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Underlined Text indicates co-authors who were students at the time of publication.
R: indicates a research publication
T: indicates a publication about teaching at the undergraduate or graduate level

APPOINTMENTS

2025-present **University of Illinois, Champaign-Urbana, IL**
Professor of Curriculum and Instruction
Department Head, Curriculum and Instruction

Indiana University, Bloomington, IN
2024-2025 Barbara B. Jacobs Chair in Education and Technology
2024-2025 Director, Center for Research on Learning and Technology (CRLT)
2022-2025 Professor of the Learning Sciences

Indiana University, Bloomington, IN
2015-2022 Associate Professor of the Learning Sciences

Indiana University, Bloomington, IN
2009-2015 Assistant Professor of the Learning Sciences

EDUCATION

2009 **University of California, Los Angeles**
Ph.D., Psychological Studies in Education
Graduate School of Education and Information Studies

2005 **University of California, Los Angeles**
M.A., Psychological Studies in Education
Graduate School of Education and Information Sciences

1997 **Johns Hopkins University**
B.S., Computer Science

EXTERNAL GRANTS

PI*, NSF Grant — Indiana University, University of Pittsburg

2023-2026 *Collaborative Research: Building AI Models to Help Middle School*

* PI at time of award, switched to CO-PI upon moving institutions.

Students Interpret Science Diagrams

Award ID: 2506945 and 2506946; Total award amount: ***$899,639***

PI[†], NSF Grant — Indiana University and Digital Promise

2023-2026 *DRL Collaborative Research: Integrating Students? Interests, Identities and Ways of Knowing with Network Visualization Tools to Explore Data Literacy Concepts*

Award ID: 2241705 and 2241706; Total award amount: ***$1,300,000***

Co-PI, NSF Grant — Indiana University and Rutgers University

2023-2026 *DRL: Collaborative Research: Engaging students in discourse about criteria for judging scientific models*

Award ID: 2300831and 2300831; Total award amount: ***$1,499,210***

Senior Personnel, NSF Grant – North Carolina State University, Indiana University, Vanderbilt University, University of North Carolina, and Digital Promise

National Science Foundation AI Institute for Engaged Learning

Award ID: 16401411 Total award amount: ***$19,996,290***

Co-PI on IU Sub-Award for: ***$4,000,000***

Co-PI, NSF Grant — Indiana University and Vanderbilt University

2019-2022 *Generalized Embodied Modeling to support Science through Technology Enhanced Play*

Award ID: 1908632 & 1908791; Total award amount: ***$1,934,403***

PI, McDonnell Foundation — Indiana University, Vanderbilt University and UCLA

2018-2023 *Teacher Cognition and Learning about Incorporating Science Representations in Elementary Classrooms*

Award ID: 220020521; Total award amount: ***$2,490,000***

PI, NSF Grant — Indiana University and Rutgers University

2018-2021 *DRL: Collaborative Research: Scaffolding Explanations and Epistemic Development for Systems*

Award ID: 1761019 and 1760909; Total award amount: ***$1,494,932***

Co-PI, NSF Grant — Indiana University

2018-2020 *EAGER: Net.Create: Using Network Analysis to Support Digital Humanities in Large History Classrooms*

Award ID: 1848655; Award amount: ***$299,661***

[†] PI at time of award, switched to CO-PI upon moving institutions.

Co-PI, NSF Grant – UCLA and Indiana University

2016-2019 *DIP: Interactive Science through Technology Enhanced (ISTEP)*
Award ID: 1628918; Award amount: **$1,349,933**

PI, NSF Grant – Indiana University

2015-2018 *EXP: Promoting Learning through Annotation of Embodiment (PLAE)*
Award ID: 1522945; Award amount: **$554,030**).

Co-PI, NSF Grant — Indiana University

2013–2016 *DIP: BioSim: Developing a Wearable Toolkit for Teaching Complex Science Through Embodied Play (*Award ID: 0018093000; Award amount: **$1,035,989.00).**

Co-PI, NSF Grant — UCLA

2013–2016 *DIP: The Science Through Technology Enhanced Play (STEP) (*Award ID: 1323767; Award amount: **$1,203,082).**

Co-PI NSF Grant — Graduate School of Education and Information Studies, UCLA

2007–2009 *Semiotic Pivots and Activity Spaces for Elementary Science (SPASES)*
Co-authored this NSF-funded grant proposal with Noel Enyedy (Award ID: 0733218; Award amount: **$285,000**).

INTERNAL GRANTS

Co-PI, Faculty Research Support Program, External Resubmission — School of Education, Indiana University

2021-2022 *Visualizing Funds of Identity* (Award amount: **$33,405**)
This grant was co-authored with Rebecca Neri.

Co-PI, Faculty Research Support Program, External Resubmission — School of Education, Indiana University

2017-2018 *Net.Create, network analysis to support reading comprehension in history classrooms* (Award amount: **$59,986**)
This grant was co-authored with Kalani Craig and Cindy Hmelo-Silver.

PI, Proffitt Endowment Faculty Support Grant — School of Education, Indiana University

2015-2016 *Examining Early Elementary Modeling of Complexity with High-Resolution Multimodal Learning Analytic Techniques* (Award amount: **$19,000**)
This grant was co-authored with Adam Maltese and Alejandro Andrade.

Recipient, Research Support Grant — School of Education, Indiana University

2012 Award amount: **$6000**

PI, Proffitt Endowment Faculty Support Grant — School of Education, Indiana University

2011–2012 *Expanding Explorations of Complexity Into Informal Spaces* (Award amount: **$19,000**)

iPad Faculty Learning Community — Indiana University

2010–2011 *Using the iPad to Support Representation in Graduate Seminars* (Award

amount: **$750**)

PI, Faculty Research Support Program (FRSP) Grant — Indiana University
2010–2011 *Representational Practices in Science and Language Arts: What's the Difference and Why* (Award amount: $**55,361**)
This grant application was co-authored with Kylie Peppler.

PI, Proffitt Endowment Faculty Support Grant — School of Education, Indiana University
2010–2011 *Harnessing Kindergarten and First Grade Students' Representational Activities to Support Science Learning* (Award amount: **$17,993**)

Co-Author, New IDEA Grant — School of Education, Indiana University
2009–2010 *Development and Implementation of a New Online Certificate Program in Learning Sciences and New Digital Media and Technology*
This proposal was co-authored with Daniel Hickey and Kylie Peppler (Award amount: **$75,000**).

PUBLICATIONS: REFEREED JOURNAL ARTICLES

1. **R**: Craig, K., & Danish, J. (2026). Designing Our Digital Past: Anchoring Digital-History Tool Development in the Historical Method Through Design-Based History Research. *Journal of Digital History*, (jdh003). https://journalofdigitalhistory.org/en/article/BGU3PDv9p7pC

2. **R**: Fonteles, J. H., Cohn, C., Ayalon, E., Zhou, M., T.s., A., Davalos, E., Li, Z., Rayala, S., Mereddy, D., Coursey, A., Jain, S., Zhang, Y., Enyedy, N., Danish, J., & Biswas, G. (2026). Analyzing embodied learning in classroom settings: A human-in-the-loop AI approach for multimodal learning analytics. Learning and Instruction, 103, 102274. https://doi.org/10.1016/j.learninstruc.2025.102274

3. **R**: Humburg, M., Danish, J., Kim, Y., Hmelo-Silver, C., Dragnić-Cindrić, D., Ryan, Z., Glazewski, K., & Lester, J. (2025). SciStory: Designing AI-Supported Inquiry in Science Learning Games. International Journal of Designs for Learning, 16(2), 170–181. https://doi.org/10.14434/ijdl.v16i2.42049

4. **R**: Humburg, M., Danish, J.A., Tu, X. et al. Using Scientific Annotation Tools to Support Collaborative Embodied Learning in Elementary School Classrooms. J Sci Educ Technol (2025). https://doi.org/10.1007/s10956-025-10248-7

5. **R**: Lee, S.J., Tu, X., Adebola, S. et al. How children blend feedback in a mixed-reality environment for collective embodied learning. Intern. J. Comput.-Support. Collab. Learn (2025). https://doi.org/10.1007/s11412-025-09453-8

6. **R**: Vickery, M., & Danish, J. (2025). Realizations & re-mediations: Enabling expression and interaction in collective embodied activities for children with disabilities. Learning, Culture and Social Interaction, 53, 100919. https://doi.org/10.1016/j.lcsi.2025.100919

