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EDUCATION

The Ohio State University

PhD, Mathematics Education *2013*
MA, Mathematics Education *2011*
MS, Mathematics *2008*
BS, Mathematics *2005*

ACADEMIC EMPLOYMENT

Texas State University, Professor *2024-present*
Associate Professor *2019-2024*
Assistant Professor *2013-2019*
Australian Catholic University, Visiting Scholar *2018*

PUBLICATIONS

Articles in Peer-Reviewed Journals

Czocher, J. A, Dawkins, P., & Weber, K. (2024) Using norms and virtues to explain the rationality of mathematical practice: The case of probabilistic proofs. *Logique et Analyse*.

Czocher, J. A., Roan, E., & Kularajan, S. (2024). Scaffolding Moves for Constructing Cognitively Meaningful Models of a Predator-Prey Scenario. *PRIMUS*.

Czocher, J. A. & Melhuish, K., (2024) Attending to Coherence Among Research Questions, Methods, and Claims in Coding Studies. *Journal for Research in Mathematics Education*.

Roan, E.* & Czocher, J. A. (2024) Instructors' beliefs and practices regarding mathematical modelling at the periphery of STEM. *International Journal of Mathematics Education in Science & Technology*.

Czocher, J. A., Roan, E.*, Quansah, A.*, & Baas, A.* (2024) Calculus is the study of change…but differential equations students need help quantifying it. *International Journal of Mathematics Education in Science and Technology*.

Czocher, J. A., Hardison, H., & Kularajan, S.* (2022). A Bridging Study Analyzing Mathematical Modeling through a Quantity-Oriented Lens. *Educational Studies in Mathematics, 111*. 299-321.

Czocher, J. A., Melhuish, K., Kandasamy, S.*, & Roan, E.* (2021). Dual Measures of Mathematical Modeling for Engineering and other STEM Undergraduates. Dual Measures of Mathematical Modeling for Engineering and other STEM Undergraduates *7,* 328-350.

Stillman, G., Brown, J., & Czocher, J. A. (2020) Yes, mathematicians do X so students should do X, but it's not the X you think! *ZDM, 52*(6), 1211-1222.

* Indicates doctoral student co-author.

Melhuish, K. & Czocher, J. A. (2020). Division is pretty much just multiplication. *For the Learning of Mathematics*, *40*(2), 38-43.

Czocher, J. A., Moss, D. L., and Maldonado, L (2020). Revitalizing and reconceptualizing conventional word problems. *Mathematics Teacher, 113*(5), 404-410.

Czocher, J. A. and Weber, K. (2020). Proof as a cluster category. *Journal for Research in Mathematics Education, 51*(1), 50-74.

Czocher, J. A., Melhuish, K., and Kandasamy, S.* (2019). Building mathematics self-efficacy of STEM undergraduates through mathematical modelling. *International Journal of Mathematics Education in Science and Technology, 51*(6), 807-834.

Weber, K. and Czocher, J. A. (2019). On mathematicians' disagreements on what constitutes a proof. *Research in Mathematics Education, 21*(3), 251 – 270.

Czocher, J. A, Tague, J. K., and Baker, G. (2018). Echoes of the Instructor's Reasoning: Modeling Exemplars at Home. *PRIMUS, 29*(6), 606 – 624.

Czocher, J. A. (2018). How does validating activity contribute to the modeling process? *Educational Studies in Mathematics, 99*(2), 137 – 159.

Moss, D. L., Czocher, J. A., and Lamburg, T (2018). Frustrations with Understanding Variables is Natural. *Mathematics Teaching in the Middle School, 112*(1), 10 – 17.

Czocher, J. A., Dawkins, P. C., and Weber, K. (2018). Alternative perspectives on cultural dimensions on proof in the mathematical curriculum: a reply to Shinno et al. *For the Learning of Mathematics, 38*(2), 25 – 27.

Czocher, J. A. and Moss, D. L (2017). Are students' prior experiences important? *Mathematics Teacher*, *111*(9), 654-660.

Czocher, J. A. and Moss, D. L (2017). Ancient paradoxes can extend mathematical thinking. *Mathematics Teaching in the Middle School, 22*(7), 438-442.

Czocher, J. A. (2017). How can emphasizing mathematical modeling principles benefit students in a traditionally taught differential equations course? *The Journal of Mathematical Behavior 45*, 1-17.

Czocher, J. A. (2017). Mathematical modeling cycles as a task design heuristic. *The Mathematics Enthusiast, 14*(1-3), 129-144.

Czocher, J. A. (2016). Introducing modeling transition diagrams as a tool to connect mathematical modeling to mathematical thinking. *Mathematical Thinking and Learning, 18*(2), 77 – 106.

Tague, J. and Czocher, J. A. (2016). A theoretical approach to ensuring instructional and curricular coherence in the flipped classroom model of a differential equations course. *International Journal of Research in Undergraduate Mathematics Education, 2*. 223 – 245.

Czocher, J. A., Tague, J., and Baker, G. (2013). Where does the calculus go? An investigation of how calculus ideas are used in later coursework. *The International Journal of Mathematical Education in Science and Technology, 44*(5). 673 – 684.

Chapters in Peer-Reviewed Books

Roan, E.* & Czocher, J. A. (2024). Reasoning students employed when mathematizing during a predator-prey modelling task. In H-S. Siller, G. Kaiser, V. Geiger (Eds.) *Researching mathematical modelling education in disruptive/challenging times*

* Indicates doctoral student co-author.

Kularajan, S. S.* & Czocher, J. A. (2024). How is reasoning with quantities limited in mathematical modelling?. In H-S. Siller, G. Kaiser, V. Geiger (Eds.) *Researching mathematical modelling education in disruptive/challenging times*

Czocher, J. A., Kularajan, S. S.*, Roan, E.*, & Sigley, R. (2023) Validating a multiple-choice modeling competencies assessment. In G. Greefrath, S. Carrera, G. Stillman (Eds.) *Advancing and consolidating research on applications and modelling in mathematics education* (pp .161–176). Springer.

