CHRISTIAN DIETER SCHUNN

STEM reasoning and learning
Neuroscience of complex learning

Web-based peer interaction and instruction
Engagement and learning

CONTACT

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WORK

University of Pittsburgh   2001–
   Institute for Learning   Co-Director, 2016–
   Psychology; Learning Sciences and Policy; Intelligent Systems   Assistant 2001; Associate 2006; Professor 2011–
   Learning Research & Development Center   Research Scientist 2001; Senior Scientist 2011–
George Mason University   1998–2001
   Psychology   Assistant Professor

EDUCATION

1996–98   Postdoc, Psychology, Carnegie Mellon University (*Advisors: John Anderson, Lynne Reder*)
1993–95   PhD, Psychology, Carnegie Mellon University (*Advisor: David Klahr*)
1990–93   MS, Psychology, Carnegie Mellon University
1987–90   BS, Honors Psychology, Minors in Mathematics and Computer Science, McGill University

LEARNING MATERIALS

Writing: SWoRD/Peerceptiv   *Biology*:   Designer Bacteria; Gecko; Stinkbug
Robotics: Dancing Robots; Robots in Motion   *Chemistry*:   Heating & Cooling
Badging: CS2N.org   *Physics*:   Alarm Systems; Lift Systems; Launcher

HONORS AND AWARDS

Society Fellowships
   Association for Psychological Science, 2014   American Association for the Advancement of Science, Section Q, 2011
   American Psychology Association, Division 3, 2009   International Society for Design & Development in Education, 2006
Journal Awards
   Design Studies Best Paper Award 2015 (with Joel Chan)
   John R. Hayes Award for the best article in Journal of Writing Research 2008-2010 (with Patchan & Charney)
Conference Awards
   Best Paper Award at *UMAP 2017* (with Guerra-Hollstein, Barria-Pineda, Bull & Brusilovsky)
   Best Paper Award at the 35th *Computers and Information in Engineering Conference* (with Egan, Cagan, & LeDuc)
   Best Paper Award at the 24th *International Conference on Design Theory and Methodology* (with Fu, Chan, Cagan, Kotovsky, Wood)
   Best work at the *ED-Media 2003* conference (with Kwangsu Cho), Hawaii, 2003

EXTERNAL GRANTS

Current
1. *University of Pittsburgh/Institute for Learning Network for School Improvement (9th Grade On Track)*. Bill & Melinda Gates Foundation. CoPI with T. Petrosky, J. Russell, D Thompson-Dorsey, R. Apodaca, & A. Escher. $7,485,903
2. *Teacher Learning to Enact Productive Discussions in Mathematics and Literacy*. James S. McDonnell Foundation. Co-PI with M. K. Stein, J. Russell, R. Correnti, & L. Matsumura. $2,499,651.
Prior
3. *Build, Understand, & Tune Interventions that Cumulate to Real Impact*. National Science Foundation, DUE-1524575, Co-PI with T. Nokes-Malach, B. Rottman, K. Binning, E. Votruba-Drzal, C. Singh, J. Grabowski, & N. Kaufmann, $1,795,922.
4. *Studying the Malleability and Impact of Science Learning Activation*. National Science Foundation, DRL-1348468. PI, CoPIs R. Dorph & M. Cannady. $1,479,490.
5. *Changing Culture in Robotics Classroom*. National Science Foundation, DRL-1416984, PI, CoPI R. Shoop, $1,568,244.
6. *Understanding and improving curriculum materials design practices for effective large-scale implementation in science.* National Science Foundation, DRL-1251562, PI, coPIs D. Bernstein, S. Mckenney, B. Drayton, J. Barber, $1,401,043.
7. *Building a theory of badges for computer science education*. National Science Foundation, CNS-1339085, PI, CoPI R. Shoop, $600,000.
8. *DDIG Understanding the Impact of Sources of Inspiration in Creative Design: The Role of Conceptual Distance*. National Science Foundation, SBE- 1360013. PI, 06/01/14-12/01/15, $15,261.

9. *Teaching Writing and Argumentation with AI-supported Diagramming and Peer Review*. National Science Foundation, IIS-1122504, Co-PI with K. Ashley & D. Litman, 09/01/11–08/31/16, $1,349,986.

10. *Intelligent Scaffolding of Peer Review of Writing*. Institute of Education Sciences, R305A120370, Co-PI with D. Litman, A. Godley and K. Ashley, 7/1/12–6/30/15, $1,498,941.

11. *Modeling Engineered Levers for the 21st Century Teaching of STEM*. National Science Foundation, DRL-1027629, PI, CoPI M. K. Stein. 09/01/10–08/31/15, $2,593,766.

12. *Connecting Research and Teaching Through Product Innovation: Quality of Life Technology RET Site*. National Science Foundation, EEC-1161880. Co-PI with J. Pearlman, 10/1/12–9/30/15, $518,179.

13. *Educational Design & Development: Planning for a STEM Learning Research Transformation*. National Science Foundation, DRL-1216850, Co-PI with F. Davis, 5/15/12–5/30/14, $49,548.

14. *Activation Design Fellows: Building Learning Pathways for Pittsburgh's Youth*. The Grable Foundation. Co-PI with K. Crowley. 6/1/12–5/30/14, $198,780.

15. *Center for the Study of Activated Science Learners*. Gordon and Betty Moore Foundation, #2820 and #3341, PI, CoPIs K. Crowley, R. Dorph, and P. Shields. 02/01/11 – 11/1/13, $3,999,646.

16. *The 21st Century Research and Development Center on Cognition and Science Education*. Institute of Education Sciences, R305C080009, Co-PI with J. Merlino, A. Porter, J. Cromley, N. Newcombe, and T. Nokes, 7/1/08–6/30/14, $9,995,038.

17. *The Robot Algebra Project*. National Science Foundation, DRL-1029404, PI, CoPIs M. K. Stein and R. Shoop. 09/01/10–08/31/13, $449,969 Pitt Contract.

18. *Fostering Innovation through Robotics Exploration*. Defense Advanced Research Projects Agency, FA8750-10-2-0165, Co-PI Investigator with R. Shoop, A. Corbett, K. Koedinger, W. Dann, H. Choset, M. Veloso, and L. Levin. 07/14/10–9/30/13, $328,364 Pitt subcontract.

19. *Advanced Analogical Search with Integrated Function and Form: The Verrocchio Project*. National Science Foundation, CMMI-0855293, Co-PI with J. Cagan and K. Wood, 07/01/09–06/30/13, $450,000.

20. *Learning Pathways for Activation in Pittsburgh*. The Sprout Fund. Co-PI with K. Crowley. 9/1/12–4/30/13, $50,000.

21. *Computer Science Student Network Badge System*. MacArthur Foundation, HASTAC/MacArthur Digital Media and Learning Badges for Lifelong Learning, Co-PI with R. Shoop, 4/1/12–3/31/13, $175,000.

22. *Training in Arithmetical Fluency*. National Science Foundation, EHR-0815945, Co-PI with J. Fiez, 9/1/08–8/31/12, $1,241,567.

23. *Assessing the Young Activated Science Learner*. Gordon and Betty Moore Foundation, #2589, PI, CoPIs K. Crowley and R. Dorph. 06/14/10 – 09/30/11, $380,000.

24. *Connecting Research and Teaching Through Product Realization: The Pittsburgh Quality of Life RET Site*. National Science Foundation, EEC-0808675, Co-PI with M. Lovell, A. Landis, and S. Balouris, 6/1/08–12/30/11, $489,700.

25. *Integrating Social and Cognitive Elements of Discovery and Innovation*. National Science Foundation, SBE-0830210, PI, 9/1/08–8/31/11, $214,556.

26. *Biologically Accelerated Learning Technology (BALT) Phase II*. Defense Advanced Research Projects Agency, NBCHC070104, Co-PI with W. Schneider, N. Tokowicz, J. Moss, and T. Huppert, 1/1/09–12/31/10, $2,360,000.

27. *Workshop on Confidential Data Collection for Innovation Analysis in Organizations*. National Science Foundation, SBE 0943337. PI, 9/15/09–9/15/10, $50,312.

28. *Design Tools to Cognitive Processes to Innovation*. National Science Foundation, SBE-0738071. PI, 1/1/08–06/31/10, $373,985 and $74,732 supplement (SBE-0823628).

29. *University of Pittsburgh for Research Experience for Teachers Innovation Generation grant*. Motorola Foundation. Co-PI with M. Lovell, 1/1/08–12/31/09, $50,000.

30. *Biologically Accelerated Learning Technology*. Defense Advanced Research Projects Agency, Co-PI with W. Schneider, N. Tokowicz, and K. VanLehn, 3/1/07–9/30/08, $1,168,781.

31. *Robotics Corridor*. National Science Foundation, DUE-0703104, PI on Subcontract, 5/1/07–4/30/10, $149,729 subcontract.

32. *Evaluation of a Robotics Curriculum*. Heinz Foundation, PI on Subcontract, 1/1/07–12/31/07, $38,054 subcontract.

33. *Evaluation of Open Learning Initiative Logic & Proofs*. Hewlett Foundation, PI on Subcontract, 1/1/07–12/31/07, $43,350 subcontract.

34. *Materials for Innovative Design into Urban High Schools*. Snee-Reinhardt Foundation. PI, 9/1/06–8/31/07, $20,350.

35. *Center for e-Design: IT Enabled Infrastructure and Technology,* National Science Foundation, Co-PI with M. Lovell, 7/06–6/08, $160,000.

36. *Towards a Science of Innovative Design*. National Science Foundation, BCS-0638451. PI, 9/1/06–8/31/08, $160,000.

37. *Workshop on the Scientific Basis of Individual and Team Innovation and Discovery*. National Science Foundation. PI, 5/1/06, $35,696.

38. *Predictive Theories for Better Displays of Uncertainty in Complex Visual Problem Solving*. Office of Naval Research, N000140610053. PI, 10/1/05–12/30/07, $171,600.

39. *Bringing Innovative Design into Urban High Schools on a Sustainable Basis: The University of Pittsburgh Innovative Design RET Site*. National Science Foundation, EEC-0502035. Co-PI with M. Lovell, 4/1/05–3/31/08, $400,000.

40. *The Impact of a Technology-Scaffolded Peer Evaluation Writing System on Writing Skills and Course Content Knowledge*. A. W. Mellon Foundation. PI, 1/1/04–12/31/06, $350,000.

41. *ACT-R/S and the Role of Mental Transformations in Complex and Map-Mediated Navigation*. Office of Naval Research, N000140210113. PI, 10/1/03–9/30/06, $337,044.

42. *SCALE: Systemwide Change for All Learners and Educators*. National Science Foundation, EHR-0227016. Co-PI with L. Resnick, T. Millar, A. Porter, & K. Lesley, 01/01/03–12/31/07, $35,000,000.

43. *Complex Problem-Solving with Certain Representations of an Uncertain World*. Office of Naval Research, N000140310061. PI, 10/1/02–9/30/05, $237,718.

44. *Model-assisted reasoning in science: Effects of model-centered instruction on middle school students' modeling abilities*. National Science Foundation. Co-PI with K. Raghavan, 7/1/02–6/30/05, $1,021,343.

45. *Modeling distant psychological space in complex problem solving*. Office of Naval Research. PI, 6/1/00–8/31/03, $194,982.

46. *Learning leadership skills in distributed training scenarios: Diagnosing strategies in scenarios using Latent Semantic Analysis.* Army Research Institute. PI. 9/1/00–8/31/02, $179,099.
47. *The role of environmental awareness and private speech in adapting and controlling behavior in children with autism.* Autism Society of America Foundation. PI, Co-PI A. Winsler, 10/1/00–9/30/02, $50,000.
48. *CyberE: Cyber environment for organizational adaptability.* Lucite/National Security Agency, Co-PI with J. Foreman & D. Rine, 11/1/00–10/31/01, $138,916.
49. *Cross-cultural views of collaborative research.* Mitsubishi Bank Foundation. Co-PI with T. Okada & K. Crowley, 9/1/94–8/31/98, $54,000.

