Catherine C. Chase

Teachers College, Columbia University

525 West 120th St.
New York, NY 10027

chase@tc.columbia.edu
catherinechase.org

EDUCATION

2006-2011 **Ph.D. in Learning Sciences and Technology Design**
Stanford University, School of Education
Advisor: Daniel Schwartz

2001-2003 **M.S.Ed. in Elementary Education**
Brooklyn College, City University of New York

1996-2000 **B.A.S. in Biology and Psychology**, with Honors
Stanford University

SELECTED PROFESSIONAL EXPERIENCE

2021-present **Lecturer and Director of the Learning in Activity Lab**
Teachers College, Columbia University

2021-present **Consultant on the Transforming Learning Accelerator Initiative**
Stanford University School of Education

2013-2021 **Assistant Professor of Cognitive Science in Education**
Teachers College, Columbia University
(Maternity leaves taken in Fall 2013 and Fall 2016)

2011-2013 **Postdoctoral Scholar** in Psychology and Human-Computer Interaction
Carnegie Mellon University

2003-2006 **Middle School Science Teacher**
Packer Collegiate Institute, Brooklyn, NY.

2001-2003 **Elementary School Science Teacher**
Public School 327, Brooklyn, NY.

AWARDS AND HONORS

2012 **Best paper award** at the International Conference of the Learning Sciences.
The interplay of chance and skill: Exploiting a common game mechanic to enhance learning and persistence.

2011-2013 Institute for Education Sciences Fellowship, Program in Interdisciplinary Education Research

2010 Spencer Dissertation Fellowship Finalist

2006-2007 Myrtie M. Gifford Fellowship

2001-2003 New York City Teaching Fellowship

GRANT FUNDING

2020-2022 **Principal Investigator**, American Society of Clinical Oncology. *How do doctors who receive training in learning science principles adapt their teaching?* Award: $43,332.

2016-2017 **Co-Principal Investigator**, Provost's Investment Fund grant with co-PI Nathan Holbert. *Can constructionist video games prepare students to engage in inquiry*? Award: $20,000.

2013-2017 **Principal Investigator**, NSF Cyberlearning grant with co-PI Vincent Aleven. *Developing a tutor to guide students as they invent deep principles with contrasting cases.* Award: $548,676.

GRANT PROPOSALS SUBMITTED AND IN PREPARATION

in prep Spencer research grant on education. *Supporting inventive processes and dispositions in STEM classrooms.*

2017 NSF STEM+C grant with co-PI Vincent Aleven. *Student and teacher tools for learning STEM modeling as a computational thinking practice*.

2017 Spencer postdoc grant. *Leveraging social and self-motivations to promote effort, persistence, and resilience at learning: Generalizing and understanding the protege effect.*

2016 NSF DRK-12 grant with PI Vincent Aleven. *Technology support for guiding Invention in classrooms.*

2016 Google Virtual Reality grant with PI John Black and co-PI Xiaodong Lin-Siegler. *Using virtual reality to provide grounding experiences for improving learning, understanding, and motivation.*

2015 NSF Cyberlearning grant with co-PI Vincent Aleven. *Comparison-focused technologies to support STEM model-building competencies*.

PUBLICATIONS [1,797 Google Scholar citations]

* student co-author

Connolly, H.*, & **Chase, C.C**. (under review). Looking beyond content knowledge: Dispositions as predictors of non-routine problem-solving and transfer in mathematics. *Journal for STEM Education Research.*

Chase, C.C., Harpstead, E., & Aleven, V. (under review/revision). Promoting transfer beyond the game: Adapting contrasting cases for educational games. *Journal of the Learning Sciences.*

Lamnina, M.* & **Chase, C.C.** (2021). Uncertain instruction: Effects on curiosity, learning, and transfer. *Instructional Science, 49*, 661-685. https://doi.org/10.1007/s11251-021-09557-2

Chase, C.C., Malkiewich, L.J.*, Lee, A.*, Slater, S.*, Choi, A., & Xing, C.* (2021). Can typical game features have unintended consequences? A study of players' learning and reactions to challenge and failure in an educational programming game. *British Journal of Educational Technology.* https://doi.org/10.1111/bjet.13021

Chase, **C.C**., Connolly, H.*, Lamnina, M.*, & Aleven, V. (2019). Problematizing helps! A classroom study of computer-based guidance for Invention activities. *International Journal of Artificial Intelligence in Education, 29*(2), 283-316. https://doi.org/10.1007/s40593-019-00178-y

