journal of Applied Developmental Psychology*, 28, 189-210.

Bernstein, D. *, Crowley, K. & Nourbakhsh, I. (2007). Working with a robot: Exploring relationship potential in human-robot systems. *Interaction Studies*, 8 (3), 465-482.

Palmquist, S. D. * & Crowley, K. (2007). Studying dinosaur learning on an island of expertise. In R. Goldman, R. Pea, B. Barron, & S. Derry (Eds.), Video Research in the Learning Sciences (pp. 271-286). Mahwah, NJ: Erlbaum.

Nourbakhsh, I., Hamner, E., E. Ayoob, Porter, E., Dunlavey, B., Bernstein, D. *, Crowley, K., Lotter, M., Shelly, S., Hsiu, T., & Clancy, D. (2006). The personal exploration rover: Educational assessment of a robotic exhibit for informal learning venues, *The International Journal of Engineering Education*, Vol. 22, No. 4, pp 777-791.

Nourbakhsh, I., Hamner, E., Dunlavey, B., Bernstein, D. * , & Crowley. K. (2006). Educational results of the personal exploration rover museum exhibit, In *Proceedings of ICRA 2005*, Barcelona, Spain, April.

Stubbs, K. *, Bernstein, D. *, Crowley, K., & Nourbakhsh, I. (2006). Cognitive evaluation of human-robot systems: A method for analyzing cognitive change in human-robot systems. In *Proceedings of IEEE International Symposium on Robot and Human Interactive Communication*, 59-65.

DiSalvo, B., Parikh, A. *, & Crowley, K. (2006). Developing The Ultimate Urban Adventure Game For Middle School Girls, *Proceedings of the Women in Games Conference 2006*, Teesside, UK.

Schunn, C.D., Crowley, K., & Okada, T. (2006). Cognitive science: Interdisciplinarity now and then. In S. J. Derry & M. A. Gernsbacher (Eds.), Problems and Promises of Interdisciplinary Collaboration: Perspectives from Cognitive Science. Mahwah, NJ: Erlbaum.

Stubbs, K. *, Bernstein, D. *, Crowley, K., & Nourbakhsh, I. (2005). Long term human-robot interaction: The personal exploration rovers and museum docents. In *Proceedings of Artificial Intelligence and Education.*

Nourbakhsh, I., Crowley, K., Bhave, A., Hamner, E., Hsiu, T., Perez-Bergquist, A., Richards, S., Wilkinson, K. (2005). The Robotic Autonomy Mobile Robotics Course: Robot Design, Curriculum Design and Educational Assessment, *Autonomous Robots Journal*, 18 (1), 103-127.

Eberbach, C.E. * & Crowley, K, (2005). From living to virtual: Learning from museum objects. *Curator*, 48 (3), 317-338.

Ellenbogen, K. & Crowley, K. (2005). Outside the walls: New directions in family learning research. *ASTC Dimensions*, November/December, pp. 13-14.

Knutson, K. & Crowley, K. (2005). Museum as learning laboratory: Developing and using a practical theory of informal learning. *Hand to Hand*, the publication of the Association of Children's Museums, 18(4), 4-5.

Crowley, K. & Knutson, K (2005). Museum as learning laboratory: Bringing research and practice together. *Hand to Hand*, the publication of the Association of Children's Museums, 19(1), 3-6.

Swartz, M. I. * & Crowley, K, (2004). Parent beliefs about teaching in a children's museum. *Visitor Studies*, 7(2), 1-16.

Eberbach, C. * & Crowley, K. (2004). Learning research in public gardens. *Public Garden*, 19(2), 14-17.

Knutson, K. & Crowley, K. (2004). Review of Behind the Scenes at the Science Museum. *Science Education*, 88 (2), 297-300.

McGregor, M. U. *, Palmquist, S. *, Schunn, C. D., & Crowley, K. (2003). Capturing Child Dinosaur Expertise With Computationally Specified Input Encoding. *Proceedings of the International Conference for Cognitive Modeling.*

Leinhardt, G., Knutson, K., & Crowley, K (2003). Museum Learning Collaborative redux. *Journal of Museum Education*, 28 (1), 23-31.