Czocher, J. A. & Hardison, H. (2021) Attending to Quantities through the Modelling Space. In F. Leung, G. A. Stillman, G. Kaiser, K. L. Wong (Eds.) *Mathematical Modelling Education in East and West* (pp. 263-272). Springer.

Czocher, J. A. Precision, priorities, and proxies in mathematical modeling (2019). In G. Stillman and J. Brown (Eds.) *Lines of Inquiry in Mathematical Modelling Research in Education* (pp. 105 - 123). New York: Springer.

Manouchehri, A, Czocher, J. A., Liu, Y., Zhang, P., Somayajulu, R., & Tague, J. (2013). Fostering mathematical competence through technology-enhanced interactive environments. In D. Polly (Ed.) *Common Core Mathematics Standards and Implementing Digital Technologies*. (pp. 53 – 77). Hershey, PA: IGI Global

Tague, J., Czocher, J. A., and Baker, G. (2013). Mathematical literacy for engineering majors. In W. Aung, V. Ilic, O. Mertanen, J. Moscinski, & J. Uhomoibhi (Eds.). *World Innovations in coa Education and Research*. (p. 21 – 29). Potomac, MD: iNEER.

Czocher, J. A. & Baker, G. (2011). Contextual learning in math education for engineers. In W. Aung, J. Moscinski, J. Uhomoibhi, & W.-C. Wang (Eds.) *World Innovations in Engineering Education and Research*. Potomac, MD: iNEER.

Peer-Reviewed Conference Papers

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Kularajan, S. S. & Czocher, J. A. (accepted). Transformations of semiotic representations in modeling: The case of Liv. Proceedings of the *International Group for the Psychology of Mathematics Education, North American Chapter,* Cleveland, OH, Nov 2024.

Czocher, J. A. & White, A., Baas*, A., Roan, E. (accepted). Scaffolding moves that elicit modeling competencies. Submitted to *PME-NA*. Proceedings of the *International Group for the Psychology of Mathematics Education, North American Chapter,* Cleveland, OH, Nov 2024.

Czocher, J. A., Kelly, B., Garfinkel, A., Deeds, E. (2024). Teaching faculty the art of modelling in biology. Proceedings of the *15th International Congress on Mathematics Education*. Sydney, AU, 2024.

Baas*, A., Czocher, J. A. & White, A (2024). Estimating inter-observer agreement on qualitative data with a complex coding scheme. Proceedings of the *15th International Congress on Mathematics Education*. Sydney, AU, 2024.

Czocher, J. A., Baas, A.*, Roan, E.*, & Quansah, A.* (2023). Mutability of STEM majors' abstracted quantitative structures. Proceedings of the *International Group for the Psychology of Mathematics Education, North American Chapter,* Reno, NV, Oct 2023.

Roan, E.* & Czocher, J. A. (2023). A Local causal explanation for why students might conflate rates of change and amounts of change. Proceedings of the *International Group*

for the Psychology of Mathematics Education, North American Chapter, Reno, NV, Oct 2023.

Kularajan, S. S.*, Roan, E.*, & Czocher, J. A. (2023). Quantitative operators in mathematical modeling. Proceedings of the *International Group for the Psychology of Mathematics Education, North American Chapter,* Reno, NV, Oct 2023.

Quansah, A.* & Czocher, J. A. (2023). Embracing student language as scaffolding during mathematical modeling. Proceedings of the *International Group for the Psychology of Mathematics Education, North American Chapter,* Reno, NV, Oct 2023.

Roan, E.* & Czocher, J. A. (2022). Justifications students use when writing an equation during a modeling task. In A. E. Lischka, E. B. Dyer, R. S. Jones, J. N. Lovett, J. Strayer, & S. Drown (Eds.), *Proceedings of the forty-fourth annual meeting of the International Group for the Psychology of Mathematics Education, North American Chapter* (pp. 839 – 847). Middle Tennessee State University.

Kularajan, S.S.* & Czocher, J. A. (2022). STEM undergraduates' structural conception of rate of change. In A. E. Lischka, E. B. Dyer, R. S. Jones, J. N. Lovett, J. Strayer, & S. Drown (Eds.), *Proceedings of the forty-fourth annual meeting of the International Group for the Psychology of Mathematics Education, North American Chapter* (pp. 822 – 830). Middle Tennessee State University.

Czocher, J. A., Roan, E.*, Acevedo, C.*, & Swartz, M.* (2021) The Interface of Quantification and Covariational Reasoning in Real-World Scenarios. In D. Olanoff, K. Johnson, S. Spitzer (Eds.) *Proceedings of the* forty-third annual meeting of the *International Group for the Psychology of Mathematics Education, North American Chapter* (pp. 608 – 612). Philadelphia, PA.

Kularajan, S.S.* & Czocher, J. A. (2021). Quantitative reasoning and covariational reasoning as the basis for mathematical structure of real-world situations. In D. Olanoff, K. Johnson, S. Spitzer (Eds.) *Proceedings of the* forty-third annual meeting of the *International Group for the Psychology of Mathematics Education, North American Chapter* (pp. 1247 - 1255). Philadelphia, PA.

Czocher, J. A., Kandasamy, S.*, and Roan, E.* (2021). Diseño y validación de instrumentos de medición de competencias y autoeficacia de modelización matemática. In A. I. Sancristan, J. C. Cortes-Zavala, & P. M. Ruiz-Arias (Eds). *Proceedings of the 42nd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 2308 - 2316). Mexico: Cinestav/AMIUTEM.

Kandasamy, S. S.* and Czocher, J. (2021). How mathematical modeling enables learning. In A. I. Sancristan, J. C. Cortes-Zavala, & P. M. Ruiz-Arias (Eds). *Proceedings of the 42nd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 922 – 930). Mexico: Cinestav/AMIUTEM.

