

University of Miami
Department of Teaching and Learning
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EDUCATION

2003-2006 Ph.D. in Physics, Department of Physics, Washington University in St. Louis.
Advisors: Patrick Gibbons (physics), Jere Confrey (education).
2001-2003 A.M. in Physics, Department of Physics, Washington University in St. Louis.
1997-2001 B.S. in Geophysics, Department of Geophysics, Beijing University. Advisor:
Chuanyi Tu (Academician, Chinese Academy of Sciences).

EMPLOYMENT

2021- Professor in STEM Education, Department of Teaching and Learning,
University of Miami
2014-2021 Associate Professor in STEM Education, Director of the Applied Learning
Sciences Programs, Department of Teaching and Learning, University of Miami
(2014-2016, Doctoral Program Director)
2013-2014 Assistant Professor in STEM Education, Department of Teaching and Learning,
University of Miami
2013-2014 On-leave, The University of Georgia (Promoted to Associate Professor with
Tenure)
2008-2012 Assistant Professor in Mathematics & Science Education, The University of
Georgia
2006-2008 Post-doctoral Researcher at the Technology-Enhanced Learning Science center,
University of California, Berkeley; Advisor: Marcia Linn

RESEARCH

Interest

Technology-enhanced STEM education; Innovative Assessments; Interdisciplinary & integrated STEM education; Model-based teaching and learning; Epistemology and learning theories; Knowledge engineering and representation; Science teacher education; Science education leadership and policy

Publication

- Journal Publications (peer reviewed; * indicates contact author)

- Wang, C., **Shen, J.**, & Ran, H. (2022). Imagining robots of the future: Examining six-graders' perceptions of robots through their literary products. *Journal of Research on Technology in Education*. Published Online. <https://doi.org/10.1080/15391523.2022.2030264>
- Wang, C., **Shen, J.**, & Chao, J. (2021). Integrating computational thinking in STEM education: A literature review. *International Journal of Science and Mathematics Education*. Published Online. <https://doi.org/10.1007/s10763-021-10227-5>
- Smith, B. E., Beach, R., & **Shen, J.** (2021). Fostering student activism about the climate crisis through digital multimodal narratives. *Journal of Sustainability Education*.
- Kolovou, M., **Shen, J.***, & Smith, B.E. (2021). Looping into hyperspace: Mechanisms of distributed imagination during a collaborative science fiction writing project. *Thinking Skills and Creativity*, 40 (2021) 200819.
- Shen, J.***, Chen, G., Barth-Cohen, L., Jiang, S., & Eltoukhy, M. (2020) Connecting students' computational thinking in everyday reasoning and programming: Designing a humanoid robotics curriculum for elementary school students. *Journal of Research on Technology in Education*.
- Jiang, S., **Shen, J.**, Smith, B.E., & Kibler, K.W. (2020). Science identity development: How multimodal composition mediates student role-taking as scientist in a media-rich learning environment. *Educational Technology Research & Development*, 68, 3187–3212.
- Sung, S., Li, C., Chen, G., Huang, X., Xie, C., **Shen, J.** & Massicotte, J. (2020). Why do metals feel cooler? Autocoding constructed responses to delineate learning with augmented reality enabled by thermal imaging. *Journal of Science Education and Technology*.
- Gao, X., Li, P., **Shen, J.***, & Sun, H. (2020). Reviewing assessments for students' learning in interdisciplinary STEM education. *International Journal of STEM Education*.
- Jiang, S., Smith, B.E., & **Shen, J.** (2019) Examining how different modes mediate adolescents' interactions during their collaborative multimodal composing processes. *Interactive Learning Environments*. Online first.
- Jiang, S., **Shen, J.***, & Smith, B. E. (2019). Designing discipline-specific roles for interdisciplinary learning: Two comparative cases in an afterschool STEM+L program. *International Journal of Science Education*. 41 (6), 803-826.
- Smith, B.E., **Shen, J.***, & Jiang, S. (2019). The science of storytelling: Middle schoolers engaging with socioscientific issues through multimodal science fictions. *Voices from the Middle*, 26 (4), 50-55.
- Barth-Cohen, L. A., Montoya, B., & **Shen, J.** (2019). Making in the middle: Walk like A Robot. *Science Scope*, 42 (9), 12-16.
- Barth-Cohen, L.A., Jiang, S., **Shen, J.**, Chen, G., & Eltoukhy, M. (2018). Interpreting and navigating multiple representations as central to computational thinking in a robotics programming environment. *Journal for STEM Education Research*, 1 (1-2), 119-147.
- Namdar, B. & **Shen, J.** (2018). Knowledge organization through multiple representations in a computer-supported collaborative learning environment. *Interactive Learning Environments* 26 (5), 638-653.