Crowley, K. (2003). Everyday explanation in museums and beyond. Proceedings of the 2003 International Conference on Creative Cognition.

Crowley, K. (2003). Learning new problem solving strategies by observing and explaining. In D. Fasko. (Ed.). Critical Thinking and Reasoning: Current Theories, Research and Practice. Cresskill, NJ: Hampton.

Leinhardt, G., Crowley, K., & Knutson, K. (Eds.) (2002). Learning conversations in museums. Mahwah, NJ: Lawrence Erlbaum Associates.

Leinhardt, G. & Crowley, K. (2002). Objects of learning, objects of talk: Changing minds in museums. In S. Paris (Ed.) Multiple Perspectives on Children's Object-Centered Learning. Mahwah, NJ: Lawrence Erlbaum Associates

Crowley, K. & Jacobs, M. * (2002). Islands of expertise and the development of family scientific literacy. In G. Leinhardt, K. Crowley, & K. Knutson (Eds.) Learning conversations in museums. Mahwah, NJ: Lawrence Erlbaum Associates.

Schunn, C. D., Crowley, K., & Okada, T. (2002). What makes collaborations across a distance succeed? The case of the cognitive science community. In P. Hinds & S. Kiesler (Eds.) Distributed work: New research on working across distance using technology. Cambridge, MA: MIT Press.

Crowley, K., Leinhardt, G., & Chang, C.F. * (2001). Emerging research communities and the World Wide Web: Analysis of a Web-based resource for the field of museum learning. *Computers and Education*, 36 (1), 1-14.

Crowley, K., Callanan, M.A., Tenenbaum, H.R. *, & Allen, E. * (2001). Parents explain more often to boys than to girls during shared scientific thinking. *Psychological Science*, 12 (3), 258-261.

Crowley, K., Callanan, M.A., Jipson, J. *, Galco, J. *, Topping, K. *, & Shrager, J. (2001). Shared scientific thinking in everyday parent-child activity. *Science Education*, 85 (6), 712-732.

Crowley, K., Schunn, C.D., & Okada, T. (Eds.) (2001). Designing for science: Implications from everyday, classroom, and professional settings. Mahwah, NJ: Lawrence Erlbaum Associates.

Crowley, K. & Galco, J* (2001). Everyday activity and the development of scientific thinking. In K. Crowley, C. D. Schunn, & T. Okada (Eds.), Designing for science: Implications from everyday, classroom, and professional settings. Mahwah, NJ: Erlbaum.

Azmitia, M.A. & Crowley, K. (2001). The rhythms of scientific thinking: A study of collaboration in an earthquake microworld. In K. Crowley, C. Schunn, & T. Okada (Eds.) Designing for science: Implications from everyday, classroom, and professional settings. Mahwah, NJ: Lawrence Erlbaum Associates.

Crowley, K. (2000). Parent explanations during museum visits: Gender differences in how children hear informal science. *Visitor Studies*, 3 (3), 21-28.

Crowley, K. & Callanan, M. A. (2000). The collaborative development of scientific literacy in everyday activity. In K. Ueda & T. Okada (Eds.), In Search of Collaborative Cognition: Cognitive Science on Creative Collaboration, Tokyo: Kyoritsu Shuppan. [in Japanese]

Schunn, C. D., Crowley, K., & Okada, T., (2000). Multipdisciplinary collaboration in cognitive science. In K. Ueda & T. Okada (Eds.), In Search of Collaborative Cognition: Cognitive Science on Creative Collaboration, Tokyo: Kyoritsu Shuppan. [in Japanese]

Okada, T. & Crowley, K. (2000). What makes for interesting developmental research? Perspectives from the sociocultural and information processing frameworks. In H. Kojima, T. Hayamizu, & H. Honjo (Eds.), Human Development and Psychology. Tokyo: Kanekoshbo. [in Japanese]

Crowley, K. & Siegler, R.S. (1999). Explanation and generalization in young children's strategy learning. *Child Development*, 70, 304-316.