NATIONAL AND INTERNATIONAL PROFESSIONAL SERVICE

International Society for Design & Development in Education
Chair of Executive Committee, 2011-2014; *Chair of the Eddie Prize committee,* 2010-2014; *Chair of Membership Committee,* 2014-

National Academy of Engineering / NRC Committee Member
K-12 Engineering Education, 2007-09; *K-12 Engineering Education Standards,* 2008-10; *Adaptability and Resilience to Change,* 2017-18

Grant Reviewing Panel Member
NSF (SBE, EHR, CISE), IES, Deutsche Forschungsgemeinschaft, Swiss National Science Foundation

Editorial Board Member
Journal of Educational Psychology, 2008 – present; *Cognitive Science,* 2005 – present; *International Journal of STEM Education,* 2013 – present
Journal of Psychology of Science and Technology, 2006 – 2010; *Cognitive Systems Research,* 2008–10

Conference Organizer
International Society for Design and Development in Education, Boston, MA, September, 2011
Computer-Supported Peer Review in Education: Synergies with Intelligent Tutoring Systems, Pittsburgh, PA, June, 2010
Workshop on Confidential Data Collection for Innovation Analysis in Organizations. Redmond, WA, September, 2009
Innovation and Discovery Workshop: The Scientific Basis of Individual and Team Innovation and Discovery. Ballston, VA, May 2006
The 4th and 6th International Conferences on Cognitive Modeling. Fairfax, VA, July, 2001; Pittsburgh, PA, July, 2004
The 24th Annual Meeting of the Cognitive Science Society. Fairfax, VA, August, 2002
Designing for Science. Pittsburgh, PA, April, 1998

PROFESSIONAL AFFILIATIONS

American Association for the Advancement of Science, Fellow
International Society for Design & Development in Education, Fellow
Association for Psychological Science, Fellow
American Psychological Association, Fellow
Psychonomic Society, Fellow
International Society of the Learning Sciences
National Association for Research in Science Teaching
Cognitive Science Society

TEACHING EXPERIENCE (last 10 years)

Graduate
  Design of Educational Systems, 2009,10,12,15,16,18
  Foundations of Cognition, 2011,13
  Problem-based Learning, 2016

Undergraduate
  Cognitive Science, 2008
  Cognitive Psychology, 2012,14,16,17,18

GRADUATE STUDENTS & POSTDOCS

Graduate student advisees
  Current
    Paulette Vincent Ruz, LSAP
    Eben Witherspoon, LSAP
  Prior
    Kwangsu Cho, Psy, PhD 2005 (Yonsei Univ., Korea)
    Lelyn Saner, Psy, PhD 2008 (Booz Allen Hamilton)
    Anthony Harrison, Psy, PhD 2008 (NRL)
    Xiaohui Kong, ISP, PhD 2009 (Cognitive AI Technologies)
    Melissa Patchan, Psy, PhD 2011 (West Virginia Univ.)
    Eli Silk, Cognitive Studies PhD 2011 (Rutgers Univ.)
    Jooyoung Jang, Psy PhD 2013 (Samsung SDS)
    Sam Abramovich, LSAP PhD 2013 (SUNY Buffalo)
    Paul Egan, Engr PhD 2014 (UTH Zurich)
    Joel Chan, Psy, PhD 2014 (U of Maryland)
    Anita Schuchardt, LSAP, PhD 2016 (U of Minn.)
    Meghan Bathgate, Psy, PhD 2016 (Yale)
    Ross Higashi, LSAP, PhD 2018 (CMU)
    Allison Liu, Psy, PhD 2018 (NC State)

Postdoc advisees
  Current
    Dana Miller, Yong Wu, Aaron Anthony
  Prior
    Brad Morris 2001-2 (Kent State)
    Laura Moin 2003-5 (Pearson)
    Yaron Doppelt 2003-5 (Israeli Ministry of Education)
    Matt Mehalik 2003-5 (Sustainable Pittsburgh)
    Xornam Apedoe 2005-8 (American University of Antigua)
    Michelle Ellefson 2005-7 (Cambridge Univ.)
    Jarrod Moss 2007-8 (Mississippi State)
    Alicia Chang 2008-10 (Google Education)
    Susannah Paletz, 2008-11 (CASL)
    Adar Ben-Eliyahu 2011-12 (Univ. of Haifa)
    Charles Cox 2010-12 (PennState)
    Arava Kallai 2010-13 (Ben-Gurion)
    Jordan Lippman 2011-13 (ISA Learning)
    Amanda Crowell 2011-13 (Eskolta School Research)
    Louis Alfieri, 2010-14 (Robomatter)
    Li Sha 2011-14 (Simon Frasier Univ.)
    Kathy Malone, 2014 (Nazarbayev University)
    Lisa Fazio, 2013-14 (Vanderbilt)
    Miray Tekkumru Kisa, 2014-15 (Florida State Univ.)
    Alok Bakaldi, 2013-16 (Pearson)
    Natalie Pareja Roblin 2013-17 (University of Deusto)
    Yao Xiong, 2017-18 (Imbellus)

EDITED VOLUMES & PROCEEDINGS

Derry, S. J., Schunn, C. D., & Gernsbacher, M. A. (Eds.) (2005). *Interdisciplinary Collaboration: An Emerging Cognitive Science*. Mahwah, NJ: Erlbaum.

Schunn, C. D., Lovett, M. C., Munro, P., & Lebiere, C. (Eds.) (2004). *Proceedings of the 2004 Sixth International Conference on Cognitive Modeling*. Mahwah, NJ: Erlbaum.

Gray, W. D., & Schunn, C. D. (Eds.) (2002). *Proceedings of the 24ᵗʰ Annual Meeting of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Altmann, E. M., Cleeremans, A., Schunn, C. D., & Gray, W. D. (Eds.) (2001). *Proceedings of the 2001 Fourth International Conference on Cognitive Modeling*. Mahwah, NJ: Erlbaum.

Crowley, K., Schunn, C.D., & Okada, T. (Eds.) (2001). *Designing for Science: Implications from Professional, Instructional, and Everyday Science*. Mahwah, NJ: Erlbaum.

JOURNAL ARTICLES, BOOK CHAPTERS, & TRADE PUBLICATIONS (*students & postdocs*)

STEM Learning

M · *Quintana, R.,* & Schunn, C. D. (In press). Who benefits from a foundational logic course? Effects on undergraduate course performance. *Journal of Research on Educational Effectiveness.*

All · McKenney, S. E., & Schunn, C. D. (In press). How can educational research support practice at scale? Attending to educational designer needs. *British Educational Research Journal*.

S · *Betancur, L.,* Votruba-Drzal, E., & Schunn, C. D. (2018). Socioeconomic gaps in science achievement. *International Journal of STEM Education, 5*, 38. 10.1186/s40594-018-0132-5

T · *Guerra, J.,* Schunn, C. D., *Bull, S., Barria-Pineda, J.,* & Brusilovsky, P. (2018). Navigation support in complex open learner models: Assessing visual design alternatives. *New Review of Hypermedia and Multimedia, 3*, 160-192. 10.1080/13614568.2018.148237

S · *Betancur, L.,* Rottman, B. M., Votruba-Drzal, E., & Schunn, C. D. (In press). Analytical assessment of course sequencing: The case of methodological courses in psychology. *Journal of Educational Psychology.*

S · *Tekkumru-Kisa, M.,* Stein, M. K., & Schunn, C. D. (In press). Identifying cognitively demanding science tasks to provide opportunities for students to engage in three-dimensional learning. *The Science Teacher.*

S · *Tekkumru-Kisa, M.,* Schunn, C. D., Stein, M. K., & Reynolds, B. (In press). Change in thinking demands for students across the phases of a science task: An exploratory study. *Research in Science Education.* 10.1007/s11165-017-9645-z

S · *Pareja Roblin, N.,* Schunn, C., Bernstein, D., & McKenney, S. (2018). Exploring shifts in the characteristics of US government-funded science curriculum materials and their (unintended) consequences. *Studies in Science Education, 54*(1), 1-39.

E · *Mandala, M.,* Schunn, C. D., Dow, S., Goldberg, M., & Perlman, J. (2018). Uncovering the practices, challenges, and incentives for engineering design faculty. *International Journal of Engineering Education, 34*(4), 1314-1324.

S · Schunn, C. D., Newcombe, N., Alfieri, L., Cromley, J., Massey, C., & Merlino, J. (2018). Using principles of cognitive science to improve science learning in middle school: What works when and for whom? *Applied Cognitive Psychology, 32*, 225-240.

T · *Witherspoon, E., Higashi, R.,* Schunn, C. D., Shoop, R. (2018). Attending to structural programming features predicts differences in learning and motivation in a virtual robotics programming curriculum. *Journal of Computer Assisted Learning, 34*(2), 115-128. *10.1111/jcal.12219*

S · *Pareja Roblin, N.,* Schunn, C., & McKenney, S. (2018). What are critical features of science curriculum materials that impact student and teacher outcomes? *Science Education, 102*(2), 260-282. 10.1002/sce.21328

ST · *Malone, K. L.,* Schunn, C. D., & *Schuchardt, A.* (2018). Improving conceptual understanding and representation skills through Excel-based modeling. *Journal of Science Education and Technology, 27*(1), 30-44. 10.1007/s10956-017-9706-0

E · Menekse, M., *Higashi, R.,* Schunn, C., & Baehr, E. (2017). Exploring the role of robotics teams' collaboration quality on team performance in a robotics tournament. *Journal of Engineering Education, 106*(4), 564-584. 10.1002/jee.20178

S · *Barstow, B., Fazio, L., Lippman, J., Falakmasir, M.,* Schunn, C., Ashley, K. (2017). The impacts of domain-general vs. domain-specific diagramming tools on writing. *International Journal of Artificial Intelligence in Education, 27*(4), 671-693. 10.1007/s40593-016-0130-z

All · Cannady, M., Moore, D., Votruba-Drzal, E., Greenwald, E., Stites, R. & Schunn, C. (2017). How personal, behavioral, and environmental factors predict working in STEMM vs non-STEMM Middle-Skill Careers. *International Journal of STEM Education, 4*(1): 22. 10.1186/s40594-017-0079-y

T · *Witherspoon, B., Higashi, R. M.,* Schunn, C. D., Baehr, E. C., Shoop, R. (2017). Developing computational thinking in robotics. *ACM Transactions on Computing Education, 18*(1). 10.1145/3104982

SM · *Schuchardt, A., Tekkumru-Kisa, M.,* Schunn, C. D., Stein, M. K., & Reynolds, B. (2017). How much professional development is needed with educative curriculum materials? It depends upon the intended student learning outcomes. *Science Education, 101*(6), 1015–1033. 10.1002/sce.21302

S · *Barstow, B., Fazio, L.,* Schunn, C. D., & Ashley, K. (2017). Experimental evidence for diagramming benefits in science writing. *Instructional Science, 45*(5), 537-556. 10.1007/s11251-017-9415-3

M · *Liu, A.S.,* & Schunn, C. D. (2017). Applying math onto mechanisms: mechanistic knowledge is associated with the use of formal mathematical strategies. *Cognitive Research: Principles and Implications, 2*(6). 10.1186/s41235-016-0044-1

All   Schunn, C. D. (2017). Building from *in vivo* research to the future of research on relational thinking and learning. *Educational Psychology Review*, *29*(1), 97-104. 10.1007/s10648-016-9384-0

All   Nye, B., Mitros, P., Schunn, C., Foltz, P., & Gašević D. (2017). *Why assess? The role of assessment in learning science & society*. In R. A. Sottilare, A. Graesser, X. Hu, & G. Goodwin (Eds.), Design Recommendations for Intelligent Tutoring Systems: Volume 5 - Domain Modeling. Orlando, FL: U.S. Army Research Laboratory.

T   *Higashi, R.*, M., Schunn, C. D., Nguyen, V. H., & Ososky, S. J. (2017). Coordinating evidence across learning modules using digital badges. In R. A. Sottilare, A. Graesser, X. Hu, & G. Goodwin (Eds.), Design Recommendations for Intelligent Tutoring Systems: Volume 5 - Domain Modeling. Orlando, FL: U.S. Army Research Laboratory.

E   *Cox, C.,* Apedoe, X., Silk, E., & Schunn, C. D. (2017). Analyzing materials in order to find design opportunities for the classroom. In S. Goldman & Z. Kabayadondo (Eds.), *Taking Design Thinking to School*, pp. 204-220. New York: Routledge.

T   *Witherspoon, E. B.*, Schunn, C. D., *Higashi, R. M.*, & Baehr, E. C. (2016). Gender, interest and prior experience shape opportunities to learn programming in robotics competitions. *International Journal of STEM Education, 3*(18). 10.1186/s40594-016-0052-1

S   Cromley, J. M., *Weisberg, S. M., Dai, T.*, Newcombe, N. S., Schunn, C. D., Massey, C., Merlino, F. J. (2016). Improving middle school science learning using diagrammatic reasoning. *Science Education, 100*(6), 1184-1213.

SEM   *Cox, C.,* Reynolds, B., *Schuchardt, A.,* & Schunn, C. D. (2016). Using mathematics and engineering to solve problems in secondary level biology. *Journal of STEM Education: Innovations and Research*, *17*(1), 22-30.

STM   Iriti, J., Bickel, W., Schunn, C., & Stein, M. K. (2016). Maximizing research and development resources: Identifying and testing "load-bearing conditions" for educational technology innovations. *Educational Technology Research & Development, 64*, 245-262. 10.1007/s11423-015-9409-2

SM   *Schuchardt, A.*, & Schunn, C. D. (2016). Modeling scientific processes with mathematics equations enhances student qualitative conceptual understanding and quantitative problem solving. *Science Education, 100*(2), 290–320. 10.1002/sce.21198

S   *Crowell, A. J.*, & Schunn, C. D. (2016). Unpacking the relationship between science education and applied scientific literacy. *Research in Science Education, 46*(1), 129-140. 10.1007/s11165-015-9462-1

SM   *Cox, C.,* Reynolds, B., *Schuchardt, A., &* Schunn, C. D., (2016). How do secondary level biology teachers make sense of using mathematics in design-based lessons about a biological process? In L. Annetta & J. Minogue (Eds.), *Connecting Science and Engineering Practices in Meaningful Ways (pp. 339-372).* Heidelberg: Springer.