- Sung, S., **Shen, J.**, Jiang, S., & Chen, G. (2017). Comparing the effects of dynamic computer visualization on undergraduate students' understanding of osmosis with randomized posttest-only control group design. *Research and Practice in Technology Enhanced Learning*, 12 (26).
- Smith, B.E., & **Shen, J.** (2017). Scaffolding digital literacies for disciplinary learning: Adolescents collaboratively composing multimodal science fictions. *Journal of Adolescent & Adult Literacy*, 61, 85-90.
- Chen, G., **Shen, J.***, Barth-Cohen, Jiang, S., Huang, X., Eltoukhy, M. (2017). Assessing elementary students' computational thinking in everyday reasoning and robotics programming. *Computer & Education*, 109, 162-175.
- Shen, J.***, Liu, O., & Chang, H.-Y. (2017). Assessing students' deep conceptual understanding in physical sciences: An example on sinking and floating. *International Journal of Science and Mathematics Education*, 15 (1), 57-70.
- Namdar, B., & **Shen, J.*** (2016). Interaction between knowledge organization with multiple external representations and socioscientific argumentation. *International Journal of Science Education*, 38 (7), 1100-1132.
- Shen, J.***, Sung, S., & Zhang, D.M. (2016). Towards an analytic framework of interdisciplinary reasoning and communication (IRC) processes in science. *International Journal of Science Education*, 37 (17), 2809-2835.
- Lei, J., Luo, P., Wang, Q., **Shen, J.**, Lee, S., & Chen, Y. (2016). Using technology to facilitate modeling-based science education: Lessons learned from a meta-analysis of empirical research. *Journal of Educational Technology Development and Exchange*, 9(2), Article 4.
- Zhang, D.M., & **Shen, J.*** (2015). Disciplinary foundations for solving interdisciplinary scientific problems. *International Journal of Science Education*. 37 (15), 2555-2576.
- Namdar, B., & **Shen, J.*** (2015). Modeling oriented assessment in K-12 science education: A synthesis of research from 1980 to 2013 and new directions. *International Journal of Science Education*. 37 (7), 993-1023.
- Sung, S., **Shen, J.***, Stanger-Hall, K.F., Wiegert, C., Li, W., Brown, S. & Robertson, T. (2015). Toward interdisciplinary perspectives: Using osmotic pressure as an example for analyzing textbook explanations. *Journal of College Science Teaching*, 44 (4), 76-87.
- Shen, J.***, Liu, O., & Sung, S. (2014). Designing interdisciplinary assessments in sciences for college students: An example on osmosis. *International Journal of Science Education*, 36 (11), 1773-1793.
- Shen, J.***, & Jackson, D. (2013). Measuring Volume of Tree: A Problem-driven, Modeling-based Lesson for Preservice Science Teachers. *Journal of Science Teacher Education*, 24 (2), 225-247.
- Shen, J.***, & Linn, M.C. (2011). Connecting scientific explanations and everyday observations: A technology enhanced curriculum on modeling static electricity. *International Journal of Science Education*, 33(12), 1597-1623.
- Shen, J.***, Gerard, L., & Bowyer, J. (2010). Getting from here to there: The roles of policy makers and principals in increasing science teacher quality. *Journal of Science Teacher Education*, 21, 283-307.

- Shen, J.*** (2010). Nurturing students' critical knowledge using technology-enhanced scaffolding strategies in science education: A conceptual framework. *Journal of Science Education and Technology*, 19 (1), 1-12.
- Shen, J.***, & Confrey, J. (2010). Justifying alternative models in learning the solar system: A case study on K-8 science teachers' understanding of frames of reference. *International Journal of Science Education*, 32 (1), 1-29.
- Shen, J.*** (2009). Walking out graphs. *Science Scope*. 33 (4), 47-51.
- Shen, J.*** & Confrey, J. (2007). From conceptual change to transformative modeling: A case study of an elementary teacher in learning astronomy. *Science Education*. 91 (6), 948-966.
- Shen, J.***, Gibbons, P.C., Wieggers, J.F., & McMahon, A. (2007). Using research based assessment tools in professional development in current electricity. *Journal of Science Teacher Education*. 18 (3), 431-459.
- Ao, X.Z., **Shen, J.**, & Tu, C.Y. (2003). Mechanism of proton anisotropic velocity distribution in the solar wind. *Science in China Series G-Physics Astronomy*. 46 (1), 78-83.
- Book Chapter

Shen, J.* & Wang, C. (forthcoming). Interdisciplinary science learning. *International Encyclopedia of Education* (4th ed.). Oxford, UK: Elsevier.

Wang, C. & **Shen, J.** (forthcoming). Technology-enhanced collaborative learning in STEM. *International Encyclopedia of Education* (4th ed.). Oxford, UK: Elsevier.

Shen, J.*, Smith, B.E., & Jiang, S. (2020). Integrating multimodal composition technology (MCT) in interdisciplinary learning. In L.C. de Oliveira, A.M. Menda (Eds.) *English language teaching methods, approaches, and lessons*. Information Age Publishing.

Shen, J.*, Jiang, S., & Liu, O.L. (2015). Reconceptualizing a college science learning experience in the new digital era: A Review of literature. In X. Ge, D. Ifenthaler, J.M. Spector (Eds.) *Emerging Technologies for STEAM Education. Educational Communications and Technology: Issues and Innovations*. Springer, Cham. https://doi.org/10.1007/978-3-319-02573-5_4

Shen, J.*, Lei, J., Chang, H., & Namdar, B. (2014). Technology-enhanced, modeling-based instruction (TMBI) in science education. In J.M. Spector, M.D., Merrill, J. Elen, & M.J., Bishop (eds.). *Handbook of research on educational communication and technology* (4th ed.) (pp. 529-540). New York: Springer.

Lei, J., **Shen, J.**, & Johnson, L. (2013). Digital technologies and assessment in 21st century schooling. In M.P. Mueller, D.J. Tippins, & A.J. Stewart (eds.). *Assessing schools for generation R (Responsibility): A guide to legislation and school policy in science education* (pp. 185-200). New York: Springer.
 - Submitted/Work in Progress
[Revised and Resubmit]

Ran, H., **Shen, J.***, Smith, B.E., & Wang, C. (2020). Storytelling for science learning: Developing an assessment framework to examine adolescents' multimodal sci-fi narratives. Manuscript under revision in *Journal of Science Education and Technology (JOST)*.

[submitted]

Shen, J.*, Jiang, S., & Smith, B.E. (2020). Disciplinary role taking in interdisciplinary multimodal composing. Manuscript submitted for publication.

[in preparation]

Kolovou, M., **Shen, J.***, Kahn, J. (in preparation). Improvising a distributed and dynamic art exhibit: Linking scientific interpretation with student-generated artistic representations.

- Textbook

Eltoukhy, M., **Shen, J.** & Wang, C. (2019). Transformative robotic experience for elementary students (TREES) curriculum (3rd Ed.).

Eltoukhy, M., Chen, G., **Shen, J.**, & Barth-Cohen, L. (2016). Transformative robotic experience for elementary students (TREES) curriculum (2nd Ed.).

Eltoukhy, M., Barth-Cohen, L. & **Shen, J.** (2015). Transformative robotic experience for elementary students (TREES) curriculum (1st Ed.).

- Conference Proceedings (peer reviewed)

Ran, H., **Shen, J.**, Smith, B.E., Wang, C., & Kolovou, M. (2020). Storytelling for science learning: Developing an assessment framework to examine adolescents' multimodal sci-fi narratives. *Proceedings of International Conference of the Learning Sciences, ICLS (2020)*.

Kolovou, M., **Shen, J.**, & Smith, B.E. (2019). Imagination in adolescents' collaborative multimodal science fictions. Proceedings of the 13th *International Conference of Computer Supported Collaborated Learning*, Lyon, France.