Tanaka T., Crowley, K., Wallach, D., and Kwon, O. (1999). Examining links between use of computers in classrooms and teachers' philosophies of learning and teaching. *Annual Report of the Research Center for Teacher Education*, Kansai University, Vol. 13 [in Japanese].

Schunn, C.D., Crowley, K. & Okada, T. (1998). The growth of multidisciplinarity in the Cognitive Science Society. *Cognitive Science*, 22, 107-130.

Crowley, K. & Callanan, M.A. (1998). Identifying and supporting shared scientific reasoning in parent-child interactions. *Journal of Museum Education*, 23, 12-17.

Crowley, K., Shrager, J., & Siegler, R.S. (1997). Strategy discovery as a competitive negotiation between metacognitive and associative knowledge. *Developmental Review*, 17, 462-489.

Schunn, C.D., Crowley, K., & Okada, T. (1996). Is cognitive science interdisciplinary?: Past and present perspectives. The Proceedings of the 18th Annual Cognitive Science Society Meetings, Mahwah, NJ: Erlbaum.

Okada, T. & Crowley, K. (1996). Capturing collaboration. *Cognitive Studies: The Bulletin of the Japanese Cognitive Science Society*, 3 (4), 3-6.

Crowley, K. (1996). Looking at everyday learning in laboratory studies. *The Hiroshima Forum for Psychology*, 17, 13-15.

Schunn, C.D., Okada, T., & Crowley, K. (1995). Is cognitive science truly interdisciplinary?: The case of interdisciplinary collaborations. The Proceedings of the 17th Annual Cognitive Science Society Meetings, pp. 100-105, Mahwah, NJ: Erlbaum.

Siegler, R.S. & Crowley, K. (1994). Constraints on learning in non-privileged domains. *Cognitive Psychology*, 27, 194-226.

Crowley, K. & Siegler, R.S. (1993). Flexible strategy use in young children's tic-tac-toe. *Cognitive Science*, 17, 531-561.

Siegler, R. S. & Crowley, K. (1992). Microgenetic methods revisited. *American Psychologist*, 47, 1241-1243.

Siegler, R.S. & Crowley, K. (1991). The microgenetic method: A direct means for studying cognitive development. *American Psychologist*, 46, 606-620.

Siegler, R. S. & Crowley, K. (1991). The Gospel of Jean Piaget, According to John Flavell. *Contemporary Psychology*, 36, 829-831.

Crowley, K. & Siegler, R. S. (1991). Review of Children's strategies: Contemporary views of cognitive development. *The American Journal of Psychology*, 104, 605-609.

SELECTED REPORTS

Dillon, J., DeWitt, J., Pegram, E., Irwin, B., Crowley, K., Hayden, R., King, H., Knutson, K., Veall, D., and Zanthoudaki, M. (2016). A learning research agenda for natural history institutions. London: Natural History Museum. http://upclose.pitt.edu/articles/UK%20Natural%20History%20Research%20Agenda.pdf

Crowley, K., Markham, L., Glass, M., & Bell, J. (2015). INCLUDES: Achieving Scale for Inclusion in STEM Synthesis Report. Download at: http://informalscience.org/research/ic-000-000-011-055/INCLUDES_Report

Shields, S., Greenwald, E., Bell, J., Crowley, K., & Ellenbogen, K. (2014). The Palo Alto Convening on Assessment in Informal Settings: Synthesis Report. Washington, DC: Center for Advancement of Informal Science Education (CAISE). http://informalscience.org/research/ic-000-000-010-051/Palo_Alto_Synthesis_Report

Crowley, K. & Knutson, K. (2014). The 21st Century Natural History Learning Research Agenda. http://informalscience.org/perspectives/blog/a-research-agenda-for-learning-in-natural-history-settings

Knutson, K. & Crowley, K. (2011). Audiences research for teen spaces at the Carnegie Libraries of Pittsburgh. Unpublished evaluation report.

Knutson, K., Crowley, K., & Steiner, M. (2010). An evaluation and capacity building partnership between the Manchester Craftsmen Guild Youth Programs and the University of Pittsburgh Center for Learning in Out-of-School Environments. Unpublished evaluation report.