S   *Bathgate, M.E., Crowell, A.J.*, Cannady, M., Dorph, R. & Schunn, C.D. (2015). The learning benefits of being willing and able to engage in scientific argumentation. *International Journal of Science Education, 37*(10), 1590-1612. 10.1080/09500693.2015.1045958

S   *Peffer, M. E.,* Beckler, M. L., Schunn, C. D., Renken, M., & Revak, A. (2015). Science classroom inquiry (SCI) simulations: A novel method to scaffold science learning. *PLOS ONE, 10*(3), e0120638. 10.1371/journal.pone.0120638

S   *Tekkumru-Kisa, M.,* Stein, M. K., & Schunn, C. D. (2015). A framework for analyzing cognitive demand and content-practices integration: Task analysis guide in science. *Journal of Research in Science Teaching*, *52*(5), 659-685. 10.1002/tea.21208

M   *Kessler, A.*, Stein, M. K., & Schunn, C. (2015). Cognitive demand of model tracing tutor tasks: Conceptualizing and predicting how deeply students engage. *Technology, Knowledge and Learning, 20*(3), 317-337. 10.1007/s10758-015-9248-6

M   *Alfieri, L., Higashi, R.,* Shoop, R., & Schunn, C. D. (2015). Case studies of a robot-based game to shape interests and hone proportional reasoning skills. *International Journal of STEM Education, 2*:4. 10.1186/s40594-015-0017-9

S   *Crowell, A. J.,* & Schunn, C. D. (2014). The context-specificity of scientifically literate action: Key barriers and facilitators across contexts and contents. *Public Understanding of Science*, *23*(6), 718-733.

T   *Liu, A.,* Schunn, C. D., Flot, J., & Shoop, R. (2013). The role of physicality in rich programming environments. *Computer Science Education*, 23(4), 315-331.

E   *Apedoe, X.* & Schunn, C. D. (2013). Strategies for Success: Uncovering what makes students successful in design and learning. *Instructional science*, *41*(4), 773-791.

T   *Liu, A.,* Newsome, J., Schunn, C. D., & Shoop, R. (2013). Kids learning to program in about half the time. *Tech Directions*, *March*, 16-19.

SE   *Apedoe, X.*, *Ellefson, M. E.,* & Schunn, C. D. (2012). Learning together while designing: Does group size make a difference? *Journal of Science Education and Technology*, *21*(1), 83-94.

T   Flot, J., Schunn, C., *Lui, A.,* Shoop, R. (2012). Learning how to program via robot simulation. *Robot Magazine*, *37*, 68-70.

SE   Schunn, C. D., *Silk, E. M., & Apedoe, X. S.* (2012). Engineering in and for science education. In S. M. Carver and J. Shrager (Eds.), *The journey from child to scientist: Integrating cognitive development and the education sciences*. Washington, DC: APA Press.

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Human Computer Interaction & Learning

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Strategy Use & Learning

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General Cognitive Science

Liu, A. S., & Schunn, C. D. (2016). The central questions of spatial cognition. In S. Chipman (Ed.), *The Oxford Handbook of Cognitive Science*. Oxford University Press.

Alfieri, L., Nokes-Malach, T. N., & Schunn, C. D. (2013). Learning through case comparisons: a meta-analytic review. *Educational Psychologist*, 48(2), 87-113.

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Schunn, C. D., & Wallach, D. (2005). Evaluating goodness-of-fit in comparison of models to data. In W. Tack (Ed.), *Psychologie der Kognition: Reden und Vorträge anlässlich der Emeritierung von Werner Tack* (pp. 115-154). Saarbrueken, Germany: University of Saarland Press.

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Schunn, C. D., & Klahr, D. (1998). Production systems: Views on intelligent behavior. In W. Bechtel and G. Graham (Eds.), *A Companion to Cognitive Science* (pp. 542-551). Malden, MA: Blackwell.

Schunn, C. D., & Vera, A. H. (1995). Causality and the categorization of objects and events. *Thinking & Reasoning, 1*(3), 237-284.

INVITED TALKS

Integrating mathematics into core high school biology in ways that deepen science & mathematics at scale. Invited talk presented to the Weizmann Institute, Rehovot, Israel, May 2018.

Scientific sensemaking: A critical resource for science learning in school. Invited talk presented to the Educational Testing Service, Princeton, NJ, January 2018.

What kinds of models are most powerful for supporting science learning?: Models that integrate mechanism. Invited talk presented at the *Berkeley Graduate School of Education Fall 2017 Colloquium Series*. Berkeley, CA, November 2017.

Engineering in/&/or/for science education. Invited talk given at *National Academy of Science Workshop on Science Investigations and Engineering Design for Grades 6-12*. Washington, DC, November 2017.

Adaptability in Individuals. Invited talk given at *National Academy of Engineering Workshop on Preparing the Engineering and Technical Workforce for Adaptability and Resilience to Change.* Washington, DC, November 2017.

Designing effective curricular materials: What actually matters? Invited talk presented at the *Gordon Research Conference: Chemistry Education Research & Practice.* Lewiston, ME, June 2017.

Modeling as an approach for integrating math and science learning. Invited research talk presented to *STEM education research group*, Bahcesehir University. Istanbul, Turkey, June 2017.

Core features of transformative STEM Learning. Invited talk presented at the *BAUSTEM Graduation Ceremony*. Istanbul, Turkey, June 2017.

TASA vision for learning: The power of talk to increase evidence-based learning. Keynote presentation given together with Lauren Resnick at the *TASA 2017 Midwinter Conference*. Austin, TX, January 2017.

How analogies propel team creativity and problem solving. Invited presentation to the *Molecular Biophysics/Structural Biology Seminar Series*, Pittsburgh, January 2017.

Cognitive science principles go to middle school science: How do they work in the real world? *Cognitive science colloquium series* speaker. Villanova, November 2016.

How analogies propel team creativity and problem solving. Invited talk at the *Second Annual RoBUST Symposium - The Science of Team Science.* Wayne State University, October 2016.

A science on inspirational examples in design. Invited talk at the *Congresso Internacional De Investigación en Diseño*, Universidad Nacional de Colombia, Bogota, Colombia, August 2016.

What kinds of models are most powerful for supporting science learning?: Models that integrate mechanism. Invited talk at the *Modeling and Model-Based Reasoning in STEM Conference*, Purdue University, Purdue, IN, August 2016.

Coordinating diverse assessment evidences using digital badges. Invited talk at the *GIFT Symposium*, Princeton, NJ, May 2016.

Social learning via web-based reciprocal peer review. Invited talk at *Learning in Social Contexts*, Pittsburgh, PA, May 2016.

Analogy as the central workhorse for creativity and problem solving in teams. Invited plenary at the *2016 Science of Team Science (SciTS) Conference*, Phoenix, AZ, May 2016.

Analogies in the wilds of engineering creativity. Invited talk at *Engineering a Better Future: Engineering, Social Science and Innovation*, Pittsburgh, PA, April 2016.

Teaching writing in chemistry—Strategies that reduce instructor load and improve learning. Chemistry Colloquium, Dept. of Chemistry, University of Pittsburgh, March 2016.

What kinds of examples inspire creativity? Invited talk, Dept. of English, Jilin University, Changchun, China, November 2015.

Using SWoRD peer review to transform writing instruction. Invited talk, School of Foreign Languages, Northeast Normal University, Changchun, China, November 2015.

What is the most efficient method to score writing?: Computer-based scoring vs. computer-assisted peer scoring. Invited talk, School of Foreign Languages, Northeast Normal University, Changchun, China, November 2015.

The science and art of science paper writing, submission, and publishing. Invited talk, School of Foreign Languages, Northeast Normal University, Changchun, China, November 2015.

How to motivate students' lifelong interest in the sciences? Invited talk, School of Foreign Languages, Northeast Normal University, Changchun, China, November 2015.

Strategic roles of leadership and information systems in adaptive team expertise: A quantitative case study of the mars exploration rover teams. Invited talk presented to the *Networking and Information Technology R&D SEW Group*, Arlington, VA, May 2015.

The power of peer feedback. Keynote talk presented at *Writing in ELA and Mathematics: Setting Students Up for Success*. Baltimore, MD, May 2015.

When (and why) do mathematical representations help students think scientifically? Keynote talk at *Diagrams as Vehicles of Scientific Reasoning*, Pittsburgh, PA, April 2015.

How does the nature of badge content affect badge value to learning? Invited presentation to TiER1 Performance. Covington, KY, March 2015.

Principles of cognitive science: Instructional judo for improved math and science learning. Keynote address presented at the *Math Science Collaborative Network Connections* event, Pittsburgh, PA, February 2015.

The feedback bottleneck problem in CC and NGSS: Can scaffolded student peer review be the savior? Invited presentation to the RAND Psychology Speaker Series, Pittsburgh, PA, November 2014.

When STEM integration improves performance in both science and mathematics: The good, the bad, and the ugly of Mendelian inheritance. Invited colloquium, School of Education, University of Delaware, Newark, DE, November 2014.

Measuring the right things: Where do you want your learners to go? Symposium presentation at the *2014 NSF AISL PI Meeting*. Washington, DC, August 2014.

Spatial mechanisms at play: Thinking and learning with physical robots. Keynote talk presented at the *1st Pennsylvania Spatial Cognition Symposium*. State College, PA, May 2014.

The impact of cognitive science principles on middle school science learning: The outcomes of a large randomized control trial study. Invited talk given to the School of Education, University of Tokyo. Tokyo, Japan, November 2013

Bridging Formal and Informal Science Learning through the Concept of Activation. Invited talk given at *Activating Inspiration and Creativity: The Tokyo International Symposium for Informal Learning in Art, Science, and Technology*. Tokyo, Japan, November 2013.

Linguistics research/practice in peer review. Invited talk given to the School of Foreign Languages, Beihang University, Beijing China, August 2013.

Engineering high school biology into the 21st Century. Invited talk presented at *STEMSmart: Lessons Learned from Successful Schools*. Atlanta, GA, June 2013.

The search spaces of adaptive expertise in large team science. Invited talk presented at the *Symposium on Cognitive Systems and Discovery Informatics*. Mountain View, CA, June 2013.

Learning to write in college chemistry labs: How to make peer review work. Invited talk presented at the *Gordon Research Conference: Chemistry Education Research & Practice*. Newport, RI, June 2013.

Psychology of science and engineering. Invited talk presented at the *Art & Science of Science and Technology Forum & Roundtable*. Sandia National Laboratories, Albuquerque, NM, June, 2013

Teaching science with math & engineering in diverse classrooms. Invited talk presented at *STEM Smart: Lessons Learned from Successful Schools*. Baltimore, MA, March, 2013

Optimizing example distance to improve engineering ideation. Invited presentation at *Open Innovation: The Journey from Ideation to Innovation.* Austin, TX, November, 2012

The transfer between formal and informal learning environments in science. Invited plenary presentation at the *Annual Great Lakes Planetarium Association Conference*, Pittsburgh, PA, October, 2012

Science Activation. Invited plenary presentation at the *2012 National Conference on Summer Learning*, Pittsburgh, PA, October, 2012

Optimizing example distance to improve engineering ideation. Invited plenary presentation at the *SciSIP Principal Investigators' Conference*, Washington, DC, September, 2012

Strategic visual support can inspire or hinder teams: What underlies these effects? Invited talk at *International Forum of Visual Practitioners 2012 Conference*, Pittsburgh, July, 2012

Gap-closing benefits from design-based learning and the role of the administrator. Invited talk at *The Cincinnati Engineering Enhanced Math and Science Program (CEEMS) Administrators' Academy*, Cincinnati, OH, July, 2012

Insights from the learning sciences for measuring for innovation in education. Invited talk at the Grantmakers for Education Member Briefing, *A Renaissance of Wonder: Supporting Creativity through Digital Media and Learning*, Pittsburgh, PA, April, 2012

Learning to argue scientifically using computer and web-based peer feedback. Invited talk at the *LTAC Frontier Lecture Series*, Texas A&M University, February, 2012

Obtaining wisdom via scaffolded peer review. Invited talk at the *iSchool Colloquium Series*, University of Pittsburgh, December, 2011

Motivating students in & out of classrooms, Invited talk to the *Faculty Development Series* of the Center for Instructional Development & Distance Education, University of Pittsburgh, October, 2011

Science Learning Activation: A new framework for building gender equity. Invited talk at Ewha Womans University, Seoul, South Korea, April, 2011