Chen, G., & **Shen, J.** (2018). Student learning of computational thinking in a robotics curriculum: Transferrable skills and relevant factors. *Proceedings of International Conference of the Learning Sciences, ICLS, 3(2018-June)*, 1439-1440.

Jiang, S., **Shen, J.**, Smith, B., & Kibler, K. W. (2018). Examining sixth graders' science identity development in a multimodal composing environment. *Proceedings of International Conference of the Learning Sciences, ICLS, 3(2018-June)*, 1587-1588.

Smith, B., **Shen, J.**, Jiang, S., Chen, G., Hamaoui, M., & Torralba, J. (2018). Multimodal reflection: Adolescents remixing and sharing their experiences in an informal stem+1 academy. *Proceedings of International Conference of the Learning Sciences, ICLS, 3(2018-June)*, 1449-1450.

Shen, J., Chen, G., Barth-Cohen, L., Eltoukhy, M., & Jiang, S. (2016). Developing a language-neutral instrument to assess fifth graders' computational thinking. In Looi, C. K., Polman, J. L., Cress, U., & Reimann, P. (Eds.). *Transforming Learning, Empowering Learners: The International Conference of the Learning Sciences (ICLS) 2016*, Volume 2 (pp. 1179-1180). Singapore.

Jiang, S., **Shen, J.**, & Smith, B. E. (2016). Integrating science and writing in multimedia science fictions: Investigating student interactions in role-taking. In Looi, C. K., Polman, J. L., Cress,

- U., & Reimann, P. (Eds.). Transforming Learning, Empowering Learners: The *International Conference of the Learning Sciences (ICLS) 2016*, Volume 1 (pp. 346-353). Singapore.
- Jiang, S., **Shen, J.**, Sun, Y. (2015). Conceptualizing, analyzing, and visualizing massive data on student engagement in MOOCs: A literature review. Proceedings of the 11th *International Conference of the Computer Supported Collaborative Learning (CSCL)*, Gothenburg, Sweden.
- Namdar, B., & **Shen, J.** (2014). Knowledge organization with multiple external representations for socioscientific argumentation: A case on nuclear energy. *Proceedings of the 11th International Conference of the Learning Sciences (ICLS)*. pp.254-261.
- Namdar, B., & **Shen, J.** (2013). Knowledge organization with multiple external representations in an argumentation based computer supported collaborative learning environment. In Rummel, N., Kapur, M., Nathan, M., & Puntambekar, S. (Eds.). *To See the World and a Grain of Sand: Learning across Levels of Space, Time, and Scale: CSCL 2013 Conference Proceedings Volume 1 — Full Papers & Symposia*. International Society of the Learning Sciences. pp, 344-351.
- Sung, S., **Shen, J.** & Zhang, D. (2012, June). Toward a framework of interdisciplinary understanding. *Proceeding of the 10th International Conference of the Learning Science 2011*. Sydney, Australia.
- Shen, J.**, & Chang, H.-Y. (2011). Collaboration as Scaffolding: Learning Together with Dynamic, Interactive Scientific Visualizations and Computer Models. Proceedings of the *9th International Conference on Computer Supported Collaborative Learning (CSCL) 2011*. Hongkong, China.
- Shen, J.**, Liu, O., Chang, H.-Y. (2010). Measuring transformative modeling: A framework of formatively assessing students' deep conceptual understanding in physical sciences. *Proceedings of the 9th International Conference of the Learning Sciences - Volume 1* (pp.137-144). Chicago, Illinois.
- Linn, M.C. & **Shen, J.** (eds.) (2010). Using Visualization to Link Abstract Science and Everyday Experience. *Proceedings of the 9th International Conference of the Learning Sciences 2010 (vol.2)*. Chicago, IL.
- Chang, H.-Y., & **Shen, J.** (eds.) (2008). How can student logs inform the design of interactive, dynamic visualizations for science learning? *Proceeding of the 8th International Conference of the Learning Sciences (ICLS) 2008*. Utrecht, the Netherlands.
- Shen, J.** (2006). Tools and task structures in modeling balance beam. *Proceedings of the 7th International Conference of the Learning Sciences* (pp. 695-701). Bloomington, IN.
- Other
 - Shen, J.** (2010-). The Innovative Knowledge Organization System (iKOS) (<http://ikos.miami.edu>)
 - Shen, J.** (2007-9). Modeling Static Electricity: A Technology Enhanced Curriculum, published online (www.wise.berkeley.edu [an earlier version of WISE]).
 - Shen, J.** (2012). From Crafted Experience to Transformative Modeling: How to Make the Most out of Learning Tools in Science Classrooms. Unpublished manuscript.

FUNDING AWARDS

Funded

- 2017-2019 Principal Investigator, **National Science Foundation** funded project
Integrating STEM and Digital Literacies with Adolescents [\$349,962]
- 2015-2017 Principal Investigator, **National Science Foundation** funded project
Transformative Robotics Experience for Elementary Students (TREES) [\$299,737]
- 2014-2015 Principal Investigator, University of Miami funded project
Learning Science through iKOS [\$17,000]
- 2011-2013 Principal Investigator, **National Science Foundation** funded project
Designing Transformative Assessments for Interdisciplinary Learning in Science (DeTAILS)
[\$392,798]
- 2010-2012 Principal Investigator, **National Science Foundation** funded project
Achievements and Challenges in Modeling-based Instruction (ACMBI) [\$248,610]
- 2011-2013 Principal Investigator, University of Georgia funded project
Developing a Transformative Knowledge System for Preservice Science Teachers [\$15,000]
- 2010 summer Principal Investigator, University of Georgia COE funded project
Measuring Transformative Modeling [\$4,999]
- 2009-2010 Principal Investigator, University of Georgia funded project
*Collaborative Activities for Science Content, Science Methods, and General Methods Courses
for Preservice Middle School Science Teachers* [\$7,986]
- 2009-2011 Senior Personnel, University of Georgia funded project
*UNITE: Undergraduate Nanotechnology Inquiry, Training and Experimentation at the
University of Georgia* (PI, Leidong Mao) [\$16,000]
- 2009-2010 Principal Investigator, University of Georgia funded project
Reviewing Modeling-based Instruction in Science Education (RMISE) [\$10,000]
- 2008-2010 Principal Investigator, University of Georgia funded project
Learning Community in Technology Enhanced Science Education [\$4,000]

