H. Chad Lane

Professor, Educational Psychology & Computer Science
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Education

Ph.D. Computer Science, University of Pittsburgh, 2004. Advisor: Kurt VanLehn

M.S. Computer Sciences, University of Wisconsin-Madison, 1997.

B.S. Mathematics & Computer Science, Truman State University, *cum laude*, minor in Philosophy, honors in Computer Science, 1995.

Current Appointments

Professor, Educational Psychology, University of Illinois, Urbana-Champaign, 2024-present.

Director, NSF-IES AI Institute for Inclusive and Intelligent Technologies for Education (INVITE), June 2023-present. http://invite.illinois.edu

Associate Chair & Director of Graduate Studies, Educational Psychology, UIUC, August 2022–present.

Affiliate Faculty, Computer Science, UIUC, 2020-present

Affiliate Faculty, Curriculum & Instruction, UIUC, 2019-present.

Affiliate Faculty, Illinois Informatics Institute, UIUC, 2015-present.

Research Interests

cognitive modeling, artificial intelligence in education, LLMs in education, human-computer interaction, pedagogical agents, simulated learners, technology-enhanced learning

Research Statement

I want to build educational technologies that are as compelling and engaging as the very best social media apps, video games, or movies. Like our most dedicated educators, I seek to design tools that captivate learners and help cultivate attitudes towards learning and growth that are compatible with the demands of the modern world. In pursuit of these goals, I conduct research on the design, use, and impacts of intelligent technologies for learning and behavior change. My current work explores how large language models (LLMs) and generative AI can revolutionize education by creating more responsive, personalized, and engaging learning experiences. I investigate how these powerful tools can serve both learners and teachers while addressing critical human-computer interaction challenges brought on by deep, AI-driven interactivity that is now possible. My work blends creative approaches from the entertainment industry (to foster engagement) with advanced AI techniques in ML and NLP (to promote learning) to address emerging problems in education. By forming radically interdisciplinary teams, I strive to create AI-powered educational tools that not only improve cognitive outcomes, but also support learners to develop critical thinking and self-regulatory skills, especially with learners from underserved and underrepresented communities in STEM.

Previous Appointments

Associate Professor, Educational Psychology, University of Illinois, Urbana-Champaign, 2015-2024.

Division Chair, Cognitive Science of Teaching and Learning (CSTL), 2016-2020.

Acting Director, Technology Innovation in Educational Research and Design Initiative (TIER-ED), Jan-Aug 2019.

Director for Learning Sciences Research, Institute for Creative Technologies, University of Southern California, 2012-2015

Project Leader, Institute for Creative Technologies, University of Southern California, 2006-2012.

Research Scientist, Institute for Creative Technologies, University of Southern California, 2004-2015.

Adjunct Assistant Professor of Clinical Education, USC Rossier School of Education, 2014 - 2015.

Graduate Research Assistant, Learning Research & Development Center, University of Pittsburgh, 1999-2004.

Teaching Fellow and Instructor, Dept. of Computer Science, University of Pittsburgh, 1997-2004.

Instructor (part time), Duff's Business College, Pittsburgh, PA, 1998-2000.

Director, Joseph Baldwin Academy, Truman State University, summers 1996-1998.

Graduate Student Instructor, Computer Sciences, University of Wisconsin-Madison, 1995-1997.

Visiting Student Researcher, U.S. Dept. of Energy, Oak Ridge National Lab, Spring/Summer 1994.

Awards and Honors

Principal Member, Institute of Education Sciences' (IES) Basic Processes Education Research Peer Review Panel. Appointed by Director of IES, Dr. Mark Schneider. 2021-2026.

Distinguished Senior Scholar Award, College of Education, University of Illinois, Urbana-Champaign, May 2023.

Outstanding Faculty Award for Public Engagement, College of Education, University of Illinois, Urbana-Champaign, May 2023.

Facilitator's Award, "Exploring Alternative Versions of Earth in Minecraft," NSF 2018 STEM for All Video Showcase http://stemforall2018.videohall.com/presentations/1188

Presenter's Award, "Move2Learn: Embodied Learning for Pre-K Scientists", NSF 2018 STEM for All Video Showcase http://stemforall2018.videohall.com/presentations/1199

Teachers Rated as Excellent, University of Illinois, Urbana-Champaign

- Spring & Fall 2015 (EPSY-INFO590, Engaging Educational Technologies)
- Fall 2016 (EPSY490, Informal Learning; EPSY-INFO590, Engaging Educational Technologies)
- Spring 2017 (EPSY-INFO590, Mobile Apps for Teaching, Learning, & Educational Research)
- Fall 2017 (ESPY490, Informal Learning; EPSY-INFO590, Engaging Educational Technologies)
- Spring 2018 (EPSY590, Mobile Apps for Teaching and Learning)
- Fall 2018 (EPSY490, Informal Learning)
- Spring 2019 (EPSY-INFO590, Mobile Apps for Teaching, Learning, & Educational Research)

- Fall 2019 (EPSY490, Informal Learning)
- Spring 2020 (EPSY590, The Science of Interest)
- Spring 2021 (EPSY490, Educational Games Research; EPSY-INFO590 Mobile Apps for Teaching and Learning)
- Spring 2023 (EPSY490, Educational Games Research)
- Spring 2024 (EPSY199, AI and the Science of Accelerated Human Learning)
- Fall 2024 (EPSY 590, Generative AI in Education)

Two-time nominee for President of the International Artificial Intelligence in Education Society, 2011 & 2013.

Best paper award, International Conference on Computers in Education, 2008. Tapei, Taiwan.

Orrin E. & Margaret M. Taulbee Award for Excellence in Computer Science (teaching & research), Department of Computer Science, University of Pittsburgh, 2000 & 2001. (first two-time recipient)

Teaching Award for the Highest Evaluation Score among TAs, Department of Computer Science, University of Pittsburgh, 1999.

Commendation from Vice Chancellor for positive interaction with students, University of Pittsburgh, 1998.

Outstanding Graduate Student Instructor Award, Computer Sciences Department, University of Wisconsin-Madison, 1997.

Selected Press

Insight Into Diversity (August 2023), Institute Uses AI to Promote Equity in STEM Education

Illinois News Bureau (May 2023), U of I to lead National Artificial Intelligence Research Institute focused on STEM Learning

Illinois News Bureau (Feb 2023), The Power of AI in Education

ARETE Podcast, Ateneo University, Philippines (Feb 2020), Interest, Play, and Learner Engagement

Illinois News Bureau (Aug 2019), Children use video games to explore science in two NSF-funded projects

Fox Champaign (Sep 2019), U of I professor studies correlation between education and video games

Associated Press (Sep 2019), Scientists use Minecraft to help students study space

Big Ten Network (Sep 2019) "STEM-learning comes alive thanks to Illinois Researchers" https://btn.com/2019/09/03/stem-learning-comes-alive-thanks-to-illinois-researchers-btn-livebig/

Monitor on Psychology (Nov 2018) Designing Smarter Tech Tools: New technology in educational gaming, health-care communication, robotics and more is benefiting from psychologists' input

American Psychology Association (March 2018) Using technology to captivate leaners: New research from psychologists

The Press-Enterprise (November 2012) Corona: Teachers hope video games teach math skills

Journal Articles

Lane, H. C. (2023). K-12 AI Education: Defining Frameworks, Curricula, and a Research Agenda. In J. Lester and N. Wang (Eds.), Special issue on K-12 Artificial Intelligence Education, *International Journal of Artificial Intelligence in Education (IJAIED),* 33:427-438. Springer. https://doi.org/10.1007/s40593-023-00359-w

Siegle, R. F., Schroeder, N. L., Lane, H. C., & Craig, S. D. (2023). Twenty-five Years of Learning with Pedagogical Agents: History, Barriers, and Opportunities. *TechTrends*, 1-14. https://doi.org/10.1007/s11528-023-00869-3

Fan, Y., Lane, H. C., & Delialioğlu, Ö. (2022). Open-ended tasks promote creativity in Minecraft. *Educational Technology & Society, 25(2)*, 105-116. https://www.jstor.org/stable/48660127