Knutson, K. & Crowley, K. (2008). Learning conversations in an art museum: The impact of a family room visit on parent-child gallery experiences. Unpublished evaluation report.

Guise, M, Crowley, K., & Knutson, K. (2008). Evaluation of the Carnegie Museum of Natural History's West Virginia Distance Learning Program: A Focus on Technology Literacy. Unpublished evaluation report.

Crowley, K. & Knutson, K. (2006). Deep dives and islands of expertise: Principles for educational games based on interest. Unpublished concept paper prepared for Scholastic, Inc.

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Nourbakhsh, I., Crowley, K. Wilkinson, K., & Hamner, E.(2003). The educational impact of the Robotic Autonomy mobile robotics course. Technical report CMU-RI-TR-03-29, Robotics Institute, Carnegie Mellon University, August, 2003. http://www.ri.cmu.edu/cgi-bin/tech_reports.cgi

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Anderson, K.C. & Crowley, K. (1999). Learning science by doing science: What elementary teachers learned from a field-based research experience. Unpublished evaluation report.

G R A N T S

ACTIVE

National Science Foundation (IIS 1735945), Smart Spaces for Making: Networked Physical Tools to Support Process Documentation and Learning, $132,450, Crowley, K. (PI), 2017- 2019. [Collaborative Grant with M. Louw and D. Byrne at Carnegie Mellon University]

National Science Foundation, Remake Making: Understanding Adoption and Adaptation of Facilitated Making in Libraries, $299,495, Akiva (PI), Bowler (Co-PI), Crowley (Co-PI), Wardrip (Co-PI). 2017-2019.

William Penn Foundation, Supporting the Informal Learning Initiative, $365,670, Crowley, Knutson, Russell, 2017-2019.

Spencer Foundation, The 21st Century Naturalist: A research-practice collaboration for informal science education, $400,000, Crowley, Knutson, Giarrantani, & Tonsor, 2015-2018.

National Science Foundation, Learning to See, Seeing to Learn: A Sociotechnical System Supporting Taxonomic Identification Activities in Volunteer-Based Water Quality Biomonitoring. $1,690,278, 2015-2018. Louw (PI), Crowley (Co-PI).

National Science Foundation, Climate Change Education Partnership-II: Climate and Urban Systems Partnership (CUSP). $5,600,000, 2012–2018. Schneider (PI), Crowley (Co-PI), & Horton (Co-PI). 2012-2018.

National Science Foundation, Center for the Advancement of Informal Science Education (CAISE). $15,000,000, 2007-2021. J. Bell (PI), Crowley (Co-PI), Ellenbogen (Co-PI), Falk (Co-PI).

National Science Foundation, Intelligent Science Exhibits: Transforming Hands-on Exhibits into Mixed-Reality Learning Experiences, $299,827, 2016-2018. Koedinger (PI), Crowley (Co-PI), Hudson (Co-PI).

CONCLUDED

Digital Promise, A Research and Practice Agenda for a Regional Learning Network, $10,000. Crowley. 2017.

Children's Museum of Pittsburgh, Make Shop Research Partnership, $120,000, Crowley (PI). 2013 to 2017.

American Educational Research Association, Making and Learning, Research conference grant, $35,000. 2015-2017. Wardrip, Brahms, & Crowley.

National Science Foundation, Collaborative Research: Energy, Environment and Society Learning Network (ENERGY NET): Enhancing opportunities for learning using an Earth systems science framework. $600,000, 2012-2014.. Elliot (PI), Bain (Co-PI), Crowley (Co-PI); Steiner (Co-PI).

Grable Foundation, Designing Regional Learning Pathways, $198,780, 2013-2014. Crowley & Schunn.

Sprout Fund, Pathways for Activation in Pittsburgh, $25,000, 2013. Crowley & Schunn.

Carnegie Libraries of Pittsburgh, Teen Spaces for Out-of-School Learning, $50,000, 2013-2015, Knutson (PI), Crowley (Co-PI).

Carnegie Museum of Natural History, Natural History Museum Research Fellows. $72,500, 2012-2015. Crowley (PI).