PRESENTATIONS (selected)

Organizer/Chair

- Shen, J.** (2015, Apr., Organizer, Chair). Interdisciplinary and Integrated STEM Education: Research, Practices, and Perspectives. *Symposium presented at the international annual Conference of American Educational Research Association 2015*, Chicago, IL.
- Shen, J.** (2012, Mar., organizer). Exploring the frontiers and linking critical aspects of assessments in science. *Symposium presented at the international annual Conference of American Educational Research Association 2012*. Vancouver, British Columbia, Canada.
- Shen, J.** & Chang, H.-Y. (2011, June, organizer). Collaboration as Scaffolding: Learning Together with Dynamic, Interactive Scientific Visualizations and Computer Models. *Symposium presented at the 9th International Conference on Computer Supported Collaborative Learning (CSCL) 2011*. Hongkong, China.

- Shen, J.** & Chang, H.-Y. (2010, June, organizer). Using Visualization to Link Abstract Science and Everyday Experience. (co-organizer) *Symposium presented at the 9th International Conference of the Learning Sciences (ICLS) 2010*. Chicago, IL.
- Shen, J.** (2009, April, Chair). Critique to learn science. *Symposium presented at the annual conference of the National Association for Research in Science Teaching (NARST) 2009*. Garden Groves, CA.
- Chang, H.-Y., & **Shen, J.** (2008, June, co-organizer). How can student logs inform the design of interactive, dynamic visualizations for science learning? *Symposium presented at the 8th International Conference of the Learning Sciences (ICLS) 2008*. Utrecht, the Netherlands.
- Shen, J.** (2007, April, Chair). Research methodology and result interpretation on students' learning in STEM: Comparative studies between China and the United States. *Symposium presented at the international annual Conference of American Educational Research Association 2007*. Chicago, IL.

Presenter

- Wang, C., **Shen, J.**, & Ran, H. (2021, April). Imagining robots of the future: Examining six-graders' perceptions of robots through their literary products. Paper to be presented at the 2021 *Annual International Conference of National Association for Research in Science Teaching (NARST)*, online.
- Johnson, N., Tippins, D., Jackson, D., & **Shen, J.** (2021, April). Experiences in Freshman Chemistry: Using Cogenerative Dialogues to Identify Critical Issues Impacting African American Females. Paper to be presented at the 2021 *Annual International Conference of National Association for Research in Science Teaching (NARST)*, online.
- Kolovou, M., Galante, M., & **Shen, J.** (2021). Figuring your own worlds: Exploring creativity-specific collaborative factors. Paper to be presented at the virtual conference of *American Educational Research Association (AERA)*.
- Ran, H., **Shen, J.**, Smith, B.E., Wang, C., & Kolovou, M. (2020, June). Storytelling for science learning: Developing an assessment framework to examine adolescents' multimodal sci-fi narratives. Poster presented at the *International Conference of the Learning Sciences, ICLS (2020)*.
- Sung, S., Huang, X., **Shen, J.**, Wang, Ch., Xie, C., Zeng, Y., & Chen, G. (2020, April). *Augmented visual perception—Interpreting thermal sensation with innovative technology*. Paper to be presented at the *annual conference of American Educational Research Association (AERA)*, San Francisco, CA. [Conference cancelled due to COVID19.]
- Sung, S., Chen, G., **Shen, J.**, Wang, C., Huang, X., & Xie, C. (2020, Mar.) *Examining high school students' scientific practices during an augmented thermal perception lab*. Paper accepted for the National Association for Research in Science Teaching (NARST), Portland, OR. [Conference cancelled due to COVID19.]
- Kolovou, M., & **Shen, J.** (2020, April). *Looping into hyperspace: mechanisms of distributed imagination during a collaborative science fiction writing project*. Paper to be presented at the annual conference of American Educational Research Association (AERA), San Francisco, CA. [Conference cancelled due to COVID19.]

- Wang, C., & **Shen, J.** (2020, April). *Preparing teachers to teach computational thinking: State of the art and future directions*. Poster to be presented at the annual conference of American Educational Research Association (AERA), San Francisco, CA. [Conference cancelled due to COVID19.]
- Smith, B.E., **Shen, J.**, & Ran, H. (2019, December). *Problem solving through narratives: Middle schoolers composing multimodal sci-fis about climate change*. Paper to be presented at the Literacy Research Association Conference, Tampa, FL.
- Shen, J.**, Kolovou, M., & Wang, C. (2019, October). *Integrating STEM and digital literacies with adolescents (Project STEM+L)*. Workshop presented at the annual conference of Florida Association of Science Teachers, St. Augustine, FL.
- Kolovou, M., **Shen, J.**, & Smith, B.E. (2019, June). Imagination in adolescents' collaborative multimodal science fictions. Proceedings of the 13th *International Conference of Computer Supported Collaborated Learning*, Lyon, France.
- Gao, X., **Shen, J.**, Li, P., & Sun, H. (2019, April). *Assessing student learning in integrated STEM educational programs*. Paper presented at the annual conference of American Educational Research Association (AERA), Toronto, Canada.
- Smith, B.E., Kolovou, M., Jiang, S., Ran, H., Torralba, J., & **Shen, J.** (2019, April). *Multidimensional meaning-making: Adolescents leveraging visuals and sounds in their multimodal science fictions*. Paper presented at the annual conference of American Educational Research Association (AERA), Toronto, Canada.
- Jiang, S., **Shen, J.**, & Smith, B.E. (2019, April). *Patterns and trajectories of an adolescents' participation during an integrated STEM and digital literacies program*. Poster presented at the annual conference of American Educational Research Association (AERA), Toronto, Canada.
- Smith, B. E. & **Shen, J.** (2018, December). *Adolescents creating digital multimodal science fictions about climate change*. Paper to be presented at the Literacy Research Association Conference, Indian Wells, CA.
- Smith, B. E., **Shen, J.**, Jiang, S., & Torralba, J. (2018, November). *The science of storytelling: Middle schoolers composing multimodal scifis about climate change*. Presentation at the National Council of Teachers of English Conference, Houston, TX
- Chen, G., & **Shen, J.** (2018, June). Student learning of computational thinking in a robotics curriculum: Transferrable skills and relevant factors. *Proceedings of the 13th International Conference of the Learning Sciences (ICLS)*, London, UK.
- Jiang, S., **Shen, J.**, Smith, B., & Kibler, K. (2018, June). Examining science identity development in a disciplinary role-taking multimodal composing environment. *Proceedings of the 13th International Conference of the Learning Sciences (ICLS)*, London, UK.
- Smith, B., **Shen, J.**, Jiang, S., Chen, G., Hamaoui, M., & Torralba, J. (2018, June). Multimodal reflection: Adolescents remixing and sharing their experiences in an informal STEM+L academy. *Proceedings of the 13th International Conference of the Learning Sciences (ICLS)*, London, UK.
- Chen, G., **Shen, J.**, Jiang, S., Barth-Cohen, L., & Eltoukhy, M. (2018, April). *Linking elementary students' problem-solving process to computational thinking*. Paper presented at the 2018 Annual Conference of American Educational Research Association (AERA), New York City, NY.