Lane, H. C., Gadbury, M., Ginger, J., Yi, S., Comins, N., Henhapl, J., & Rivera-Rogers, A. (2022). Triggering STEM Interest With Minecraft in a Hybrid Summer Camp. *APA Technology, Mind, and Behavior, 3(4: Winter)*. https://doi.org/10.1037/tmb0000077

Morrow, D. G., Lane, H. C., & Rogers, W. A. (2021). A Framework for Design of Conversational Agents to Support Health Self-care for Older Adults. *Human Factors, 63(3),* 369-378. http://doi.org/10.1177/0018720820964085

Bell, B. M., Martinez, L., Gotsis, M., Lane, H. C., Davis, J. N., Antunez-Castillo, L., Ragusa, G., & Spruijt-Metz, D. (2018). Virtual Sprouts: A Virtual Gardening Pilot Intervention Increases Self-Efficacy to Cook and Eat Fruits and Vegetables in Minority Youth. *Games for Health Journal*. http://doi.org/10.1089/g4h.2017.0102

Lineberry, M., Dev, P., Lane, H. C., & Talbot, T. B. (2018). Learner-Adaptive Educational Technology for Simulation in Healthcare: Foundations and Opportunities. *Simulation in Healthcare: Journal of the Society for Simulation in Healthcare*. https://doi.org/10.1097/SIH.0000000000000274

Lane, H. C., McCalla, G., Looi, C. K., & Bull, S. (2016). Preface to the IJAIED 25th Anniversary Issue, Part 2. *International Journal of Artificial Intelligence in Education, 26(2)*, 539-543.

Lane, H.C., Hays, M.J., Core, M.G., & Auerbach, D. (2013). Learning intercultural communication skills with virtual humans: Feedback and fidelity. *Journal of Educational Psychology, 105 (4)*, 1026-1035.

Woolf, B., Lane, H.C., Chaudhri, V., & Kolodner, J. (2013). AI Grand Challenges for Education. *AI Magazine, 34(4)*, 66-84.

Swartout, W., Artstein, R., Forbell, E., Foutz, S., Lane, H.C., Lange, B., Morie, J., Noren, D., Rizzo, S., & Traum, D. (2013). Virtual Humans for Learning. *AI Magazine, 34(4)*, 13-30.

Kim, J., Hill, R.W., Durlach, P.W., Lane, H.C., Forbell, E., Core, M., Pynadath, D., & Hart, J. (2009). BiLAT: A game-based environment for practicing negotiation in a cultural context. *International Journal of Artificial Intelligence in Education, 19(3)*, 289-308.

Core, M., Traum, D., Lane, H. C., Swartout, W., Marsella, S., Gratch, J., & van Lent, M. (2006). Teaching negotiation skills through practice and reflection with virtual humans. *SIMULATION: Transactions of the Society for Modeling and Simulation, 82(11)*, 685-701.

Lane, H. C. & VanLehn, K. (2005). Teaching the tacit knowledge of programming to novices with natural language tutoring. *Computer Science Education 15(3)*, 183-201.

Stringently Reviewed Conference Publications

(NOTE: Conferences listed in this section had acceptance rates ranging from 15% to 45%).

Liu, X., Zambrano, A., Barany, A., Ocumpaugh, J., Ginger, J., Gadbury, M., Lane, H.C., & Baker, R.S. (2024). Investigating Learner Interest and Observation Patterns in a Minecraft Virtual Astronomy Environment. In: Kim, Y.J., Swiecki, Z. (eds) Advances in Quantitative Ethnography. ICQE 2024. *Communications in Computer and Information Science, vol 2279*. Springer. https://doi.org/10.1007/978-3-031-76332-8_2

Hum, S., Shipley, E., Gadbury, M., Lane, H.C., & Ginger, J. (2024). Mars, Minecraft, and AI: A Deep Learning Approach to Improve Learning by Building. In: Olney, A.M., Chounta, IA., Liu, Z., Santos, O.C., Bittencourt, I.I. (eds) *Artificial Intelligence in Education. AIED 2024. Lecture Notes in Computer Science*, vol 14830. Springer. https://doi.org/10.1007/978-3-031-64299-9_39

Mahajan, J., Hum, S., Henhapl, J., Yunus, D., Gadbury, M., Brown, E., Ginger, J. & Lane, H. C. (2024). MineObserver 2.0: A Deep Learning & In-Game Framework for Assessing Natural Language Descriptions of Minecraft Imagery. *Proceedings of The 14th Symposium on Educational Advances in Artificial Intelligence (EAAI-24)*. arXiv preprint arXiv:2312.11761.

Cox, E., Hasegawa-Johnson, M., Bhat, S., Umashankar, M., Lane, H. C., & Morrow, D. (2023). The Importance of Diverse User Goals When Designing an Automated COVID Risk Counselor. *Proceedings of the International Symposium on Human Factors and Ergonomics in Health Care, 12(1)*, 35–39. https://doi.org/10.1177/2327857923121009

Mahajan, J., Hum, S., Ginger, J., & Lane, H. C. (2022). MineObserver: A Deep Learning Framework for Assessing Natural Language Descriptions of Minecraft Imagery. *The International FLAIRS Conference Proceedings, 35*. https://doi.org/10.32473/flairs.v35i.130729

Yi, S., Lane. H. C. (2019). Space explorers: What-if hypothetical implementations in Minecraft. In J.H. Kalir & D. Filipiak (Eds.), *Proceedings of the 2019 Connected Learning Summit Conference.* ETC Press. Irvine, CA.

Yi, S., Lane, H.C., & Delialioglu, O. (2019). What if We Were Twice as Close to the Sun? Interview Findings from a Science Summer Camp Serving Underrepresented Youth. *Proceedings of Foundations of Digital Games*, San Luis Obispo, CA.

Yi, S. & Lane, H.C. (2019). Fostering Interest in Science through Interactive Exploration of Astronomy Simulations. *Proceedings of 2019 Conference of the International Society for Technology in Education*, Philadelphia, PA.

Lane, H.C., Core, M.G., Hays, M.J., Auerbach, D., & Rosenberg, M. (2015). Situated pedagogical authoring: Authoring intelligent tutors from a student's perspective. In *Proceedings of the 17th International Conference on Artificial Intelligence in Education*, LNAI 9912 (195-204). Heidelberg, Germany: Springer.

Lane, H.C., Cahill, C., Foutz, S., Auerbach, D., Noren, D., Lussenhop, C., & Swartout, W. (2013). The effects of a pedagogical agent for informal science education on learner behaviors and self- efficacy. In *Proceedings of the 16th International Conference on Artificial Intelligence in Education*, LNAI 7926 (309-318): Heidelberg, Germany: Springer.

Lane, H.C., Noren, D., Auerbach, D., Birch, M. & Swartout, W. (2011). Intelligent tutoring goes to the museum in the big city: A pedagogical agent for informal science education. In *Proceedings of the 15th International Conference on Artificial Intelligence in Education*, LNAI 6738 (155-162). Heidelberg, Germany: Springer.

Swartout, W., Traum, D., Artstein, R., Noren, D., Debevec, P., Bronnenkant, K., Williams, J., Leuski, A., Naraayanan, S., Piepol, D., Lane, H.C., et al., (2010). Ada and Grace: Toward realistic and engaging virtual museum guides. In *Proceedings of the 10th Intelligent Virtual Agents Conference*, LNAI 6356 (286-300). Heidelberg, Germany: Springer.

Lane, H.C., Hays, M.J., Auerbach, D., & Core, M.G. (2010). Investigating the relationship between presence and learning in a serious game. In *Proceedings of the 10th International Conference on Intelligent Tutoring Systems*, LNCS 6094 (274-284). Heidelberg, Germany: Springer.

Lane, H.C., Schneider, M., Michael, S.W., Albrechtsen, J.S. & Meissner, C. (2010). Virtual humans with secrets: Learning to detect verbal cues to deception. In *Proceedings of the 10th International Conference on Intelligent Tutoring Systems*, LNCS 6095 (144-154). Heidelberg, Germany: Springer.