Sprout Fund, Activation for Learning Science and Art, $25,000, 2012. Crowley & Schunn

Children's Museum of Pittsburgh, Children's Museum Research Fellow. $43,000, 2011-2012. Crowley (PI).

Gordon & Betty Moore Foundation, Activated Young Science Learner, $4,000,000, 2011-2013. Schunn, Dorph, Crowley, & Shields.

William T. Grant Foundation, Distinguished Fellows Program: Finding a place for museums in the learning lives of youth, $200,000, 2011-2013. Crowley.

National Science Foundation, Gigapixel cyberinfrastructure for participatory science learning. $569,000, 2011-2015. Louw (PI), Crowley (Co-PI), Nourbakhsh (Co-PI), Steiner (Co-PI).

National Science Foundation, Building Informal Science Education: Supporting Evaluation of Exhibitions and Programs with an informalscience.org research network. $1,400,000, 2010-2013. Crowley (PI), Knutson (Co-PI), Ellenbogen (Co-PI).

National Science Foundation, Urban climate education partnership, $911,000, 2010-2012. Schneider (PI), Crowley (Co-PI), Horton (Co-PI).

Gordon & Betty Moore Foundation, Activated Young Science Learner Planning Grant, $380,000, 2010-2011. Schunn, Dorph, & Crowley

Learning Research and Development Center Faculty Research Award, School/Community Partnerships in the 21st Century: How Digital Technologies Can Build a Culture of Learning That Extends Beyond School $75,000, 2010-2011. Gomez, Gomez, Matsumura, & Crowley.

Institute for Museum and Library Services, Improving outcomes in art museums: Supporting family learning on the gallery floor, $100,000, 2009-2012. Knutson (PI) & Crowley (Co-PI).

Learning Research and Development Center Faculty Research Award, School/Community Partnerships in the 21st Century: How Digital Technologies Can Build a Culture of Learning That Extends Beyond School $75,000, 2009-2010. Crowley, Gomez, & Gomez.

Learning Research and Development Center Faculty Research Award, The Ecology of Educational Opportunities in Pittsburgh, $75,000, 2009-2010 with J. Russell, K. Knutson, & W. Bickel.

National Science Foundation, City as Learning Lab: Spreading Technological Fluency Through Creative Robotics, $1,900,000, 2008-2013. Crowley (PI), DiSalvo (Co-PI), Nourbakhsh (Co-PI).

Manchester Craftsmen's Guild, Understanding the student and community impact of arts-based youth programs, $216,248. 2008-2010. PI's: Crowley & Knutson.

Carnegie Mellon University, Neighborhood Nets, $25,000, 2007-2008. Crowley (PI). [Subaward from an Intel grant]

Carnegie Mellon University, Robot 250, $61,000, 2007-2008. Crowley (PI). [Subaward from a Heinz Endowments grant]

Carnegie Mellon University, Robot Diaries II, $40,000, 2007-2008, Crowley. [Subaward from a Heinz Endowments grant]

National Science Foundation, InformalScience.org: Building a Web Community for Informal Science, $675,348, 2006-2008. Crowley (PI), Louw (Co-PI).

National Science Foundation, Supplemental funding for Conceptualizing and Assessing Web-based Informal Science Learning, $120,000, 2006. Crowley (PI).

Children's Museum of Pittsburgh, How People Make Things, $180,000, 2006-2009. Subcontract to Crowley from a National Science Foundation grant to the Children's Museum of Pittsburgh.

Carnegie Mellon University, Robot Diaries, $10,000, 2006. Crowley (PI) [Subaward from a Heinz Endowments grant]

J. Paul Getty Trust, How do family rooms impact art gallery experience? $32,301, 2006-2007. Crowley (PI) & Knutson (Co-PI).

Mattress Factory, Artistic process, individual, and community change: A study of museum outreach. $12,000. 2006-2008. Knutson (PI) & Crowley (Co-PI).

Carnegie Museum of Natural History, Understanding minerals and gems: A visitor study, $15,024, January 1, 2006 to April 30, 2006. Crowley (PI) & Knutson (Co-PI).

Carnegie Museum of Natural History, Biotechnology in a natural history museum, $15,000, January 1, 2006 to October 31, 2006. Crowley (PI).