- Shen, J.**, Smith, B.E., Jiang, S., Chen, G., Hamaoui, M., Torralba, J. (2018, March). *Science or fiction, Students' role taking patterns in an integrated STEM and literacy academy*. Poster presented at the National Association for Research in Science Teaching (NARST) Conference 2018, Atlanta, GA.
- Smith, B. E. & **Shen, J.** (2017, December). *Scaffolding multimodal composing to support disciplinary learning*. Paper presented at the Literacy Research Association Conference, Tampa, Florida.
- Shen, J.**, Smith, B.E., Jiang, S., Kibler, K., Chen, G., & Malova, I. (2017, Nov.) Examining middle school students' collaborative multimodal composing through disciplinary identity development. Paper presented at *Association of Educational Communication and Technology (AECT)* annual convention. Jacksonville, FL.
- Chen, G., **Shen, J.** (2017, August). Mining process data: Assessing elementary students' computational thinking. Poster presented at the annual *International Computing Education Conference (ICER)*. Tacoma, WA.
- Barth-Cohen, L., Jiang, S., **Shen, J.**, Chen, G., & Eltoukhy, M., (2017, April). Elementary school students' computational thinking practices in a robotics-programming environment. Paper presented at the annual conference of *American Educational Research Association (AERA)*, San Antonio, TX.
- Jiang, S., Smith, B.E., & **Shen, J.** (2017, April). Peer interaction in multimodal composition: the story behind the scenes. Paper presented at the annual conference of *American Educational Research Association (AERA)*, San Antonio, TX.
- Shen, J.** (2016, October). Reconceptualizing a college science learning experience in the new digital era. Paper presented at the annual conference of *Association of Educational Communication and Technology*. Las Vegas, NV.
- Jiang, S., Smith, B.E., & **Shen, J.** (2016, October). Exploring multimodal composition in collaborative digital learning environments. Paper presented at the annual conference of *Association of Educational Communication and Technology*. Las Vegas, NV.
- Shen, J.**, Chen, G., Barth-Cohen, L., Eltoukhy, M., & Jiang, S. (2016, June). Developing a language-neutral instrument to assess fifth graders' computational thinking. Poster presented at the 12th *International Conference of the Learning Sciences (ICLS)*, Singapore.
- Jiang, S., **Shen, J.**, & Smith, B. (2016, June). Integrating science and writing in multimedia science fictions: Investigating student interactions in role-taking. Paper presented at the 12th *International Conference of the Learning Sciences (ICLS)*, Singapore.
- Sung, S., **Shen, J.**, Jiang, S. & Chen, G. (2016, April). The effect of including dynamic computer visualizations on assessing college students' interdisciplinary understanding of osmosis. Poster presented at *the 2016 Annual Meeting of the American Educational Research Association (AERA)*, Washington, D.C.
- Jiang, S., **Shen, J.**, & Smith, B. (2016, April). Assessing students' scientific literacy in collaborative science fiction writing. Poster presented at *the 2016 Annual Meeting of the American Educational Research Association (AERA)*, Washington, D.C.
- Barth-Cohen, L., Eltoukhy, M., & **Shen, J.** (2016, April). Students Meta-Representational Competence in a Humanoid Robotics Programming Environment. Poster presented at *the 2016 Annual Meeting of the American Educational Research Association (AERA)*, Washington, D.C.

- Muir, A., Barth-Cohen, L., Eltoukhy, M., **Shen, J.**, & McCanna C. (2016, January). Computer science classroom integration using robotics and coding. *36th Annual National Future of Education Technology Conference (FETC)*. Orlando, FL.
- Namdar B., & **Shen, J.** (2015, April). Knowledge organization with multiple external representations: A mixed methods study. Paper presented at the *American Educational Research Association (AERA) annual meeting 2015*, Chicago, IL.
- Shen, J.**, Sung, S., & Zhang, D. (2015, April). Toward an analytic framework of interdisciplinary reasoning and communication (IRC) in science. Poster presented at the *American Educational Research Association (AERA) annual meeting 2015*, Chicago, IL.
- Shen, J.**, Xie, C. & Namdar, B. (2015, April). A design framework on assessing modeling practices. Poster presented at *National Association for Research in Science Teaching (NARST) Conference 2015*, Chicago, IL.
- Namdar, B., & **Shen, J.** (2015, April). Supporting argumentation practices with knowledge organization via student-generated multiple external representations. Paper presented at *National Association for Research in Science Teaching (NARST) Conference 2015*, Chicago, IL.
- Shen, J.**, Jiang, S., Cheng, G., & Namdar, B. (2014). Designing the Innovative Knowledge Organization System (iKOS) for Science Learning. *Poster presented at the Annual International Convention of the Association for Educational Communications and Technology (AECT)*, Jacksonville, FL.
- Zhang, Q. & **Shen, J.** (2014). Synthesizing assessment of collaborative learning in computer supported collaborative learning environments. *Poster presented at the Annual International Convention of the Association for Educational Communications and Technology (AECT)*, Jacksonville, FL.
- Namdar, B., & **Shen, J.** (2014, June). Knowledge organization with multiple external representations for socioscientific argumentation: A case on nuclear energy. Paper presented at the 11th *International Conference of the Learning Sciences (ICLS)*, Boulder, CO.
- Shen, J.**, Liu, L. & Sung, S. (2014, April). Assessing college students' interdisciplinary understanding in sciences. Paper presented at *National Association for Research in Science Teaching (NARST) Conference 2014*, Pittsburgh, PA, USA.
- Zhang, D., **Shen, J.** & Crawford, B. (2014, April). Disciplinary foundations of solving interdisciplinary scientific problems. Paper presented at *National Association for Research in Science Teaching (NARST) Conference 2014*, Pittsburgh, PA, USA.
- Sung, S. & **Shen, J.** (2014, April). Constructing an innovative measure assessing interdisciplinary understanding using Rasch Model. Paper presented at *National Association for Research in Science Teaching (NARST) Conference 2014*, Pittsburgh, PA, USA.
- Kim, Y., Namdar, B., & **Shen, J.** (2014, April). Technology enhanced, modeling-oriented assessment (TMOA) in science education: A conceptual framework. Poster presented at *National Association for Research in Science Teaching (NARST) Conference 2014*, Pittsburgh, PA, USA.
- Kim, Y., Zhang, D., Tippins, D., Ntemngwa, C., & **Shen, J.** (2014, January). Exploring pre-service teachers' interdisciplinary understandings of science through design technology. Paper presented at *the annual conference of the Association for Science Teacher Education (ASTE)*, San Antonio, TX.