Czocher, J. A., Kandasamy, S.*, and Roan, E.* Validating a modelling competencies assessment. Paper presented at *14th International Congress on Mathematical Education*. July 2021. Shanghai, China: ICME. (no page numbers)

Roan, E.* and Czocher, J. A. Students' expected gains from a modeling competition. Paper presented at *14th International Congress on Mathematical Education*. July 2021. Shanghai, China. (no page numbers)

Czocher, J. A. and Hardison, H. (2019). Characterizing the evolution of mathematical models. In S. Otten, A. G. Candela, Z. de Araujo, C. Haines, & C. Munter (Eds.)

Proceedings of the 41st annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (pp. 864 – 873). St. Louis, MO: University of Missouri.

Czocher, J. A. and Kandasamy, S. S.* (2018). On how participation in a modeling competition occasions changes in undergraduate students' self-efficacy regarding mathematical modeling. In T.E. Hodges, G. J. Roy, & A. M. Tyminski (Eds.) *Proceedings of the 40th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 596 – 599). Greenville, SC: University of South Carolina & Clemson University.

Czocher, J. A., Stillman, G., and Brown, J. (2018). Verification and validation: What do we mean? In J. Hunter, P. Perger, & L. Darragh (Eds.) *Proceedings of the 41st annual meeting of the Mathematics Education Research Group of Australasia*. (pp. 250 – 257). Albany, NZ: MERGA.

Czocher, J. A. (2016). Making sense of student-generated conditions and assumptions. Paper presented at the *13th International Congress on Mathematical Education*. Hamburg, Germany: ICME. (no page numbers)

Czocher, J. A. and Fagan, J.* (2016). Characteristics of effective questioning for mathematical modeling tasks. In M. B. Wood, E. E. Turner, M. Civil, & J. A. Eli (Eds.) *Proceedings of the 38th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 1406). Tucson, AZ: The University of Arizona.

Czocher, J. A. and Maldonado, Luz, M. (2015) A Mathematical modeling lens on conventional word problems. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & H. Dominguez (Eds.) *Proceedings of the 37th annual meeting of the North American chapter of the International Group for the Psychology of Mathematics Education.* (pp. 332 – 338). East Lansing, MI: Michigan State University.

Czocher, J. A. and Fagan, J.* and Linker, R.* (2015). Identifying and prioritizing unknowns in mathematical modeling. In T. G. Bartell, K. N. Bieda, R. T. Putnam, K. Bradfield, & H. Dominguez (Eds.) *Proceedings of the 37th annual meeting of the North American chapter of the International Group for the Psychology of Mathematics Education* (p. 418). East Lansing, MI: Michigan State University.

Czocher, J. A. (2015) Competing Conceptual Systems and their Impact on Generating Mathematical Models. In K. Krainer & N. Vondrová (Eds.) *Proceedings of the 9th Congress of European Research in Mathematics Education*. (p. 841 – 847). Prague, Czech Republic: CERME.

Czocher, J. A. (2014). Toward building a theory of mathematical modeling. In P. Liljedahl, C. Nicol, S. Oesterle, & D. Allan (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*. (Vol II, p. 353 – 360). Vancouver, Canada: PME.

Czocher, J. A., Tague, J., and Baker, G. (2012). Calculus: Foundations for differential equations. *Proceedings of the 12th International Congress on Mathematics Education, Topic Study Group 13*. Seoul, Korea: ICME. (no page number)

Tague, J., Czocher, J. A., and Baker, G. (2012). Mathematical literacy for engineering students. *Proceedings of the 12th International Congress on Mathematics Education, Topic Study Group 6.* Seoul, Korea: ICME. (no page number)

* Indicates doctoral student co-author.

Czocher, J. A. (2012). Mathematical modelling and engineering majors. In J. Björqvist, M., Laasko, J. Rosl¨f, R. Tuohi, & S. Virtanen (Eds.) *Proceedings of the 18th International Conference on Engineering Education*. (pp. 426-433). Turku Finland: INEER.

Tague, J., Czocher, J. A., & Baker, G. (2012). Mathematical literacy for engineering majors. In J. Björqvist, M., Laasko, J. Rosl¨f, R. Tuohi, & S. Virtanen (Eds.) *Proceedings of the 18th International Conference on Engineering Education*. (pp. 854 - 861). Turku, Finland: INEER.

Czocher, J. A. and Manouchehri, A. (2012). Task design to capture mathematical modeling skills. In L. R. van Zoest, J.-J. Lo, & J. L. Kratky (Eds.) *Proceedings of the 34th annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (pp. 264). Kalamazoo, MI: Western Michigan University.

Tague, J., Czocher, J. A., Manouchehri, A., and Baker, G. (2012). An Academic perspective of mathematical literacy. In L. R. van Zoest, J.-J. Lo, & J. L. Kratky (Eds.) *Proceedings of the 34th annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (p. 129 - 130). Kalamazoo, MI: Western Michigan University.

Czocher, J. A. (2011). Explaining student performance through instruction. In L. R. Wiest & T. Lamberg (Eds.) *Proceedings of the 33rd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education.* (pp. 44-52). Reno, NV: University of Nevada, Reno.

Czocher, J. A. (2011). Examining the relationship between contextual mathematics instruction and performance of engineering students. In J. Uhomoibhi (Ed.) *Proceedings of the 17th International Conference on Engineering Education.* Belfast, Northern Ireland: INEER. (no page number)

Czocher, J. A. (2010). An exploration of factors that influence student achievement in differential equations. In P. Brosnan, D. B. Erchick, & L. Flevares (Eds.) *Proceedings of the 32nd annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. (p. 153). Columbus, OH: The Ohio State University.

Czocher, J. A. and Baker, G. (2010). Contextual learning in math education for engineers. In J. Mościński & M. Maciążekj (Eds.) *Proceedings of the 16th International Conference on Engineering Education*. Gliwice, Poland: INEER. (no page number)

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Czocher, J. A., Baas*, A., Melhuish, K., White, A. (2024). When Cohen's Kappa Is Not Enough: Exploring Methods for Estimating Inter-Rater Reliability for Time Sequential Data. Submitted to the *26th Conference on Research in Undergraduate Mathematics Education*. Omaha, NE: SIGMAA on RUME.