Hays, M., Lane, H. C., Core, M., Auerbach, D., Gomboc, D., & Rosenberg, M. (2009). Feedback specificity and the learning of intercultural communication skills. In *Proceedings of the 14th International Conference on Artificial Intelligence in Education* (391-398). Amsterdam: IOS Press.

Gomboc, D., Core, M., Lane, H.C., Karnavat, A., Auerbach, D., & Rosenberg, M. (2008). An intelligent tutoring framework for simulation-based training. In *Proceedings of the 18th International Conference on Computers in Education (93-97).* Taipei, Taiwan: APSCE.

Lane, H. C., Hays, M., Core, M., Gomboc, D.,Forbell, E., Auerbach, D., & Rosenberg, M. (2008). Coaching intercultural communication in a serious game. In *Proceedings of the 18th International Conference on Computers in Education* (35-42). Taipei, Taiwan: APSCE. **BEST PAPER AWARD**

Lane, H. C., Core, M., Gomboc, D., Karnavat, A., & Rosenberg, M. (2007). Intelligent tutoring for interpersonal and intercultural skills. In *Proceedings of the I/ITSEC Interservice/Industry Training, Simulation, and Education Conference*. Arlington, VA: National Training Systems Association.

Hill, R. W., Belanich, J., Lane, H. C., Core, M., Dixon, M., Forbell, E., Kim, J., & Hart, J. (2006). Pedagogically structured game-based training: Development of the ELECT BiLAT simulation. *In Proceedings of the Army Science Conference*.

Core, M., Lane, H. C., van Lent, M., Gomboc, D., Solomon, S., & Rosenberg, M. (2006). Building explainable artificial intelligence systems. In *Proceedings of the 18th Conference on Innovative Applications of Artificial Intelligence (IAAI)* (1766-1773). Menlo Park, CA: AAAI Press.

Gomboc, D., Solomon, S., Core, M., Lane, H. C., & van Lent, M. (2005). Design recommendations to support automated explanation and tutoring. In *Proceedings of the 14th Conference on Behavior Representation in Modeling and Simulation (BRIMS)*.

Lane, H. C. & VanLehn, K. (2005). Intention-based scoring: An approach to measuring success at solving the composition problem. In *Proceedings of the 36th ACM SIGCSE Technical Symposium on Computer Science Education* (373-377). New York, NY: ACM Press.

Lane, H. C. & VanLehn, K. (2004). A dialogue-based tutoring system for beginning programming. In *Proceedings of the 17th FLAIRS International Florida Artificial Intelligence Research Society Conference* (449-454). Menlo Park, CA: AAAI Press.

Lane, H. C. & VanLehn, K. (2003). Coached program planning: Dialogue-based support for novice program design. In *Proceedings of the 34th ACM SIGCSE Technical Symposium on Computer Science Education* (148-152). New York: ACM Press.

Book Chapters (reviewed)

Lane. H. C. (2023). Pedagogical agents for all: Designing virtual characters for inclusion and diversity in STEM, *Handbook of Artificial Intelligence in Education,* B. du Boulay, Mitrovic, A., & K. Yacef (Eds.). Chapter 27.3. Cheltenham, UK: Edward Elgar Publishing.

Lane, H. C., & Schroeder, N. L. (2022). Pedagogical agents. In *The Handbook on Socially Interactive Agents: 20 years of Research on Embodied Conversational Agents, Intelligent Virtual Agents, and Social Robotics Volume 2: Interactivity, Platforms, Application*, B. Lugrin, C. Pelachaud, & D. Traum (Eds.). Chapter 21 (pp. 307-330). New York: ACM Press.

Bulut, I.H., Delialioglu, O., & Lane. H. C. (2020). Beyond Acceptance: A new model for technology engagement in 21st Century Learning. In M. Montebello (Ed.) *Handbook on Research on Digital Learning*. (pp. 262-283). Abingdon, UK: Routledge.

Lane, H. C., & D'Mello, S. K. (2019). Uses of Physiological Monitoring in Intelligent Learning Environments: A Review of Research, Evidence, and Technologies. In T. D. Parsons, L. Lin, & D. Cockerham (Eds.), *Mind, Brain and Technology: Learning in the Age of Emerging Technologies* (pp. 67-86). Springer International Publishing.

Goldberg, B., Nye, B., Lane, H.C., & Guadagnoli, M. (2018). Team Assessment and Pedagogy as Informed by Sports Coaching and Assessment. In R. Sottilare, A. Graesser, X. Hu, & A. Sinatra (Eds.), *Design Recommendations for Intelligent Tutoring Systems* (pp. 105-120). US Army Research Laboratory.

Lane, H. C. & Mercier, E. (2017). Enhancing collaboration and learning through touch screen interfaces. 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. 41-44). Menlo Park CA: SRI International.

Fusco, J. Martin, W. Lane, H. C. & Chase, 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.

Lane, H. C., & Yi, S. (2017). Playing with virtual blocks: Minecraft as a learning environment for practice and research. In F. C. Blumberg & P. J. Brooks (Eds.), *Cognitive Development in Digital Contexts* (pp. 145-156). Amsterdam, Netherlands: Elsevier.

Lane, H.C. (2017). Interactive sensing technologies. In K. Peppler (Ed.), *The SAGE Encyclopedia of Out-of-School Learning* (pp. 373-375). Los Angeles: SAGE.

Toedte, R. J. & Lane, H. C. (2017). Data visualization. In K. Peppler (Ed.), *The SAGE Encyclopedia of Out-of-School Learning* (pp. 201-204). Los Angeles: SAGE.

Lane, H.C. (2016). Pedagogical agents and affect: Molding positive learning interactions. In S.Y. Tettegah & M. Gartmeier (Eds), *Emotions, Technology, Design, & Learning* (pp. 47-61). London: Academic Press.

Lane, H.C. (2015). Enhancing informal learning experiences with affect-aware technologies. In R.A. Calvo, S.K. D'Mello, J. Gratch, & A. Kappas (Eds) *Handbook of Affective Computing* (pp. 435-446). New York: Oxford University Press.

Lane, H. C. (2012). Coaching and mentoring. In N. Seel (Ed.), *Encyclopedia of the Sciences of Learning, Vol 1* (pp. 557-559). Heidelberg, Germany: Springer.

Lane, H. C. (2012). Cognitive models of learning. In N. Seel (Ed.), *Encyclopedia of the Sciences of Learning, Vol 1* (pp. 608-610). Heidelberg, Germany: Springer.

Lane, H. C. (2012). Intercultural learning. In N. Seel (Ed.), *Encyclopedia of the Sciences of Learning, Vol 2* (pp. 1618-1620). Heidelberg, Germany: Springer.

Lane, H.C. & Wray, R. (2012). Individualized social and cultural learning with virtual humans. In P. Durlach & A. Lesgold (Eds.), *Adaptive Technologies for Training and Education* (pp. 204-221), New York: Cambridge University Press.

Ogan, A. & Lane, H. C. (2010). Virtual learning environments for culture and intercultural competence. In E. Blanchard & D. Allard (Eds.), *Handbook of Research on Culturally-Aware Information Technology: Perspectives and Models* (pp. 501-519). Hershey, PA: IGI Global.

Lane, H. C. & Johnson, W. L. (2009). Intelligent Tutoring and Pedagogical Experience Manipu- lation in Virtual Learning Environments. In D. Schmorrow, J. Cone, & D. Nicholson (Eds.), *The Handbook of Virtual Environments for Training and Education, Volume 2: VE Components and Training Technologies* (pp. 393-406). Wesport, CT: Praeger Security International.

Workshops, Short papers, Magazine articles, and Other Publications

Gadbury, M., & Chad Lane, H. (2023, June). A Bayesian Analysis of Adolescent STEM Interest Using Minecraft. In *International Conference on Artificial Intelligence in Education* (pp. 384-389). Cham: Springer Nature Switzerland.

Gadbury, M., & Lane, H. C. (2022). Mining for STEM Interest Behaviors in Minecraft. In Artificial Intelligence in Education. *Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners' and Doctoral Consortium: 23rd International Conference, AIED 2022*, Durham, UK, July 27–31, 2022, Proceedings, Part II (pp. 236-239).