Marks, J.* & **Chase, C. C.** (2019). Impact of a brief prototyping intervention on middle school students' iterative practices and reactions to failure. *Journal of Engineering Education, 108*, 547-573. DOI: 10.1002/jee.20294

Chase, **C.C**., Malkiewich, L.J.*, & Kumar, A.* (2019). Learning to notice science concepts in engineering activities and transfer situations. *Science Education*, *103*(2), 440-471. https://doi.org/10.1002/sce.21496

Chase, **C.C**., Marks, J.*, Malkiewich, L.J.*, & Connolly, H* (2019). How teacher talk guidance during Invention activities shapes students' cognitive engagement and transfer. *International Journal of STEM Education, 6*(14), 1-22. https://doi.org/10.1186/s40594-019-0170-7

Malkiewich, L.J.*, & **Chase, C.C.** (2019). The process of focusing on deep structures in an engineering design task. *International Journal of Science Education, 41*(11), 1475-1495. https://doi.org/10.1080/09500693.2019.1613583

Malkiewich, L.J.*, & **Chase, C.C**. (2019). What's your goal? The importance of shaping the goals of engineering tasks to focus learners on the underlying science. *Instructional Science*, 1-38. https://doi.org/10.1007/s11251-019-09493-2

Lamnina, M.*, & **Chase, C.C.** (2019). Developing a thirst for knowledge: How uncertainty in the classroom influences curiosity, affect, learning, and transfer. *Contemporary Educational Psychology*, *59*. https://doi.org/10.1016/j.cedpsych.2019.101785

Chase, **C.C.**, & Klahr, D. (2017). Invention versus direct instruction: In some contexts it's a tie. *Journal of Science Education and Technology*, 26(6), 582-596. https://doi.org/10.1007/s10956-017-9700-6

Fusco, J. Martin, W. Lane, H. C. & **Chase**, **C.C.** (2017). Virtual peers and coaches: Social and cognitive support for learning. In J. Roschelle, W. Martin, J. Ahn, & P. Schank (Eds.), *Cyberlearning Community Report: The State of Cyberlearning and the Future of Learning With Technology* (pp. 31-35). Menlo Park CA: SRI International.

Marks, J.*, Bernett, D.*, & **Chase, C.C.** (2016). The Invention Coach: Integrating data and theory in the design of an exploratory learning environment. *International Journal of Designs for Learning*, 7(2), 74-92. https://doi.org/10.14434/ijdl.v7i2.20126

Shemwell, J.T., **Chase, C.C.,** & Schwartz, D.L. (2015). Seeking the general explanation: A test of inductive activities for learning and transfer. *Journal of Research in Science Teaching*, 52(1), 58-83. https://doi.org/10.1002/tea.21185

Chase, **C.C.** (2013). Motivating expertise: Equipping novices with the motivational tools to move beyond failure. In J.J. Staszewski (Ed.), *Expertise and skill acquisition: The impact of William G. Chase* (pp. 59-83). New York: Psychology Press. https://doi.org/10.4324/9780203074541

Chi, M.T.H., Roscoe, R., Slotta, J., Roy, M. & **Chase, C.C.** (2012). Misconceived causal explanations for emergent processes. *Cognitive Science*, *36*(1), 1-61. https://doi.org/10.1111/j.1551-6709.2011.01207.x

Schwartz, D.L., **Chase**, **C.C.,** & Bransford, J.D. (2012). Resisting overzealous transfer: Coordinating previous successful routines with needs for new learning. *Educational Psychologist*, *47*(3), 204-214. https://doi.org/10.1080/00461520.2012.696317

Schwartz, D.L., **Chase, C.C.,** Oppezzo, M.A., & Chin, D.B. (2011). Practicing versus inventing with contrasting cases: The effects of telling first on learning and transfer. *Journal of Educational Psychology*, *103*(4), 759-775. https://doi.org/10.1037/a0025140

Chin, D.B., Dohmen, I.M., Cheng, B.H., Oppezzo, M.A., **Chase, C.C.**, & Schwartz, D.L. (2010). Preparing students for future learning with Teachable Agents. *Educational Technology Research and Development*, *58*(6), 649-669. https://doi.org/10.1007/s11423-010-9154-5

Chase, C.C., Chin, D.B., Oppezzo, M.A., & Schwartz, D.L. (2009). Teachable Agents and the Protégé Effect: Increasing the effort towards learning. *Journal of Science Education and Technology*, *18*(4), 334-352. https://doi.org/10.1007/s10956-009-9180-4

Schwartz D.L., **Chase C.C.,** Chin D.B., Oppezzo M.A., Kwong H., Okita S., Biswas G., Roscoe R.D., Jeong H., & Wagster J.D. (2009). Interactive metacognition: Monitoring and regulating a teachable agent. In D.J. Hacker, J. Dunlosky, & A.C. Graesser (Eds.), *Handbook of metacognition in education* (pp. 340-358). New York: Taylor and Francis. https://doi.org/10.4324/9780203876428

PUBLICATIONS IN PREPARATION

* student co-author

Chase, C.C. (in prep). Learning to "see" like an expert: Designing STEM learning activities to encourage novices to perceive and transfer deep domain structures.