Kularajan, S. S., Czocher, J. A. (2024). Operationalizing What Is Learnt during Mathematical Modeling. Submitted to the *26th Conference on Research in Undergraduate Mathematics Education*. Omaha, NE: SIGMAA on RUME.

Roan*, E., Czocher, J. A. (2024). The Cognitive Obstacles Associated with Structuring for Mathematization Undergraduates Encountered During Dynamic Modeling Tasks. Submitted to the *26th Conference on Research in Undergraduate Mathematics Education*. Omaha, NE: SIGMAA on RUME.

Czocher, J. A., Kularajan, S. S.*, & Roan, E.* (2023). Quantitative reasoning augments scaffolding for mathematical model construction. In XX (Eds.) *Proceedings of the 25th Conference on Research in Undergraduate Mathematics Education*. (pp. XX). Omaha, NE: SIGMAA on RUME.

Roan, E.* & Czocher, J. A. (2023). Reasoning students employed when mathematizing during a disease transmission modeling task. In XX (Eds.) *Proceedings of the 25th Conference on Research in Undergraduate Mathematics Education*. (pp. XX). Omaha, NE: SIGMAA on RUME.

Kularajan, S. S.* & Czocher, J. A. (2023). How do STEM Undergraduates Structurally Conceive Change During Modeling? In XX (Eds.) *Proceedings of the 25th Conference on Research in Undergraduate Mathematics Education*. (pp. XX). Omaha, NE: SIGMAA on RUME.

Czocher, J. A., Sigley, R., Kularajan, S. S.*, & Roan, E.* (2022). Analysis of a mathematical modeling assessment. In S. S. Karunakaran & A. Higgins (Eds.) *Proceedings of the 24th Conference on Research in Undergraduate Mathematics Education*. (pp. 152 – 159). Boston, MA: SIGMAA on RUME.

Roan, E.* & Czocher, J. A. (2022). Instructor beliefs and practices at the periphery of STEM. In S. S. Karunakaran & A. Higgins (Eds.) *Proceedings of the 24th Conference on Research in Undergraduate Mathematics Education*. (pp. 463 - 471). Boston, MA: SIGMAA on RUME.

Melhuish, K. & Czocher, J. A. (2022). Research Questions & Framework Studies. In S. S. Karunakaran & A. Higgins (Eds.) *Proceedings of the 24th Conference on Research in Undergraduate Mathematics Education*. (pp. 834 - 841). Boston, MA: SIGMAA on RUME.

Kularajan, S. S.* & Czocher, J. A. (2022). Characterizing Quantitative Structures Students Establish for Real-World Situations. In S. S. Karunakaran & A. Higgins (Eds.) *Proceedings of the 24th Conference on Research in Undergraduate Mathematics Education*. (pp. 622 - 629). Boston, MA: SIGMAA on RUME.

Roan, E.* & Czocher, J. A. (2022). Towards an operationalization of mathematization. Conference on Research in Undergraduate Mathematics Education. In S. S. Karunakaran & A. Higgins (Eds.) *Proceedings of the 24th Conference on Research in Undergraduate Mathematics Education*. (pp. 1268 – 1269). Boston, MA: SIGMAA on RUME.

Czocher, J. A. and Hardison, H. (2020). The Modeling space: An Analytic tool for documenting students' modeling activities. In S. S. Karunakaran, Z. Reed, & A. Higgins (Eds.) *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 769 - 776) Boston, MA: SIGMAA on RUME.

Tague, J., Nunez*, D., and Czocher, J. A. (2020). Comparison of a pre-requisite to co-requisite model of remedial mathematics. In S. S. Karunakaran, Z. Reed, & A. Higgins (Eds.) *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 962 - 967) Boston, MA: SIGMAA on RUME.

Roan, E.* and Czocher, J. A. (2020). Mathematical modeling competitions from the student perspective. In S. S. Karunakaran, Z. Reed, & A. Higgins (Eds.) *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 962 - 967) Boston, MA: SIGMAA on RUME.

Kandasamy, S. S.*, Czocher, J. A., and Melhuish, K. (2019). Participation in a mathematical modeling competition as an avenue for increasing STEM majors' mathematics self-

efficacy. In A. Weinberg, D. Moore-Russo, H. Soto, & M. Wawro (Eds.) *Proceedings of the 22nd Annual Conference on Research in Undergraduate Mathematics Education* (pp. 154 - 163) Oklahoma City, OK: SIGMAA on RUME.

Czocher, J. A. and Tague, J. K. (2018). Modus tollens in modeling. In A. Weinburg, C. Rasmussen, J. Rabin, M. Wawro, & S. Brown (Eds.) *Proceedings of the 21st Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 1555 - 1562) San Diego, CA: SIGMAA on RUME.

Melhuish, K., Bergman, A., and Czocher, J. A. (2018). Revisiting reducing abstraction in abstract algebra. In A. Weinburg, C. Rasmussen, J. Rabin, M. Wawro, & S. Brown (Eds.) *Proceedings of the 21st Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 1197 - 1205) San Diego, CA: SIGMAA on RUME.

Czocher, J. A. (2017). Applying variation theory to study modeling competencies. In A. Weinburg, C. Rasmussen, J. Rabin, M. Wawro, & S. Brown (Eds.) *Proceedings of the 20th Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 1189 - 1194) San Diego, CA: SIGMAA on RUME.

Czocher, J. A. (2014). A Typology of Validating Activity. In T. Fukawa-Connolly, G. Karakok, K. Keene, M. Zandieh (Eds.) *Proceedings of the 17th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 533 - 541) Denver, CO: SIGMAA on RUME.

Tague, J., Czocher, J. A., Roble, A., Baker, G. (2014). Pencasts as exemplars in differential equations. In T. Fukawa-Connolly, G. Karakok, K. Keene, M. Zandieh (Eds.) *Proceedings of the 17th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 542 - 548) Denver, CO: SIGMAA on RUME.