Hum, S., Stinar, F., Lee, H., Ginger, J., & Lane, H. C. (2022). Classification of Natural Language Descriptions for Bayesian Knowledge Tracing in Minecraft. *In Artificial Intelligence in Education. Posters and Late Breaking Results, Workshops and Tutorials, Industry and Innovation Tracks, Practitioners' and Doctoral Consortium: 23rd International Conference, AIED 2022*, Durham, UK, July 27–31, 2022, Proceedings, Part II (pp. 250-253). Cham: Springer International Publishing.

Yi, S., Gadbury, M., & Lane, H. C. (2021). Identifying and coding STEM interest triggers in a summer camp. In *Proceedings of the 15th International Conference of the Learning Sciences-ICLS 2021*. International Society of the Learning Sciences.

Yi, S., Gadbury, M., & Lane, H.C. (2020). Coding and analyzing scientific observations from middle school students in Minecraft. In M. Gresalfi & I. S. Horn (Eds.), *The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020*, Volume 3 (pp. 1787-1788). Virtual Nashville, TN, USA: International Society of the Learning Sciences.

Bell, B., Cook, L., Gotsis, M., Lane, H.C., Davis, J., Castillo, L.A., Ragusa, G., & Spruijt-Metz, D. (2017) Virtual Sprouts: A virtual gardening pilot intervention increases self-efficacy to cook and eat fruits and vegetables in minority youth. *Society of Behavioral Medicine, 38th Annual Meeting & Scientific Sessions*. San Diego, CA.

Lane, H.C., Yi, S., Guerrero, B., & Comins, N. (2017) Minecraft as a Sandbox for STEM Interest Development: Preliminary Results. In *Proceedings of the Workshop on Interest Driven Creation at the International Conference on Computers in Education* (pp. 1-10). Christchurch, NZ.

Lane, H.C., Yi, S., Guerrero, B., & Comins, N. (2017) A Taxonomy of Minecraft Activities for STEM. In *Proceedings of the International Conference on Computers in Education* (pp. 1-3). Christchurch, NZ.

Lane, H.C. & Santos, O. (2016). Embodied Learning and Artificial Intelligence: Expanding the bandwidth of learning technologies. In *Ideas Worth Sharing*. London: Pearson.

Lane. H.C. (2016, May). Virtual Environments, Real Learning. *Computer* (pp. 14-15), IEEE Computer Society.

Hays, M.J., Ogan, A., & Lane, H.C. (2010). The evolution of assessment: Learning about culture from a serious game. In C. Lynch et al. (Eds.), *Proceedings of the Workshop on Intelligent Tutoring Technologies for Ill-defined Problems and Ill-defined Domains at the 10th International Conference on Intelligent Tutoring Systems*. Pittsburgh, PA.

Lane, H.C. (2010). Characters that help you learn: Individualized practice with virtual human role players. In D. Perez-Marın, I. Pascual-Nieto, & S. Bull (Eds.), *Proceedings of the Workshop on Adaptation and Personalization in e-b/Learning using Pedagogic Conversational Agents held at User Modeling, Adaptation, and Personalization*. Waikoloa Village, Hawaii.

Woolf, et al. (2010). *A Roadmap for Education Technology.* Computing Research Association (CRA). [Contributing Author, sections on Serious Games and Intelligent Environments]

McAlinden, R., Gordon, A., Lane, H.C., & Pynadath, D. (2009). UrbanSim: A game-based simulation for counterinsurgency and stability-focused operations. In H.C. Lane, Ogan, A., & V. Shute (Eds.), *Proceedings of the Educational Games Workshop at the 14th International Conference on Artificial Intelligence in Education* (pp. 41-50). Brighton, UK.

Lane, H. C. & Ogan, A. (2009). Virtual environments for cultural learning. In E. Blanchard, H. C. Lane, & D. Allard (Eds.), *Proceedings of the 2nd Workshop on Culturally-Aware Tutoring Systems at the 14th International Conference on Artificial Intelligence in Education* (25-34). Brighton, UK.

Wray, R., Lane, H. C., Stensrud, B., Core, M., Hamel, L., & Forbell, E. (2009). Pedagogical experience manipulation for cultural learning. In E. Blanchard, H. C. Lane, & D. Allard (Eds.), *Proceedings of the 2nd Workshop on Culturally-Aware Tutoring Systems at the 14th International Conference on Artificial Intelligence in Education* (35-44). Brighton, UK.

Lane, H.C. (2009). Promoting metacognition in immersive cultural learning environments. In J.A. Jacko (Ed.), *Human-Computer Interaction, Part IV, HCII 2009*, LNCS 5613 (129-139). Heidelberg, Germany: Springer.

Lane, H.C., Core, M., Gomboc, D., Birch, M., Hart, J., & Rosenberg, M. (2009). Using written and behavioral data to detect evidence of continuous learning. In J. Kay & B. Kummerfeld (Eds.), *Proceedings of the Lifelong Learner Modeling Workshop at User Modeling, Adaptation, and Personalization* (54-61). Trento, Italy.

Lane, H. C. & Matthew J. Hays (2008). Getting down to business: Teaching cross-cultural social interaction skills in a serious game. In E. G. Blanchard et al., (Eds.), *Proceedings of the 1st Workshop on Culturally-Aware Tutoring Systems at the 9th International Conference on Intelligent Tutoring Systems* (35-46). Montreal, Canada.

Lane, H. C. (2007). Metacognition and the Development of Intercultural Competence. In I. Roll et al. (Eds.), *Proceedings of the Workshop on Metacognition and Self-Regulated Learning in Intelligent Tutoring Systems at the 13th International Conference on Artificial Intelligence in Education* (23- 32). Marina del Rey, CA.

Lane, H. C., Core, M., Gomboc, D., Solomon, S., van Lent, M., & Rosenberg, M. (2006). Reflective tutoring for immersive simulation. In *Proceedings of the 8th Intelligent Tutoring Systems Conference* (pp. 732-734). Heidelberg, Germany: Springer-Verlag.

Lane, H. C. (2006). Intelligent tutoring systems: Prospects for guided practice and efficient learning. *Army Science of Learning Workshop*, Hampton, VA. August 1-3, 2006.

Core, M., Lane, H. C., van Lent, M., Solomon, S., Gomboc, D., & Carpenter, P. (2005). Toward question answering for simulations. *Papers of the Knowledge and Reasoning for Answering Questions workshop at IJCAI05*, Edinburgh, Scotland.

Lane, H. C., Core, M., van Lent, M., Solomon, S., & Gomboc, D. (2005). Explainable artificial intelligence for training and tutoring. In *Proceedings of the 12th International Conference on Artificial Intelligence in Education*. (pp. 762- 764). Amsterdam: IOS Press.

Riedl, M., Lane, H. C., Hill, R. W., & Swartout, B. (2005). Automated story direction and intelligent tutoring: Towards a unifying architecture. In *Proceedings of the Workshop on Narrative Learning Environments at the 12th International Conference on Artificial Intelligence in Education*. Amsterdam, The Netherlands.

Lane, H. C. (1994). Cryptographic algorithms for privacy-enhanced mail (Technical Report K/DSRD- 1721). Department of Energy, Oak Ridge National Lab, Data Systems Research and Development.

Thesis & Dissertation

Lane, H. C. (2004). Natural Language Tutoring and the Novice Programmer. Doctoral dissertation, Department of Computer Science, University of Pittsburgh. Advisor: Kurt VanLehn, Committee: Diane Litman, Peter Brusilovsky, Jan Wiebe, & Marian Petre. http://etd.library.pitt.edu/ETD/available/etd-12082004-151424/

Lane, H. C. (1995). Zero-knowledge proofs: Proving you know without telling. Senior Honors Thesis, Division of Math & Computer Science, Truman State University.