7. **R**: Zhou, M., Vickery, M., & Danish, J. A. (2025). Goals in Motion: How Emergent Embodied Goals Support Elementary Students' Mechanistic Reasoning in Collaborative Modeling Activities. Cognition and Instruction, 1–52. https://doi.org/10.1080/07370008.2025.2503194

8. **R**: Murphy, D., Duncan, R. G., Chinn, C. A., Danish, J., Hmelo Silver, C. E., Zhou, J., & Ryan, Z. (2025). Elementary Students' Metacognitive Knowledge of Epistemic Criteria. *Journal of Research in Science Teaching*, *n/a*(n/a). https://doi.org/10.1002/tea.22030\

9. **R**: Zhou, J., Hmelo-Silver, C. E., Ryan, Z., Stiso, C., Murphy, D., Danish, J., Chinn, C. A., & Duncan, R. G. (2024). Disagreeing softly: Supporting students in managing disagreement in peer critique. International Journal of Computer-Supported Collaborative Learning. https://doi.org/10.1007/s11412-024-09438-z

10. **R**: Humburg, M., Dragnić-Cindrić, D., Hmelo-Silver, C. E., Glazewski, K., Lester, J. C., & Danish, J. A. (2024). Integrating Youth Perspectives into the Design of AI-Supported Collaborative Learning Environments. *Education Sciences*, *14*(11), 1197. https://doi.org/10.3390/educsci14111197

11. **R:** Fonteles, J., Davalos, E., S, A. T., Zhang, Y., Zhou, M., Ayalon, E., Lane, A., Steinberg, S., Anton, G., Danish, J., Enyedy, N., & Biswas, G. (2024). A First Step in Using Machine Learning Methods to Enhance Interaction Analysis for Embodied Learning Environments. *arXiv preprint arXiv:2405.06203*.

12. **R**: Zhou, M., Steinberg, S., Stiso, C., Danish, J. A., & Craig, K. (2024). Using network visualizations to engage elementary students in locally relevant data literacy. Information and Learning Sciences, 125(3/4), 209–231.

13. **R**: Zhong, Q., Park Rogers, M., Nicholas, C., Danish, J. A., & Hmelo-Silver, C. E. (2023). An Elementary Teacher's Development of Using Representations: Comparing 2 Years' Teaching in Earth Science Unit. Journal of Science Teacher Education, 0(0), 1–22. https://doi.org/10.1080/1046560X.2023.2291246

14. **R**: Ryan, Z., Danish, J., Zhou, J., Stiso, C., Murphy, D., Duncan, R., ... & Hmelo-Silver, C. E. (2023). Investigating students' development of mechanistic reasoning in modeling complex aquatic ecosystems. Investigating Complex Phenomena: Bridging between Systems Thinking and Modeling in Science Education, 139

15. **R**: Park Rogers, M., Hmelo-Silver, C., Nicholas, Cross Francis, D., & Danish, J. (2023). Learning to Teach with Science Representations. *Science and Children*, *60*(3), 60–67.

16. **R:** Danish, J., Anton, G., Mathayas, N., Jen, T., Vickery, M., Lee, S., Tu, X., L., Cosic, Zhou, M., Ayalon, E., & Enyedy, N. (2022). Designing for Shifting Learning Activities. The Journal of Applied Instructional Design, 11(4).

17. **R**: McClain, J., Nicholas, C., Zimmermann, K., Pierce, E., Danish, J., & Zhong, Q. (2022). Observing the Unobservable. Science and Children, 60(2).

18. **R:** Danish, J., Johnson, H., Nicholas, C., Francis, D. C., Hmelo-Silver, C., Rogers, M. P., Askew, R., Gerber, A, Enyedy, N. (In press). Situating video as context for teacher learning. *Learning, Culture and Social Interaction*, 30, 100542. doi:https://doi.org/10.1016/j.lcsi.2021.100542

19. **R / T:** Craig, K., Danish, J. A., Humburg, M., Hmelo-Silver, C., Szostalo, M., & McCranie, A. (2021). Net.Create: Network visualization to support collaborative historical knowledge building. *International Journal of Computer Supported Collaborative Learning*.

20. **R**: Tu, X., Georgen, C., Danish, J. A., & Enyedy, N. (2021). Elementary students learning science in an MR environment by constructing liminal blends through action on props. *Information and Learning Sciences*, ahead-of-print(ahead-of-print). doi:10.1108/ILS-10-2020-0235

21. **R:** Dahn, M., Lee, C., Enyedy, N., & Danish, J. (2021). Instructional improv to analyze inquiry-based science teaching: Zed's dead and the missing flower. *Smart Learning Environments*, 8(1). doi:10.1186/s40561-021-00156-9

22. **R / T:** Humburg, M., Tan, V., Maltese, A. V., Simpson, A., & Danish, J. A. (2021). Making for learning: How graduate students discuss and design for maker-focused pedagogy. *Information and Learning Sciences*. (Online first).

23. **R:** Park Rogers, M., Hmelo-Silver, C., Nicholas, C., Cross Francis, D., & Danish, J. (accepted, April 2021). Learning to teach with science representations: Meaningfully connecting the three dimensions of science. *Science and Children* [*Teaching Teachers* column]. National Science Teachers Association.

24. **R:** DeLiema, D., Enyedy, N., Steen, F., Danish, J. A. (2021). Integrating viewpoint and space: How lamination across gesture, body movement, language, and material resources shapes learning. *Cognition & Instruction*, 1-38.

25. **R:** McClain, J., Nicholas, C., Pierce, E., Zimmerman, K., Danish, J.A., & Zhong, Q. (In press). Using multiple representations to shine light on unobservable Earth science phenomena. *Science and Children*. National Science Teachers Association.

26. **R:** Danish, J. A., Enyedy, N., Saleh, A., & Humburg, M. (2020). Learning in embodied activity framework: a sociocultural framework for embodied cognition. *International Journal of Computer-Supported Collaborative Learning*. doi: 10.1007/s11412-020-09317-3

27. **R:** Keifert, D., Lee, C., Dahn, M., Lindberg, L., Enyedy, N., & Danish, J. (2020). Tracing Bodies through Liminal Blends in a Mixed Reality Learning Environment. *International Journal of Science Education*. doi: 10.1080/09500693.2020.1851423

28. **R / T:** Craig, K., Humburg, M., Danish, J., Szostalo, M., Hmelo-Silver, C., & McCranie, A. (2020). Increasing Students' Social Engagement During COVID-19 with Net.Create: Collaborative Social Network Analysis to Map Historical Pandemics During a Pandemic. *Information and Learning Sciences*. doi: 10.1108/ILS-04-2020-0105

29. **R:** Peppler, K., Thompson, N., Danish, J., Moczek, A., & Corrigan, S. (2020). Comparing first- and third-person perspectives in early elementary learning of honeybee systems. *Instructional Science*. doi: 10.1007/s11251-020-09511-8

30. **R:** Danish, J. A., & Hmelo-Silver, C. E. (2020). On Activities and Affordances for Mobile Learning. *Journal of Contemporary Educational Psychology*.

31. **R:** Davis, B., Tu, X., Georgen, C., Danish, J. A., & Enyedy, N. (2019). The Impact of Different Play Activity Designs on Students' Embodied Learning. *Information and Learning Science*.

32. **R:** DeLiema, D., Enyedy, N., & Danish, J. A. (2019). Roles, Rules, and Keys: How Different Play Configurations Shape Collaborative Science Inquiry. *Journal of the Learning Sciences*.

33. **R:** Danish, J.A., Saleh, A, Andrade, A and Bryan, B. (2017) Observing Complex Systems Thinking in the Zone of Proximal Development. *Instructional Science:* 1-20.

34. **R:** Andrade, A., Danish, J., & Maltese, A. (2017). A Measurement Model of Gestures in an Embodied Learning Environment: Accounting for Temporal Dependencies. *Journal of Learning Analytics, 4*(3), 18-45. doi: 10.18608/jla.2017.43.3

35. **R:** Andrade, A., Delandshere, G., & Danish, J. A. (2016). Using Multimodal Learning Analytics to Model Student Behavior: A Systematic Analysis of Epistemological Framing. *Journal of Learning Analytics*, 3(2), 282-306.

36. **R:** Danish, J. A., & Enyedy, N. (2015). Latour Goes to Kindergarten: Children Marshalling Allies in a Spontaneous Argument About What Counts as Science. *Learning, Culture and Social Interaction*.