Tague, J., Czocher, J. A., Baker, G. (2014). Using the flipped model to address cognitive obstacles in differential equations. In T. Fukawa-Connolly, G. Karakok, K. Keene, M. Zandieh (Eds.) *Proceedings of the 17th Annual Conference on Research in Undergraduate Mathematics Education*, (pp. 1076 - 1077) Denver, CO: SIGMAA on RUME.

Tague, J., Czocher, J. A., and Baker, G. (2014). Addressing Cognitive Obstacles through the Flipped Classroom Model. *Proceedings of the annual conference for the American Society for Engineering Education*. Indianapolis, IL: ASEE. (no page numbers).

Tague, J., Czocher, J. A., Roble, A., Baker, G. (2013). Choosing and adapting technology in a mathematics course for engineers. *Proceedings of the 120th Annual Meeting of the American Society of Engineering Education.* Atlanta, GA: ASEE. (no page numbers)

Czocher, J. A. (2013). A modern look at the cell problem. In S. Brown, G. Karakok, H. R. Roh, M. Oehrtman (Eds.) *Proceedings of the 16th Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 2-475 – 2-479). Denver, CO: SIGMAA on RUME.

Czocher, J. A. & Tague, J. (2013). Coherence from calculus to differential equations. In S. Brown, G. Karakok, H. R. Roh, M. Oehrtman (Eds.) *Proceedings of the 16th Annual Conference on Research in Undergraduate Mathematics Education*. (pp. 2-83 – 2-90). Denver, CO: SIGMAA on RUME.

Czocher, J. A. (2012). Mathematical modeling and engineering majors. In S. Brown, S. Larsen, K. Marrongelle, M. Oehrtman (Eds.) *Proceedings of the 15th annual Conference on Research in Undergraduate Mathematics Education*. (pp. 2-391 – 2-395). Portland, OR: SIGMAA on RUME.

* Indicates doctoral student co-author.

Peer-Reviewed Conference Abstracts

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Czocher, J. A., Kularajan, S. S.*, Roan, E.* Cycles of a design experiment for fostering mathematization. Paper presented at the Biennial meeting of the *International Community of Teachers of Mathematical Modelling and Applications*, Wurzburg, Germany, September 2022.

Roan, E.*, Czocher, J.A. Reasoning students employed when mathematizing during a predator-prey modeling task. Paper presented at the Biennial meeting of the *International Community of Teachers of Mathematical Modelling and Applications*, Wurzburg, Germany, September 2022.

Kularajan, S. S.*, Czocher, J.A. The role of quantitative and covariational reasoning in mathematical modeling. Paper presented at the Biennial meeting of the *International Community of Teachers of Mathematical Modelling and Applications*, Wurzburg, Germany, September 2022.

Czocher, J. A. and Hardison, H. Quantities as a basis for mathematical models: Illustrations and implications of a student's modeling space. Presented at The Biennial meeting of the *International Community of Teachers of Mathematical Modelling and Applications*. July 2019. Hong Kong.

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Czocher, J. A. Scaffolding Undergraduate STEM Majors' Learning of Mathematical Modeling. Invited panelist to NSF's Special Session at the Joint Mathematics Meeting. San Francisco, CA, 2024.

Garfinkel, A , Czocher, J. A., Deeds, E., Kelly, B. Dynamical Systems Modeling for Biologists & Doctors – without Prerequisites! Presented at AMS Special Session at the Joint Mathematics Meeting. San Francisco, CA, 2024.

Czocher, J. A., Garfinkel, A., Kelly, B. Deeds, E. A Master Class in Modeling the Life Sciences, for Mathematics Faculty. Presented at AMS Special Session at the Joint Mathematics Meeting. San Francisco, CA, 2024.

Czocher, J. A. What can we learn about students that grades won't teach us? (And how can we model student success?). SIMIODE EXPO, February 2021. Virtual presentation.

Czocher, J. A. SCUDEM Update: Students' expected and measured gains. Presentation at the Joint Mathematics Meetings. January 2020, Denver, CO.

Melhuish, K., Bergman, A. *, and Czocher, J. A. Revisiting reducing abstraction in abstract algebra. Paper presented at the Joint Mathematics Meetings. January 2019, Baltimore, MD.

Czocher, J. A. Can mathematical modeling competitions help participants build confidence? If so, so what? Presentation at the Joint Mathematics Meetings. January 2019, Baltimore, MD.

Czocher, J. A. What outcomes might we anticipate from students engaging concurrently with modeling and differential equations content? Presentation at the Joint Mathematics Meetings. January 2018, San Diego, CA.

Edwards, B. and Czocher, J. A. Assessment/Evaluation Plans and Results on SIMIODE programs – workshops and SCUDEM – student competition. Presentation at SIAM – ED. July 2018, Seattle, WA.

* Indicates doctoral student co-author.

Lewis, S. T., Czocher, J. A., Brax, K. A pedagogical analysis of mathematical modeling teaching experiments. Paper presented at the *20th Annual Conference of the Association of Mathematics Teacher Educators*. January 2016. Irvine, CA.

Czocher, J. A. & Tague, J. Smartpen technology as an instructional medium. Presentation at the Joint Mathematics Meeting, January 2012, Boston, MA.

Czocher, J. Comparing an applications-first approach and an analytic-techniques-first approach to teaching topics in differential equations. Presentation at the Joint Mathematics Meeting, January 2011, New Orleans, LA.

. . . . . with regional scope

Roan, E.* & Czocher, J. A. (2022). Reasoning students employed when mathematizing during a predator-prey modeling task. Presentation at OK-TX RUME.

Czocher, J. A. Mathematical Modeling in the Classroom. Paper presented at the Conference on the Teaching of Mathematics 6 – 12, January 2014, Sam Houston State University.

Czocher, J. A., Tague, J., Roble, A., Baker, G. Successful collaboration between engineering and mathematics education. Paper presented at the American Society for Engineering Education, North Central Section Conference, 2013, Columbus, OH.

Curricular Products

COMAP Micro-credentials in Modeling, Module 3: Factors & Assumptions. 2023.