Connolly, H.*, Abowd, N.*, & **Chase, C.C.** (in prep). Teacher adaptation during the pandemic: The instructional legacy of COVID-19 and its implications for teacher education.

Gonazalez-Cabanes, E.*, Garcia, T., **Chase, C.C**., & Carlos Nunez, J. (in prep). Problem-solving before instruction to promote learning and motivation in children and adults.

Chesebrough, C.*, **Chase, C.C**., & Wiley, J. (in prep). Aha! moments and learning.

REFEREED CONFERENCE PROCEEDINGS

* student co-author

Connolly, H.*, Abowd, N.*, & **Chase, C.C.** (under review). The instructional legacy of COVID-19: Teacher adaptation during and after the pandemic. *The 16th International Conference of the Learning Sciences (ICLS)*.

Chase, C.C., Malkiewich, L.J.*, & Kumar, A.* (2018). Contrasting cases enhance transfer of physics knowledge from an engineering design task. *40th annual meeting of the Cognitive Science Society (CogSci 2018), Vol 1*, 196-201. Cognitive Science Society.

Chase, C.C., Connolly, H.*, Lamnina, M.*, & Aleven, V. (2018). The design and evaluation of optimal computerized guidance for Invention activities: The Invention Coach. In J. Kay, & R. Luckin (Eds.), *Rethinking Learning in the Digital Age: Making the Learning Sciences Count*, *13th International Conference of the Learning Sciences (ICLS) 2018, Volume 1*, 304-311. London, UK: International Society of the Learning Sciences.

Aleven, V., Connolly, H.*, Popescu, O., Marks, J.*, Lamnina, M.*, & **Chase, C. C.** (2017). An Adaptive Coach for Invention Activities. In E. Andre, R. Baker, X. Hu, M.M.T. Rodrigo, & B. du Boulay (Eds.), *Artificial Intelligence in Education 18th International Conference* (pp. 3-14). Springer International Publishing. https://doi.org/10.1007/978-3-319-61425-0.

Lamnina, M.*, Connolly, H.*, Aleven, V., & **Chase, C.C.** (2017). The Invention Coach: A computer-based environment that supports the transfer of STEM concepts. In L. Ding, A. Traxler, & Y. Cao (Eds.), *Physics Education Research Conference Proceedings*, 228-231. Cincinati, OH: Physics Education Research Topical Group. https://doi:10.1119/perc.2017.pr.052

Chase, C.C., Harpstead, E., & Aleven, V. (2017). Inciting out-of-game transfer: Adapting contrast-based instruction for educational games. In A. Barany, S. Slater, & C. Steinkeuhler (Eds.), *GLS 12 Conference Proceedings 2017* (pp. 29-38). Pittsburgh: ETC Press. https://doi.org/10.1184/R1/6686780

Lee, A.*, Malkiewich, L.J.*, Slater, S.*, & **Chase, C.C.** (2017). Understanding the gap: Gender similarities and differences in persistence and self-efficacy in a coding game. In A. Barany, S. Slater, & C. Steinkeuhler (Eds.), *GLS 12 Conference Proceedings 2017* (pp.153-162). Pittsburgh: ETC Press. https://doi.org/10.1184/R1/6686780

Malkiewich, L.J.*, Lee, A.*, Slater, S.*, & **Chase, C.C.** (2017). Tenacious assessments: Using in-game behaviors to measure students' persistence and challenge navigation. In A. Barany, S. Slater, & C. Steinkeuhler (Eds.), *GLS 12 Conference Proceedings 2017* (pp. 9-18). Pittsburgh: ETC Press. https://doi.org/10.1184/R1/6686780

Malkiewich, L.J.*, Lee, A.*, Slater, S.*, Xing, C.*, & **Chase, C.C.** (2016). No lives left: How common game features can undermine persistence, challenge-seeking, and learning to program. In C-K. Looi, J. Polman, U. Cress, & P. Reimann (Eds.), *Proceedings of the 12th International Conference of the Learning Sciences, Vol 1,* 186-193. International Society of the Learning Sciences.

