

# Avery Harrison Closser, Ph.D.

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## EDUCATION

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- May 2022    **Ph.D. Learning Sciences & Technologies**  
*Worcester Polytechnic Institute (WPI)*  
Dissertation Chair: Erin Ottmar  
Dissertation: “*The Effects of Perceptual and Embodied Features on Student Learning and Performance in Online Platforms*”
- May 2019    **M.S. Learning Sciences & Technologies**  
*Worcester Polytechnic Institute*  
Advisors: Erin Ottmar & Ivon Arroyo
- May 2015    **B.A. Honor in Psychology**  
*University of Richmond (UR)*  
Institution Honors: *cum laude*  
Advisor: Beth Crawford

## CURRENT POSITION

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- 2022-Present    **Postdoctoral Research Associate, Human Development and Family Science**  
Purdue University, Indiana

## GRANTS & FELLOWSHIPS

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*Note: Maiden name is Harrison*

- 2023-2025    **Closser, A. (PI)**, Purpura, D. Institute of Education Sciences: *Now I See It: Supporting Flexible Problem Solving in Mathematics through Perceptual Scaffolding in ASSISTments* (\$400,000).
- 2023-2026    Ottmar, E., Hornburg, C., **Closser, A. (co-PI)**, & Lee, J. NSF EDU Core Research: *Examining the Effects of Perceptual Cues on Middle School Students’ Online Mathematical Reasoning and Learning* (#2300764; \$667,617).
- 2023-2024    Open Education Research Fellowship from the Open Education Group (25% acceptance rate)
- 2019-2022    NSF Graduate Research Fellowship (#1645629; \$138,000)
- 2021-2022    Psi Chi (Intl. Honor Society in Psychology) Graduate Research Grant (\$1,250)
- 2021-2022    **Closser, A. H.**, Perez, L., & Ottmar, E. *WIN Women’s Young Investigators Fellowship: Providing WPI Students and Faculty with Mentorship and Research Conference Opportunities*. WPI Women’s Impact Network (\$23,500).
- 2020-2021    **Harrison, A.**, Perez, L., & Ottmar, E. *WIN Women’s Young Investigators Fellowship: Providing WPI Students and Faculty with Mentorship and Research Conference Opportunities*. WPI Women’s Impact Network (\$23,000).

- 2019-2020 **Harrison, A.**, Hulse, T., Sawrey, K., Ottmar, E., & Mitchell, M. *WIN Women's Young Investigators Fellowship: Providing WPI Students and Faculty with Mentorship and Research Conference Opportunities*. WPI Women's Impact Network (\$23,000).
- 2018-2019 Ottmar, E., Douglas, E., **Harrison, A.**, Hulse, T., & Daigle, M. *WIN Women's Young Investigators Fellowship: Providing WPI Students and Faculty with Mentorship and Research Conference Opportunities*. WPI Women's Impact Network (\$28,000).
- 2017-2018 Marietta Anderson Graduate Fellowship (WPI; Tuition & \$31,200)
- 2017-2018 Women's Research and Mentoring Program Fellowship (WPI; \$1,000)
- 2014 Spider Research Fellowship; full-time summer research (\$4,000)
- 2013 Arts & Sciences Summer Research Fellowship; full-time research (\$4,000)