On the benefits and pitfalls of analogies for innovative design. Invited talk at Sungkyunkwan University, Department of Interactional Studies, Seoul, South Korea, March, 2011

Design principles for adding game-like features to Robo Math. Invited talk at the *Center for Advanced Technology in Schools (CATS) Workshop For Research on Games and Learning*, Los Angeles, CA, January, 2011

What makes engineering teams succeed? Better consideration of options. Invited talk at the *3rd biennial conference of the International Society for Psychology of Science and Technology*, Berkeley, CA, August, 2010

What does it mean for cognitive psychologists to study groups of scientists at work?: The interplay of cognitive and social processes. Invited talk at the *2nd Purdue Symposium on Psychological Sciences*, West Lafayette, IN, June, 2010

Standards in K-12 Tech Literacy and Engineering: Implications for Design and Research. Invited symposium presentation at the *2009 NSF DR-K12 PI Meeting*. Washington, DC, November, 2009

Engineering in/&/or/for science education. Invited talk at the *2009 Carnegie Symposium From Child to Scientist: Mechanisms of Learning and Development*. Pittsburgh, PA, October, 2009

Peer reviewers as effective audience, teacher, and learner. Keynote speaker to the *Fifth Biennial Conference of the European Association for the Teaching of Academic Writing*. Coventry, England, July, 2009

Diving deeper into the black box: Sampling from automated video collection to understand what influences innovation processes. Invited symposium presentation at *Advancing the Study of Innovation and Globalization in Organizations*. Nuremberg, Germany, July, 2009

Learning experiment design and analysis from worked examples. Invited symposium presentation at the *Council of Science Editors 52nd Annual Meeting*. Pittsburgh, PA, May, 2009

From tools to innovation: What cognitive processes lie in between? Invited talk at the *Purdue Mechanical Engineering Graduate Seminar*. West Lafayette, IN, December, 2008

Analogies between science and design: What models of science can learn from models of engineering design? Invited talk given at the *Symposium on Computational Approaches to Creativity in Science*. Palo Alto, CA, March, 2008

The science of educational reform: The case of writing in the disciplines. Keynote talk to the *2008 Educational Research Exchange*. Kent, OH, March, 2008

Do universities teach thinking? Invited talk at the *Kent State Learning Communities Series*. Kent, OH, October, 2004

Learning to be a good reviewer through scaffolded classroom-based reciprocal evaluation. Invited mini-session presentation to the *2004 APA Education Leadership Conference*. Washington, DC, September, 2004

Using model-based reasoning in psychology education. Invited plenary panel presentation to the *2004 APA Education Leadership Conference*. Washington, DC, September, 2004

Models of seeing with visualizations. Invited panel presentation at the *Human Systems Integration Symposium*. Newport, RI, May, 2004

Supporting collaborative scientific discovery. Invited talk at the *NASA Information Science HCC review meeting*. Pittsburgh, PA, March, 2003

On the value of fitting models to data. Paper presented at the *Digital Human Modeling for Design and Engineering Conference*. Crystal City, VA, June, 2001

Psychologist in a box: Capturing the skills of the expert scientist using ACT-R. Invited talk given at the *Navy Center for Applied Research in Artificial Intelligence Seminar Series,* Naval Research Lab, October, 2000

Mechanisms of adaptivity: Insights from dogs who can't learn new tricks. Invited talk given to the *Psychology Department Lecture Series*, University of Maryland, College Park, September, 2000

What makes collaborations across a distance succeed?: The case of the Cognitive Science community. Invited talk given to the Psychology Institute, Basel, Switzerland, July, 2000

Now they see the point: Improving science reasoning through making predictions. Invited talk given to the Psychology Institute, Basel, Switzerland, July, 2000

What gestures reveal about the scientist's mind. Invited talk given at the *Krasnow Institute Lecture Series*, Fairfax, VA, November, 1999

Acquiring expertise in science: What, when, and how. Invited talk given to the Psychology Institute, Basel, Switzerland, June, 1998

CONFERENCE PRESENTATIONS & PUBLICATIONS

Elizondo, J., Gallardo Cordova, K. E., & Schunn, C. D. (2018, December). La calidad de la retroalimentación entre pares en relación con el diseño instruccional: Un estudio comparativo en MOOCs de energía y sustentabilidad. Paper presented at *5° Congreso Internacional de Innovación Educativa del Tecnológico de Monterrey*. Monterrey, Mexico.

Hosseini, R., Akhuseyinoglu, K., Peterson, A., Schunn, C. D., & Brusilovsky, P. (2018, November). Interactive program construction examples for learning programming. Paper presented at *Koli Calling 2018: International Conference on Computing Education Research*. Koli, Finland.

Vincent Ruz, P., & Schunn, C. D. (2018, August). The influence of gender and ethnicity on student's endorsement of science identity. Talk presented at the *4th Annual Gender & STEM Network Conference*. Eugene, OR.

Vincent Ruz, P., & Schunn, C. D. (2018, August). The role of attitudinal factors on the gendered nature of Pre-Med STEM course attrition. Talk presented at the *4th Annual Gender & STEM Network Conference*. Eugene, OR.

Pareja Roblin, N., McKenney, S., & Schunn, C. D. (2018, June). Measuring the scale outcomes of curriculum materials. Paper presented at the *International Conference of the Learning Sciences*. London, UK.

Tekkumru Kisa, M., & Schunn, C. D. (2018, June). Designing an educative curriculum embedded within an interactive web-based platform to facilitate teacher learning. Paper presented at the *International Conference of the Learning Sciences*. London, UK.

Witherspoon, E. B., & Schunn, C. D. (2018, March). Women give up on pre-med plans even when they do well in STEM 'weeder' classes. Talk presented at the *2018 NARST Annual International Conference*, Atlanta, GA.

Vincent Ruz, P., Page, L., & Schunn, C. D. (2018, March). The effect of early undergraduate research experiences on STEM degree attainment. Talk presented at the *SREE Spring 2018 Conference*. Washington, DC.

Schunn, C. D. (2017, November). Designing effective curricular materials: What actually matters? Invited talk presented at the *2017 Annual Conference of International Society for Design and Development in Education*. Berkeley, CA.

Mandala, M., Cole, E., Schunn, C., Goldberg, M., & Pearlman, J. (2017, August). Comparison of collective team and individual student peer feedback on design. Paper presented at the *14th International Conference on Design Education*. Cleveland, OH.

Schunn, C. D. (2017, July). Scientific sensemaking: A critical resource for science learning in school. Talk presented at the *39th Annual Meeting of the Cognitive Science Society*, London, UK.

Guerra-Hollstein, J., Barria-Pineda, J., Schunn, C. D., Bull, S., & Brusilovsky P. (2017, July). Fine-grained open learner models: complexity versus support. Paper presented at the *25th Conference on User Modeling, Adaptation, and Personalization*, Bratislava, Slovakia.

Nokes-Malach, T., Marshman, E., Kalender, Y., Schunn, C., & Singh, C. (2017, July). Investigating attitudes and performance of students in introductory physics courses: Gender differences. Poster presented at *Physics Education Research Conference 2017*. Cincinnati, OH.

Vincent Ruz, P., Dorph, R., & Schunn, C. D. (2017, April). The experiences and malleable factors that support the development of science identity in middle school students. Symposium talk presented at *2017 AERA Annual Meeting*, San Antonio, TX.

Vincent Ruz, P., Binning, K. R., Schunn, C. D. & Grabowski, J. (2017, April). The effect of SAT math scores on women's self-efficacy and its implications for chemistry learning. Paper presented at the *2017 NARST Annual International Conference*, San Antonia, TX.

Schuchardt, A., Grabowski, J., & Schunn, C. D. (2017, April). What attitudes matter for homework and exams across first and second year weeder chemistry courses? Poster presented at the *2017 NARST Annual International Conference*, San Antonia, TX.

Betancur, L., Votruba-Drzal, E., & Schunn, C. D. (2017, April). Socioeconomic gaps in science achievement. Poster presented *Biennial Meeting of Society Research in Child Development*, Austin, TX.

Chan, J., & Schunn, C. D. (2016, November). Old hat, useless or impossible? The importance of separating quality into impact and feasibility when studying real-world creative ideation. Poster presented at the *2016 Annual Meeting of the Psychonomic Society*, Boston, MA.

Bernstein, D., Drayton, B., McKenney, S., Schunn, C. (2016, September). Designing supports for scientific discourse and argumentation. Poster presented at the *International Society for Design and Development in Education*, Utrecht, NL.

Pareja Roblin, N., Bernstein, D., McKenney, S., Schunn, C. D., (2016, September). Scalability of Science Curriculum Materials: A Review of Federally Funded Projects in the United States. Poster presented at the *International Society for Design and Development in Education*, Utrecht, NL.

Schunn, C. D. (2016, September). When and why good science reading strategies go awry: insights from fMRI. Symposium presentation at the *2016 International Mind, Brain and Education Society Conference*, Toronto, Canada.

Schuchardt, A., Malone, K., and Schunn, C. (2016, August). Student selection of relevant elements during computational modeling increases conceptual understanding in an integrated STEM biology unit. Poster presented at the *Modeling and Model-Based Reasoning in STEM Conference,* Purdue, IN.

Baikadi, A., Schunn, C. & Ashley, K. (2016, June). Impact of revision planning in peer-reviewed writing. In *Proceedings of the Second Workshop on Computer-Supported Peer Review in Education*, Raleigh, NC.

Patchan, M., Schunn, C., & Clark, R. (2016, June). When trying to be helpful, peer reviews are also more accurate. In *Proceedings of the Second Workshop on Computer-Supported Peer Review in Education*, Raleigh, NC.

Wang, Y., Wang, H., Schunn, C., & Baehr, E. Choosing a better moment to assign reviewers in peer assessment: the earlier the better, or the later the better? In *Proceedings of the Second Workshop on Computer-Supported Peer Review in Education*, Raleigh, NC.

Baikadi, A., Schunn, C., Demmans-Epp, C., & Long, Y. (2016, June). Redefining "what" in analyses of who does what in MOOCs. In Proceedings of the *Ninth International Conference on Educational Data Mining (*pp. 569-570), Raleigh, NC.

Bernstein, D., Drayton, B., McKenney, S., & Schunn, C. (2016, June). Designing science curriculum for implementation at scale: Considerations for diverse and resource-limited settings. Paper presented at the *12th International Conference of the Learning Sciences*, Singapore.

Schuchardt, A., Schunn, C. D., & Godley, A. (2016, April). High school students' assessments of science concepts and explanations through peer review of writing. Paper presented at the *2016 NARST Annual International Conference*, Baltimore, MD.

Muhsin, M., Schunn, C., Higashi, R., & Behr, E. (2016, April). Exploring the challenges and successes of integrating robotics in K-12 learning environments. Paper presented at the *2016 NARST Annual International Conference*, Baltimore, MD.

Schunn, C. D. (2016, April). Informal science learning experiences that (de)activate. Paper presented at the *2016 Annual Meeting of the American Educational Research Association*, Washington, DC.

Malone, K., Schuchardt, A., & Schunn, C. (2016, March). Modeling tools, engineering practices, and invasive species. Paper presented at *2016 NSTA National Conference on Science Education*, Nashville, TN.

Menekse, M., Schunn, C., Higashi, R., & Baehr, E. (2015, Oct). An investigation of the relationship between K-8 Robotics teams' collaborative behaviors and their performance in a robotics tournament. Paper presented at *Frontiers in Education 2015*, El Paso, TX.

Liu, A. S., Schunn, C. D., Fiez, J., & Libertus, M. (2015, July). Symbolic integration: Non-symbolic number knowledge influences symbolic number judgments. Paper presented at the *37th Annual Meeting of the Cognitive Science Society*, Pasedena, CA.

Barstow, B. J., Schunn, C. D., Fazio, L., Falakmasir, M., & Ashley, K. (2015, July). Improving science writing in research methods classes through computerized argument diagramming. Poster presented at the *37th Annual Meeting of the Cognitive Science Society*, Pasedena, CA.

Egan, P, Cagan, J., LeDuc, P., Schunn, C., Moore, J., & Chiu, F. (2015, July). The D3 science-to-design methodology: Automated and cognitive-based processes for discovering, describing, and designing complex mechanical systems. Paper presented at *ASME International Conference on Design Theory and Methodology*, Boston, MA.

Egan, P., Schunn, C., Cagan, J., & LeDuc, P. (2015, July). Development of graphical user interfaces to improve human design proficiency for complex multi-level biosystems. Paper presented at *ASME Computers and Information in Engineering Conference*, Boston, MA.

Egan, P., Ho, T., Schunn, C. D., Cagan, J., & LeDuc, P. (2015, July). The effects of training background and design tools on multi-level biosystems design. Paper presented at the *International Conference on Engineering Design (ICED2015)*, Milan, Italy.

Baikadi, A., Schunn, C., & Ashley, K. (2015, June). Understanding revision planning in peer-reviewed writing. Paper presented at the *8th International Conference on Educational Data Mining*, Madrid, Spain.