37. **R / T:** Maltese, A. V., Danish, J. A., Bouldin, R. M., Harsh, J. A., & Bryan, B. (2015). What are students doing during lecture? Evidence from new technologies to capture student activity. *International Journal of Research & Method in Education*, 1-19. doi: 10.1080/1743727x.2015.1041492

38. **R:** Danish, J. A., & Saleh, A. (2015). The impact of classroom context upon 1st and 2nd grade students' critical criteria for science representations. *Instructional Science*. doi: 10.1007/s11251-015-9355-8

39. **R:** Enyedy, N., Danish, J. A., & DeLiema, D. (2015). Constructing liminal blends in a collaborative augmented-reality learning environment. *International Journal of Computer Supported Collaborative Learning*.

40. **R:** Danish, J. A., & Saleh, A. (2014). Examining How Activity Shapes Students' Interactions While Creating Representations in Early Elementary Science. *International Journal of Science Education*, 1-21.

41. **R:** Danish, J. A. (2014). Applying An Activity Theory Lens to Designing Instruction For Learning About The Structure, Behavior, and Function of a Honeybee System. *Journal of the Learning Sciences*, 1-49.

42. **R / T:** Danish, J. A. (2013). Designing for Technology Enhanced Activity to Support Learning. *The Journal of Emerging Learning Design* (1).

43. **R:** Peppler, K., Danish, J. A., & Phelps, D. (2013). Collaborative Gaming: Designing Board Games to Teach Young Children about Complex Systems and Collective Behavior. *Simulation and Gaming*.

44. **R:** Enyedy, N., Danish, J. A., Delacruz, G., & Kumar, M. (2012). Learning physics through play in an augmented reality environment. *International Journal of Computer-Supported Collaborative Learning,* 1-32.

45. **R:** Danish, J. A., Peppler, K., Phelps, D., & Washington, D. (2011). Life in the Hive:

Supporting Inquiry into Complexity Within the Zone of Proximal Development. *Journal of Science Education and Technology*.

46. **R:** Enyedy, N., Danish, J. A., & Fields, D. (2011). Negotiating the "Relevant" in Culturally Relevant Mathematics. *Canadian Journal for Science, Mathematics, and Technology* Education 11(3).

47. **R:** Danish, J. A., & Phelps, D. (2010). Representational Practices by The Numbers: How Kindergarten and First-Grade Students Create, Evaluate, and Modify Their Science Representations. *International Journal of Science Education*.

48. **R:** Danish, J. A., & Enyedy, N. (2007). Negotiated Representational Mediators: How Young Children Decide What to Include in Their Science Representations. *Science Education*, 91(1), 1-35.

PUBLICATIONS: REFEREED PROCEEDINGS

1. **R**: Steinberg, S., & Danish, J. (2024). "We were doing science, not just talking about science": Embodied Learning and Science Identity Development. Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 306-313. https://repository.isls.org/handle/1/11104

2. **R**: DeLiema, D., Lindgren, R., & Danish, J. (2024). Reflections on Flexible and Constrained Agency as Affordances for Embodied Learning Design. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 2277-2278*. https://repository.isls.org/handle/1/10974

3. **R**: Zhou, M., Fonteles, J., Danish, J., Davalos, E., Steinberg, S., Biswas, G., & Enyedy, N. (2024). Exploring Artificial Intelligence Supported Interaction Analysis. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 2327-2328*. https://repository.isls.org/handle/1/10999

4. **R**: Zhou, M., Steinberg, S., Stiso, C., Danish, J., & Cruz-Gonzalez, C. (2024). Embodied and Digital Network Visualization of Data Design for Elementary Students. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 1107-1110*. https://repository.isls.org/handle/1/10632

5. **R**: Zhou, M., Mathayas, N., & Danish, J. (2024). Elementary Students' Emergent and Divergent Goals in Collective Embodied Modeling Activities. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 1339-1342*. https://repository.isls.org/handle/1/10693

6. **R**: McClain, J., Miller, J., Hmelo-Silver, C. E., Danish, J., Walter, W., Fusco, J., Dragnić-Cindrić, D., Ruiz, P., Buli, T., & Karim, S. (2024). The Ties that Bind: Bringing Research into Practical Spaces. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 2233-2234*. https://repository.isls.org/handle/1/10951

7. **R**: Vickery, M., Mathayas, N., & Danish, J. (2024). Being Body-Conscious: A Trauma-Informed Inquiry into Elementary Students' Collective Embodied Learning Experiences. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 1846-1849*. https://repository.isls.org/handle/1/10826

8. **R:** Tu, X., Danish, J., Ryan, Z., Vickery, M., Rogers, M. P., Hmelo-Silver, C. E., & Philips, A. (2024). Teaching with Representations: How Teachers' Perception Shift Their Science Teaching. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 602-609*. https://repository.isls.org/handle/1/11145

9. **R**: Murphy, D., Duncan, R. G., Chinn, C. A., Danish, J., Hmelo-Silver, C. E., Ryan, Z., Zhou, J., & Stiso, C. (2024). Students' Prioritization of Initial and Direct Causal Mechanisms During Model Evaluation. *Proceedings of the 18th International Conference of the Learning Sciences-ICLS 2024, Pp. 442-449*. https://repository.isls.org/handle/1/11123

10. **R**: Zhou, J., Albert, L., Hmelo-Silver, C. E., Danish, J., Ryan, Z., Stiso, C., Murphy, D., Duncan, R. G., Chinn, C. A., & Lin, Q. (2024). Scaffolding students' adoption of norms for peer critique. *Proceedings of the 17th International Conference on Computer-Supported Collaborative Learning-CSCL 2024, Pp. 349-350*. https://repository.isls.org/handle/1/10548

11. **R**: Lee, S., Tu, X., Adebola, S., Enyedy, N., & Danish, J. (2022). "We Made Liquid!": How Children Blend Feedback in a Mixed-Reality Environment for Collective Embodied Learning. In A. Weinberger, W. Chen, L. Hernández, & B. Chen (Eds.), Proceedings of the 15th International Conference on Computer Supported Collaborative Learning (CSCL). International Society of the Learning Sciences.

12. **R:** Zhou, J., Hmelo-Silver, C., Danish, J., Ryan, Z., Stiso, C., Cruz Gonzalez, C., Duncan, R., Chinn, C., & Murphy, D. (2022). Mediating Students' Scientific Argumentation to Support Model Revision. In A. Weinberger, W. Chen, L. Hernández, & B. Chen (Eds.), Proceedings of the 15th International Conference on Computer Supported Collaborative Learning (CSCL). International Society of the Learning Sciences.

13. **R:** Tu, X., Humburg, M., Mathayas, N., Zhou, M., & Danish, J. (2022). How Embodiment Helps Students Explain Their Ideas within an MR Environment and Content Interviews. In C. Chinn, E. Tan, C. Chan, & Y. Kali (Eds.), Proceedings of the 16th International Conference of the Learning Sciences. International Society of the Learning Sciences.

14. **R:** Steinberg, S., & Danish, J. (2022). Balancing Agency and Accountability to Support Learning in Playful, Embodied Science Activities. In C. Chinn, E. Tan, C. Chan, & Y. Kali (Eds.), Proceedings of the 16th International Conference of the Learning Sciences. International Society of the Learning Sciences.

15. **R**: Zhou, M., Vickery, M., & Danish, J. (2022). Mediating elementary students' mechanistic reasoning in collective embodied modeling activities. In C. Chinn, E. Tan, C. Chan, & Y. Kali (Eds.), Proceedings of the 16th International Conference of the Learning Sciences. International Society of the Learning Sciences.

16. **R**: Murphy, D., Chinn, C., Duncan, R., Danish, J., Hmelo-Silver, C., Ryan, Z., Zhou, J., & Stiso, C. (2022). Students' Ideas About Evidentiary Fit and Its Role in Modeling Practice. In C. Chinn, E. Tan, C. Chan, & Y. Kali (Eds.), Proceedings of the 16th International Conference of the Learning Sciences. International Society of the Learning Sciences.

17. **R**: Dabholkar, S., Danish, J., & Wilensky, U. (2022). Guided Epistemic Expansion in a Science Classroom. In C. Chinn, E. Tan, C. Chan, & Y. Kali (Eds.), Proceedings of the 16th International Conference of the Learning Sciences. International Society of the Learning

Sciences.