- Namdar, B., & **Shen, J.** (2013, June). Knowledge organization with multiple external representations in an argumentation based computer supported collaborative learning environment. Paper presented at the *annual conference of the Computer Supported Collaborative Learning*, Madison, WI.
- Shen, J.** & Liu, O. (2013, April). Designing interdisciplinary assessments in sciences for college students. Poster presented at the *American Educational Research Association (AERA) annual meeting 2013*, San Francisco, CA.
- Namdar, B. & **Shen, J.** (2013, April). Modeling-oriented assessment in science education: A synthesis and a new framework. Paper presented at the *American Educational Research Association (AERA) annual meeting 2013*, San Francisco, CA.
- Sung, S., **Shen, J.**, & Kim, S-h (2013, Apr.). Using separate and concurrent equating methods to link two instruments for assessing undergraduate students' energy understanding across disciplines. *Poster presented at the annual conference of the National Council on Measurement in Education (NCME)*, San Francisco, CA.
- Shen, J.**, Lei, J., Namdar, B. & Chen, Y. (2013, April). Synthesizing modeling-based instruction in science education from 1980 to 2010. Poster presented at *National Association for Research in Science Teaching (NARST) Conference 2013*, Puerto Rico.
- Shen, J.** & Namdar, B. (2013, April). Designing assessments of collaborative learning in science education. In M.C. Linn and K. Ryoo (eds.). *Technology-Enhanced Assessment: Implications for Science Education Policy*. Symposium presented at *National Association for Research in Science Teaching (NARST) Conference 2013*, Puerto Rico.
- Namdar, B. & **Shen, J.** (2013, April). Knowledge organization and collaborative argumentation: A new online platform and two illustrative cases. Paper presented at *National Association for Research in Science Teaching (NARST) Conference 2013*, Puerto Rico.
- Sung, S., & **Shen, J.** (2013, Apr.). Developing Interdisciplinary Science Curricula that Foster Energy Literacy for Undergraduate Students. Poster presented at *the annual conference of the National Association for Research in Science Teaching (NARST)*, Rio Grande, Puerto Rico.
- Lee, C.J. & **Shen, J.** (2012, October). A TPACK-Based Instructional Design Model for Preservice Science Teachers. Paper presented at the *2012 International Convention of the Association for Educational Communication & Technology*, Louisville, KY.
- Wiegert, C., Brown, S., Li, W., Oliver, J.S., Robertson, T., Stanger-Hall, K., Sung, S., Zhang, D. & **Shen, J.** (2012, July). Interdisciplinary understanding of osmosis and diffusion among undergraduate science students. *Poster presented at the annual summer meeting of the American Association of Physics Teachers (AAPT)*. Philadelphia, PA.
- Sung, S., **Shen, J.**, & Zhang, D. (2012, June). *Toward a framework of interdisciplinary understanding*. Proceeding of the 10th International Conference of the Learning Sciences, Sydney, Australia.
- Shen, J.** & Sung, S. (2012, Mar.). Developing a framework to assess interdisciplinary understanding. Poster presented at *the international annual Conference of American Educational Research Association 2012*. Vancouver, British Columbia, Canada.
- Enriquez, R.B. & **Shen, J.** (2012, Mar.). Using role-playing as formative assessment for preservice science teachers. Poster presented at *the international annual Conference of American Educational Research Association 2012*. Vancouver, British Columbia, Canada.