Paletz, S. B. F., Chan, J., & Schunn, C. D. (2015, June). The Mars Exploration Rover Mission: Findings from a Large Multidisciplinary Team. Paper presented at the *2015 Science of Team Science (SciTS) Conference*, Bethesda, MD.

Schuchardt, A., & Schunn, C. D. (2015, April). Leveraging mathematical models in an integrated biology and engineering curriculum enhances student learning. Paper presented at the *2015 NARST Annual International Conference*, Chicago, IL.

Malone, K., Schuchardt, A., & Schunn, C. D. (2015, April). Scalable approaches to modeling and engineering in high school biology. Paper presented at the *2015 NARST Annual International Conference*, Chicago, IL.

Cromley, J. G., Alfieri, L., Massey, C., Merlino, F. J., Newcombe, N. S., & Schunn, C. D. (2015, April). Improving middle-school science instruction with analogical reasoning. Symposium paper presented at the *2015 Annual Meeting of the American Educational Research Association*, Chicago, IL.

Egan, P., Cagan, J., Schunn, C., & LeDuc, P. (2014, August). Cognitive-based search strategies for complex bio-nanotechnology design derived through symbiotic human and agent-based approaches. Paper presented at the *ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*. Buffalo, NY.

Paletz, S. B. F., Chan, J., & Schunn, C. D. (2014, July). Making conflicts work: Team success moderates the relationship between micro-conflicts and uncertainty. Paper presented at the *Interdisciplinary Network for Group Research (INGRoup) Conference*, Raleigh, NC.

Liu, A., & Schunn, C. D. (2014, July). Applying math onto mechanism: Investigating the relationship between mechanistic and mathematical understanding. Paper presented at the *36th Annual Meeting of the Cognitive Science Society*. Quebec City, Canada.

Chan, J., Schunn, C. D., & Dow, S. (2014, July). Overreliance on conceptually far sources decreases the creativity of ideas. Paper presented at the *36th Annual Meeting of the Cognitive Science Society*. Quebec City, Canada.

Egan, P., Schunn, C. D., Cagan, J., & LeDuc, P. (2014, July). Surprisingly stochastic: Learning and application of emergent behavior using interactive simulations of nano-mechanical biological systems. Poster presented at the *36th Annual Meeting of the Cognitive Science Society*. Quebec City, Canada.

Egan, P., Schunn, C. D., Cagan, J., & LeDuc, P. (2014, July). Multiscale modeling and optimization of natural and biomimetic myosin-based systems. Paper presented at the World Congress of Biomechanics. Boston, MA.

Falakmasir, M. H., Ashley, K., Schunn, C., & Litman, D. (2014, June). Identifying thesis and conclusion statements in student essays to scaffold peer review. Paper presented at the *12th International Conference on Intelligent Tutoring Systems*. Honolulu, HI.

Hashemi, H. B., & Schunn, C. D. (2014, June). A tool for summarizing students' changes across drafts. Paper presented at the *12th International Conference on Intelligent Tutoring Systems*. Honolulu, HI.

Schunn, C. D. (2014, May). Sketches, examples, and other terrible things in engineering ideation. Talk given that the *Sketching and Education Workshop*. Evanston, IL.

Tekkumru-Kisa, M., Stein, M. K., & Schunn, C. D. (2014, April). A framework for assessing cognitive demand of instructional tasks in the NGSS era. Paper presented at the *2014 NARST Annual International Conference*, Pittsburgh, PA.

Bathgate, M., & Tuninetti, A., & Schunn, C. D. (2014, April). Stepping-stones or dead-ends: Understanding and developing learning pathways across science programs in an urban setting. Paper presented at the *2014 NARST Annual International Conference*, Pittsburgh, PA.

Crowley, K., Schunn, C.D., Bathgate, M., Kehoe, S., Louw, M., Wardrip, P. (2014, April). *Designing for Activation: Building STEM Learning Pathways for Pittsburgh's Youth*. Paper presented at the *2014 NARST Annual International Conference*, Pittsburgh, PA.

Chan, J., Schunn, C. D. & Dow, S. (2014, February). Conceptual distance matters when building on others' ideas in crowd-collaborative innovation platforms. Interactive poster presented at *The 17th ACM Conference on the Computer Supported Cooperative Work and Social Computing*, Baltimore, MD.

Egan, P., Cagan, J., Schunn, C.D. & LeDuc, P. (2013, December). Robust active material components designed with agent-based myosin-actin simulations. Paper presented at the *2013 Fall Meeting of the Materials Research Society*, Boston, MA.

Chan, J., & Schunn, C. D. (2013, November). Near rather than far analogical sources leads to success in a design competition. Poster presented at the *2013 Annual Meeting of the Psychonomic Society*, Toronto, Canada.

Liu, A., & Schunn, C. D. (2013, November). Investigating the level of mechanistic understanding in physical versus virtual learning environments. Poster presented at the *2013 Annual Meeting of the Psychonomic Society*, Toronto, Canada.

Chan, J. & Schunn, C. D. (2013, November). Using topic modeling to study the effects of inspiration source conceptual distance on success in a large scale online design competition. Talk presented at the *2013 Annual Conference of the Society for Computers in Psychology*, Toronto, Canada.

Schunn, C. D., Dorph, R., Cannady, M., Crowley, K., & Shields, P. M. (2013, September). Science learning activation: Positioning youth for success. Talk presented that the *Fall 2013 Conference of the Society for Research on Educational Effectiveness*, Washington, DC.

Egan, P., Cagan, J., Schunn, C.D. & LeDuc, P. (2013, August). A modular design tool for visualizing complex multiscale systems. Paper presented at the *International Conference on Engineering Design 2013*, Seoul, Korea.

Egan, P., Cagan, J., LeDuc, P., & Schunn, C.D. (2013, August). Utilizing emergent levels to facilitate complex systems design: Demonstrated in a synthetic biology domain. Paper presented at the *Design Automation Conference / IDETC 2013*, Portland, OR.

Fu, K., Chan, J., Schunn, C.D., Cagan, J., Kotovsky, K. (2013, August). Validating the basis for an automated design-by-analogy tool through comparison to expert thinking. Paper presented at the *25th Anniversary of the Design Theory and Methodology Conference / IDETC 2013*, Portland, OR.

Paletz, S.B.F., Chan, J., & Schunn, C. D. (2013, July). Scientists and student engineers. Presentation in a panel on Translating Research Results Across Group Contexts at *The Eighth Annual INGRoup Conference*, Atlanta, GA.

Paletz, S.B.F., Chan, J., & Schunn, C. D. (2013, July). Micro-conflicts and emotion in engineering design team conversations. Presentation in symposium on Do You Feel What I Feel? Dynamic Emotional Processes in Groups and Teams at *The Eighth Annual INGRoup Conference*, Atlanta, GA.

Falakmasir M, Ashley K.D., & Schunn C.D. (2013, July). Using argument diagramming to improve peer grading of writing assignments. *Workshop on Massive Open Online Courses* (moocshop); AIED 2013 Conference, Memphis, TN.

Bathgate, M., Crowell, A., Nagy-Catz, K., & Schunn, C. D. (2013, June). Adolescent perceptions of purposes and risks of discourse impact middle school science learning. Paper presented at the *43rd Annual Meeting of the Jean Piaget Society*, Chicago, IL.

Alfieri, L., & Schunn, C. (2013, May). Individual and contextual investigations of a cognitive-based intervention. Poster presented at the *Conference on Improving Middle School Science Instruction Using Cognitive Science*. Washington, DC

Tekkumru Kisa, M., Stein, M. K., & Schunn, C. D. (2013, April). Teachers' learning to analyze cognitive demand of science tasks. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, San Francisco, CA.

Kessler, A., Stein, M. K., & Schunn, C. (2013). Cognitive demand of robot algebra tutor tasks: How students are really enacting tasks. Paper presented at the Annual meeting of the American Educational Research Association, San Francisco, CA.

Ben-Eliyahu, A., Sha, L., Bathgate, M., & Schunn, C. D. (2013, April). But what if I don't like science: Gender differences in science engagement for youth. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, San Francisco, CA.

Liu, A. & Schunn, C. D. (2013, April). Physical versus virtual interactions influence formation of representations and preparedness for learning. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, San Francisco, CA.

Abramovich, S. & Schunn, C. D. (2013, April). The relationship between educational badges and motivation. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, San Francisco, CA.

Egan, P., Cagan, J., Schunn, C.D., & LeDuc, P. (2013, February). Probing why nature may favor heterogeneous myosin systems through single molecule and systems level approaches. Poster presented at the *57th Annual Meeting of the Biophysical Society*, Philadelphia, PA.

Egan, P., Cagan, J., Schunn, C.D., & LeDuc, P. (2012, October). Investigating heterogeneous system performance of synthetic myosins computationally. Paper presented at the *AIChE 2012 Annual Meeting*, Pittsburgh, PA.

Sharma, B., Reynolds, B., & Schunn, C. (2012, October). Student-directed learning: Approach to sustainability and engineering education. Paper presented at the *2012 Frontiers in Education Conference*, Seattle, WA.

Fu, K., Chan, J., Cagan, J., Kotovsky, K., Schunn, C., & Wood, K. (2012, August). The meaning of "near" and "far": The impact of structuring design databases and the effect of distance of analogy on design output. Paper presented at the *24th International Conference on Design Theory and Methodology (DTM)*, Chicago, IL.

Egan, P., Cagan, J., Schunn, C., & LeDuc, P. (2012, August). Design of complex nanoscale systems using multi-agent simulations and structure-behavior-function representations. Paper presented at the *24th International Conference on Design Theory and Methodology (DTM)*, Chicago, IL.

Paletz, S. B. F., Tollinger, I. T., Schunn, C. D., & Vera, A. (2012, August). The development of routine and adaptive expertise in a large team: The proximal associations of leadership and communication. In R. Nouri (Chair), The duality of creativity and innovation. Paper present at the *Academy of Management's Annual Convention*, Boston, MA.

Chan, J., & Schunn, C. D. (2012, July). Re-examining the impact of analogies on creative ideation search patterns in engineering design. Talk given at the *4th Biennial Conference of the International Society of the Psychology of Science and Technology*, Pittsburgh, PA.

Neff, R., Jankovic, S., Wolf, M., Tacey, P., Paletz, S., & Schunn, C. D. (2012, July). Specific emotional affect during conflict in student engineering teams. Poster presented at the *4th Biennial Conference of the International Society of the Psychology of Science and Technology*, Pittsburgh, PA.

Jang, J., & Schunn, C. D. (2012, July). Unpacking cognitive benefits of distributed complex visual displays for expert and novice scientists. Poster presented at the *4th Biennial Conference of the International Society of the Psychology of Science and Technology*, Pittsburgh, PA.

Burstein, S., Paletz, S., & Schunn, C. D. (2012, July). Task, process, and relationship micro-conflict in student engineering design teams. Poster presented at the *4th Biennial Conference of the International Society of the Psychology of Science and Technology*, Pittsburgh, PA.

Elfenbein, M., Lippman, J., Diabes, M., Luchau, C., Lynch, C., Ashley, K., & Schunn, C. D. (2012, July). To revise or not to revise: What influences undergraduates to implement peer critiques of their argument diagrams. Poster presented at the *4th Biennial Conference of the International Society of the Psychology of Science and Technology*, Pittsburgh, PA.

Xiong, W., Litman, D., Wang, J., & Schunn, C. D. (2012, June). An interactive analytic tool for peer review. Poster presented at *The 7th Workshop on Innovative Use of NLP for Building Educational Applications*, Montreal, Canada.

Higashi, R., Abramovich, S., Schunn, C., & Shoop, R. (2012, June). The roles of badges in the Computer Science Student Network. Paper presented at the *Games Learning Society 8.0*, Madison, WI.

Abramovich, S., & Schunn, C. D. (2012, April). The influence of teacher created metadata in online resource exchange. Paper presented at *Emerging Web Technologies, Facing the Future of Education*, Lyon, France.

Sha, L., Schunn, C. D., & Bathgate, M. (2012, April). Activated science learners as self-regulation agents. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, Vancouver, Canada.

Nagy Catz, K., Crowell, A., Burmester, K. O., Schunn, C. D., & Dorph, R. (2012, April). Scientific sense making in context. Poster presented at presented at the *Annual Meeting of the American Educational Research Association*, Vancouver, Canada.

King, S. O., Stein, M. K., Schunn, C. D., & Boston, M. D. (2012, April). Designing educative teacher guides for informal learning. Paper presented at presented at the *Annual Meeting of the American Educational Research Association*, Vancouver, Canada.

Lau, M., Stein, M. K., Reynolds, B. S., Schunn, C. D., Ruppel, R., Cox, C. D., & Bender, S. (2012, April). Educative or not: how teachers' framing of activities impacts their Learning From Curricular Materials. Paper presented at presented at the *Annual Meeting of the American Educational Research Association*, Vancouver, Canada.