## **PUBLICATIONS**

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### **Journal Articles**

- Chan, J. Y.-C., Nagashima, T., & **Closser, A. H.** (2023). Participatory design for cognitive science: Examples from the Learning Sciences and Human-Computer Interaction. *Cognitive Science*, 47(10), 1-8. <https://doi.org/10.1111/cogs.13365>
- Closser, A. H.**, Chan, J. Y.-C., & Ottmar, E. R. (2023). Resisting the urge to calculate: The relation between inhibition skills and perceptual cues in arithmetic performance. *Quarterly Journal of Experimental Psychology*. <https://doi.org/10.1177/17470218231156125>
- Ngo, V., Perez, L., **Closser, A. H.**, & Ottmar, E. (2023). The effects of operand position and superfluous brackets on student performance in math problem-solving. *Journal of Numerical Cognition*, 9(1), 107-128. <https://doi.org/10.5964/jnc.9535>
- Chan, J. Y.-C., **Closser, A. H.**, Ngo, V., Smith, H., Liu, A., & Ottmar, E. (2023). Examining shifts in conceptual knowledge, procedural knowledge, and mathematical flexibility in the context of two game-based technologies. *Journal of Computer Assisted Learning*, 39(4), 1274-1289. <https://doi.org/10.1111/jcal.12798>
- Chan J. Y. C., Ottmar, E. R., Smith, H., & **Closser, A. H.** (2022). Variables versus numbers: Effects of symbols and mathematical knowledge on students' problem-solving strategies. *Contemporary Educational Psychology*, 71, 102114. <https://doi.org/10.1016/j.cedpsych.2022.102114>
- Closser, A. H.**, Erickson, J. A., Smith, H., Varatharaj, A., & Botelho, A. F. (2022). Blending Learning Analytics and Embodied Design to Model Students' Comprehension of Measurement Using Their Actions, Speech, and Gestures. *International Journal of Child-Computer Interaction (IJCCI) Special Issue on Learning Analytics of Embodied Design: Enhancing Synergy*, 32, 100391. <https://doi.org/10.1016/j.ijcci.2021.100391>
- Arroyo, I., **Closser, A. H.**, Castro, F., Smith, H., Ottmar, E., & Micciolo, M. (2022). The Wearable Learning Platform: A computational thinking tool supporting game design and active play. *Technology, Knowledge, and Learning*. <https://doi.org/10.1007/s10758-022-09601-1>
- Smith, H., **Closser, A. H.**, Ottmar, E. R., & Chan, J. Y. C. (2022). The impact of algebra worked example presentations on student learning. *Applied Cognitive Psychology*, 36(2), 363-377. <https://doi.org/10.1002/acp.3925>

- Smith, H., **Closser, A. H.**, Ottmar, E. & Arroyo, I. (2020). Developing math knowledge and computational thinking through game play and design: A professional development program. *Contemporary Issues in Technology and Teacher Education*, 20(4).
- Harrison, A.**, Smith, H., Hulse, T., & Ottmar, E. (2020). Spacing out!: Manipulating spatial features in mathematical expressions affects performance. *Journal of Numerical Cognition*, 6(2), 186-203. <https://doi.org/10.5964/jnc.v6i2.243>
- Hulse, T., Daigle, M., Manzo, D., Braith, L., **Harrison, A.**, & Ottmar, E. (2019). *From Here to There! Elementary: A game-based approach to developing number sense and early algebraic understanding. Educational Technology Research and Development*, 67(2), 423-441. <https://doi.org/10.1007/s11423-019-09653-8>
- McCarthy, V., **Harrison, A.**, & McCarthy, F. (2014). Sustainable organizations and leadership development: Developing self-efficacy and a growth mindset in employees. *Journal of Academy for Advancement of Business Research*, 3, 55-59.

### **Book Chapters and Outreach**

- Chan, J. Y. C., **Closser, A. H.**, Drzewiecki, K. C., Lee, J. E., Smith, H., & Ottmar, E. (2023). Grasping patterns of algebraic understanding: Dynamic technology facilitates learning, research, and teaching in mathematics education. In K. M. Robinson, D. Kotsopoulos, & A. Dubé (Eds), *Mathematical Teaching and Learning: Perspectives on Mathematical Minds in the Elementary and Middle School Years*.
- Closser, A. H.**, Chan, J. Y.-C., Smith, H., & Ottmar, E. R. (2022). Perceptual learning in math: Implications for educational research, practice, and technology. *Rapid Community Report Series*. Digital Promise and the International Society of the Learning Sciences. <https://repository.isls.org/handle/1/7668>

### **SUBMITTED MANUSCRIPTS**

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- Closser, A. H.**, Sales, A., & Botelho, A. F. (accepted with minor revisions). Should we account for classrooms? Analyzing online experimental data with student-level randomization. Accepted at *Educational Technology Research and Development*.
- St. John, J., Thompson, T., **Closser, A. H.**, Lee, J. & Ottmar, E. (in revision). The vibrant side of math: The perceptual effects of color on mathematical accuracy.
- Closser, A. H.**, Ottmar, E., & Purpura, D. J. (under review). From sight to insight: Perceptual cues in mathematics offer new directions for interdisciplinary research.
- Closser, A. H.**, Botelho, A. F., & Chan, J. Y.-C. (under review). Called to order: Arithmetic problem features and order impact undergraduates' performance.
- Botelho, A. F., Gorgun, G., **Closser, A. H.**, & Baral, S. (under review). Characterizing mathematical conceptions through common wrong explanations.