18. **R:** Vickery, M., Danish, J., Tu, X., & Zhou, M. B. G. (2021). Scientific Modeling Practices Through Perspective Taking in a Mixed Reality Embodied Learning Environment. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

19. **R:** Ryan, Z., Danish, J., & Hmelo-Silver, C. (2021). Understanding Students' Representations of Mechanism through Modeling Complex Aquatic Ecosystems. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

20. **R:** Murphy, D., Duncan, R., Chinn, C., Danish, J., Hmelo-Silver, C., Ryan, Z., . . . Stiso, C. (2021). Students' Justifications for Epistemic Criteria for Good Scientific Models. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

21. **R:** Lee, C., Humburg, M., Georgen, C., Enyedy, N., & Danish, J. (2021). Playful Discourse Practices in Guided Play Learning Environments. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

22. **R:** Humburg, M., Craig, K., Szostalo, M., Danish, J., Hmelo-Silver, C., & McCranie, A. (2021). Noticing, Understanding, and Encouraging Positive Engagement with Collaborative History Learning. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

23. **R:** DeLiema, D., Enyedy, N., Danish, J., & Steen, F. (2021). Meadow Bees, Hive Bees, and a Moving Sun: Tensions and Affordances in Learning between Embodied Point of View and Spatial Frames of Reference. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

24. **R:** Danish, J., Vickery, M., Duncan, R., Ryan, Z., Stiso, C., Zhou, J., . . . Chinn, C. (2021). Scientific Model Evaluation During a Gallery Walk. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

25. **R / T**: Danish, J., Duncan, R., Hmelo-Silver, C., Chinn, C., Vickery, M., Ryan, Z., . . . Zhou, J. (2021). Interactive Demo of the Modeling and Evidence Mapping Environment (MEME) for Supporting both Elementary and Graduate Students. Paper presented at the 2021 Annual Meeting of the International Society of the Learning Sciences (ISLS), Bochum, Germany (held virtually due to COVID-19).

26. **R**: Danish, J., Stiso, C., Nicholas, C., Hmelo-Silver, C. E., Rogers, M. P., & Francis, D. C. (2020). What, How, and Why Do Elementary Teachers Think About Using Representations in Their Science Teaching?. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 4 (pp. 1934-1941). Nashville, Tennessee: International Society of the Learning Sciences.

27. **R**: Moreland, M., Vickery, M., Ryan, Z., Murphy, D., Av-Shalom, N., Hmelo-Silver, C. E.,

Danish, J., Duncan, R., & Chinn, C. (2020). Representing Modeling Relationships in Systems: Student Use of Arrows. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 3 (pp. 1773-1774). Nashville, Tennessee: International Society of the Learning Sciences.

28. **R**: Keifert, D., Wang, X. C., Sacks, D., Levy, S. T., Tu, X., Danish, J., Humburg, M., & Enyedy, N. (2020). Broadening Learning Sciences Theoretical Lenses to Understand Young Children's Sensemaking. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 1 (pp. 390-397). Nashville, Tennessee: International Society of the Learning Sciences.

29. **R / T:** Craig, K., Danish, J., Humburg, M., Szostalo, M., McCranie, A., & Hmelo-Silver, C. E. (2020). Net.Create: Network Analysis in Collaborative Co-Construction of Historical Context in a Large Undergraduate Classroom. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 2 (pp. 1055-1062). Nashville, Tennessee: International Society of the Learning Sciences.

30. **R / T:** Stiso, C., Ryan, Z., Danish, J., & Robinson, E. (2020). Fostering Perspective-taking in History Students Through Board Games. In Gresalfi, M. and Horn, I. S. (Eds.), The Interdisciplinarity of the Learning Sciences, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 2 (pp. 1165-1172). Nashville, Tennessee: International Society of the Learning Sciences.

31. **R:** Nicholas, C., McClain, J., Park Rogers, M., & Danish, J. (2020). Elementary teachers' elicitation of students' funds of knowledge to support science learning with representations. Poster presented at the International Conference on the Learning Sciences (ICLS). Nashville, TN.

32. **R:** Danish, J., Enyedy, N., Humburg, M., Davis, B., & Tu, X. (2019). Collective embodied activity and how different concepts map to social exploration. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., & Baker, M. (Eds.), A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL) 2019, Volume 2 (pp. 799-805). Lyon, France: International Society of the Learning Sciences.

33. **R:** Tu, X., Danish, J., Georgen, C., Humburg, M., Davis, B., & Enyedy, N. (2019). Examining How Scientific Modeling Emerges Through Collective Embodied Play. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., & Baker, M. (Eds.), A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL) 2019, Volume 2 (pp. 676-679). Lyon, France: International Society of the Learning Sciences.

34. **R:** Peppler, K., Danish, J., & Thompson, N. (2019). Exploring Disciplinary Boundaries in Early Elementary Students' Developing Practices. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., & Baker, M. (Eds.), A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL) 2019, Volume 1 (pp. 408-415). Lyon, France: International Society of the Learning Sciences.

35. **R:** Lindberg, L., Keifert, D., Enyedy, N., & Danish, J. (2019). When Words Are Not Enough: What Student Gestures and Embodied Responses Tell Us About Understanding Science Through Dance. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., & Baker, M. (Eds.), A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL) 2019, Volume 2 (pp. 953-954). Lyon, France: International Society of the Learning Sciences.

36. **R / T:** Bae, H., Craig, K., Danish, J., Hmelo-Silver, C. E., Uttamchandani, S., Szostalo, M., & McCranie, A. (2019). The Power of Network Analysis Tool for Collaborative Learning. In Lund, K., Niccolai, G. P., Lavoué, E., Hmelo-Silver, C., Gweon, G., & Baker, M. (Eds.), A Wide Lens: Combining Embodied, Enactive, Extended, and Embedded Learning in Collaborative Settings, 13th International Conference on Computer Supported Collaborative Learning (CSCL) 2019, Volume 2 (pp. 1025-1028). Lyon, France: International Society of the Learning Sciences.

37. Danish, J., Enyedy, N., Humburg, M., Saleh, A., Dahn, M., Lee, C., Tu, X., Davis, B., Georgen, C. (2018). STEP-Bees and the Role of Collective Embodiment in Supporting Learning Within a System. Paper presented at the International Conference of the Learning Sciences, London, England.

38. **R:** Humburg, M., & Danish, J. (2018). Investigating Multiple Dimensions of Student Engagement with Embodied Science Learning. Paper presented at the International Conference of the Learning Sciences, London, England.

39. **R:** Davis, B., Tu, X., Danish, J., & Enyedy, N. (2018). The Structures of Embodied Play Activities and Their Impact on Students' Exploration of the Particulate Nature of Matter. Paper presented at the International Conference of the Learning Sciences, London, England.

40. **R:** Danish, J., Humburg, M., Tu, X., Davis, B., & Georgen, C. (2018). Modeling bees by acting as bees in a mixed reality simulation. Paper presented at the International Conference of the Learning Sciences, London, England.

41. **R:** Dahn, M., Enyedy, N., & Danish, J. (2018). How Teachers Use Instructional Improvisation to Organize Science Discourse and Learning in a Mixed Reality Environment. Paper presented at the International Conference of the Learning Sciences, London, England.

42. **R:** Alejandro Andrade, Danish, J., and Adam V. Maltese. (2018). Complexity Learning via Elicited Movements: MMLA of Embodied Design. Paper presented at the International Conference of the Learning Sciences, London, England.

43. **R:** Keifert, D., Enyedy, N., Danish, J., Lee, C., Dahn, M., & Lindberg, L. . (2018). Tracing Bodies Through Liminal Blends during Play-based Inquiry in a Mixed Reality Environment. Paper presented at the International Conference of the Learning Sciences, London, England.

44. **R:** Peppler, K. A., Thompson, N., Danish, J., Moczek, A., & Corrigan, S. (2018). Comparing First- and Third-Person Perspectives in Early Elementary Learning of Honeybee Systems. Paper presented at the International Conference of the Learning Sciences, London, England.

45. **R:** Peppler, K. A., Thompson, N., Danish, J., Moczek, A., & Corrigan, S. (2018). In the Hive: Designing for Emergence When Teaching Complex Systems In Early Childhood. Paper

presented at the International Conference of the Learning Sciences, London, England.

46. **R:** Peppler, K. A., Thompson, N., Danish, J., Moczek, A., & Han, S. (2018). Indoor Positioning Technology & Enhanced Engagement in Early Elementary Systems Thinking and Science Learning. Paper presented at the International Conference of the Learning Sciences, London, England.

47. **R:** Davis, B., Tu, X., Danish, J., & Enyedy, N. (2017). The Impact of the Structure of Play, Gesture and Teacher Prompts on Student Explanations About the Particulate Nature of Matter. Paper presented at the 12th International Conference on Computer Supported Collaborative Learning, Philadelphia, PA.