Cox, C., Reynolds, B., Schuchardt, A., & Schunn, C. (2012, April). Get the lazy math hiding in secondary biology curricula to do some work for a change. Paper presented at the *2nd P-12 Engineering and Design Research Summit*, Washington, DC.

Kallai, A. Y., Schunn, C. D., & Fiez, J. F. (2012, April). Automaticity in processing of numbers that were never presented: An fMRI Study. Poster presented at the *Nineteenth Annual Cognitive Neuroscience Society Meeting*, Chicago, IL.

Schunn, C. D. (2012, March). Cognitive science learning principles in action: Contrasting cases. Presentation given at the *NSTA 2012 National Conference on Science Education*, Indianapolis, IN.

Verstynen, T. D., Workman, B., Braun, E., Phillips, J., Schunn, C., & Schneider, W. (2011, November). The behavioral, neurophysiological and anatomical changes following long-term motor skill learning. Poster presented at the *Society for Neuroscience*, Washington, DC.

Kallai, A. Y., Schunn, C. D., & Fiez, J. A. (2011, November). An fMRI study of Arithmetic training: different activation patterns of basal ganglia due to differences in training procedures. Poster presented at the *52nd Annual Meeting of the Psychonomic Society*, Seattle, WA.

Kallai, A. Y., Schunn, C. D., Ponting, A. L., & Fiez, J. A. (2011, September). Improving foundational number representations through simple arithmetical training. Paper presented at the *Fall 2011 Research Conference of the Society for Research in Educational Effectiveness*, Washington, DC.

Alfieri, L., Nokes, T. J., & Schunn, C. D. (2011, September). Aligning the structural components across learning tasks of case comparisons. Paper presented at the *Fall 2011 Research Conference of the Society for Research in Educational Effectiveness*, Washington.

Jang, J., & Schunn, C. D. (2011, September). Physical design tools support and hinder innovative engineering design. Paper presented at the *Human Factors and Ergonomics Society's 55th Annual Meeting*, Las Vegas, NV.

Egan, P., LeDuc, P., Cagan, J., & Schunn, C. (2011, August). A design exploration of genetically engineered myosin motors. Paper presented at the *37th Design Automation Conference*. Washington, DC.

Krager, J., Wood, K., Crawford, R., Jensen, D., Cagan, J., Schunn, C., Linsey, J., & White, C. (2011, August). Understanding innovation: A study of perspectives and perceptions in engineering. Paper presented at the *ASME 2011 International Design Engineering Technical Conference*. Washington, DC.

Chan, J.C.S., Fu, K., Schunn, C. D., Cagan, J., Wood, K., & Kotovsky, K. (2011, August). On the effective use of design-by-analogy: The influences of analogical distance and commonness of analogous designs on ideation performance. Paper presented at the *18th International Conference on Engineering Design*, København, Denmark.

Paletz, S. B., & Schunn, C. D. (2011, August). Unpacking Problem-Solving Conversations: When Conflict Sparks Analogies. Paper presented at the *Academy of Management Annual Meeting*, San Antonio, TX.

Moss, J., Schunn, C. D., Schneider, W. S., McNamara, D. (2011, July). An fMRI study of zoning out during strategic reading comprehension. Poster presented at the *33rd Annual Meeting of the Cognitive Science Society*, Boston, MA.

Jang, J., & Schunn, C. D. (2011, July). Student's adaptive choice of instruction format. Poster presented at the *33rd Annual Meeting of the Cognitive Science Society*, Boston, MA.

Schunn, C. D. & SLAL (2011, July). Public science literacy vs. science careers. Talk given at the conference on *Public Understanding and Public Engagement with Science*. New York, NY.

Silk, E. M., Higashi, R., & Schunn, C. D. (2011, June). Resources for Robot Competition Success: Assessing Math Use in Grade-School-Level Engineering Design. Paper presented at the *Annual Conference of the American Society for Engineering Education*. Vancouver, B.C., Canada.

Abramovich, S., Higashi, R., Hunkele, T., Schunn, C. D., & Shoop, R. (2011, June). An achievement system to increase achievement motivation. Papers presented at the *Games + Learning + Society Conference 7.0*, Madison, WI.

Silk, E. M., & Schunn, C. D. (2011, June). Calculational versus mechanistic mathematics in propelling the development of physical knowledge. Paper presented at the *41st Annual Meeting of The Jean Piaget Society*, Berkeley, CA.

Bathgate, M., Brahms, L., Schunn, C. D., & Crowley, K. (2011, June). Capturing content and context effects on engagement with science learning. Paper presented at the *41st Annual Meeting of The Jean Piaget Society*, Berkeley, CA.

Schunn, C. D., Patchan, M. M., & Sieg, W. (2011, May). How and For Whom Does Accelerated Learning Work? The Case of the Open Learning Initiative Course - Logic & Proofs. Paper presented at the *Open Educational Resources 2011*, Manchester, UK.

Schunn, C. D., Richey, J. E., Alfieri, L. (2011, May). Contrasting cases can facilitate hands-on middle school science learning at scale. Symposium presentation at the *Association for Psychological Science 23rd Annual Convention*, Washington, DC.

Kallai, A., Ponting, A., Schunn, C.D., & Fiez, J.A. (2011, April). Critical constituents of reward-based learning in an arithmetic training. Poster presented at the *Eighteenth Annual Cognitive Neuroscience Society Meeting*, San Francisco, CA.

Ellefson, M., Schunn, C.D., & Khamar, H. J. (2011, April). Are students' causal models of scientific ideas flexible? Symposium talk presented at the *Society for Research in Child Development 2011 Biennial Meeting*, Montreal, QC.

Silk, E., & Schunn, C.D. (2011, April). Resources for learning robots: facilitating the incorporation of mathematical models in students' Engineering Design Strategies. Talk presented at the *Annual Meeting of the American Educational Research Association*, New Orleans.

Abramovich, S., & Schunn, C.D. (2011, March). Teachers Exchanging Materials in Web 2.0. Paper presented at the *Society for Information Technology & Teacher Education International Conference*, Nashville, TN.

Kallai, A., Ponting, A., Schunn, C. D., & Fiez, J. A. (2010, November). An arithmetical training regime improves number representation within hIPS and broad mathematical performance. Poster presented at the *51st Annual Meeting of the Psychonomic Society*, St. Louis.

Jang, J., & Schunn, C. D. (2010, November). Benefits of spatially distributed rather than stacked information displays. Poster presented at the *51st Annual Meeting of the Psychonomic Society*, St. Louis, MI.

Kallai, A., Ponting, A., Schunn, C. D., & Fiez, J. A. (2010, November). An arithmetical training regime improves number representation within hIPS and broad mathematical performance. Poster presented at the *Society for Neuroscience*, San Diego, CA.

Apedoe, X. S., & Schunn, C. D. (2010, August). Strategies for Success in Design and Science Learning. Paper presented at the *P-12 Engineering and Design Education Research Summit*, Seaside, OR.

Moss, J., Schunn, C. D., Schneider, W., McNamara, D., VanLehn, K. (2010, August). An fMRI Study of Strategic Reading Comprehension. Paper presented at the *32nd annual meeting of the Cognitive Science Society*, Portland, OR.

Richey, J. E., Chang, A., Nokes, T., & Schunn, C. D. (2010, August). Using analogical learning in science curricula to improve conceptual understanding. Poster presented at the *32nd annual meeting of the Cognitive Science Society*, Portland, OR.

Jang, J., & Schunn, C. D. (2010, August). Physical design tools support and hinder innovative engineering design. Poster presented at the *32nd annual meeting of the Cognitive Science Society*, Portland, OR.

Patchan, M. M., & Schunn, C. D. (2010, August). Impact of diverse abilities on learning to write through peer-review. Poster presented at the *32nd annual meeting of the Cognitive Science Society*, Portland, OR.

Chan, J., Fu, K, Schunn, C. D., Cagan, J., Kotovsky, K., & Wood, K. (2010, August). What makes for inspirational examples in design? The effects of example modality, distance, and familiarity. Poster presented at the *32nd annual meeting of the Cognitive Science Society*, Portland, OR.

Paletz, S. B. F., & Schunn, C. D., & Kim, K. H. (2010, August). Micro-conflicts in naturalistic team discussions: Measurement, correlates, and context. Symposium paper presented at the *2010 Academy of Management Meeting*, Montreal, Quebec, Canada.

Paletz, S. B. F., & Schunn, C. D., & Kim, K. H. (2010, July). Analogies can spark intra-group conflict in teams. Paper presented at the *The Fifth Annual INGRoup Conference*, Arlington, VA.

Apedoe, X. S., Mattis, K., Rowden-Quince, B., & Schunn, C. D. (2010, July). Examining the role of verbal interaction in team success on a design challenge. In the *Proceedings of the 9th International Conference of the Learning Sciences*. Chicago, IL.

Xiong, W., Litman, D., & Schunn, C. D. (2010, June). Assessing reviewer's performance based on mining problem localization in peer-review data. Paper presented at the Third International Conference on Educational Data Mining, Pittsburgh, PA.

Xiong, W., Litman, D., & Schunn, C. D. (2010, June). Impact of Annotation Difficulty on Automatically Detecting Problem Localization of Peer-Review Feedback. Paper presented at the Workshop on Computer-Supported Peer Review in Education, Pittsburgh, PA.

Paletz, S. B. F., & Schunn, C. D. (2010, May). The interaction between conflict and analogy in teams. Symposium presentation given at the *22nd Annual Convention of the Association for Psychological Science*, Boston, MA.

Schunn, C. D. (2010, May). Innovators' physical environment changes cognitive processes and innovation outcomes. Symposium presentation given at the *22nd Annual Convention of the Association for Psychological Science*, Boston, MA.

Chang, A., Nokes, T. J., & Schunn, C. D. (2010, April). Scaffolding middle school science learning with contrasting cases. Symposium presentation given at the *19th Annual Convention of the Western Psychological Association*, Cancun, Mexico.

Ponting, A., Kallai, A., Schunn, C. D., & Fiez, J. A. (2010, April). General improvements in mathematical ability via a basal ganglia learning mechanism. Poster presented at the *Seventeenth Annual Cognitive Neuroscience Society Meeting*, Montreal, Quebec, Canada.

Kallai, A., Ponting, A., Schunn, C. D., & Fiez, J. A. (2010, April). An arithmetical training regime motivated by principles of basal ganglia function. Poster presented at the *Seventeenth Annual Cognitive Neuroscience Society Meeting*, Montreal, Quebec, Canada.

Schunn, C. D., Merlino, J., Cromley, J., Massey, C., Newcombe, N., & Nokes, T. (2010, April). Translational Science of Cognitive Science in Middle School Science Curricula. Symposium talk presented at the *Annual Meeting of the American Educational Research Association*, Boston, MA.

Abramovich, S.J. & Schunn, C.D. (2010, March). Using a taxonomy of design with students. Talk presented at *International Technology Education Association*. Charlottes, NC.

Patchan, M. M., Schunn, C. D., & Charney, D. (2010, March). Validating students' end comments. Talk presented at the *Conference on College Composition and Communication,* Louisville, KY

Chang, A., Nokes, T., & Schunn, C. D. (2009, November). Using cognitive science to improve middle school science learning. Poster presented at the *Annual Meeting of the Psychonomic Society*, Boston, MA.

Lee, C. J., & Schunn, C. D. (2009, October). Social bases for cognitive critique: A case study of peer review in philosophy. Talk presented at *Feminist Legacies/ Feminist Futures: Hypatia 25th Anniversary Conference*, Seattle, WA.

Schunn, C. D., Moss, J., Huppert, T., & Schneider, W. (2009, October). Real-time NIRS feedback may help improve self-explanation learning strategy use. Talk presented at the *Society for Neuroscience*, Chicago, IL.

Paletz, S. B. F., & Schunn, C. D. (2009, October). A new metric for assessing group level participation in fluid teams. Paper presented at the *Atlanta Conference on Science and Innovation Policy*, Atlanta, GA.

Schunn, C. D. (2009, September). Diving deeper into the Blackbox: Sampling from automated video to understand the innovation process. Talk given at the *Workshop on Confidential Data Collection for Innovation Analysis in Organizations*, Redmond, WA.

Paletz, S. B. F., Bearman, C. R., & Schunn, C. D. (2009, August). Intercoder reliability as shared mental models. Poster presented at the *2009 Academy of Management Meeting*, Chicago, Illinois.

Wong, T. J., Schunn, C. D., & Siegle, G. (2009, July). What our eyes can tell us about how an insight emerges? Poster presented at the *31st annual meeting of the Cognitive Science Society*, Amsterdam, The Netherlands.

Khamar, H. Ellefson, M., & Schunn, C.D. (2009, July). Causal parsimony in learning science. Poster presented at the *31st annual meeting of the Cognitive Science Society*, Amsterdam, The Netherlands.