### **MANUSCRIPTS IN PREPARATION**

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- Closser, A. H.**, O'Rear, C., Botelho, A. B., & Purpura, D. J. Now I see it: The effects of perceptual scaffolding on elementary students' mathematics performance. Registered report in prep.

- Castro, F., **Closser, A. H.**, Smith, G., Smith, H., Rasul, I., Arroyo, I., & Perez, L. Defining a computational thinking framework within the WearableLearning platform and curriculum.
- Smith, H., Ngo, V., Sales, A., **Closser, A. H.**, Chan, J. Y.-C., & Ottmar, E. R. To wait or not to wait: Adding to the debate on immediate vs. delayed feedback.
- Closser, A. H.**, Westerberg, L., Geer, E., Duncan, R., Schmitt, S., & Purpura, D. J. How do spatial skills take shape? Examining preschoolers' performance on 2D and 3D assembly tasks.
- Westerberg, L. E., Ehrman, P., Herrera, F., Varnell, S., King, Y. A., **Closser, A. H.**, Clark, E., Carkoglu, C., McElveen, T. L., Ellis, A., Cosso, J., Beltrán-Grimm, S., & Purpura, D. J. Beyond quantity and number symbols: Spontaneous focusing on early mathematical domains.
- Bye, J. K., Chan, J. Y.-C., **Closser, A. H.**, Lee, J.-E., Shaw, S. T., Ottmar, E. Perceiving precedence: Order of operations errors are predicted by perception of equivalence expressions.

## CONFERENCE PAPER PROCEEDINGS

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\*Denotes undergraduate mentee

- Closser, A. H.**, Smith, H., Ottmar, E. & Chan, J. Y.-C. (June, 2023). Designing worked examples for dynamic learning technologies: The effects of action and self-explanation [Poster paper]. To be included in the proceedings for the 2023 Annual Meeting of the International Society of the Learning Sciences (ISLS).
- Closser, A. H.**, Smith, H., Chan, J. Y.-C. (November, 2022). Students' impressions of equation-solving worked examples in an online environment [Brief Research Report]. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the Forty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 1973-1977. Middle Tennessee State University. <https://doi.org/10.51272/pmena.44.2022>
- Closser, A. H.**, Chan, J. Y.-C., Smith, H., Ottmar, E. (November, 2022). College students' input on the design of worked examples for online environments [Empirical Research Report]. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the Forty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 1598-1606. Middle Tennessee State University. <https://doi.org/10.51272/pmena.44.2022>
- Smith, H., Perez, L., & **Closser, A. H.** (November, 2022). Exploring successful measurement estimation strategies among novice and advanced learners [Poster paper]. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the Forty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 628-629. Middle Tennessee State University.
- Chan, J. Y. C., Smith, H., **Closser, A. H.**, Drzewiecki, K. C., & Ottmar, E. (2021). Number vs. variable: The effect of symbols on students' math problem solving. In T. Fitch, C. Lamm, H. Leder, K. Teßmar-Raible (Eds), *Proceedings of the Forty-Third Annual Meeting of the Cognitive Science Society*, pp. 2836-2842. Vienna, Austria: University of Vienna.