Chase, C.C., Marks, J.*, Bernett, D.*, Bradley, M.*, & Aleven, V. (2015). Towards the development of an exploratory learning environment: A study of naturalistic teacher guidance of Invention. In C. Conati, N. Heffernan, M. Mitrovic, & F. Verdejo (Eds.), *Proceedings of the 17th International Conference on Artificial Intelligence in Education*, *AIED 2015,* (pp. 558-561). Springer Cham. https://doi.org/10.1007/978-3-319-19773-9

Chase, C.C., Marks, J.*, Bernett, D.*, & Aleven, V. (2015). The design of an exploratory learning environment to support Invention. In J. Boticario, & K. Muldner, (Eds.), *Proceedings of the Workshops at the 17th International Conference on Artificial Intelligence in Education*, *AIED 2015, Vol 2,* 1-8.

Chase, C.C. (2012). The interplay of chance and skill: Exploiting a common game mechanic to enhance learning and persistence. In J. van Aalst, K. Thompson, M. Jacobson, & P. Reimann (Eds.), *The Future of Learning*: *Proceedings of the 10th International Conference of the Learning Sciences.* [**Won best paper award**].

Christel, M.G., Stevens, S. M., Maher, B.S., Brice, S., Champer, M., Jayapalan, L., Chen, Q., Jin, J., Hausmann, D., Bastida, N., Zhang, X., Aleven, V., Koedinger, K., **Chase, C.**, Harpstead, E., & Lomas, D. (2012). RumbleBlocks: Teaching science concepts to young

children through a Unity game. *Proceedings of the 17th International Conference on Computer Games (CGAMES),* p. 162-166. IEEE. https://doi.org/10.1109/CGames.2012.6314542

Chase, C.C., Shemwell, J.T., & Schwartz, D.L. (2010). Explaining across contrasting cases for deep understanding in science: An example using interactive simulations. In K. Gomez, L. Lyons, & J. Radinsky (Eds.). *Proceedings of the 9th International Conference of the Learning Sciences*, *Vol 1,* 153-160. International Society of the Learning Sciences.

CONFERENCE PRESENTATIONS AND POSTERS

* student co-author

Abowd, N.*, Connolly, H. *, Scott, A. *, & **Chase, C.C.** (2021). Challenges, adaptations, and transformative changes to teaching practice during distance learning, and the instructional legacy of COVID-19. Poster presented at 4rd Psychology @ TC Conference, Teachers College, Columbia University, New York, NY

Connolly, H.*, & **Chase, C. C.** (2020, April). *Beyond prior knowledge: Conceptualizing adaptive expertise in middle school Invention Activities.* Poster presented at the American Educational Research Association (AERA), San Francisco, CA.

Connolly, H.*, & **Chase, C. C.** (2020, April). *Measuring flexibility in a computer-based exploratory problem-solving environment.* Poster presented at the American Educational Research Association (AERA), San Francisco, CA.

Connolly, H.*, Lamnina, M.*, Chesebrough, C. B.*, **Chase, C. C.** (2019, April). *Which dispositions and behaviors characterize productive exploration in Invention tasks?* Poster presented at the 3rd Psychology @ TC Conference, Teachers College, Columbia University, New York, NY.

Kumar, A., & Chase, C.C. (2019, September). *The effects of a dynamic spatial overlay on understanding of magnetic field representations.* Poster presented at the 4th Learning Sciences Graduate Student Conference, Evanston, IL.

Connolly, H.*, Lamnina, M.*, Aleven, V., & **Chase, C.C.** (2018, June). *Supporting transfer of physics knowledge from open-ended learning activities with the Invention Coach*. Talk presented at the 11th annual Subway Summit on Cognition and Education, New York, NY.

Malkiewich, L. J.*, & **Chase, C.C.** (2018, June). *How learning goals and contrasting cases aid transfer from engineering activities.* Talk presented at the 11th annual Subway Summit on Cognition and Education, New York, NY.

Lamnina, M.*, & Chase, C.C. (2018, June). *Uncertainty and expectations in instruction influence curiosity, sffect, learning, and transfer.* Poster presented at the 11th annual Subway Summit on Cognition and Education, New York, NY.

Connolly, H.*, Lamnina, M.*, Aleven, V., & **Chase, C.C.** (2018, April). *A study of the Invention Coach: A computer-based environment that promotes transfer of concepts through open-ended problem solving.* Poster presented at the annual meeting of the American Educational Research Association (AERA), New York, NY.