48. **R:** DeLiema, D., Enyedy, N., Danish, J., Lee, C., Illum, R., Dahn, M., . . . Mahoney, C. (2016). Blending Play and Inquiry in Augmented Reality: A Comparison of Playing a Video Game to Playing Within a Participatory Model. Paper presented at the International Conference of the Learning Sciences.

49. **R:** Danish, J. A., Enyedy, N., Saleh, A., Lee, C., & Andrade, A. (2015). Science Through Technology Enhanced Play: Designing to Support Reflection Through Play and Embodiment. In O. Lindwall, Häkkinen, P., Koschman, T. Tchounikine, P. & Ludvigsen, S. (Ed.), Exploring the Material Conditions of Learning: The Computer Supported Collaborative Learning (CSCL) Conference (Vol. 1). Gothenburg, Sweden: The International Society of the Learning Sciences.

50. **R:** Saleh, A., Danish, J., Enyedy, N., & Lee, C. (2015). Assessing Young Children's Cognition through Multi-Modal Interviews. In O. Lindwall, Häkkinen, P., Koschman, T. Tchounikine, P. & Ludvigsen, S. (Ed.), Exploring the Material Conditions of Learning: The Computer Supported Collaborative Learning (CSCL) Conference (Vol. 1). Gothenburg, Sweden: The International Society of the Learning Sciences.

51. **R:** Danish, J. A., Enyedy, N., & Parnafes, O. (2014). A Coordination Class in Interaction. Proceedings of the International Conference of the Learning Sciences. Boulder, CO: International Society of the Learning Sciences.

52. **R:** Enyedy, N., & Danish, J. A. (2014). Distributed acts of reflection: Embodied acts to focus and filter a jointly produced reflection. Proceedings of the International Conference of the Learning Sciences. Boulder, CO: International Society of the Learning Sciences.

53. **R:** Andrade-Lotero, A., & Danish, J. A. (2014). Advancing Epistemological Frame Analysis to Refine our Understanding of Inquiry Frames in Early Elementary Interviews. Proceedings of the International Conference of the Learning Sciences. Boulder, CO: International Society of the Learning Sciences.

54. **R:** Danish, J. A., Saleh, A., & Andrade, L. A. (2013). Designing Interactive Scaffolds to Support Teacher-Led Inquiry of Complex Systems Concepts. In S. Puntambekar, N. Rummel, M. Kapur & M. Nathan (Eds.), Proceedings of the 10th International Conference on Computer Supported Collaborative Learning. Madison, WI.

55. **R:** Andrade, L., Danish, J. A., Moreno, Y., & Perez, L. (2013). Measuring 'Framing' Differences of Single-Mouse and Tangible Inputs on Patterns of Collaborative Learning (full paper). In S. Puntambekar, N. Rummel, M. Kapur & M. Nathan (Eds.), Proceedings of the 10th International Conference on Computer Supported Collaborative Learning. Madison, WI.

56. **R:** Enyedy, N., Danish, J. A., & DeLiema, D. (2013). Constructing and Deconstructing Materially-Anchored Conceptual Blends in an Augmented Reality Collaborative Learning Environment (full paper). In S. Puntambekar, N. Rummel, M. Kapur & M. Nathan (Eds.), Proceedings of the 10th International Conference on Computer Supported Collaborative Learning. Madison, WI.

57. **R:** Enyedy, N., Danish, J. A., Delacruz, G., Kumar, M., & Gentile, S. (2011). Play and Augmented Reality in Learning Physics: The SPASES Project. In G. S. Hans Spada, Naomi Miyake, Nancy Law (Ed.), Connecting Computer-Supported Collaborative Learning to Policy and Practice: CSCL2011 Conference Proceedings. Volume I — Long Papers (pp. 216-223). Hong Kong, China: International Society of the Learning Sciences.

58. **R:** Danish, J. A., & Phelps, D. (2010). Kindergarten and First-Grade Students' Representational Practices While Creating Storyboards of Honeybees Collecting Nectar. In K. Gomez, L. Lyons & J. Radinsky (Eds.), Learning in the Disciplines: Proceedings of the 9th International Conference of the Learning Sciences (ICLS 2010) - Volume 1, Full Papers (pp. 420-427). Chicago IL: International Society of the Learning Sciences.

59. **R:** Danish, J. A., Peppler, K., & Phelps, D. (2010). BeeSign: designing to support mediated group inquiry of complex science by early elementary students. Proceedings of the 9th International Conference on Interaction Design and Children (pp. 182-185). Barcelona, Spain: ACM.

60. **R:** Peppler, K., Danish, J. A., Zaitlen, B., Glosson, D., Jacobs, A., & Phelps, D (2010). BeeSim: leveraging wearable computers in participatory simulations with young children. Proceedings of the 9th International Conference on Interaction Design and Children (pp. 246-249). Barcelona, Spain: ACM.

61. **R:** Danish, J. A., & Enyedy, N. (2006). Unpacking the Mediation of Invented Representations. In S. Barab, K. Hay & D. Hickey (Eds.), Proceedings of the 7th international conference on Learning sciences (pp. 113-119). Bloomington, IN: International Society of the Learning Sciences.

62. **R:** Enyedy, N., Mukhopadhyay, S., & Danish, J. A. (2006). Emergent tensions between statistics education and culturally relevant pedagogies. In A. Rossman & B. Chance (Eds.), Proceedings of the Seventh International Conference on Teaching Statistics (ICOTS). Salvador Brazil: IASE.

PUBLICATIONS: BOOK CHAPTERS AND OTHER PUBLICATIONS

1. **R**: Danish, J. A., & Ma, J. Y. (2023). Sociocultural and cognitive perspectives on learning: What is learning, for whom, and to what end? In In R. J. Tierney, F. Rizvi, & K. Erkican (Eds.), International Encyclopedia of Education (Fourth Edition) (pp. 1–11). Elsevier.

2. **R**/ **T**: Ryan, Z., Stiso, C., Danish, J., & Robinson, E. (2021). Designing sustained game-based learning environments to engage undergraduate students in history. Accepted for Rapid Community Report Series.

3. **R:** Danish, J., Saleh, A.., Gomoll, A., Sigley, R., & Hmelo-Silver, C. (in press). Transfer as progressive re-mediation of object-oriented activity in school. In C. Hohensee & J. Lobato (Eds.), Transfer of learning: Progressive perspectives for mathematics education and related fields (pp. 127–142). Dordrecht, The Netherlands: Springer. https://doi.org/10.1007/978-3-030-65632-4_6

4. **R:** Danish, J. (2020). Design Case Chapters Afterward: The Challenges and Opportunities of Sharing Design Studies. In Bishop, Boling, Elen & Svihla (Eds), Handbook of Research in Educational Communications and Technology: Learning Design (pp. 867-875): Springer, Cham.

5. **R:** Danish, J. A., & Enyedy, N. (2020). Constructing with and through the body. In N. Holbert, Berland, M., & Kafai, Y. (Ed.), Designing Constructionist Futures: The Art, Theory, and Practice of Learning Designs.: MIT Press.

6. **R:** Danish, J. A., & Gresalfi, M. (2018). Cognitive and Sociocultural Perspective on Learning: Tensions and Synergy in the Learning Sciences. In F. Fischer, Hmelo-Silver, C.E., Goldman, S.R., & Reimann, P. (Ed.), International Handbook of the Learning Sciences. New York, NY: Routledge.

7. **R:** Danish, J. A., Enyedy, N, Saleh, A and Lee, C. "Designing for Activity." In Design as Scholarship: Case Studies from the Learning Sciences, edited by V. Svihla and R. Reeve, 26: Routledge, 2016.

8. **R:** Thompson, N., Peppler, K., & Danish, J. (2016). Designing BioSim: Playfully Encouraging Systems. In R. Zheng & M. K. Gardner (Eds.), Handbook of Research on Serious Games for Educational Applications (pp. 149): IGI Global.

9. **R:** Danish, J. A., Enyedy, N., & Parnafes, O. (2015). *Working Towards an Integrated Analysis of Knowledge in Interaction.* In A. diSessa, M. Levin & N. Brown (Eds.), Knowing and Learning in Interaction: Taylor and Francis.

10. **R:** Brown, N. J. S., Danish, J. A., Levin, M., & diSessa, A. A. (2015). *Competence Reconceived: The Shared Enterprise of Knowledge Analysis and Interaction Analysis.* In A. A. diSessa, M. Levin, & N. J. S. Brown (Eds.), Knowledge and interaction: A synthetic agenda for the learning sciences. New York, NY: Routledge.