Research Funding (active)

NSF-IES AI Institute for Inclusive and Intelligent Technologies for Education (INVITE) (PI/Director, NSF/IES CISE-EDU #2229612, $19,998,746, 6/1/2023 – 5/31/2028). The Institute for Inclusive and Intelligent Technologies for Education (INVITE) seeks to fundamentally reframe how educational technologies interact with learners by developing artificial intelligence (AI) tools and approaches to support three crucial noncognitive skills known to underlie effective learning: persistence, academic resilience, and collaboration. We are developing a new generation of intelligent systems that seek to be radically more responsive to learner needs, behaviors, and development. Designed to support the whole learner and go well beyond discipline-focused achievement, INVITE systems leverage advanced machine learning techniques and generative AI to model, support, and simulate diverse learners. Use-inspired research will focus on how children collaborate to solve STEM problems, how they learn to persist through challenging work, and how teachers support and promote noncognitive skill development. The resulting AI-based tools will be integrated into classrooms to empower teachers to support learners in more developmentally appropriate ways. Our work generates rich data documenting learner interactions with educational technologies, each other, and teachers, allowing researchers to study learner growth over time and across different STEM activities. Research and outreach activities draw from the INVITE K-12 partner network reaching up to 96,000 learners across 24 school districts and nonprofits spanning 8 states. INVITE offers programs to support teacher participation in research and design, provides undergraduate courses in AI in education for capacity building, and professional development programs for teachers. http://invite.illinois.edu

Designing Agrivoltaics for Sustainably Intensifying Food and Energy Production (Co-PI, USDA/NIFA #2021-05691, Sustainable Agricultural Systems, $10,000,000, 10/1/2021 – 9/30/2025). The Sustainably Colocating Agricultural and Photovoltaic Electricity Systems (SCAPES) project investigates the co-location of energy and food production and will provide a comprehensive analysis of agrivoltaic farms to increase the combined productivity (food and electricity) of land and diversity farmers' profits with row crops, forage, and

specialty crops across a range of environments. Lane's role is to lead the development of an agrivoltaics app for public outreach that leverages the popularity of farming games to engage learners in the design and exploration of foundational concepts from the project. https://scapes.illinois.edu/

Research Funding (completed)

Fostering Enduring Interest in STEM through Exoplanet Education and Interactive Exploration and Creation of Potentially Habitable Worlds (PI, NSF DRL# 1934087, AISL, $2,738,242, 8/1/19 – 7/31/24). This project involves the design of engaging, interactive digital activities for middle school learners (ages 9-13) that trigger and sustain interest in STEM. Using a customized Minecraft server, learners can explore alternative versions of Earth, visit representations of known exoplanets, interact with autonomous agents, and create new content to share with other learners. Collaborators: University of Maine, University of Colorado-Boulder (Fiske Planetarium), PBS NOVA, Learn01 (Miami). https://whimc.education.illinois.edu/

Cultivating Creativity to Integrate Computation and Science Problem Solving in Informal Learning (PI, NSF DRL# 1934087, STEM+C, $635,553, 9/1/19 – 2/29/24). This project develops interactive learning content for the learning of computational thinking skills in the context of scientific problem solving and data science education. Research identifies strategies for encouraging creative solutions to problems inspired by real-world challenges, such as flooding and agricultural optimization, that require scientific understanding, use of computational thinking skills, and use of data science skills for visualizing and understanding scientific phenomena. https://publish.illinois.edu/stemc-minecraft/

Move2Learn: Understanding the role of embodied interaction in Pre-K science learning (Co-PI, NSF DRL#1646940, $2.4M total w/UK, $1,420,050 US, UIUC $400K, ScienceLearning+, 3/1/17 - 9/30/20).

Fostering Interest in Science through Interactive Exploration of Astronomy What-If Simulations (PI, NSF DRL# 1713609, $331,949, 6/1/17 – 5/31/20).

Scrutability in Game-Based Assessment and Prediction of Career Fit, (Subcontractor, Research Lead, NSF SBIR#1747381, $300,000, UIUC $60K, 1/1/18 – 12/31/18). Collaborator: Posed2, Inc.

Virtual Sprouts: Web-based Gardening Games to Teach Nutrition and Combat Obesity (co-PI), NCRR Science Education Partnership Award (SEPA), National Institutes for Health, 5/1/11-4/30/16, $1,338,123

Situated Pedagogical Authoring for Virtual Human-based Training (PI), Department of the Army, 11/1/11 - 10/31/14, $2,193,558

Fostering Engagement, Motivation, and Diligence in STEM Learning (PI), Telemedicine & Advanced Technology Research Center (TATRC), 10/1/12 - 3/31/14, $231,310

Fast Authoring of Content for Intelligent Tutoring Systems (Co-PI), Office of Naval Research, 5/1/13 - 6/30/14, $273,280

Responsive Virtual Human Museum Guides (co-PI), National Science Foundation, DRL#0813541, 9/1/08 - 8/31/12, $2,062,116

Technologies for Accelerated Continuous Learning (PI), Department of the Army, 8/1/07 - 10/31/11, $1,450,100

Intelligent Guided Experiential Learning: Tutoring for Practice (PI), Department of the Army, 11/1/09 - 10/31/11, $1,019,328

Interactive Game-Based Systems for Psychological Health (co-PI), Office of Naval Research, 2/1/10 - 1/31/11, $50,017

Virtual Practice for Removable Partial Denture Design (co-PI), University of Southern California, James H. Zumberge Award for Interdepartmental Collaboration, 2/1/10 - 7/31/10, $10,000

Intelligent Modeling for Pedagogically Aware Cultural Training (co-PI), United States Air Force, 8/1/08 - 7/31/10, $262,633

Adaptive Expertise for Leadership Training (co-PI), Office of Naval Research, 3/1/09 - 8/31/09, $24,439

Intelligent Guided Experiential Learning: Tutoring for Practice (PI), Department of the Army, 11/1/07 - 10/31/08, $859,611

Dynamic Experiences for Simulation-based Training (PI), Department of the Army, 11/1/05 - 10/31/06, $188,250

Reflective Tutoring and Explainable Artificial Intelligence (co-PI), Department of the Army, 11/1/05 - 10/31/07, $1,754,965

Service (External, senior positions and national committees)

Principal Reviewer, appointed by Director of Institute for Education Sciences, Department of Education, 2021-2026.

Program Co-Chair, Technology, Mind, & Society (TMS) by APA and SIGCHI, October 2019.

Program Co-Chair, Computer Supported Education (CSEDU), Crete, Greece, May 2019, May 2020.

Program Co-Chair, 26th International Conference on Computers in Education (ICCE), Track C1: Artificial Intelligence in Education, Metro Manila, Philippines, 2018.

Advisor, Special Interest Group, IEEE ICICLE Design for Learning, 2018-current.

Steering Committee, Technology, Mind, & Society Conference (TMS), new conference funded by APA, with support from ACM SIGCHI and AAAI, 2017-2019.

Lead Editor, International Journal of Artificial Intelligence in Education, Special Issue on 25th anniversary of AIED, 2016.

Associate Editor, IEEE Transactions on Learning Technologies (TLT), 2014 - 2021.

Executive Committee (elected position), International Society for Artificial Intelligence in Education, 2010-2015.

Special Editor, AI Magazine special double issue on Advanced Learning Technologies, Fall 2013 & Spring 2014.

Advisory Committee, National Science Foundation, Cyberlearning: Transforming Education Program, 2012.

Reviewer & Consultant, European Commission, Divisions on Technology-Enhanced Learning and Creativity Research, 2011-2021.

Program Co-Chair, 16th International Conference on Artificial Intelligence in Education (AIED), 2013. Memphis, TN.

Conference Chair, 27th International Florida Artificial Intelligence Research Society Conference (FLAIRS), 2012.

Senior Program Committee & Interactive Events Co-Chair, 15th International Conference on Artificial Intelligence in Education (AIED), 2011. Auckland, New Zealand.

Program Co-Chair, 23rd and 24th International Florida Artificial Intelligence Research Society Conferences (FLAIRS), 2008 & 2009.

Service (program committees, chair positions, editorships, volunteering)

Reviewer & Panel Chair, Institute for Educational Sciences (IES), Department of Education, 2012-present.