Lamnina, M.* & **Chase C.C.** (2018, April). *How different types of uncertainty affect learning, transfer, curiosity, and affect.* Poster presented at the annual meeting of the American Educational Research Association, New York, N.Y.

Connolly, H.*, Lamnina, M.*, Aleven, V., & **Chase, C.C.** (2018, April). *The Invention Coach: A computer-based environment that guides students through exploratory problem solving.* Poster presented at the 2nd Psychology @ TC conference, New York, NY.

Malkiewich, L. J.*, & **Chase, C. C**. (2018, April). *The effect of goals and contrasting cases on learning and transfer from an engineering design task.* Poster presented at the 2nd Psychology @ TC conference, New York, NY.

Lamnina, M.*, & **Chase, C.C.** (2018, April). *The interplay of uncertainty, curiosity, and affect influences learning and transfer.* Poster presented at the 2nd Psychology @ TC conference, New York, NY.

Chase, C.C., Marks, J.*, Lamnina, M.*, Connolly, M.*, Popescu, O., & Aleven, V. (2017, April). *An adaptive system for guiding open-ended problem solving: The Invention Coach.* Poster presented at the annual CyberLearning meeting, Arlington, VA.

Holbert, N., & **Chase, C.C.** (2017, April). *Constructionist games as preparation for future inquiry.* Talk presented at the annual meeting of the American Educational Research Association (AERA), San Antonio, TX.

Lamnina, M.* & **Chase, C.C.** (2017, April). *Increasing curiosity through Invention*. Talk presented at the annual meeting of the American Educational Research Association (AERA), San Antonio, TX.

Malkiewich, L.J.*, Xing, C.*, Slater, S.*, Lee, A.*, & **Chase, C.C.** (2016, April). *Game over: Detrimental effects of game features on persistence and learning of computer programming.* Talk presented at the annual meeting of the American Educational Research Association (AERA), Washington, D.C.

Malkiewich, L. J.*, Bernett, D.*, Kumar, A.*, **& Chase, C. C**. (2016, April). *Building to learn: Effects of contrasting cases during reflection on engineering design tasks.* Poster presented at the Inaugural Cross-Psychology Conference, Teachers College, Columbia University, New York, NY.

Lee, A.*, Malkiewich, L. J.*, Slater, S., Xing, C., **& Chase, C. C**. (2016, April). *Whose game is it anyway?: How gender and game design affect persistence, learning, and motivation.* Poster presented at the Inaugural Cross-Psychology Conference, Teachers College, Columbia University, New York, NY.

Chase, C.C., Marks, J.*, Bernett, D.*, Malkiewich, L.*, & Aleven, V. (2016, June). *Towards the development of the Invention Coach: A naturalistic study of teacher guidance for an exploratory learning task.* Poster presented at the annual CyberLearning meeting, Arlington, VA.

Chase, C.C. & Marks, J.* (2016, January). *Developing the Invention Coach with studies of naturalistic teacher guidance.* Roundtable at the annual CyberLearning meeting, Arlington, VA.

Chase, C.C., Marks, J.*, Wille, J.*, Bradley, M.*, & Malkiewich, L.J.* (2015, April). *A naturalistic study of tutor guidance during Invention tasks.* Poster presented at the annual meeting of the American Educational Research Association (AERA), Chicago, IL.

Bradley, M.*, Marks, J.*, Bernett, D.*, Aleven, V., & **Chase, C.C.** (2015, January). *Designing an intelligent learning environment for open-ended Invention tasks.* Poster presented at the 8th annual Subway Summit on Cognition and Education Research, New York, NY.

Chase, C.C. (2014, January). *Adapting instructional strategies for educational games: Contrasting cases in RumbleBlocks.* Talk presented at the 7th annual Subway Summit on Cognition and Education Research, Brooklyn, NY.

Ashe, C. A., Yaron, D. J., Carter, W. C., **Chase, C.**, Adamson, D., & Bartolo, L. (2012, August). *Advancing chemistry and interdisciplinary STEM education through interactive simulations, computer-facilitated collaborative chat, and novel instructional strategies.* American Chemical Society National Meeting and Exposition (ACS), Washington, DC.

Chi, Min., Dohmen, I., Shemwell, J.T., Chin, D.B., **Chase, C.C.**, & Schwartz, D.L. (2012, May). *Seeing the forest from the trees: A comparison of two instructional models using contrasting cases.* Talk presented at the annual meeting of the American Educational Research Association (AERA), Vancouver, Canada.