AWARDS & RECOGNITION

. . . . . research

Research Excellence Award, Department of Mathematics, Texas State University, 2020

Achievement in Scholarly Activity, College of Science and Engineering, Texas State University 2019

Achievement in Scholarly Activity, College of Science and Engineering, Texas State University 2016

Research Excellence Award, Department of Mathematics, Texas State University, 2015

Award for Best Paper, Student Category, American Society for Engineering Education, North Central Section, Columbus, OH, 2013

. . . . . teaching

The Graduate College Outstanding Mentor Award, Nominee, 2023

Achievement in Teaching, College of Science and Engineering, Texas State University 2023,

Teaching Excellence Award, Department of Mathematics, Texas State University, 2022

« Favorite Professor », Alfred H. Nolle Chapter of the Alpha Chi National College Honor Society, 2016.

. . . . . service

Outstanding Reviewer, *Journal for Research in Mathematics Education*, 2021

Outstanding Reviewer, *Journal of Mathematical Behavior*, 2020

FELLOWSHIPS AND GRANT ACTIVITIES

* Indicates doctoral student co-author.

Fellowships

Australia's Endeavour Post-Doctoral Fellowship. Visiting Professor at Australian Catholic University, Ballarat, VIC, Australia, $20,000 AUD, 2018.

https://internationaleducation.gov.au/Endeavour%20program/Scholarships-and-Fellowships/Pages/default.aspx

Marilyn Ruth Hathaway Education Research Fellowship, College of Education and Human Ecology, The Ohio State University, $16,800, 2011-2012

External Grants

. . . . . funded

NSF: IUSE, *Tracking Adaptation and Investigating Learning Outcomes for Reforming Mathematics for Life Sciences (TAILOR)*, Role: PI (CoPI: Brendan Kelly, Harvard University), $394,000.

NSF: CAREER, *Scaffolding Strategies for Undergraduate Mathematical Modeling Skills (SUMMS)*, Role: PI, $970,000. September 2018 – 2024.

Ohio DoE: *Young Scholars Program*, Role: Instructor, (PI: Azita Manouchehri, The Ohio State University), $500,000.

. . . . . under review

NSF: DGE – Post Doctoral Fellowships, *Transformative Research Pathways: Postdoctoral Fellowships in Advanced Undergraduate Mathematics Education*, Role: CoPI. (PI: Kate Melhuish). $1,249,995.

. . . . . advisory role

NSF:DRK-12, *Leveraging Dynamically Linked Representations in a Semi-Structured Workspace to Cultivate Mathematical Modeling Competencies Among Secondary Students (M2Studio)*. Role : Advisory Board (PI: Jie Chao, Concord Consortium, Inc), $2,983,986, May 2021 – 2024.

NSF: IUSE, *Building Community Through Systemic Initiative for Modeling Investigations and Opportunities with Differential Equations (SIMIODE)*. Role: Personnel/Evaluator (PI: Brian Winkel, SIMIODE, Inc.), $400,000, January 2018 – 2021.

Internal Grants

. . . . . funded

Supplemental Funding, Faculty Development Leave, ~$42,000, 2022-2023

Research Enhancement Program, Texas State University, *How to help STEM undergraduates develop mathematical modeling skills*, $7040, 2017-2018.

Research Enhancement Program, *Investigating mathematical modeling skills in linguistically diverse 6-12 students in Texas*, Texas State University, $16000, 2014-2015

Alkek Library New Faculty Startup Funds, Texas State University, $946, 2013

Utilizing Technologies to Enhance Teaching and Learning, *Using smartpens to model mathematical modeling*, College of Engineering, The Ohio State University, $5,000, 2011 – 2013

* Indicates doctoral student co-author.

INVITED TALKS

Keynote, Plenary, and Other Talks Addressing the Field

Czocher, J. A. & Melhuish, K. *Is your codebook playing nice with your research paradigm? (What are you counting and why are you doing that?)*. JRME Talks. March 4, 2024.

Czocher, J. A. *In their own words*: *Explanations of STEM Students' Reasoning during Mathematical Modeling*. International Community of Teachers of Modelling and Applications. Awaji, Japan, September 2023.

Seminars and Colloquia

. . . . . formally extended invitation, external venues

Czocher, J. A. *Title TBD.* Life Sciences Colloquium, UCLA, Anticipated Fall 2024.

Czocher, J. A. *Two peeks at scaffolding in modeling.* Mathematics Education Seminar, Arizona State University, April 18, 2024.

Czocher, J. A. *Mathematical Modeling: State of the Field and State of My Lab.* Mathematics Education Seminar, Utah State University, March 7, 2024.

Czocher, J. A. and Melhuish, K. *Is your codebook playing nice with your research paradigm ?* JRME Talks, March 4, 2024.

Czocher, J. A. Mathematical modeling is hard; Studying students doing it is even harder. Mathematics Education Seminar, Montclair State University, May 2023.

Czocher, J. A. Applying a Cognitive Constructivist Account of Mathematical Reasoning to Mathematical Modeling. Mathematics Education Colloquium of the University of Münster, Münster, Germany, May 2021.

Czocher, J. A. What can we learn about students that grades won't teach us ? (How can we model student success?). SIMIODE Expo. Virtual. February 2021.

Czocher, J. A. The Literature Says… Panel Presentation #5 for Critical Issues in Mathematics Education at the Mathematical Sciences Research Institute (CIME at MSRI). Berkeley, CA, March 2019.

Czocher, J. A. Why (other) mathematicians disagree with your definition of *proof*. STEM Education Colloquium of University of Tasmania, Hobart, Australia, August 2018

Czocher, J. A. What are some benefits of teaching differential equations with a mathematical modeling approach? Joint STEM Education Colloquium between Auckland University of Technology and University of Auckland, Aukland, New Zealand, July 2018.

Czocher, J. A. What is a modeling task? Presented at The Ohio State University Mathematics Education Roundtable. March, 2015.

. . . . . university functions

Czocher, J. A. Can we trust mathematics (to tell us if there are intelligent beings from outer space)? Presented at *Mathworks* Colloquium. July, 2014.