- Lei, J. & **Shen, J.** (2012, Mar.). Assessing digital competencies in science learning: A construct. Poster presented at *the international annual Conference of American Educational Research Association 2012*. Vancouver, British Columbia, Canada.
- Shen, J.**, Sung, S., & Wendell, R. (2012, Mar.). Assessing interdisciplinary understanding in science: The IT3 framework. Poster presented at the annual international conference of the *National Association for Research in Science Teaching (NARST)*. Indianapolis, IN.
- Sung, S., **Shen, J.** (2012, Mar.). Improving college students' interdisciplinary science understanding. Paper presented for the annual international conference of the *National Association for Research in Science Teaching (NARST)*. Indianapolis, IN.
- Namdar, B. & **Shen, J.** (2012, Mar.). Fukushima disaster: Online debate and its implication in socio-scientific argumentation. Poster presented at the annual international conference of the *National Association for Research in Science Teaching (NARST)*. Indianapolis, IN.
- Shen, J.**, Wiegert, C.C., Shannon, S., Stanger-Hall, K., Wiegert, C., Li, W., Moore, J., Oliver, S., Brown, S., & Robertson, T. (2011, Aug.). Physics models in complex phenomena: An example using osmosis. *Poster presented at the annual meeting of the American Association of Physics Teachers (AAPT) 2011*. Omaha, NE.
- Shen, J.**, Enriquez, R., Namdar, B. (2011). Collaboration in technology-enhanced, modeling-based instruction environments in science education, Part I. Poster presented at the 9th International Conference on Computer Supported Collaborative Learning (CSCL) 2011. Hongkong, China.
- Sung, S., **Shen, J.**, Stanger-Hall, K., Wiegert, C., Li, W., Moore, J., Oliver, S., Brown, S., Robertson, T. (2011, Jul.). Concept mapping for clarifying big ideas across disciplines: An example on osmosis. *Poster presented at the first annual meeting of the Society for the Advancement of Biology Education Research (SABER)*. Minneapolis, MN.
- Shen, J.**, Lei, J., Enriquez, R., Luo, H., & Lee, S. (2010, Dec.). Achievements and challenges of modeling-based instruction (ACMBI) in science education from 1980 to 2009. *Poster presented at the annual PI meeting of the NSF DRK12 program*. Washington, D.C.
- Tarábek, P. & **Shen, J.** (2010, Oct). *Transformative modeling and triangular model of conceptual learning*. Paper presented at the DIDFYZ Current Problems of Physics Education in the European Area. Račková Dolina, Slovakia.
- Shen, J.** & Rutchelle, E. (2010, June). Transformative modeling in learning electricity: A case study of preservice teachers. In J. Shen & H.-Y. Chang (eds.) Using visualization to link abstract science and everyday experience. *Poster presented at the 9th International Conference of the Learning Sciences (ICLS) 2010*. Chicago, IL.
- Shen, J.** (2010, March). Crafted experience: The interplay between manipulative tools and conceptual learning in science classrooms. Poster presented at the annual international conference of the *National Association for Research in Science Teaching (NARST) 2010*. Philadelphia, PA.
- Shen, J.** (2009, December). Constructing transformative modeling problems to promote students' deep learning in physics. Invited Panelist for *the West Central Georgia Regional STEM Institute: Developing STEM Learning Communities Conference*. Columbus, GA.

- Shen, J.** (2009, October). Transformative modeling as a way to bridge the content knowledge and pedagogical knowledge for pre-service science teachers. Paper presented at the annual conference of the *Southeastern Association for Science Teacher Education*. Kennesaw, GA.
- Shen, J.** (2008, October). Introduction to technology enhanced science modules. Workshop conducted at the annual conference of the *Southeastern Association for Science Teacher Education*. Columbia, SC.
- Shen, J.** (2008, April). Connecting atomic models and observations to explain static electricity. Paper presented at *the annual conference of American Educational Research Association (AERA) 2008*. New York City.
- Shen, J.** (2007, April). Justifying alternative model: A case study on K-8 science teachers' understanding of frames of reference in astronomy. *Paper presented at the annual conference of American Educational Research Association (AERA) 2007*. Chicago, IL.
- Shen, J.** (2006, April). Understanding balance: Model or tool? *Paper presented at National Association for Research in Science Teaching (NARST) 2006*. San Francisco, CA.
- Grillo-Hill, A., Gay, A., McNew, J., **Shen, J.**, & Tate, W.F. (2006, April). Research and practice in science education: New scholars navigating the divide. *Paper presented at National Association for Research in Science Teaching (NARST) 2006*. San Francisco, CA.
- Shen, J.** (2006, February). Teaching strategies and conceptual change of science teachers of K-8. *Poster presented at the conference of the CLT-PI meeting 2006*. Washington, D.C.
- Shen, J.** (2005, August). Conceptual change of K-8 science teachers in buoyancy. *Paper presented at the annual meeting of the American Association of Physics Teachers (AAPT)*. Salt Lake City, UT.
- Shen, J.**, Gibbons, P.C., Wieggers, J.F., & McMahon, A. (2005, April). Conceptual change of K-8 science teachers in force and motion. *Paper presented at the annual meeting of Missouri Academy of Science (MAS)*. Jefferson City, MO.
- Shen, J.**, Gibbons, P.C., Wieggers, J.F., & McMahon, A. (2005, April). A Framework of a professional development program for K-8 science teachers. *Paper presented at National Association for Research in Science Teaching (NARST) 2005*. Dallas, TX.
- Gay, A., **Shen, J.**, Maloney, A., Balcerzak, P., & Confrey J. (2005, January) CISTL Professional Development Bundles: Investigating Impact on Teacher Conceptual Development. *Poster presented at the annual meeting of American Association for the Education of Teachers in Science (AETS)*, 2005.
- Shen, J.**, Gibbons, P.C., & Wieggers, J.F. (2004, April). Using research based assessment tools in professional development – electricity & magnetism. *Paper presented at MAS*. Kansas City, MO.

Invited Speaker

- Shen, J. (2020, Sep.). Interdisciplinary learning in higher education. Invited talk at Nanyang Technological University, Singapore.
- Shen, J. (2019, June). Examining Middle School Students' Collaborative Multimodal Composing through Disciplinary Identity Development: A Design-based Research. Invited talk at Southwest University, Chongqing, China.

- Shen, J. (2019, May). Introduction to qualitative research in science education. Invited talk at Beijing Normal University, Beijing, China.
- Shen, J. (2018, Jan). Facilitating Adolescents' Collaborative Multimodal Composing through Disciplinary Identity Development. Invited talk at East China Normal University.
- Shen, J. (2016, June). A new framework for iSTEAM education. Invited talk at Peking University, Beijing, China.
- Shen, J. (2015, September). Toward assessing interdisciplinary science learning. Invited talk at Florida International University, Miami, FL.
- Shen, J. (2015, October). Assessing college students' interdisciplinary learning. Invited talk at Peking University, Beijing, China.
- Shen, J. (2015, May). Introduction to the learning sciences. Invited talk at Beijing Normal University, Beijing, China.
- Shen, J. (2014, June). Interdisciplinary science education: theory, assessment, and technology. Invited talk at Beijing Normal University, Beijing, China.
- Shen, J. (2010, December). Modeling-based instruction in Science Education. Invited talk at Nanjing Normal University, Nanjing, China.
- Shen, J. (2009, December). Science Education in the U.S. *Invited four-day workshop on science education*. Capital Normal University, Beijing, China.
- Shen, J. (2009, December). Adapting curriculum to problem-based learning. *Panelist for the West Central Georgia Regional STEM Institute*, Columbus State University.
- Shen, J. (2009, October). Transformative modeling: Towards an instructional theory of learning sciences. *Brown Bag Seminar at the Friday Institute at the North Carolina State University*. Raleigh, NC.
- Shen, J. (2005, September) Learning physics: A modeling approach and new insights. *Invited talk at Missouri State University*. Springfield, MO.