Chase, C.C. (2012, May). *Exploiting game mechanics to promote persistence and risk-taking in the face of failure.* Talk presented at the annual meeting of the National Council of Teachers in Mathematics (NCTM), Philadelphia, PA.

Chase, C.C., Shemwell, J.T., & Schwartz, D.L. (2012, May). *Critical ingredients of contrasting case instruction.* Talk presented at the annual meeting of the American Education Research Association (AERA), Vancouver, Canada.

Chase, C.C., Chin, D.B., Oppezzo, M.A., & Schwartz, D.L. (2011, September). *Learning for the sake of a digital protégé: An analysis of students' think-alouds as they engage with a*

Teachable Agent. Poster presented at the Socializing Intelligence through Talk and Dialogue Conference, Pittsburgh, PA.

Chase, C.C. & Schwartz, D.L. (2010, July). *Inventing with contrasting cases: An instructional method that improves students' uptake of big ideas*. Poster presented at the Physics Education Research Conference (PERC), Portland, OR.

Chase, C.C., Chin, D.B., Gresalfi, M., & Schwartz, D.L. (2010, May). *Why instruction supports or hinders transfer in physics.* Talk presented at the annual meeting of the American Educational Research Association (AERA), Denver, CO.

Chase, C.C., Chin, D.B., Oppezzo, M.A., Dohmen, I., & Schwartz, D.L. (2009, November). *The Protégé Effect: Increasing the effort towards learning with Teachable Agents.* Poster presented at the National Science Foundation's annual Science of Learning Centers awardees meeting, Washington, D.C.

Chase, C.C., Chin, D.B., Oppezzo, M.A., & Schwartz, D.L. (2009, August). *Teachable Agents and the Protégé Effect: Increasing the effort towards learning*. Talk presented at the annual meeting of the European Association for Research on Learning and Instruction (EARLI), Amsterdam, Netherlands.

Chase, C.C., Chin, D.B., Oppezzo, M.A., & Schwartz, D.L. (2009, June). *Teachable Agents and the Protégé Effect: Increasing the effort towards learning*. Poster presented at the annual Institute of Education Sciences (IES) research conference, Washington, DC.

Chin, D.B., **Chase, C.C.**, Oppezzo, M.A., Kwong, H.Y., & Schwartz, D.L. (2008, June). *Sociable Learning Technologies: Teachable Agents to enhance feedback, assessment, and future learning.* Poster presented at the annual Institute of Education Sciences (IES) research conference, Washington, DC.

Chase, C.C., Chin, D.B., Cheng, B., Oppezzo, M.A., & Schwartz, D. L. (2008, March). *Learning with Teachable Agents: A look at production feedback.* Talk presented at the annual meeting of the American Educational Research Association (AERA), New York, NY.

Oppezzo, M.A., **Chase, C.C.**, Chin, D.B., & Schwartz, D. L. (2008, March). *Homework - work = future learning: Using informal learning structures to enhance formal education.* Talk presented at the annual meeting of the American Educational Research Association (AERA), New York, NY.

Chase, C.C. & Schwartz, D. L. (2008, February). *Teaching to learn: The impact of Teachable Agents on achievement goals and motivation.* Poster presented at the annual Inter-Science of Learning Center (ISLC) student and post-doc conference, Pittsburgh, PA.

TECHNOLOGY DEVELOPMENT

2013-2017 **The Invention Coach**. An adaptive, intelligent environment that supports middle school students as they invent equations for physical science phenomena. https://inventioncoachproject.com. Role: principal investigator.

2011-2013 **RumbleBlocks**. An educational game about the physics of stability, designed for elementary aged children. Role: learning science specialist. http://rumbleblocks.etc.cmu.edu

2009-2011 **Mendel's Galaxy**. An educational game about genetics and probability for middle schoolers. Role: lead developer.

INVITED TALKS

The instructional legacy of COVID-19: Teacher adaptation during and after the pandemic. (2021, November). Daniel Schwartz's Lab. Stanford University School of Education.

Promoting transfer of STEM concepts with the Invention Coach. (2021, January). Seminar. SRI International, Education Division.

Promoting transfer of STEM concepts with the Invention Coach. (2021, January). Seminar. National Science Foundation, Division of Research on Learning in Formal and Informal Settings.

Developing learners' adaptive knowledge of STEM concepts with guided Invention activities. (2020, December). Seminar. Department of Education and Child Study, Smith College.

Understanding and supporting transfer from production activities: How to guide students as they build, create, and invent in STEM domains. (2020, January). Seminar. Department of Educational Psychology, College of Education, University of Arizona.