11. **R:** Enyedy, N., & Danish, J. (2015). The Need for the Participant's Perspective in a KAIA Joint Enterprise. In A. A. diSessa, M. Levin, & N. J. S. Brown (Eds.), Knowledge and interaction: A synthetic agenda for the learning sciences. New York, NY: Routledge.

12. **R:** DeLiema, D., Lee, V. R., Danish, J. A., Enyedy, N., & Brown, N. J. S. (2015*). A microlatitudinal/microlongitudinal analysis of speech, gesture, and representation use in a student's scientific explanation of phase change.* In A. diSessa, M. Levin, & N. Brown (Eds.), Knowing and Learning in Interaction: Taylor and Francis.

13. **R:** Enyedy, N., & Danish, J. A. (2015). *Learning Physics through Play and Embodied Reflection in an mixed-reality learning environment*. In V. Lee (Ed.), Learning Technologies and the Body: Integration and Implementation in Formal and Informal Learning Environments. New York, NY: Routledge.

14. **R:** Peppler, K., & Danish, J. A. (2013). *E-textiles for Educators: Participatory Simulations with e-Puppetry*. In L. Buechley, K. Peppler, M. Eisenberg & Y. Kafai (Eds.), Textile Messages: Dispatches from the World of E-textiles and Education.

15. **R:** Danish, J. A. (2012). *Designing Authentic Cross-Class Collaboration by Focusing On Activity.* In R. Morgan & K. Olivares (Eds.), Quick Hits Teaching with Technology: Successful Strategies by Award-winning Teachers. Bloomington, IN: Indiana University Press.

16. **R:** Danish, J. A. (Spring, 2006). *A Work of Goodness: When a Simple Vote Reveals Children's Representational Ideas and the Classroom That Helped Produce Them*. CONNECTIONS: The quarterly newsletter of the UCLA University Elementary School, 1, 9-12.

PRESENTATIONS

Select Invited Talks

1. **R:** Danish, J. A. (2019). Activities and Talk Bringing Visualizations to Life for Young Children. Invited talk presented at the Gordan Research Conference on Visualization in Science and Education.

2. **R:** Danish, J. A. (2016). Raising the Bar for Early Elementary Science Through Reimagined Activity Systems: Jan Hawkins Award Address. Annual Meeting of the American Educational Research Association Washington, DC.

3. **R / T:** Danish, J. A. (2012, June). *Design for Activity: A Heuristic Approach to Educational Technology Design*. Keynote talk presented at the Emerging Learning Design conference, Montclair, NJ.

4. **R:** Danish, J. A. (2012, May). Representation as Mediated Action. Invited talk presented at Center for Engineering Education and Outreach (CEEO), Tufts University, Medford, MA.

5. **R:** Danish, J. A. (2011, December). *Inserting the Activity Back Into Technology Design.* Invited talk as part of the Rob Kling Center for Social Informatics (RKCSI) Talk Series, Bloomington, IN.

6. **R:** Danish, J. A., & Saleh, A. (2011, March). *Pilot Explorations of the iPad to Extend Classroom Collaboration.* Paper presented at the Indiana University iConference., Bloomington, IN.

7. **T:** Danish, J. A. (2011, February). *Activity Theory as an Instructional Design Heuristic*. Presentation at The Edward C. Moore Symposium on Teaching Excellence, Indianapolis, IN.

8. **T:** Danish, J. A. (2010, June) . *Extending the Conversation: Using Sakai to Promote Ongoing Reflection and Communication Between and Around Class Sessions*. Teaching With Sakai Innovation Award presentation at the Sakai Conference, Denver, CO.

9. **T**: Danish, J. A. (2010, May) . *Extending the Conversation*. Invited presentation at the Indiana University Center for Innovative Teaching and Learning Workshop Series, Bloomington, IN.

10. **T:** Danish, J. A. (2009, February). *Computational Thinking for Everyone… Even K-1 Student*s. Presentations at the Computational Thinking for Everyone Workshop Series, Washington, DC.

Professional Meetings

1. Zhou, J., Hmelo-Silver, C., Danish, J., Ryan, Z., Stiso, C., Duncan, R., Chinn, C., & Murphy, D. (2022, April). Mediating scientific argumentation when students engage in modeling in small groups. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

2. **R/T**: Gerber, A., Park Rogers, M., Cross Francis, D., Danish, J., & Akerson, V. (2022). Exploring how a Professional Development Program Adapts to Support Elementary teachers Learning to Teach Science with Representations.

3. **R:** Danish, J., Vickery, M., Duncan, R., Ryan, Z., Stiso, C., Zhou, J., Moreland, M., Hmelo-Silver, C., Chinn, C. (2021). Scientific Model Evaluation During a Gallery Walk. Paper presented at the Annual Meeting of the American Educational Research Association, Online.

4. **R:** Tu, X., Humburg, M. A., Danish, J., Davis, B. N., Ryan, Z. D., Vickery, M., . . . Mathayas, N. (2021). Assessing Young Children's Embodied Learning of States of Matter in a Mixed-Reality Environment. Paper presented at the 2021 Annual Meeting of the American Educational Research Association (AERA), held virtually (due to COVID-19).

5. **R:** Humburg, M. A., Craig, K., Danish, J., & Szostalo, M. (2021). Fostering Historical Empathy Through Network Analysis: Personal Experiences as a Lens for Understanding the Past. Paper presented at the 2021 Annual Meeting of the American Educational Research Association (AERA), held virtually (due to COVID-19).

6. **R:** Danish, J., Vickery, M., Duncan, R. G., Ryan, Z. D., Stiso, C., Moreland, M., . . . Chinn, C. A. (2021). Scientific Model Evaluation During a Gallery Walk. Paper presented at the 2021 Annual Meeting of the American Educational Research Association (AERA), held virtually (due to COVID-19).

7. **R:** Danish, J., Tu, X., Ryan, Z. D., Stiso, C., Vickery, M., & Zhou, M. (2021). Play as Representational Practice. Paper presented at the 2021 Annual Meeting of the American Educational Research Association (AERA), held virtually (due to COVID-19).

8. **R:** Tu, X., Danish, J., Georgen, C., Humburg, M. A., Davis, B. N., & Enyedy, N. D. (2020). Using Props to Support Embodied Learning of Science Concepts in a Mixed-Reality Environment. Paper presented at the 2020 Annual Meeting of the American Educational Research Association (AERA), San Francisco, CA (Conference cancelled due to COVID-19).

9. **R:** Davis, B. N., Tu, X., Humburg, M. A., Georgen, C., Danish, J., & Enyedy, N. D. (2020). An Analysis of Supplementary Guided Play Activities to Enhance Embodied Science Learning Within Classroom Contexts. Paper presented at the 2020 Annual Meeting of the American Educational Research Association (AERA), San Francisco, CA (Conference cancelled due to COVID-19).

10. **R:** Danish, J., Nicholas, C., Hmelo-Silver, C. E., Rogers, M. A. P., Francis, D. C., Enyedy, N. D., . . . Stiso, C. (2020). What, How, and Why Do Elementary Teachers Think About Using Representations in Their Science Teaching? Paper presented at the 2020 Annual Meeting of the American Educational Research Association (AERA), San Francisco, CA (Conference cancelled due to COVID-19).

11. **R:** Danish, J., Moreland, M., Ryan, Z. D., Hmelo-Silver, C. E., Chinn, C. A., Duncan, R. G., & Av-Shalom, N. a. Y. (2020). Designing to Support Iterative Model Revision From Simulation and Research Evidence. Paper presented at the 2020 Annual Meeting of the American Educational Research Association (AERA), San Francisco, CA (Conference cancelled due to COVID-19).

12. **R / T:** Craig, K., Danish, J., Bae, H., Szostalo, M., Humburg, M. A., Hmelo-Silver, C. E., & McCranie, A. (2020). Net.Create: Network Analysis in Collaborative Co-Construction of Historical Context in a Large Undergraduate Classroom. Paper presented at the 2020 Annual Meeting of the American Educational Research Association (AERA), San Francisco, CA (Conference cancelled due to COVID-19).

13. **T:** Duncan, S., Danish, J., Craig, K., (2019). Playing, making, and learning: Thinking deeply about how games and learning intersect. Presentation at the annual meeting of GenCon, Indianapolis, IN.

14. **R:** Tu, X., Danish, J., Georgen, C., Humburg, M., & Enyedy, N. (2019). Play, Modeling, and Play-as-Modeling in Early Elementary Science. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, CA.