Carnegie Museum of Natural History, Learning Research and Evaluation for Dinosaurs in Their World. 2005-2007, $200,000. Crowley (PI) & Palmquist (Co-PI).

Arts Education Collaborative, Research partnership to examine professional development for art teaching, $50,000, 2005. Knutson & Crowley.

Children's Museum of Pittsburgh, Developing web games to facilitate home-museum synergy, $51,083, 2004-2006. [Subcontract to Crowley from a larger IMLS award to the museum.]

Carnegie Mellon University, Learning about Mars, Autonomous Robots, and the Nature of Life: Studies of the Personal Exploration Rover Exhibit, $10,000, 2004-2005. (Subcontract to Crowley from a NASA award to CMU).

Setting Priorities for the Retirement Years (SPRY), Intergenerational learning with older adults and children in museums, on the web, and in programs, $85,000, 2004-2005. A subcontract to Crowley & Knutson from an NSF grant to SPRY.

The Andy Warhol Museum, Research on Re-Installing the Permanent Collection and Teen Programs, $12,000, 2004. Knutson & Crowley.

Setting Priorities for the Retirement Years (SPRY), Evaluation of organizational aspects of the Science Across the Generations Project, $8,500, 2004-2005. Knutson & Crowley.

Carnegie Museum of Natural History, Expertise and museum learning: Studies of learning in Dinosaur Hall. 2004, $20,000.

The Tech Museum of Innovation, Learning with TechTags, $15,000, 2004. Eberbach & Crowley

Heinz Endowments, Creating a Place for Family Learning: The Transformation of a Children's Museum, $303,000, 2003-2006. Crowley & Knutson.

National Wildlife Federation, Review of Botanical Reasoning Strategies, $5000, 2003. Eberbach & Crowley.

Children's Museum Pittsburgh, Family learning on the web, $11,000, 2003-2004.

National Science Foundation, Conceptualizing and Assessing Web-based Informal Science Learning, $665,615, 2002-2005. Crowley (PI); Leinhardt (Co-PI).

National Science Foundation, Explanatoids: Gender-Sensitive Signage to Seed Science Talk in Public Places, $900,000, 2002-2005. Stocks (PI), Crowley (Co-PI), Hughes (Co-PI).

Heinz Endowments and the Pittsburgh Children's Museum, Documenting Culture and Practice in a Children's Museum, $24,500, 2002-2003. Crowley & Knutson.

Family Communications, Professional development learning in a train-the-trainers workshop, $40,000, 2002-2003. Crowley & Blessing.

University of Pittsburgh Central Research Development Fund, Robot City: What children learn about artificial and human intelligence from interacting with autonomous mobile robots, $15,486, 2000 to 2002. Crowley.

Heinz Endowments, Explanatoids: Signange to Seed Science Talk in Pittsburgh's Public Places, $50,000, 2001-2002, Stubbs, Stocks, Crowley, & Vogel.

National Science Foundation, Responding to the Gender Gap in Informal Science Education, ESI-9815021, $585,548, 1999-2003. Crowley (PI).

Pittsburgh Children's Museum, Facilitating Parent Support of Young Children's Learning in a Children's Museum, $4,000, 1999.

U.S. Department of Agriculture, Learning to teach science by doing science: The educational consequences of teacher participation in a botanical field survey, 58-3148-8-096, $47,643, 1998-2000. Crowley.

Institute for Museum and Library Services, National Science Foundation, National Endowment for the Arts, National Endowment for the Humanities, The Museum Learning Collaborative $1,000,000 (1997-2003). Leinhardt, Crowley, & Schauble.

Children's Discovery Museum of San Jose, Parent-child scientific thinking: Studies of family learning at the "Take Another Look" interactive science exhibition $31,000, 1995-1997.

Mitsubishi Bank Foundation, Multidisciplinary Collaboration in Cognitive Science, $54,000, 1994-1998. Okada, Crowley, Schunn.

Sato Toy & Culture Foundation, A Developmental Study of Children's Scientific Thinking, $4,000. Okada, Crowley.