Problematizing helps! Designing and evaluating problematizing guidance with the Invention Coach. (2019, July). New journal track session of the International Conference of Artificial Intelligence in Education, Chicago, IL.

The design and evaluation of computer-based guidance of Invention Activities. (2018, December). Colloquium, Department of Human Development, Teachers College, Columbia University, New York, NY.

Teaching rapid prototyping to reframe failure and drive iteration. (2017, December). Symposium. The success of failure: Perspectives from the arts, sciences, humanities, education, and law. Columbia University, New York, NY.

Supporting transfer from production activities. (2017, October). Colloquium, Department of Human Development, Teachers College, Columbia University, New York, NY.

Learning by Inventing: Understanding, guiding, and adapting the process of Invention. (2016, April). Panel on Learning and Cognition at the 2016 Inaugural Cross-Psychology Conference, Teachers College, Columbia University, New York, NY.

The Teachable Agent: A sociable technology for learning causal reasoning. (2016, February). Panel on Learning with technology at the 2016 NSF Science of Learning Centers Meeting, Arlington, VA.

Augmenting student production activities with contrasting cases. (2016, February). The Program for Interdisciplinary Educational Research (PIER) Speaker Series, Carnegie Mellon University, Pittsburgh, PA.

Scaffolding exploratory learning tasks with the Invention Coach. (2016, February). The Program for Interdisciplinary Educational Research (PIER) Speaker Series, Carnegie Mellon University, Pittsburgh, PA.

Promoting deep learning and transfer with Invention Activities. (2015, October). Proseminar, Department of Human Development, Teachers College, Columbia University, New York, NY.

Developing an Invention Coach. (2014, September). Meeting for the Research and Educational Network and the Institute for Learning Technologies, Teachers College, Columbia University, New York, NY.

Noticing structure amidst variation: Contrast-based activities that support learning and transfer. (2014, April). Janet Metcalfe's lab, Department of Psychology, Columbia University, New York, NY.

Adapting contrast-based instruction for novel contexts: The case of RumbleBlocks, an educational game. (2014, February). Colloquium, Department of Human Development, Teachers College, Columbia University, New York, NY.

Developing an Invention Tutor. (2013, December). Institute for Learning Technologies, Teachers College, Columbia University, New York, NY.

Learning and engagement within a gaming environment. (2012, November). Center for Advanced Technology in Schools (CATS) Seminar for Research on Games and Learning, Los Angeles, CA.

Positioning novices as relative experts: Motivating expert behaviors. (2009, June). The 36th Carnegie Symposium on Cognition, Carnegie Mellon University, Pittsburgh, PA.

TEACHING & ADVISING

Courses Taught

HUDK 4080: Educational Psychology*

HUDK 6199: Principles of Effective Learning Design*
HUDK 5505: Transfer of Learning*
HUDK 6199: Learning through Play*
HUDK 4029: Cognition and Learning
HUDK 5324/6539: Research Practicum*
* *courses I developed or significantly re-designed*

Masters Student Advising

in progress	Keying Wang, MA in Cognitive Science in Education
	Camila Torres-Rivera, MA in Cognitive Science in Education
2018	Kimberly Zambrano, MA in Cognitive Science in Education
2017	Sharmeen Islam, MA in Cognitive Science in Education
	Christine Chesebrough, MA in Cognitive Science in Education
2015	Deena Bernett, MA in Cognitive Science in Education

Doctoral Student Advising

in progress	Helena Connolly, PhD in Cognitive Science in Education
	Aakash Kumar, PhD in Cognitive Science in Education
	Alexandra Scott, EdD in Cognitive Science in Education
2019	Marianna Lamnina, PhD in Cognitive Science in Education
2018	Laura Malkiewich, PhD in Cognitive Science in Education
2017	Jenna Marks, PhD in Cognitive Science in Education

SERVICE

Dissertation Committee Service

in progress	Yun Yang, PhD in Cognitive Science in Education
	Wendy Witterschein, PhD in Cognitive Science in Education
	Aakash Kumar, PhD in Cognitive Science in Education
	Helena Connolly, PhD in Cognitive Science in Education
	Jayadhurganandh Jayaraman, PhD in Cognitive Science in Education
2021	Rosianne Lesperance, PhD in Developmental Psychology
	Julia Guzman, EdD in Motor Learning
2020	Tanmay Sinha, PhD in Learning Sciences at ETH Zurich
	Jun Gao, PhD in Cognitive Science in Education
	Renqiuwen Wu, PhD in Developmental Psychology
	Jite Lark, PhD in Science Education
2019	Jung-Hyun Ahn, EdD in Instructional Technology and Media
	Nirmaliz Colon-Acosta, PhD in Cognitive Science in Education
	Xingchi Lu, EdD in Math Education
	Marianna Lamnina, PhD in Cognitive Science in Education
2018	Ahram Choi, EdD in Instructional Technology and Media
	Ilya Lyashevsky, PhD in Cognitive Studies in Education
	Yuchen Shi, PhD in Cognitive Studies in Education
	Laura Malkiewich, PhD in Cognitive Science in Education
2017	Alison Lee, PhD in Cognitive Studies in Education