Czocher, J. A and Tague, J. An Update on an applied approach to teaching engineering mathematics. Presented at the Engineering Education Innovation Center. March, 2013. Columbus, OH.

Czocher, J. A. Examining the relationship between contextual mathematics instruction and performance of engineering students. The Second Annual Education and Human Ecology Student Research Forum. November 2011. Columbus, OH.

* Indicates doctoral student co-author.

Czocher, J. A. Comparing an applications-first approach and an analytic-techniques-first approach to teaching topics in differential equations. Presented at the Engineering Education Innovation Center. October, 2011. Columbus, OH.

. . . . . departmental functions

Czocher, J. A. Why care about basic operations when teaching advanced mathematics? Graduate Student Open House. November 2023.

Czocher, J. A. Research program overview: 2013 - 2018. Texas State University Mathematics Education Seminar. September 2018.

Czocher, J. A. What Are Some Benefits of Teaching Differential Equations with a Mathematical Modeling Approach? Graduate Student Open House. November 2017.

Czocher, J. A. Why (other) mathematicians disagree with your definition of *proof*. Texas State University Mathematics Education Seminar. January 2018.

Czocher, J. A. Making sense of student-generated conditions and assumptions helps to articulate an old pedagogical problem in a new way. Texas State University Mathematics Education Seminar. April 2016.

Czocher, J. A. The top 13 most important things to know about orchestrating an academic job search. Texas State University Mathematics Education Seminar. September, 2015.

Czocher, J. A. What is a beautiful proof? Presented at Texas State University Graduate Student Open House, Mathematics. October, 2014.

Czocher, J. A. Modeling mathematical modeling. Texas State University Graduate Student Open House, Mathematics. November, 2013.

Czocher, J. A. Making sense of students' mathematical modeling activity. Texas State University Mathematics Education Seminar. November, 2013

TEACHING EXPERIENCE

Courses Taught

. . . . . graduate level

Current Research in Mathematics Education (doctoral level)

Teaching and Learning of Post-Secondary Students (doctoral level)

Research in Undergraduate Mathematics Education (doctoral level)

Advanced Qualitative Research (doctoral level)

Intro to Quantitative Research (doctoral level)

Teaching Techniques and Assessment (doctoral level)

Graduate Teaching Associate Seminar (masters & doctoral level)

Methods in teaching STEM, secondary mathematics II (geometry methods, masters level)

Assessment of STEM learning, secondary mathematics and science (masters level)

. . . . . undergraduate level

Ordinary and partial differential equations (for science and engineering)

Calculus and analytic geometry I, II, III (regular, business, life sciences, civil engineering)

College algebra

* Indicates doctoral student co-author.

Algebra and trigonometry and their applications (pre calculus)

Number and operation for elementary teachers

Informal geometry for elementary teachers

Elementary statistics

Modern geometry

History of mathematics

. . . . . K-12 level

Sessions on mathematical modeling and mathematics in music at the Mathematics Summer Institute for Promoting STEM Education among Children from Urban Communities (middle grades)

Sessions at the Young Scholars Program at The Ohio State University (problem solving, high school)

Doctoral Student Supervision

. . . . . dissertation committee chair for

Sindura Subanemy Kularajen (nee Kandasamy), Texas State University (2023)

Elizabeth Roan, Texas State University (in progress)

Haley King (pre-proposal)

. . . . . dissertation committee member for

Michael Hicks, Texas State University (2021)

Enes Akbuga, Texas State University (2018)

Emily Kuper, Arizona State University (2018)

Dan Cheshire, Texas State University (2017)

. . . . . graduate research assistantships for

Student	Years	Student	Years
Andrew Baas	2022 - present	Enes Akbuga	2017
Abigail Quansah	2022 – present	Josh Fagan	2016
Micah Swartz	2021	Pari Fariborz	2015
Carlos Acevdeo	2021	Ree Linker	2015
Elizabeth Roan	2019 – 2023	Frankie Hruzek	2014
Suby Kularajan	2017 – 2023		

Tenure Track Mentress

Cody Patterson (Tenure Track Faculty, TXST)

Teaching Mentress

. . . . . lecturers

Tammy Burch

* Indicates doctoral student co-author.

. . . . . doctoral students

Xiaowen Cui

Elizabeth Hewer

Elizabeth Lampert

Elizabeth Roan

Suby Kularajan

HL-SAMP Mentress

Rhiannon Moss

WORKSHOPS & PROFESSIONAL DEVELOPMENT

Organization & Presentations

Master Class in Teaching Math Modeling for Life Sciences. Professional Development for university faculty at Harvard University Summer School, Cambridge, MA. July, 2023. Co-Organizers : Alan Garfinkel and Eric Deeds (UCLA), Brendan Kelly, Hannah Constantin, Erica Dinkins, and Guigo Corominas (Harvard),

La Modelización matemática: prestar atención a la estructura (*Mathematical modeling with special attention to structures*). Workshop for Secondary Mathematics Teachers (Spanish version at Universidad Pedagógica Nacional Francisco Morazán, Honduras; English version at Fresno Pacific University).

Invited Panelist

Third National Conference on Doctoral Programs in Mathematics Education. NSF-sponsored. University of Nevada – Las Vegas, October, 2023.

Status of Upper Division Physics Curriculum Workshop. NSF-sponsored. Oregon State University. June 2014.

Attendee

. . . . . national

Transforming Instruction in Undergraduate Mathematics via Primary Historical Sources (TRIUMPHS). NSF-Sponsored professional development. University of Colorado Denver. September 2018.

MPWR group at RUME, San Diego, February 2017, 2018

MAA special session on teaching statistics using project-based and inquiry methods. Professional development. San Antonio, 2015.

. . . . . local & regional

Getting Your Graduate Students to the Finish Line. Professional Development. Texas State University. February 2023.

In Limbo: Dilemmas faced by undocumented and DACAmented students. Professional Development. Texas State University. May 2017.

Guide on the Side: Mentoring graduate students. Professional Development. Texas State University. March 2017.