Reviewer & Senior Program Committee, Artificial Intelligence in Education Conference (AIED), 2004-current.

Senior Program Committee, Artificial Intelligence in Education Conference (AIED), 2010-current.

Proposal reviewer, National Science Foundation (EDU, CISE), 2009-current.

Reviewer & Program Committee, International Journal of Artificial Intelligence and Education, 2008-current.

Program Committee, International Florida Artificial Intelligence Research Society Conference (FLAIRS), 2008-current.

Editorial Board, Frontiers in Computer Science, 2018-current.

Chair, Panel on Scaling ITEST Projects. NSF ITEST PI Meeting, November 3, 2022.

Reviewer, ACM Technical Symposium on Computer Science Education (SIGCSE), 2004-2019.

Chair, NSF STEM+C Synthesizing Committee 2019. Appointed by Dr. Arlene de Strulle, Program Director, NSF: https://www.youtube.com/watch?v=LxstWhEM34U&feature=youtu.be (I speak at about 9:00), and our wrap-up: https://www.youtube.com/watch?v=3EE5jV3t69Q

Editorial Board, Journal of Interactive Learning Environments, 2007-2020.

Reviewer & Program Committee, Intelligent Tutoring Systems Conference (ITS), 2006-2019.

Reviewer IEEE Conference on Intelligence in Games (CIG), 2019.

Program Committee, Special track on Intelligent Tutoring Systems, International Florida Artificial Intelligence Research Society Conference (FLAIRS), 2008-2013.

Program Committee, Special track on Intelligent Learning Technologies, International Florida Artificial Intelligence Research Society Conference (FLAIRS), 2014-2020.

Reviewer & Program Committee, Conference on Computer Supported Education (CSEDU), 2010-2019.

Reviewer, IEEE Transactions on Learning Technologies, 2008-2019.

Chair, Workshop on Empirical Research on Pedagogical Agents, October 20-22, 2015. Playa Vista, CA. https://werpa.ict.usc.edu/

Reviewer, Cognitive Technology Journal, 2008-2010.

Mentor & Reviewer, Young Researchers Track, 10th International Conference on Intelligent Tutoring Systems, Pittsburgh, PA, 2010.

Youth technology mentor, MEND (Meeting Every Need with Dignity), 2010.

Program Committee, 14th International Conference on Artificial Intelligence in Education (AIED09), Brighton, UK, 2009.

Chair, Workshop on Intelligent Lifelong Learning Companions, October 2-3, 2008. Marina del Rey, CA. https://companion.ict.usc.edu/

Program Committee, National Conference of the Association for the Advancement of Artificial Intelligence (AAAI), 2007.

Reviewer, Young Researcher Track, National Conference on Artificial Intelligence (AAAI), 2007- 2009.

Organizing Committee, Local Arrangements, Artificial Intelligence in Education Conference (AIED07), Marina del Rey, CA, 2007.

Chair, Special track on Intelligent Tutoring Systems, 19th International Florida Artificial Intelligence Research Society Conference (FLAIRS), May 11-13, 2006. Melbourne Beach, FL.

Chair, Workshop on Intelligent Tutoring in Serious Games, August 24-25, 2006. Marina del Rey, CA. https://itgs.ict.usc.edu/

Service (internal)

Associate Chair, Director of Graduate Studies, Dept. of Educational Psychology, University of Illinois, Urbana-Champaign, 2022-current.

Member, Boldly Illinois Research Computing Visioning Committee. 2024-current.

Member, National Center for Supercomputer Application's (NCSA) DeltaAI Advisory Committee

Campus Honors Program (Undergraduate) Faculty, 2023-current.

James Scholar Undergraduate Research Program, advisor 2018-current.

Member, Dean Search Committee, 2022.

Member, Academic Programs Committee, 2022-current.

Member (Fall), Chair (Spring), College Research Committee, College of Education, University of Illinois, Urbana-Champaign, 2020-2021.

Member, EPSY Executive Committee (elected), University of Illinois, Urbana-Champaign, 2020-2021.

Member, Specialized Faculty Promotion Committee, University of Illinois, Urbana-Champaign, 2019-2021.

Chair, College Research Committee, College of Education, University of Illinois, Urbana-Champaign, 2019-2020.

Host, Fulbright Visiting Scholar, Assoc. Prof. Dr. Hasan Cakir, Gazi University, Turkey. 2019-2020.

Division Chair, Cognitive Science of Teaching and Learning (CSTL), Department of Educational Psychology, College of Education, University of Illinois, Urbana-Champaign, 2016-current.

TIER-ED Committee (including hiring search), College of Education, University of Illinois, Urbana-Champaign, 2017-current.

Host, Fulbright Visiting Scholar, Prof. Dr. Ömer Delialioğlu, Middle East Technical University (METU), 2017-2018.

Online Programs Committee, College of Education, University of Illinois, Urbana-Champaign, 2017-current.

O'Leary Center Design Committee, College of Education, University of Illinois, Urbana-Champaign, 2016-2017.

College of Education Dean Search Committee, University of Illinois, Urbana-Champaign, 2016-2017.

Illinois Informatics Institute Review Committee, University of Illinois, Urbana-Champaign, 2016.

Volunteer Java Instructor, Learning Research & Development Center, University of Pittsburgh, 1999.

Undergraduate Programs Committee, Computer Science, University of Pittsburgh, 1998-2000.

Invited Talks, Keynotes, Panels, and Presentations

"Navigating the Rapidly Evolving Landscape of AI in Education: A Researcher's Perspective", Dean's Distinguished Speaker Series, University of Utah, Salt Lake City, UT. March 3, 2025. bit.ly/coe-lane

"Generative AI in Education", Invited Panel Presentation, Association of American Universities (AAU), Annual Education Dean's Meeting, December 6, 2024.

"Generative AI in Higher Education", Invited Panel Presentation, AAAI/NSF IUSE PI Summit, Washington, DC, June 17, 2024.

"Generative AI and the Future of Education", Invited Panel Presentation, University of North Carolina-Chapel Hill. April 22, 2024.

"Applying Artificial Intelligence and Interactive Technologies to Educational Problems: Reflections and Future Research Directions", Invited Talk for the University of Wyoming, February 19, 2024.

"Reflections on Five years of Research on Minecraft for Informal Science Learning + Defining the NSF INVITE AI Institute", Invited Talk at the Institute for Cognitive Science at the University of Colorado, Boulder. February 15, 2024.

"AI In Education: Human Learning, 40+ years of work, and Generative AI", Invited Talk (online), National Institutes of Standards and Technology (NIST), NICE Seminar, September 20, 2023. https://www.nist.gov/news-events/events/2023/09/nice-webinar-impact-generative-artificial-intelligence-education-and

"Applying Artificial Intelligence and Interactive Technologies to Educational Problems: Themes, Ethics, and Future Research Directions", Invited Talk (online), US Bank – Design Ethics Group, May 12, 2023.

"Reflections on Using Minecraft for STEM Education", Invited Talk (online), Ateneo University, March 10, 2023.

"Cognition, Emotions, and Coding: How psychology research can support CS educators", Keynote, Capital One Coders Conference, Thursday January 26, 2023. Audience: 200+ nationwide volunteers.

"Integrating Computational Thinking and Science Learning in Minecraft", Invited talk, NSF ITEST PI Meeting, November 1, 2022.

"Crafting Interactive Experiences: The Power of Games for Meaningful Engagement and Impact", Invited Speaker (public audience), St. Louis Science Center, September 2, 2022

"Unpacking the Cognitive and Emotional Aspects of Learning to Code", Keynote, 1st Wyoming Computer Science Education Conference, July 21, 2022. Riverton, WY.

"Unpacking STEM Interest development in Minecraft", Keynote, NSF Workshop on Human-Technology Interface Series - Pathways to Products for Lifelong Learning, Monday, January 24, 2022.

"Educational Games Research: Designing games for teaching and learning", Panel Presentation, Playful By Design (PBD) Fall Symposium, University of Illinois, October 2, 2021.