Apedoe, X. S., & Schunn, C. D. (2009, April). Understanding How Students Solve Novel Design Challenges. Poster presented at the *Annual Conference of the National Association for Research in Science Teaching*. Los Angeles, CA.

Khamar, H. J., Ellefson, M., & Schunn C. D. (2009, April). Is Reasoning About Chemistry Constrained by Causal Parsimony? Poster presented at the *Society for Research in Child Development 2009 Biennial Meeting*. Denver, CO.

Paletz, S. B. F., & Schunn, C. (2009, February). Conflict and analogy in informal science teams. Paper presented at the *Center for Interdisciplinary Research on Teams conference*, Pittsburgh, PA.

Wang, Y., Balaban, C., Bidanda, B., Schunn, C. D., Shuman, L., Sochats, K. (2008, October). Intelligent Strategy Decision Support System for Engineering Design. Paper presented at the *INFORMS Annual Meeting 2008*. Washington, DC.

Moss, J., Schunn, C. D., VanLehn, K., Schneider, W., McNamara, D. S., & Jarbo, K. (2008, August). They Were Trained, But They Did Not All Learn: Individual Differences in Uptake of Learning Strategy Training. Poster presented at the *30th Annual Meeting of the Cognitive Science Society*. Washington, DC.

Wooley, R., Was, C.A., Schunn, C.D., Dalton, D.W. (2008, August). The effects of feedback elaboration on the giver of feedback. In the Proceedings of the *30th Annual Meeting of the Cognitive Science Society*. Washington, DC.

Titus, N., Schunn, C. D., Walhall, C., Chiu, G., & Ramani, K. (2008, April). What design processes predict better design outcomes? The case of robotics design teams. In the *Proceedings of the International Symposium series on Tools and Methods of Competitive Engineering*, Izmir, Turkey.

Paletz, S. B. F., & Schunn, C. D. (2008, July). A socio-cognitive model of team innovation in science and engineering. Talk given at the *2nd Bi-Annual Conference of the International Society for the Psychology of Science & Technology*. Berlin, Germany.

Schunn, C. D. (2008, July). Epistemic uncertainty vs. approximation in science and engineering. Talk given at the *2nd Bi-Annual Conference of the International Society for the Psychology of Science & Technology*. Berlin, Germany.

Reynolds, B., Mehalik, M., Lovell, M., & Schunn, C. D. (2008, June). Lessons learned from a product realization RET site: Maximizing success for teacher research and high school student impact. Paper presented at the *Annual Conference of the American Society for Engineering Education*. Pittsburgh, PA.

Silk., E., & Schunn, C. D. (2008, June). Using robotics to teach mathematics: Analysis of a curriculum designed and implemented. Paper presented at the *Annual Conference of the American Society for Engineering Education*. Pittsburgh, PA.

Nelson, M. M. & Schunn, C. D. (2008, April). What Types of Comments Motivate Writers to Revise? Symposium talk presented at the *Conference on College Composition and Communication*. New Orleans.

Charney, D., & Schunn, C. D. (2008, April). What do Readers and Writers Gain from Peer Review? A Call for Research. Symposium talk presented at the *Conference on College Composition and Communication*. New Orleans.

Silk, E., & Schunn, C. D. (2008, April). Utilizing Contrasting Cases to Target Science Reasoning and Content in a Design-for-Science Unit. Paper presented at the *Annual Conference of the National Association for Research in Science Teaching*. Baltimore, MD.

Kaufman, J., & Schunn, C. D. (2008, March). Student resistance to innovation: An investigation of undergraduate attitudes toward an online writing peer review and assessment system. Paper presented at the *Annual Meeting of the American Educational Research Association*. New York, NY.

Schunn, C. D., Lovell, M. R., Wang, Y., and Yang, A. (2008, March). Measuring Innovative Apples & Oranges: Towards More Robust and Efficient Measures of Product Innovation. Paper presented at the *Studying Design Creativity* conference. Aix-en-Provence, France.

Schunn, C. D., & Christensen, B. T. (2008, January). The Environment of Analogical Reasoning in Expert Conceptual Design. Talk given at the *NSF CMMI Workshop on Innovation*. Knoxville, TN.

Ellefson, M. R., & Schunn, C. D. (2007, November). Can domain knowledge improve causal reasoning? Poster presented at *48th Annual Meeting of the Psychonomic Society Annual Meeting*. Long Beach, CA.

Tollinger, I., Schunn, C., & Vera. A. H. (2007, August). From radical colocation to fully distant—how developed team expertise weathers the transition. Symposium talk presented at the *29th Annual Conference of the Cognitive Science Society*. Nashville, TN.

Schunn, C. D. (2007, August). Avoiding fault lines in interdisciplinary collaboration. Symposium talk presented at the *29th Annual Conference of the Cognitive Science Society*. Nashville, TN.

Schunn, C. D., Wong, T., Manzoul, W., Kamer, J., Harris, J., Trafton, J. G., & Trickett, S. B. (2007, August). Detecting and Resolving Informational Uncertainty in Complex Domains. In the *Proceedings of the 29th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Cho, K., Schunn, C. D., & Kwon. K. (2007, July). Learning writing by reviewing in science. Poster presented at *Computer Support Collaborative Learning 2007*. New Brunswick, NJ.

Doppelt, Y., Schunn, C. D., Silk, E. M., & Mehalik, M. M. (2007, June). Evaluating the impact of professional development on teacher practice and student achievement. Paper presented at the *Fifth International Teacher Education at a Crossroads*. Tel-Aviv, Israel.

Doppelt, Y., Schunn, C. D., & Silk, E. M. (2007, June). Implementing embedded assessment as a tool for identifying misconceptions. Paper presented at the *Fifth International Teacher Education at a Crossroads*. Tel-Aviv, Israel.

Kong, X., & Schunn, C. D. (2007, June). Information seeking in complex problem solving. In the *Proceedings of the 8th International Conference on Cognitive Modeling*. Ann Arbor, MI.

Silk, E., Schunn, C. D., & Carey, M. S. (2007, April). Evaluating A Design-Based Learning Curriculum in Terms of Students' Science Reasoning Gains. Paper presented at the *National Association for Research in Science Teaching*. New Orleans, LA.

Apedoe, X. S., & Schunn, C. D. (2007, April). Investigating the Tacit Problem-Solving Strategies of Novice Designers: Implications for Science Teaching and Learning. Poster presented at the *National Association for Research in Science Teaching*. New Orleans, LA.

Schunn, C. D., Raghavan, K., & Cho, K. (2007, April). Domain-General Learning Accelerators in Middle-School Science. Symposium talk presented at the *Annual Meeting of the American Educational Research Association*. Chicago, IL.

Moin, L. J., & Schunn, C. D. (2007, April). Some Elements to Design Effective Math and Science Teacher Recruitment Programs. Paper presented at the *Annual Meeting of the American Educational Research Association*. Chicago, IL.

Charney, D., Nelson, M. M., & Schunn, C. D. (2007, March). How and How Helpfully Do Peers Comment on Student Writing? Symposium talk presented at the *Conference on College Composition and Communication*. New York, NY.

Schunn, C. D., & Christensen, B. T. (2006, December). Trading-Off Analogical and Quantitative Reasoning in Expert Conceptual Design. Talk presented at the *Tools for Innovation Workshop*. Austin, TX.

Schunn, C. D., Saner, L. D., Trafton, J. G., Trickett, S. B., & Kirschenbaum, S. K. (2006, November). The Evolution of Spatial Representations During Complex Visual Data Analysis. Talk presented at *47th Annual Meeting of the Psychonomic Society Annual Meeting*. Houston, TX.

Tollinger, I., Schunn, C. D., & Vera, A. H. (2006). What changes when a large team becomes more expert? In the *Proceedings of the 28th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Kong, X., & Schunn, C. D. (2006). Global vs. local information processing in problem solving: A study of the traveling salesman problem. In the *Proceedings of the 7th International Conference on Cognitive Modeling*. Trieste, Italy.

Doppelt, Y., Silk, E., Mehalik, M., Schunn, C. D., & Reynolds, B. (2006). Evaluating the Impact of a Facilitated Learning Community Approach to Professional Development on Student Achievement. Paper presented at *National Association for Research on Science Teaching Annual Meeting*. San Francisco, CA, (April, 2006)

Moin, L., & Schunn, C. D. (2006, April) Elements for Successful Teacher Recruitment Strategies Reported by SEM Undergraduates with and without Teaching Experiences. Paper presented at *National Association for Research on Science Teaching Annual Meeting*. San Francisco, CA.

Tollinger, I., Schunn, C. D., & Vera, A. H. (2006, February). What Changes When a Large Team Becomes More Expert? Analyses of Speed-Up in the Mars Exploration Rovers Science Planning Process. Paper presented at the *Human Computer Interaction Consortium*. Frasier, CO.

Moin, L., & Schunn, C. D. (2006, January). Elements to build more effective teacher recruitment programs among math, science, and engineering undergraduates. Paper presented at the *Association for the Education of Teachers of Science International Conference*. Portland, OR.

Morris, B. J., & Schunn, C. D. (2005, April). Encoding problem features in logical reasoning. Poster presented at the *Biennial Meeting of the Society for Research in Child Development*. Atlanta, GA.

Abar, B., Winsler, A., Feder, M., & Schunn, C. D. (2005, April). Private speech and executive functioning in children with autistic spectrum disorders and ADHD. Poster presented at the *Biennial Meeting of the Society for Research in Child Development*. Atlanta, GA.

Mehalik, M. M., Doppelt, Y., & Schunn, C. D. (2005). Addressing performance and equity of a design-based, systems approach for teaching science in eighth grade. Paper presented at the *Annual Meeting of the American Educational Research Association*. Montreal, Canada. (April, 2005).

Schunn, C. D. (2005). Targeted studies: Immersion, learning, and equity. Symposium talk presented at the *Annual Meeting of the American Educational Research Association*. Montreal, Canada. (April, 2005).

Moin, L. J., Dorfield, J., & Schunn, C. D. (2005). Prior teaching experiences' influence on k-12 math/science teaching interest: Analyses of direct and indirect effects. Paper presented at the *Annual Meeting of the American Educational Research Association*. Montreal, Canada. (April, 2005).

Doppelt, Y., Mehalik, M. M., & Schunn, C. D. (2005). A close-knit collaboration between researchers and teachers for developing and implementing a design-based science module. Paper presented at *National Association for Research on Science Teaching Annual Meeting*. Dallas, TX. (April, 2005).

Raghavan, K., Sartoris, M., & Schunn, C. D. (2005). Middle-school students' perceptions and interpretations of different model types. Paper presented at *National Association for Research on Science Teaching Annual Meeting*. Dallas, TX. (April, 2005).

Moin, L. J., Dorfield, J., & Schunn, C. D. (2005). Where can we find future k-12 science and math teachers? A search by academic year, discipline, and achievement level. Paper presented at the *Association for the Education of Teachers of Science International Conference*. Colorado Springs, CO. (January, 2005).

Schunn, C. D., & Saner, L. D. (2004). Thinking about uncertain data: How scientists represent uncertainty in their data. Paper presented at the *45th Annual Meeting of the Psychonomic Society*. Minneapolis, MN (November, 2004).

Mehalik, M. M., Doppelt, Y. & Schunn, D. C. (2004). A systems approach for design-based learning. *International Conference on Engineering Education*, Gainesville FL (October, 2004).

Schunn, C. D., Saner, L. D., & Harrison, A. H. (2004). The role of gestures in a theory of spatial representation. Symposium talk presented at the *26th Annual Conference of the Cognitive Science Society*. Chicago, IL (August, 2004).

Harrison, A., & Schunn, C. D. (2004). The transfer of logically general scientific reasoning skills. In the *Proceedings of the 26th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Doppelt, Y. & Schunn, D. C. (2004). What is your science classroom like? Poster presented at the *Sixth International Conference of the Learning Sciences*, Los Angeles, CA (June, 2004).

Weiss, D. J., & Schunn, C. (2003). Evaluating peer evaluation of writing. Paper presented at the International Meeting of the Brunswik Society, Vancouver (November, 2003).

Cho, K., & Schunn, C. D. (2003). Seven factors that make learning successful in networked collaboration. Poster presented at *25th Annual Conference of the Cognitive Science Society*. Boston, MA (August, 2003).

Christensen, B., & Schunn, C. D. (2003). Returning to unsolved creative problems. Poster presented at *25th Annual Conference of the Cognitive Science Society*. Boston, MA (August, 2003).

Morris, B., & Schunn, C. D. (2003). *Strategically logical*. Poster presented at *25th Annual Conference of the Cognitive Science Society*. Boston, MA (August, 2003).

Cho, K., & Schunn, C. D. (2003). Battling the Tyranny of the Thousands with a SWoRD: Scaffolded Writing and Rewriting in the Discipline. Paper presented at *ED-Media*. Honolulu, HI (July, 2003).