15. **R:** Park Rogers, M., Danish, J., Nicholas, C., Cross Francis, D., & Hmelo-Silver, C. (2019). Supporting teacher cognition and instruction of science representations in elementary classrooms: A peek into the first year of a multi-year program. Paper presented at the Association for Science Teacher Education International Conference. Savannah, GA.

16. **R:** McCranie, A., Bae, H., Craig, K., Danish, J., Uttamchandani, S., Szostalo, M., & Hmelo-Silver, C. E. (2019). How to Support Network Capta and Collaborative Data Entry through Net.Create, Open Source Software. Paper presented at the NetSci, Burlington, VT.

17. **R:** Keifert, D., Enyedy, N., Dahn, M., Lee, C., Lindberg, L., & Danish, J. (2019). Tracing Bodies Through Liminal Blends During Play-Based Inquiry in a Mixed-Reality Environment. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, CA.

18. **R:** Humburg, M., Tu, X., Danish, J., Georgen, C., Davis, B., & Enyedy, N. (2019). Comparing Young Students' Uses of Scientific Annotation Tools for Observing Peers' Embodiment. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, CA.

19. **R:** Humburg, M., & Danish, J. (2019). Using Annotations to Unpack Embodied Models of States of Matter in Early Elementary Science. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, CA.

20. **R:** Georgen, C., Danish, J., Uttamchandani, S., Craig, K., & Lane, K. (2019). Potosí: The Struggle for Silver: A Card Game to Support Learning About Colonialism. Paper presented at the Annual Meeting of the American Educational Research Association, Toronto, CA.

21. **R:** Humburg, M., Keifert, D., Georgen, C., Lee, C., Tu, X., Danish, J., & Enyedy, N. (2018). The Challenge of Consistency in Sensemaking Resources Across Play and Assessment for Young Science Learners. Paper presented at the Annual conference of the American Educational Research Association, New York, NY.

22. **R:** Danish, J., Keifert, D., Enyedy, N., Humburg, M., Tu, X., Davis, B., & Lee, C. (2018). Embodiment Within Computational Models: Explorations of Agency and Normativity. Paper presented at the Annual conference of the American Educational Research Association, New York, NY.

23. **R / T:** Wilkins-Yel, K. G., Danish, J., & Lees, O. It Takes a Village: Examining the Effectiveness of the "I CAN PERSIST" STEM Initiative. Paper presented at the annual convention of the American Psychological Association, San Francisco, CA.

24. **R:** Saleh, A., Danish, J., Humburg, M., & Enyedy, N. (2017). How body-based actions support elementary students' science explanations about the particulate nature of matter. Paper presented at the Annual conference of the American Educational Research Association, San Antonio, TX.

25. **R:** Humburg, M., Danish, J., Enyedy, N., & Saleh, A. (2017). Problem solving in coordinated embodied activity: Emergent goals and solutions. Paper presented at the Annual conference of the American Educational Research Association, San Antonio, TX.

26. **R / T:** Gomoll, A., Rehak, A., Hmelo-Silver, C. E., Danish, J. A., Chen, Y., & Huang, J. (2017). Supporting Pre-Service Teachers' Development of Professional Vision: Performance Assessments and Beyond. Paper presented at the Annual Meeting of the American Educational Research Association San Antonio, TX.

27. **R:** Danish, J. A., Enyedy, N., Saleh, A., Humburg, M., DeLiema, D., Dahn, M., & Lee, C. (2017). STEP-Bees: Coordinating embodied interaction with peers, teachers, and computer simulation to support learning. Paper presented at the Annual conference of the American Educational Research Association, San Antonio, TX.

28. **R:** Danish, J., Humburg, M., Saleh, A., Lee, C., Dahn, M., Kiefert, D., & Enyedy, N. (2017). A Socio-Cultural Framework for Embodied Cognition. Paper presented at the Jean Piaget Society, San Francisco, CA.

29. **R:** Craig, K., Mahoney, C., & Danish, J. A. (2017). Correcting for Presentism in Student Reading of Historical Accounts Through Digital-History Methodologies. Paper presented at the Annual Meeting of the American Educational Research Association, San Antonio, TX. http://www.kalanicraig.com/publications/AERA-dh-and-presentism/

30. **R:** Saleh, A., & Danish, J. A. (2016). *The Interactional Nature of the Interview and Its Impact on Students' Complex System Performance*. Paper presented at the Annual Meeting of the American Educational Research Association Washington, DC.

31. **R / T:** Gomoll, A., Rehak, A., Novak, W., Andrade, A., Saleh, A., Hmelo-Silver, C. E., & Danish, J. A. (2016). *"It Could Be So Many Learning Theories": Multimedia Artifacts and Professional Vision in Preservice Teachers*. Paper presented at the Annual Meeting of the American Educational Research Association Washington, DC.

32. **R:** Enyedy, N., Danish, J. A., Lee, C. D., DeLiema, D., Saleh, A., Dahn, M., & Illum, R. (2016). *Learning About States of Matter Through Multiple Correspondences Among the Body, Abstractions, and Reality.* Paper presented at the Annual Meeting of the American Educational Research Association Washington, DC.

33. **R:** Andrade, A., Saleh, A., Rehak, A., Gomoll, A., Danish, J. A., & Hmelo-Silver, C. E. (2016). *Exploring a Text-Mining Approach for the Analysis of Computer Collaborative Data From a Design-Based Research Project*. Paper presented at the Annual Meeting of the American Educational Research Association Washington, DC.

34. **R:** Danish, J. A., Enyedy, N., & Peppler, K. (2015). *Collective and Participatory Embodiment: Science through Technology Enhanced Play (STEP) & BioSim*. Paper presented at the Association of Science and Technology Centers (ASTC) Annual Conference, Montreal, CA.

35. **R:** Danish, J. A., Enyedy, N., Saleh, A., Andrade-Lotero, A., & Lee, C. (2015). *Science Through Technology Enhanced Play: Using Play and Embodiment to Promote Reflection About States of Matter*. Paper presented at the Annual Meeting of the American Educational Research Association Chicago, IL.

36. **R:** Andrade, A., Danish, J. A., Delandshere, G., & Saleh, A. (2015). *Using a Multimodal Learning Analytic Technique to Find Epistemological Framing in Early Elementary Interviews.* Paper presented at the Annual Meeting of the American Educational Research Association Chicago, IL.

37. **R / T:** Leeuw, J. d., Motz, B., Eastwood, J. L., Matlese, A., Goldstone, R., & Danish, J. A. (2015). *Needle in the Neural Haystack: Electroencephalograph Signatures of Concept Learning While Viewing Naturalistic Educational Materials*. Paper presented at the Annual Meeting of the American Educational Research Association Chicago, IL.

38. **R:** Danish, J. A., Saleh, A., & Andrade-Lotero, L. A. (2014). *Software Scaffolds for Supporting Teacher-Led Inquiry into Complex Systems Concepts.* Paper presented at the Annual Meeting of the American Educational Research Association, Philadelphia, PA.

39. **R:** Danish, J. A., Peppler, K. A., Phelps, D. Andrade-Lotero, L. A., & Whiting, J. (2014). *The Impact of Disciplinary Framing Upon Early Elementary Students' Representational Critiques.* Paper presented at the Annual Meeting of the American Educational Research Association, Philadelphia, PA.

40. **R:** Danish, J. A., Saleh, A., Andrade-Lotero, L. A., & Bryan, B. (2014). *Observing Complex Systems Thinking in the Zone of Proximal Development.* Poster presented at the Annual Meeting of the American Educational Research Association, Philadelphia, PA.

41. **R:** Danish, J. A., Saleh, A. (2013, April). *The Impact of Classroom Context Upon 1st and 2nd Grade Students' Critical Criteria for Science Representations.* Paper presented at the Educational Research Association Annual Meeting, San Francisco, California.

42. **R / T:** Harsh, J., Maltese, A. V., & Danish, J. A. (2013). *Learning From the Learner's Point of View: Using Cameras to Assess Undergraduate Science Educational Practices.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California.

43. **R:** McWilliams, J., Keene, J., Danish, J. A., & Saleh, A. (2013). *"I Hate That Word*

Savage/Don't Mind If You Use It": Exploring the "Safe Space" Construct. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California.

44. **R / T:** Bryan, B., Maltese, A. V., Danish, J., Liao, W., Bouldin, R. & Harsh, J. (2013). *What Are Students Doing While You Are Trying to Teach?* Poster presented at AAAS Annual Meeting, Boston, MA.

45. **R:** Danish, J. A., & Phelps, D. (2012). *Collective Gaming: Lessons for Designing 21st-Century Classroom Learning.* Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, British Colombia.