"AI supported formal and informal CS Education", Invited talk, UIUC Computer Science, Computers and Education group, October 27, 2020.

"Promoting Interest and Engagement with Intelligent Learning Technologies", Invited Talk, Ateneo University, Ateneo Laboratory for the Learning Sciences, February 18, 2020. Manila, Philippines.

"The How and Why of Integrating Computing with STEM (aka, *What Computer Science and Cranberry Juice*

have in common)", Invited talk, NSF STEM+C PI Meeting, September 20, 2019. https://youtu.be/ZUQGzDNXRaA?si=H2BKu5TdrPmP5MIY

"Technology-Enhanced Informal STEM Learning", Invited Panel Presentation, NSF AISL PI Meeting, February 12, 2019."

"How AI is being used for fine-grained assessment and to support learning across contexts", Keynote, Superintelligence: The Future of Artificial Intelligence. Kuwait Foundation for the Advancement of Science (KFAS), November 20, 2018.

"How AI Research is Working to Support and Empower Educators", Alelo Webinar Series on the Future of AI in Education and Training, August 8-9, 2018.

"Exploring Alternative Versions of Earth in Minecraft", 2018 STEM for All Video Showcase, May 14-21, 2018. http://videohall.com/p/1188 **FACILITATOR'S CHOICE AWARD** (20 awards out of 214)

"Move2Learn: Embodied Learning for Preschool Scientists", 2018 STEM for All Video Showcase, May 14-21. http://videohall.com/p/1199 **PRESENTER'S CHOICE AWARD** (9 awards out of 214)

"Promoting Interest and Engagement with Intelligent Learning Technologies", Invited Plenary, Rensselear Polytechnic Institute, Teaching & Learning Colloquium, Troy, NY, May 18, 2018.

"Promoting Interest and Engagement in Informal Learning with Intelligent Learning Technologies", Invited talk, Emerging Technology Workshop, St. Louis Science Center, St. Louis, MO. May 4, 2018.

"Technology-Enhanced Informal Learning: Bringing Advanced Learning Technologies into Museums and Out-of-School Settings", Invited Lecture, London Knowledge Lab, University College London, London, England, March 20, 2018.

"Technology-Enhanced Informal Learning: Bringing Advanced Learning Technologies into Museums and Out-of-School Settings", Keynote Presentation, CSEDU (Computer Supported Education), Funchal, Portugal, March 17, 2018.

"Research on Pedagogical Agents: How Making Computers More Human-like Can Improve Learning." Invited online talk, Center for Innovative Research in Cyberlearning (CIRCL), October 24, 2017. Retrieved from http://circlcenter.org/events/ecolloq-implicit-assessments-pedagogical-agents/

"Informal science learning: Promoting engagement, interest, and learning in museums", Distinguished Visiting Lecture, Notre Dame University, Psychology Department, November 28, 2016.

"Can we Build Passionate Intelligent Tutoring Systems? Promoting Engagement and Learning with Pedagogical Agents", Kitchen Talk, Culture Lab, Newcastle University, England, February 24, 2014.

"Can we Build Passionate Intelligent Tutoring Systems? Promoting Engagement and Learning with Pedagogical Agents", Seminar, Institute for Language, Cognition, and Computation, University of Edinburgh, Scotland, February 21, 2014.

"Grand Challenges in the Human Dimension: Expertise and Training", Army Research Laboratory's (ARL) Human Dimension Workshop, Potomac, Maryland, November 5, 2013.

"The Design, Implementation, and Impacts of Pedagogical Agents", NIH mHealth summer institute, University of California Los Angeles, Los Angeles, CA, August 27, 2013.

"Designing and Building Pedagogical Agents for Informal Science Education", Invited talk, UCLA Psychology Department, Los Angeles, CA, August 30, 2013.

"Pedagogical agents for informal science education", Invited talk, Knowledge Factor, Inc., Boulder, CO, July 23, 2013.

"How can we intelligently make more intelligent computer scientists for the world to enjoy?", Keynote presentation, Workshop on AI-supported Education for Computer Science (AIEDCS), Memphis, TN, July 13, 2013.

"Neuroscience, Learning, and Creativity" Invited panel presentation, USC Interaxon (neuroscience education group), University of Southern California, March 12, 2013.

"Using Virtual Humans to Educate and Inspire", Western Center Academy (middle school), Hemet, CA, December 6, 2012.

"Can we build passionate and inspiring intelligent tutors? Lessons learned from using virtual humans and intelligent tutoring systems in the Boston Museum of Science", Invited talk, University of Memphis, September 1, 2011.

"I'm Learnding! What the Simpsons have to tell us about education, learning, and technology." Banquet address, 15th International Conference on Artificial Intelligence in Education (AIED2011), June 29, 2011. Auckland, New Zealand.

"The learning vs. fun debate: An abbreviated history", panel presentation at the 24th Florida Artificial Intelligence Research Society (FLAIRS-24) Conference, Games, Entertainment, Palm Beach, FL, May 20, 2011.

"Learning with virtual humans: Using simulated role players to teach and inspire", Truman State University, Department of Mathematics and Computer Science, Kirksville, MO, October 14, 2010.

"Promoting metacognitive learning in video games for children", panel presentation at the NSF Conference on Academic Lessons from Video Game Learning, Fordham University, New York, NY, October 7, 2010.

"What else can games teach?", panel presentation at the 23rd Florida Artificial Intelligence Research Society (FLAIRS-23) Conference, Games, Entertainment, and Learning, Daytona Beach, FL, May 21, 2010.

"Learning with virtual humans: Using simulated role players to teach and inspire", keynote address to the National Meeting of the Junior Science and Humanities Symposium (JSHS), Washington, DC, April 28, 2010. (300 of the top high school STEM students from all 50 states)

"Learning with virtual humans: Using simulated role players to teach and inspire", Invited talk, Worcester Polytechnic University, Departments of Computer Science and Psychology, Worcester, MA, April 12, 2010.

"The evolution of AIED: Successes and challenges", panel presentation, 14th International Conference Artificial Intelligence in Education, Brighton, UK, July 8, 2009.

"Guided learning and cognitive skill acquisition in serious games", Northern Illinois University, Department of Computer Science, DeKalb, IL, October 25, 2007.

"Guided learning and cognitive skill acquisition in serious games", Northern Iowa University, Department of Computer Science, Cedar Rapids, IA, October 24, 2007.

"Guided learning and cognitive skill acquisition in serious games", Truman State University, Department of Mathematics and Computer Science, Kirksville, MO, October 22, 2007.

"Human and Computer Tutoring: What we know, need to know, and are finding out about guided learning", Invited talk, University of California Los Angeles, Department of Psychology, Los Angeles, CA, January 12, 2007.

“Intelligent Tutoring Systems: Prospects for Guided Practice and Efficient Learning”, Invited working group talk, Army Science of Learning Conference, Hampton, VA, August 1, 2006.

Academic advising, thesis committees, supervision

Postdoctoral Researchers:

- Dr. Jeff Ginger, PhD UIUC Informatics, 2020-2022 (WHIMC project); Dr. Ginger is now a Senior Research Scientist in my lab.

Current Graduate Students and committees (PhD unless noted):

- Andrea Pellegrini, Educational Psychology (co-advisor w/Robb Lindgren)
- Sam Hum, Curriculum & Instruction/DELTA (advisor)
- Cameron Merrill, Computer Science (advisor)
- Sofia Meyers, Computer Science (advisor)
- Heather Broome, Computer Science (advisor)
- Mark Pelmore, Curriculum & Instruction/DELTA (co-advisor)
- Andrea Pellegrini, Educational Psychology (co-advisor)
- Sneha Krishna Kumaran, Computer Science (committee)
- Paul Hur, Information Science (committee)
- Morgan Fong, Computer Science (committee)
- Aysa Fan, Curriculum & Instruction/DELTA (committee)
- Juan Pinto, Curriculum & Instruction/DELTA (committee)
- Runzhi Chen, Educational Psychology (committee)

Graduated PhD students (UIUC):

- Sherry Yi, PhD 2021, Educational Psychology, Senior UX Researcher, JP Morgan Chase & Co.
- Ross Toedte, PhD 2021, Educational Psychology, President & Chief Research Officer, Science Education Research Foundation.
- Brian Guerrero, PhD 2023, Curriculum & Instruction (co-advisor w/Robb Lindgren). Postdoctoral Research Associate, Siebel Center for Design, UIUC.
- Mattthew Gadbury, PhD 2024, Educational Psychology. Associate Director of Custom Programs, Harris School of Public Policy, University of Chicago.