	Jing Zhao, PhD in Cognitive Studies in Education
	William Tonissen, EdD in Music Education
	Jenna Marks, PhD in Cognitive Science in Education
2016	Sorachai Kornkasem, PhD in Cognitive Studies in Education
2015	Yumiko Murai, EdD in Communication and Education
	Yung-Yi (Juliet) Chou, PhD in Cognitive Studies in Education
	Cathy Jalali, PhD in Cognitive Studies in Education
2014	Elizabeth Jewett, PhD in Developmental Psychology
	Azadeh Jamalian, PhD in Cognitive Studies in Education
	John McDonald, EdD in Educational Leadership Practice

Additional University Service

2019-2020	Co-lead, Initiative to develop a shared participant pool of TC students
2017-present	Member, Psychology Faculty Coordinating Committee
2016-2017	Member, Faculty Search Committee, Cognitive Studies in Education
2016	Invited panelist at the Teachers College President's Advisory Council Meeting
2015	Invited panelist at the Roundtable on Technology and the Learning Sciences
2014-2016	Member, Learning Sciences Committee
2013-present	Member, Institute for Learning Technologies

Ad hoc Referee Service

Journals	*Journal of Educational Psychology, Journal of Experimental Psychology: General, Educational Psychology: An International Journal of Experimental Educational Psychology, Cognition and Instruction, Cognitive Development, Cognitive Research: Principles and Implications, npj Science of Learning, Journal of the Learning Sciences, Learning and Instruction, Instructional Science, PLOS ONE, American Educational Research Journal, Learning: Research and Practice, Learning and Individual Differences, Science Education, Journal of Research in Science Teaching, Journal of Science Education and Technology, Journal of Mathematical Behavior, International Journal of Artificial Intelligence in Education, IEEE Transactions on Learning Technologies, Journal for Research on Technology in Education*
Conferences	*American Educational Research Association (AERA), International Conference of the Learning Sciences (ICLS), ACM CHI Conference on Human Factors in Computing Systems*
Grant Panels	*National Science Foundation*, EHR Core Research
	National Science Foundation, Cyberlearning program
	National Science Foundation, Discovery Research K-12

Additional Service to the Profession

2020	Dissemination work, Advise Columbia education fellows on measurement and evaluation of emerging educational technologies
2018-present	Dissemination work, Lead workshops to train medical faculty from the American Society of Clinical Oncologists in learning science principles

2018	Co-chair, *Subway Summit*, a conference on cognition and education research
2017	Participant, Play Data Consortium
2015	Member, Technology Advisory Group for the George Lucas Education Research Foundation
2012	Panelist, Center for Advanced Technology in Schools (CATS) Seminar for Research on Games and Learning

PROFESSIONAL AFFILIATIONS

Transforming Learning Accelerator at Stanford University
American Educational Research Association (AERA)
International Society of the Learning Sciences (ISLS)
Center for Innovative Research in CyberLearning (CIRCL)
International Artificial Intelligence in Education Society (AIED)
Cognitive Science Society (COGSCI)
American Psychological Association (APA)
Pittsburgh Science of Learning Center (PSLC)
Learning in Informal and Formal Environments (LIFE) Center

MEDIA COVERAGE

Levine, J. (2019). The importance of deeper noticing: Leveraging contrasts to reveal engineering activity's underlying principles. Retrieved from https://www.tc.columbia.edu/articles/2019/march/the-importance-of-deeper-noticing/

Giegerich, S. (2018). Interactive learning, via the subway. Retrieved from https://www.tc.columbia.edu/articles/2018/september/interactive-learning-via-the-subway/

The Invention Coach. (2016). Retrieved from https://circlcenter.org/the-invention-coach/

Sparks, S. D. (2010). Scientists Say Their 'Teachable Agents' Seem to Spur Effort, Motivation. Retrieved from https://www.edweek.org/ew/articles/2010/10/28/10avatar.h30.html