46. **R:** Manlove, S. A., Day, S. B., Goldstone, R. L., & Danish, J. A. (2012). *Workshop on Transfer Across Science Domains through Simulations and Complex Systems Topics.* Paper presented at the National Science Teachers Association Annual Meeting, Indianapolis, IN.

47. **R:** Brown, N., Danish, J. A., DeLiema, D., Engle, R. A., Enyedy, N. D., Lee, V. R., & Parnafes, O. (2012). *Representations, Interlocutors, and Their Influences on Apparent Knowledgeability.* Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, British Colombia.

48. **R:** Peppler, K., & Danish, J. A. (2012). *E-Textiles for Educators: Participatory Simulations With E-Puppetry.* Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, British Colombia.

49. **R:** Saleh, A., Danish, J. A., Andrade Lotero, L. A., & Phelps, D. (2012, April). *Designing Using Object of Activity and Its Impact on Young Children's Representations*. Paper presented at the Annual Meeting of the American Educational Research Association, Vancouver, BC.

50. **R:** Danish, J. A., Saleh, A. , Andrade Lotero, L.A. , & Phelps, D. (2012, March). *Student-Generated Representations as Tools for Reasoning in Science*. Paper presented at the National Association for Research in Science Teaching, Indianapolis, IN.

51. **R:** Danish, J. A. (2011). *The Primary Interactive Pathway: An Analytic Tool For Examining and Comparing Students' Representational Activities.* Paper to be presented at the International Society for Cultural and Activity Research.

52. **R:** Danish, J. A., & Saleh, A. (2011*). The Primary Interactive Pathway: An Analytic Tool For Examining and Comparing Students' Representational Activities.* Paper presented at the Annual Meeting of the Jean Piaget Society.

53. **R:** Danish, J. A., Peppler, K., & Phelps, D. (2011). *BeeSign: Designing to Support Mediated Group Inquiry of Complex Science by Early Elementary Students*. Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA.

54. **R:** Danish, J. A., & Phelps, D. (2011). *The Interactional Role of Kindergarten and First Grade Students' Representational Practices*. Paper presented at The Annual Meeting of the American Educational Research Association, New Orleans, LA.

55. **R:** Danish, J. A. (2010). *The Primary Interactive Pathway: An Analytic Tool For Examining and Comparing Students' Representational Activities.* Paper presented at the Annual Meeting

of the American Educational Research Association, Denver CO.

56. **R:** Enyedy, N., Danish, J. A., & Delacruz, G. (2010). *Play and Augmented Reality in Learning Physics: The SPASES project.* Paper presented at the Annual Meeting of the American Educational Research Association, Denver CO,

57. **R:** Danish, J. A. (2009). *BeeSign: a Design Experiment to Teach Kindergarten and First Grade Students About Honeybees From a Complex Systems Perspective.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

58. **R:** Enyedy, N., Danish, J. A., Fields, D., Kao, L., Hart, M., & Mukhopadhyay, S. (2009). Negotiating the "Relevant" in Culturally Relevant Mathematics: The Community Mapping Project. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

59. **R:** Danish, J. A., & Enyedy, N. (2008). *CHAT & Actor Network Theory (ANT) Perspectives on How Kindergarten and First Grade Students Co-Construct Science in Action.* Poster presented at the Triennial Meeting of the International Society for Cultural and Activity Research (ISCAR), San Diego, CA.

60. **R:** Danish, J. A. (2007). *Latour Goes to Kindergarten: K-1 Classroom Science Examined as a Process of Argumentation Using Inscriptions*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

61. **R:** Danish, J. A., & Enyedy, N. (2007). *Agency and Accountability: Two Necessary Components in Science Classrooms Utilizing Invented Representations, and Their Impact Upon Students Activities*. Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.

62. **R:** Danish, J. A., & Enyedy, N. (2006). *Negotiated Representational Mediators: An Approach to Metarepresentational Competence Grounded in Practice*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.

63. **R:** Danish, J. A., & Enyedy, N. (2005). *The Dialectic of Task Based Communities and Communities of Practice.* Paper presented at the Triennial Meeting of the International Society for Cultural and Activity Research, Sevilla, Spain.

64. **R:** Danish, J. A., & Enyedy, N. (2005). *Mediation of Students' Ideas Through Representational Activities.* Paper presented at the Triennial Meeting of the International Society for Cultural and Activity Research, Sevilla, Spain.

65. **R:** Enyedy, N., & Danish, J. A. (2005). *At the intersection of classroom culture and culturally relevant pedagogy: What students' arguments around maps reveal about how to increase student achievement within our diverse society*. Paper presented at the Triennial Meeting of the International Society for Culture and Activity Research, Sevilla, Spain.

COURSES TAUGHT

Activity Theory [D, R]
Applied Cognition and Learning Strategies [R]
College Teaching and Instruction

Computational Technologies in Educational Ecosystems [D]
Designing for Learning Activities [D]
Educational Psychology for Elementary Teachers [R]
Learning and Cognition [D]
Learning Sciences Apprenticeship [R]
Video Analysis of Learning [D]

D: Developed
R: Redesigned

HONORS AND AWARDS

2024 Fellow, International Society of the Learning Sciences

2023 Naomi Miyake Outstanding Student Paper Award for Humburg, M., Bell, A., Keifert, D, T., Tu, X., Hmelo-Silver, C., Danish, A., Lee, S., Henrie, A., Park Rogers, M., Francis, D., & Enyedy, N. (2023) Learning to be a science teacher: The worries, joys, and vulnerabilities of exploring new pedagogies.

2021 IU School of Education Award for Excellence in Mentoring

2019, 2020 Nominee, Spencer Foundation Mentoring Award

2019 Nominee, Best Design Paper Award at the International Conference of Collaborative Learning along with Xintian Tu, Megan Humburg, and Noel Enyedy

2018 Facilitator's Choice Award in the STEM for All Video Showcase for BioSim along with Kylie Peppler and Naomi Thompson

2017 Burton Gorman Teaching Award from the IU School of Education

2015 Recipient of Jan Hawkins Award for Early Career Contributions to Humanistic Research and Scholarship in Learning Technologies, AERA Division C

2013 Nominated for the CSCL Best Design Paper Award (with Noel Enyedy and David DeLiema)

2010, 2012, 2014 Indiana University Trustees Teaching Award

2011 Recipient of the CSCL Best Design Paper Award along (with Noel Enyedy, Girlie Delacruz, Melissa Kumar, and Sylvia Gentile)

2011 Invited Participant in AERA funded Educational Research Conference on Integrative perspectives on knowledge analysis and interaction analysis

2010 Teaching With Sakai Innovation Award (TWSIA), Honorable Mention

2007–2008 Spencer Dissertation Fellowship

2007–2008	UCLA Dissertation Year Fellowship
2005–2007	National Institute of Mental Health (NIMH) pre-doctoral training fellowship
2005–2006	Graduate Summer Research Mentorship Program fellowship
2003–2004	CONNECT Graduate Student Research Fellowship

PROFESSIONAL MEMBERSHIPS

American Educational Research Association (AERA)
International Society of the Learning Sciences (ISLS)
International Society for Cultural and Activity Research (ISCAR)

PROFESSIONAL ACTIVITIES

2022-2023	President, International Society of the Learning Sciences
2021-2022	President Elect, International Society of the Learning Sciences
2018-2022	Treasurer, International Society of the Learning Sciences Board Member, International Society of the Learning Sciences
2013–2016	Editorial Board Member, Journal of Emerging Learning Design
2012–2022	Consulting Editor for the Research Section of ETR&D
2013–2014	Program Committee, International Conferences of the Learning Sciences
2012–2013	Chair, AERA SIG Advanced Technologies for Learning (ATL)
2011–2012	Co-Chair, AERA SIG Advanced Technologies for Learning (ATL)
2011	Reviewer, Sakai Foundation, Teaching With Sakai Innovation Award (TWSIA)
2009–present	Reviewer, National Science Foundation
2009	Invited Panelist, National Academies Workshop: Computational Thinking for Everyone
2015-present	Editorial Board, Journal of the Learning Sciences
2008-present	Reviewer, Journal of the Learning Sciences
2016-present	Associate Editor, Cognition & Instruction
2013	Reviewer, Cognition & Instruction
2020-present	ISLS Senior Reviewer
2006, 2008, 2010, 2012	Reviewer, International Conference for the Learning Sciences (ICLS)
2006–present	Reviewer, AERA
2006	Reviewer, InterActions: UCLA Journal of Education and Information

Studies