Past Students:

- Vishruth Kumar, UIUC (INVITE, undergraduate)
- Emi Brown, Computer Science, UIUC (WHIMC, undergraduate)
- Win Lawson, Physics, UIUC (STEM+C, undergraduate)
- Jay Mahajan, Computer Science, UIUC (WHIMC, undergraduate)
- Kriti Mathur, Computer Science, UIUC (STEM+C, undergraduate)
- Eric Mattson, Physics, UIUC (STEM+C & WHIMC, undergraduate)
- Leah Goldberg, EdD 2024, Educational Policy and Leadership/LDL, UIUC (committee)
- Evan Shipley, Curriculum & Instruction/DELTA, MS 2023, UIUC (advisor)
- Andrea Kunze, PhD 2022, Educational Psychology, UIUC (committee) (now Asst. Professor at Butler University)
- Kenny Blocker, PhD 2022 Educational Psychology, UIUC (committee) (now UX Lead at John Deere)
- John Myers, PhD Curriculum & Instruction, UIUC (committee)

- Irene Chen, Education, UIUC (Move2Learn, undergraduate)
- Aidan Rogers-Rivera, Environmental Science, UIUC (WHIMC, undergraduate)
- Jack Henhapl, Computer Science, UIUC (WHIMC, undergraduate)
- Pieter Svenson, Civil Engineering, UIUC (WHIMC, undergraduate)
- Matthew Feinberg, Electrical Engineering, UIUC (WHIMC, undergraduate)
- Alex Swanson-Lindville, Computer Engineering, UIUC (WHIMC, undergraduate)
- Kayley Jackson, Learning & Education Studies, UIUC (Move2Learn, undergraduate)
- Helen Wauck, PhD 2022, Computer Science, UIUC (committee) (now UX Researcher at SIFT)
- Hyunoo Park, Mathematics & Informatics, UIUC (WHIMC, undergraduate)
- Xingliang Chen, Computer Science, University of Canterbury (dissertation committee), May 2019.
- Xue Yan, APPLeS, James Scholar, UIUC (co-advisor w/Prof. Kiel Christianson)
- Kyungho Lee, 2019 PhD Informatics, UIUC (committee).
- Rebecca Teasdale, 2019 PhD Educational Psychology,m UIUC (committee). (now Asst. Prof. at University of Illinois, Chicago)
- Geoffrey McKinley, 2018 PhD Psychology, UIUC (committee).
- Yue Fan, Educational Psychology 2018 MS Ed Psych, UIUC (advisor) (now employed in Beijing).
- Joshua Fiechter, 2017 PhD (committee), UIUC, Psychology, 2017.
- Destinee Johnson, B.S. (co-advisor), UIUC, Learning and Education Studies, 2017 (graduate student, Howard University).
- Kaylee Furlett (advisor), UIUC James Scholar, 2017-2018.
- Robert Deloatch, 2018 PhD (committee), UIUC, Computer Science (Research Scientist at Apple)
- Qing He, M.A. 2017 (thesis committee), UIUC, Fine Arts, 2017.
- Nick Degens, PhD (dissertation committee), Department of Social Sciences, Information Technology Group, Wageningen University, Netherlands, 2014. (Asst. Prof., Hanze University)
- Richard Gluga, PhD (dissertation committee), Department of Computer Science, University of Sydney, Australia, 2013.
- Sergey Sosnovsky, PhD (dissertation committee), Dept. of Information Science, University of Pittsburgh, 2011. (Assoc. Prof, University of Utrecht)
- Shumin Wu: PhD (dissertation committee member), Dept. of Computer Science, University of Southern California, spring 2007. (Software Engineer, Facebook)

Supervision (USC):

- Daniel Auerbach, Programmer Analyst, Fall 2007 - 2015.
- Matthew Hays: Research Associate, 2011-2014; Postdoctoral Research Assistant, 2009 - 2011; Visiting Graduate Student Researcher (Psychology Dept., University of California, Los Angeles), Summer 2007 - Fall 2007, Summer 2008. (now Director of Research, Knowledge Factor, Inc., Boulder, CO)
- Mike Birch, Programmer Analyst, 2009 - 2013; Graduate student researcher (University of Southern California, Los Angeles), Summer - Fall 2008.
- Dave Gomboc, Research Programmer, Spring 2005 - Fall 2010.
- Mike Schneider, Research Programmer, Spring 2008 - Summer 2010.
- Tony Lockhart, Visiting Graduate Student Researcher (Georgia Tech University, Atlanta, GA), Summer 2010.
- Adeola Odunsi, Summer Intern (Jackson State University, Jackson, MS), Summer 2010.
- Toby Dragon, Visiting Graduate Student Researcher (University of Massachusetts, Amherst, MA),

Summers 2008, 2009.
- Steven Michael, Visiting Graduate Student Researcher (Psychology Dept., University of Texas-El Paso), Summer 2009.
- Martin van Velsen: Programmer Analyst, Fall 2006 - Fall 2008.
- Jonathan Gordon, Visiting Graduate Student Researcher (University of Rochester, Rochester, NY), Summer 2008.
- Nazila Hafezi, Visiting Graduate Student Researcher (University of Texas, El Paso, TX), Summer 2008.
- Eric Zastoupil, Summer Intern (Westpoint Military Academy), Summer 2008.
- Amy Ogan: Visiting Graduate Student Researcher (Human-Computer Interaction, Carnegie Mellon University, Pittsburgh), Summer 2007.
- Ahish Karnavat: Programmer Analyst, Spring 2006 - Spring 2008.
- Tipu Qamril, Student Programmer (University of Southern California), 2006-2007.
- Qun Cao, Programmer Analyst, 2006-2007.
- David Dawes, Summer Intern (Westpoint Military Academy), Summer 2006.
- Jeremy Glick, Summer Intern (Cognitive Science, Stanford University), Summer 2006.
- Emily Pitts, Summer Intern (North Carolina A&T), Summer 2006, Summer 2007.
- Sheldon Harris, Summer Intern (Xavier University of Louisiana), Summer 2006.
- Zeeshan Maqbool, Independent Study, University of Southern California, Spring 2005.

Teaching

Courses at UIUC (2015-current):

- EPSY199: AI and the Science of Accelerated Human Learning (Spring 2024; Fall 2025), Campus Honors Program
- EPSY 590: Generative AI in Education (Fall 2024).
- EPSY-GSD490: Educational Games Research (Spring 2021, Spring 2023)
- CS498: AI Applications in Education (Fall 2021)
- EPSY-INFO590: Mobile Technologies for Teaching, Learning, & Educational Research (Spring 2017, Spring 2018, Spring 2019, Spring 2021)
- CI210: Introduction to Digital Learning Environments (Fall 2020)
- EPSY590: The Science of Interest (Spring 2020)
- EPSY-INFO590: Interactive and Engaging educational technologies (Spring 2015, Fall 2015, Fall 2016, Fall 2017) *As of May 2018, this course is now permanent as EPSY/CI/INFO 555*
- EPSY573/CI550/SPED550: Methods of Educational Inquiry (Spring 2016)
- ESPY490: Learning in Everyday Contexts (Fall 2015, Fall 2016, Fall 2017)

Courses in Undergraduate and Graduate School (1995-2003)

- Graduate School Teaching Portfolio: https://people.cs.pitt.edu/~hcl/TP/
- Intermediate Programming in C++, University of Pittsburgh, Summer 2001.
- Introduction to Computer Programming, University of Pittsburgh, 1997-2003.
- Introduction to Algebraic Language Programming, University of Wisconsin-Madison, 1995-1997.
- College Algebra, Truman State University, 1994.