Harrison, A., & Schunn, C. D. (2003). ACT-R/S: Look MA, No "Cognitive map"! In the *Proceedings of the 5th International Conference on Cognitive Modeling*. Bamberg, Germany: Universitäts-Verlag Bamberg.

Schunn, C. D., & Harrison, A. (2003). *Segmented spaces: Coordinated Perception of Spaces in ACT-R.* Symposium talk presented at the *5th International Conference on Cognitive Modeling*. Bamberg, Germany (April, 2003).

McGregor, M. U., Palmquist, S. D., Schunn, C. D., & Crowley, K. (2003). Capturing child dinosaur expertise with computationally specified input encoding. Poster presented at the *5th International Conference on Cognitive Modeling*. Bamberg, Germany (April, 2003).

Schunn, C. D., & Morris, B. J. (2002). Empirical demonstration of logical strategy. Paper presented at the *43rd Annual Meeting of the Psychonomic Society*. Kansas City, MO (November, 2002).

Schunn, C. D., & Cho, K. (2002). A web-based system for reciprocal evaluation of student paper writing. Paper presented at the *32nd Annual Meeting of the Society for Computers in Psychology*. Kansas City, MO (November, 2002).

Harrison, A., & Schunn, C. D. (2002). ACT-R/S: A computational and neurologically inspired model of spatial reasoning. Poster presented at *24th Annual Conference of the Cognitive Science Society*. Fairfax, VA (August, 2002).

Harrison, A., Saner, L., & Schunn, C. D. (2002). Using Latent Semantic Analysis for diagnosing strategy use in open text responses. Poster presented at *24th Annual Conference of the Cognitive Science Society*. Fairfax, VA (August, 2002).

Altmann, E. M., & Schunn, C. D. (2002). Integrating Decay and Interference: A New Look at an Old Interaction. In the *Proceedings of the 24th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Cho, K., Schunn, C. D., & Lesgold, A. (2002). Comprehension monitoring and regulation in collaboration. In the *Proceedings of the 24th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Morris, B. J., & Schunn, C. D. (2002). Logical Strategery. In the *Proceedings of the 24th Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Saner, L., & Schunn, C. D. (2002). Let me tell you why that is a bad analogy: The role of prior beliefs in processing analogical arguments. Poster presented at *24th Annual Conference of the Cognitive Science Society*. Fairfax, VA (August, 2002).

Shiflett, K., Winsler, A., & Schunn, C. (2002). Parenting style and parenting stress among children with executive and self-regulatory problems. Poster presented at the *Biennial Conference on Human Development*. Charlotte, NC (April 2002).

Feder, M., Winsler, A., & Schunn, C. (2002). Executive functioning in children with ADHD, High Functioning Autism, and controls: Parent report and Tower of Hanoi performance. Poster presented at the *Biennial Conference on Human Development*. Charlotte, NC. (April 2002)

Littleton, C. D., Schunn, C. D., & Kirschenbaum, S. S. (2001). Sub space: Describing distant psychological space. Poster presented at *23rd Annual Conference of the Cognitive Science Society*. Edinburgh, Scotland (August, 2001).

Schunn, C. D., & Harrison, A. (2001). ACT-RS: A neuropsychologically inspired module for spatial reasoning. Poster presented at the *4th International Conference on Cognitive Modeling*. Fairfax, VA (July, 2001).

Trickett, S. B., Trafton, J. G., Schunn, C. D., & Harrison, A. (2001). "That's odd!" How scientists respond to anomalous data. In the *Proceedings of the 23rd Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Schunn, C. D., Trickett, S. B., Trafton, J. G., & Harrison, A. (2001). Framework anomalies in visual scientific data. Paper presented at the *Cognitive Studies of Science and Technology Workshop*. Charlottesville, VA (April, 2001).

Schunn, C. D. (2000). Cross-task stability of individual differences in adaptivity to changing base rates. Paper presented at the *41st Annual Meeting of the Psychonomic Society*. New Orleans, LA (November, 2000).

Schunn, C. D., Crowley, K., & Okada, T. (2000). What makes collaborations across a distance succeed?: The case of the Cognitive Science community. Paper presented at the *NSF Workshop on Distributed Work*. Carmel-by-the-Sea, CA (August, 2000).

Schunn, C. D., & Ngo, T. L. (2000). Motivating base-rate sensitivity (sometimes): Testing predictions of the RCCL framework. In the *Proceedings of the 22nd Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Schunn, C. D., & O'Malley, C. J. (2000). Now they see the point: Improving science reasoning through making predictions. In the *Proceedings of the 22nd Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Trickett, S. B., Fu, W.-T., Schunn, C. D., & Trafton, J. G. (2000). From dipsy-doodles to streaming motions: Changes in representation in the analysis of visual scientific data. In the *Proceedings of the 22nd Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Trickett, S. B., Trafton, J. G., & Schunn, C. D. (2000). Blobs, dipsy-doodles and other funky things: Framework anomalies in exploratory data analysis. In the *Proceedings of the 22nd Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Schunn, C. D. & Vera, A. H. (1999). Cross-cultural comparisons of the role of the function in property centrality. Poster presented at the *40th Annual Meeting of the Psychonomic Society*. Los Angeles, CA (November, 1999).

Schunn, C. D. (1999). Including authentic experiments in research methods with E-Prime and Statview: An empirical evaluation. Paper presented at the *29th Annual Meeting of the Society for Computers in Psychology*. Los Angeles, CA (November, 1999).

Schunn, C. D., Trickett, S., Trafton, G., & Seeley, G. (1999). Sifting through masses of observational data: children and professional astronomers. Invited symposium talk presented at the *1st Meeting of the Cognitive Development Society*. Chapel Hill, NC (October, 1999).

Schunn, C. D. (1999). Exploring individual variability using ACT-R. Paper presented at the *6th Annual ACT-R Workshop*. Fairfax, VA (August, 1999).

Schunn, C. D. (1999). The presence and absence of category knowledge in LSA. In the *Proceedings of the 21st Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Saner, L., & Schunn, C. D. (1999). Analogies out of the blue: When history seems to retell itself. In the *Proceedings of the 21st Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum.

Schunn, C. D., Crowley, K., & Okada, T. (1998). Interdisciplinarity in Cognitive Science: Now and then. Invited symposium talk presented at *The 20th Annual Conference of the Cognitive Science Society*. Madison, WI (August, 1998).

Schunn, C. D., & Anderson, J. R. (1998). The acquisition of expertise in science. Paper presented at the *International Conference on the Application of Psychology to the Quality of Learning and Teaching*. Hong Kong (June, 1998).

Schunn, C. D., & Reder, L. M. (1998). Feeling-of-knowing & strategy selection: Consequences for education. Paper presented at *Annual Meeting of the American Educational Research Association*, San Diego (April, 1998).

Best, B. J., Schunn, C. D., & Reder, L. M. (1998). Modeling adaptivity in a dynamic task. In M. A. Gernsbacher & S. J. Derry (Eds.), *Proceedings of the 20th Annual Conference of the Cognitive Science Society*. (p. 144-149) Mahwah, NJ: Erlbaum.

Schunn, C. D., & Anderson, J. R. (1998). Science education in universities: Explorations of what, when, and how. Paper presented at *Designing for Science*. Pittsburgh, PA (April, 1998).

Schunn, C. D., & Anderson, J. R. (1997). The Simulated Psychology Lab: A Tool for evaluating and teaching research skills. Paper presented at the *1997 Annual Meeting of the Society for Computers in Psychology*, Philadelphia, PA (November, 1997).

Schunn, C. D., & Klahr, D. (1997). GET: A goals/effort tradeoff model of decision making in the design of scientific experiments. Paper presented at the *1997 Annual Meeting of the Judgment/Decision Making Society,* Philadelphia, PA (November, 1997).

Schunn, C. D., & Reder, L. M. (1997). Sensitivity to base-rates: Individual differences in strategy adaptation. Poster presented at the *38th Annual Meeting of the Psychonomic Society,* Philadelphia, PA (November, 1997).

Reder, L. M., Nhouyvansivong, A., Schunn, C. D., Ayers, M. S., Angstadt, P., & Hiraki, K. (1997). Modeling the Mirror effect in a Continuous Remember/Know Paradigm. In *Proceedings of the 19th Annual Conference of the Cognitive Science Society* (pp. 644-649). Mahwah, NJ: Erlbaum.

Schunn, C. D., & Anderson, J. R. (1997). General and specific expertise in scientific reasoning. In *Proceedings of the 19th Annual Conference of the Cognitive Science Society* (pp. 674-679). Mahwah, NJ: Erlbaum.

Schunn, C. D., & Anderson, J. R. (1997). Psychologist in a box: An ACT-R model that designs and interprets experiments. Paper presented at the *4th Annual ACT-R Workshop*. Pittsburgh, PA (August, 1997).

Schunn, C. D., Crowley, K., & Okada, T. (1996). What leads to a successful collaboration among cognitive scientists? Paper presented at the conference on *Understanding Interdisciplinary Teamwork: Challenges for Research and Practice*. Madison, WI (November, 1996).

Schunn, C. D., & Lovett, M. L. (1996). Representation and individual differences in base-rate neglect. Poster presented at the *37th Annual Meeting of the Psychonomic Society,* Chicago, IL (November, 1996).

Reder, L. M., Nhouyvanisvong, A., Schunn, C. D., Angstadt, P., & Hiraki, K. (1996). Modeling word frequency effects in a continuous remember/know judgment paradigm. Paper presented at the *37th Annual Meeting of the Psychonomic Society,* Chicago, IL (November, 1996).

Schunn, C. D., & Reder, L. M. (1996). Modeling changes in strategy selections over time. Paper presented at the *AAAI-96 Workshop: Computational Cognitive Modeling*, Portland, OR (August, 1996).

Schunn, C. D., & Anderson, J. R. (1996). Modeling Design Processes in Scientific Discovery. Paper presented at the *3rd Annual ACT-R Workshop*. Pittsburgh, PA (August, 1996).

Schunn, C. D., Crowley, K., & Okada, T. (1996). Is cognitive science multidisciplinary?: Past and present perspectives. Poster presented at *The 18th Annual Conference of the Cognitive Science Society.*, San Diego, CA (July, 1996).

Schunn, C. D., & Klahr, D. (1996). The problem of problem spaces: When and how to go beyond a 2-space model of scientific discovery. Symposium talk presented at *The 18th Annual Conference of the Cognitive Science Society.*, San Diego, CA (July, 1996).

Okada, T., Crowley, K., Schunn, C. D., & Miwa, K. (1996). Collaborative scientific research in Japanese cognitive science: Analyses of questionnaire survey data. Paper presented at the *1996 Meeting of the Japanese Cognitive Science Society*.

Schunn, C. D. & Okada, T. (1996). The role of distributed reasoning and analogy in lab groups and colloquia. Paper presented at the *Nagoya International Symposium on Collaboration*, Nagoya, Japan (May 1996).

Reder, L. M., & Schunn, C. D. (1995). Metacognition does imply awareness: Implicit processes govern strategy selection. Paper presented at the *36th Annual Meeting of the Psychonomic Society,* Los Angeles, CA (November, 1995).

Okada, T., Schunn, C. D., Crowley, K., Oshima, J., Miwa, K., Aoki, T., & Ishida, Y. (1995). Collaborative scientific research: Analyses of historical and interview data. Paper presented at the *1995 Meeting of the Japanese Cognitive Science Society.*

Schunn, C. D. (1995). Creative conceptions in scientific discovery: Creating new data representations. Poster presented at the *Creative Concepts Conference*, Texas A&M University (May, 1995).

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

Schunn, C. D., & Klahr, D. (1995). A 4-space model of scientific discovery. Paper presented at the *AAAI 1995 Spring Symposium Series: Conference on Systematic Methods of Scientific Discovery*, Stanford, CA (March, 1995).

Schunn, C. D., & Klahr, D. (1995). A 4-space model of scientific discovery. In *Proceedings of the 17th Annual Conference of the Cognitive Science Society* (pp. 106-111). Hillsdale, NJ: Erlbaum.

Schunn, C. D., & Klahr, D. (1993). Self- vs. other-generated hypothesis in scientific discovery. In *Proceedings of the 15th Annual Conference of the Cognitive Science Society* (pp. 900-905). Hillsdale, NJ: Erlbaum.

Schunn, C. D., & Klahr, D. (1992). Complexity management in a discovery task. In *Proceedings of the 14th Annual Conference of the Cognitive Science Society* (pp. 177-182). Hillsdale, NJ: Erlbaum.

Vera, A. H., & Schunn, C. D. (1992). Causality and the categorization of objects and events. Paper presented at the *18th Annual Meeting of the Society for Philosophy and Psychology*, Montréal, Québec, Canada (June, 1992).

Dunbar, K., & Schunn, C. D. (1990). The temporal nature of scientific discovery: The roles of priming and analogy. In *Proceedings of the 12th Annual Conference of the Cognitive Science Society* (pp. 93-100). Hillsdale, NJ: Erlbaum.