* Indicates doctoral student co-author.

RUME with a View. University of Oklahoma. Workshop. October 2016.

Allies Training. Texas State University. Professional Development. June 2016.

SERVICE

Service to the Profession

. . . . . organizational leadership

Secretary, The International Community of Teachers of Mathematical Modelling and Applications (ICTMA) (elected, 2022 - 2025)

Program Committee, Conference for SIGMAA on RUME (appointed, 2023 – present)

Nominating Committee, SIGMAA on RUME (chair, 2023-2024)

. . . . . editorial board membership

Journal of Mathematical Behavior (2020 – present)

Mathematical Teaching and Learning (2024 – present)

. . . . . journal referee

For the Learning of Mathematics (2021 – present)

Mathematics Teacher (2019 – present)

Journal for Research in Mathematics Education (2015 – present)

Journal of Mathematical Behavior (2017 – present)

Mathematical Thinking and Learning (2015 – present)

International Journal of Mathematics Education in Science and Technology (2013 – present)

EURASIA Journal of Mathematics, Science and Technology Education (2017 – present)

PRIMUS (2017 – present)

Statistics Education Research Journal (2017 – present)

School Science and Mathematics (2016 – 2020)

International Journal of Research in Undergraduate Mathematics Education (2016 – present)

ZDM (2019 – 2020)

International Journal of STEM Education (2020 – present)

Mathematics Teaching: Learning & Teaching PK-12 (2019 – present)

. . . . . conference reviewer

Psychology for Mathematics Education, North American Chapter (PME-NA) (2010 – present in English; 2016 – present in Spanish)

Conference for Research in Undergraduate Mathematics Education (RUME) (2011 – present)

International Community of Teachers of Mathematical Modelling and Applications (ICTMA) (publications arising from 2019, 2022)

International Group for the Psychology of Mathematics Education (PME) (2014, 2020)

International Congress on Mathematics Education (ICME) (publications arising from 2012, 2016, 2020)

International Association for Statistical Education (IASE) (2015)

* Indicates doctoral student co-author.

Congress on European Research in Mathematics Education (CERME) (2014)

. . . . . funding agencies

Panel Reviewer, National Science Foundation, EHR (now STEM Ed) Directorate

Panel Reviewer, National Science Foundation, America's Seed Fund SBIR/STTR

University of Leuven Research Council, Belgium

. . . . . textbook reviews and consultancies

W. H. Freeman Publishing Company. Sowder, et al. *Reconceptualizing Mathematics* (2015)

McGraw Hill. *SmartBook learning platform,* for Navidi & Monk and Bluman statistics books. (2016)

McGraw Hill. ALEKS learning platform. (2018)

Wiley, E-Learning platform for statistics books

MacMillan, statistics and elementary pre-service teachers textbooks

Sapling Learning, statistics textbooks (2014 – 2015)

zyBooks, statistics materials (2017 – 2019)

Member of ETS exam review committee for TExES generalist (EC-6) mathematics section items (2014)

. . . . . conference organization and participation

Lunch table discussion leader at 38th meeting of the Psychology of Mathematics Education, North American Chapter, 2017, Indianapolis, IN.

Lunch table discussion leader at 37th meeting of the Psychology of Mathematics Education, North American Chapter, 2016, Tucson, AZ.

Session chair at 38th meeting of International Group for Psychology of Mathematics Education, Vancouver, CA, 2014

Mathematics special session planner. 19th International Conference on Engineering Education, 2013, Marrakech, Morocco.

Member of the conference organizing team, 62nd annual meeting of the Ohio Council of Teachers of Mathematics, 2012, Columbus, OH.

Session presider, 34th meeting of the Psychology of Mathematics Education, North American Chapter, 2012 Kalamazoo, MI.

Member of the conference greeting committee, 33rd meeting of the Psychology of Mathematics Education, North American Chapter, 2011, Reno, NV.

Member of the conference program committee, 32nd meeting of the Psychology of Mathematics Education, North American Chapter, 2010, Columbus, OH

Service at Texas State University

. . . . . to the University

Institutional Review Board (member, 2019 – 2021)

. . . . . to the College of Science and Engineering

CoSE Post Doctoral Mentorship Committee (member, 2023 – present)

. . . . . to the Department of Mathematics

* Indicates doctoral student co-author.

Strategic Planning Committee (2022 – 2023)
Budget Committee (2022 – present)
Scheduling Oversight Committee (2022 – present)
Strategic Planning Committee (2022 – 2023)
Graduate Committee (2020 – present)
Awards Committee (member 2015 – 2016, chair 2016 - 2020)
Colloquium Committee (member, 2014 - 2018)
Student Affairs Committee (member, 2013 – 2015)
Textbook selection committee, Math 2311/2312 (member, 2015)

. . . . . volunteer for

Commencement attendance (2014 – present)
Graduate Student Expo (2013 – present)
Recruitment at professional meetings for graduate students and tenure track faculty (2013 - present)
Bobcat Days (2013 – 2015)
Math Club tailgate (2013)

Service in the Community

Pop Wuj, Xela, Guatemala (2015)
Proyecto estufa segura (installing safe indoor stoves in rural Guatemala)
Proyecto guardaria (after school tutoring in mathematics and english in rural Guatemala)

COMPUTING SKILLS

MaxQDA, SPSS, Geometer's Sketchpad, GeoGebra, LaTeX, Mathematica, MATLAB

LANGUAGES

Signed Exact English, native comprehension, composition
Spanish, advanced speaking, comprehension, composition
French, intermediate composition
German, beginning reading

AFFILIATIONS

International Consortium of Teachers of Modeling and Applications (ICTMA)
Special Interest Group of the Mathematical Association of America (SIGMAA on RUME)
International Group for the Psychology of Mathematics Education (PME)
International Group for the Psychology of Mathematics Education, North American Chapter (PME-NA)
Mathematics Education Research Group of Australasia (MERGA)

* Indicates doctoral student co-author.

National Council of Teachers of Mathematics (NCTM)

* Indicates doctoral student co-author.