Professional Services

Editorial Board

- Editorial board member (2011-2020), *International Journal of Environmental and Science Education*
- Editorial board member (2012-), *Models and Modelling in Science Education book series* (Springer)

Journal Review (ad hoc)

- Science Education
- International Journal of Science Education
- Journal of Research in Science Teaching
- Journal of Science Education and Technology
- Journal of Science Teacher Education
- Research in Science Education
- International Journal of Environmental and Science Education
- Computer & Education
- Research in Disciplinary and Interdisciplinary Science Education

Conference/Grant Review

- National Science Foundation, 2011-2013 (2 programs), 2015 (1 program), 2016 (2 programs), 2017 (1 program), 2018 (1 program), 2019 (1 program), 2020 (ad hoc reviewer)
- Annual Conference of International Society of the Learning Sciences, 2017
- Annual Conference of National Association of Research in Science Teaching, 2008,2010
- Annual Conference of Association of Educational Research in America, 2008-2012
- Annual IEEE International Conference on Advanced Learning Technologies, 2011-2013
- International Symposium on Science 2 and Expansion of Science: S2ES, 2010
- Gerogia's Teacher Quality Grant (U.S. Department of Education, Title II Part A), 2009

Organization Committee

- Member of the International Committee, NARST, 2011-2014

TEACHING

University of Miami

- TAL 777: Practicum in STEM Education
- TAL 776: Assessment in STEM Education
- TAL 774: Research on Learning in STEM
- TAL 772: Instructional Design and Technology in STEM Education
- TAL 709: Applied Research and Development in LS – Seminar I
- TAL 704: Introduction to the Learning Sciences
- TAL 662/3: Mathematics and Science Instruction in the Secondary School
- TAL 652: Assessment of Human and Organizational Learning (UOnline)
- TAL 543: Science Instruction in the Secondary School
- TAL 323: Science Instruction in the Elementary School
- TAL 323 (new): Interdisciplinary Methods in the Content Areas

University of Georgia

- ESCI8990: Research Seminar in Science Education, College of Education
- ESCI4480/6480: Technology for Science Teaching, College of Education
- CHEM1060: Physical Sciences for Middle School Teachers, College of Arts & Sciences
- ESCI4420: Science for Early Childhood Education, College of Education

Other Institutions

- Selected Topics in the Learning Sciences, Beijing Normal University (May, 2015; June 2018).
- Conceptual Change & Critical Transitions (Co-instructor), Graduate School of Education, University of California, Berkeley (Fall, 2007, with Marcia Linn and Norma Chang).
- Introductory Physics (Lab Instructor), Department of Physics, Washington University in St. Louis (2002-2003).

- Physical sciences courses for K-8 science teachers (Instructor Assistant), Science Outreach at Washington University in St. Louis (2003-2005, with Patrick Gibbons, Ann McMahon, and Jack Wieggers).

DOCTORAL STUDENTS SUPERVISED

as major professor:

- Dimitris Timpilis (expected 2024)
- Changzhao Wang (expected 2023)
- Guanhua Chen (2014- December 2018, UM), now post-doctoral researcher at Concord Consortium.
- Shiyann Jiang (2013- May 2018, UM), now assistant professor at North Carolina State University.
- Bahadir Namdar (2010-Aug. 2014, UGA), now associate professor at Recep Tayyip Erdogan University, Turkey.
- Hianghan (Shannon) Sung (2010-May 2013, UGA), now research scientist at Concord Consortium; formerly Assistant Professor at Spelman College.
- Rutchelle Enriquez (2009-2011, UGA, terminated), now Research Director at Leyte Normal University, Philippines.
- Dongmei Zhang (2011-2013, UGA), major advisor changed due to my leave.
- Celestin Ntemngwa (2011-2012, UGA), major advisor changed due to my leave.

as major adviser (the Applied Learning Sciences EDD program):

- 2021: D'Jarius Jones, David Martin, Bradley Myers
- 2022: Nathan Bullock, McDonald Homer, Arthur Kosakowki, Courtney Matthews, Amy Sluis, Cristina Telepman, Stefan Wenk, Kimberly Wicker, Lisa Winer

as dissertation committee member:

- Olga Tserej Vazquez (Biology, UM)
- Maria Kolovou (STEM Education, UM)
- Hua Ran (STEM Education, UM)
- Karen Lionberger (Science Education, UGA, Apr. 2020)
- Edwing Medina (STEM Education, June 2019, UM)
- Natasha Johnson (Science Education, April 2019, UGA)
- Alexandra Alexander (Psychology, December 2018, UM)
- Naomi Ramona Iuhasz (STEM Education, July 2018, UM)
- Uma Gadge (STEM Education, June 2018, UM)
- Julie Memler (Science Education, UGA, Jun. 2017)
- Maria Elena Vaca (REMS, UM, Dec. 2016)
- Bruce Gabbitas (Learning, Design, and Technology, UGA, May. 2015)

- Chia-Chung Lee (Learning, Design, and Technology, UGA, Aug. 2013)
- Brandon Diamond (STEM Education, UM, May 2013)
- Kyung-A Kwon (Science Education, UGA, Dec 2012)

AWARDS & Honors

2020	U-LINK Predoctoral Fellowship Recipient's (Olga Tserej) Co-advisor
2014	Provost Research Award, University of Miami
2010	Early Career Workshop Fellow, International Society of the Learning Sciences
2009	OVPR Research Fellow, University of Georgia
2004	Chair's Choice Award, Department of Education, Washington University
2001-06	Doctoral Research and Teaching Fellowship, Washington University
1998	Motorola Scholarship, Beijing University

PROFESSIONAL MEMBERSHIP

- American Educational Research Association (AERA)
- Association of Educational Communication and Technology (AECT)
- International Society of the Learning Sciences (ISLS)
- National Association for Research in Science Teaching (NARST)