<https://cognitivesciencesociety.org/wp-content/uploads/2021/07/CogSci2021-Final-Proceedings.pdf>

- Closser, A. H.,** Smith, H., Chan, J., Trac, C. \*, & Ottmar, E. (June, 2021). Worked examples: Do learning and perceived helpfulness align? In de Vries, E., Hod, Y., & Ahn J. (Eds.), *Proceedings of the 15th International Conference of the Learning Sciences - ICLS 2021*, pp. 879-880. Bochum, Germany: International Society of the Learning Sciences.
- Harrison, A.,** Razzaq, R., Ottmar, E., & Arroyo, I. (2020). *Gestures in geometry: How do gestures contribute to engagement and vocabulary acquisition through game play?* In A.I. Sacristán, J.C. Cortés-Zavala & P.M. Ruiz-Arias, (Eds.), *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Mexico* (pp. 733-734). Cinvestav /AMIUTEM / PME-NA. <https://doi.org/10.51272/pmena.42.2020-109>
- Smith, H., **Harrison, A.,** Chan, J. Y. C., & Ottmar, E. (2020). *The Effects of Worked Example Formats on Student Learning of Algebra*. In A.I. Sacristán, J.C. Cortés-Zavala & P.M. Ruiz-Arias, (Eds.), *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education, Mexico* (pp. 1458-1459). Cinvestav /AMIUTEM / PME-NA. <https://doi.org/10.51272/pmena.42.2020-233>
- Smith, H. & **Harrison, A.** (2020). *Working it out: How does the format of worked examples influence learning?* Poster paper in *Proceedings of the LSGS Conference 2020: Finding Your Place in the Learning Sciences Community*, pp. 68-69.
- Harrison, A.,** Smith, H., Botelho, A., Ottmar, E., & Arroyo, I. (June, 2020). *For good measure: Identifying student measurement estimation strategies through actions, language, and gesture*. In the International Conference of the Learning Sciences (ICLS) 2020 Proceedings, pp. 869-870. (Poster)
- Harrison, A.,** Wixon, N., Botelho, A., & Arroyo, I. (July, 2018). *Sensor-free predictive models of affect in an online learning environment*. Proceedings of the 11<sup>th</sup> International Conference on Educational Data Mining. Buffalo, New York. pp. 634-637. (Poster)
- Hulse, T., **Harrison, A.,** Ostrow, K., Botelho, A., & Heffernan, N. (July, 2018). *Starters and finishers: Predicting next assignment completion from student behavior during math problem solving*. In *Proceedings of the 11<sup>th</sup> International Conference on Educational Data Mining*. Buffalo, New York. pp. 525-528. (Poster)
- Harrison, A.,** Hulse, T., Manzo, D., Micciolo, M., Ottmar, E., & Arroyo, I. (June, 2018). *Computational thinking through game creation in STEM classrooms*. Proceedings (Part II) of the 19<sup>th</sup> International Conference on Artificial Intelligence in Education. London, U.K. pp. 134-138. (Poster)
- Micciolo, M., Arroyo, I., **Harrison, A.,** & Hulse, T. (June, 2018). *The wearable learning cloud platform for the creation of embodied multiplayer math games*. Proceedings (Part II) of the 19<sup>th</sup> International Conference on Artificial Intelligence in Education. London, U.K. pp. 220-224. (Poster)

## CONFERENCE SYMPOSIA, WORKSHOPS, & WORKING GROUPS

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- Closser, A. H.** (September, 2023). Conducting At-scale Research in ASSISTments: A Digital Learning Platform. In Roschelle, J. (Organizer), *Early Reflections on Conducting Research in Digital Learning Platforms for Equity and Effectiveness* [Symposium]. Society for Research on Educational Effectiveness (SREE) 2023 Conference, Arlington, VA.
- Beltrán-Grimm, S., **Closser, A. H.**, Purpura, D. J. (June, 2023). Parental math anxiety and reading habits: A comparison of math and non-math books and e-books. In Y. Zhang (Chair), *Parent language input, math attitudes, and family contexts in children's math learning* [Symposium]. The 2023 Mathematical Cognition and Learning Society Conference. Loughborough, UK.
- Bye, J. K., Chan, J. Y.-C., **Closser, A. H.**, Lee, J.-E., Shaw, S. T., & Ottmar, E. (June, 2023). Perceiving precedence: Adherence to order of operations is predicted by students' perception of equivalent expressions. In Medrano, J. (Chair), *The role of perception in arithmetic cognition* [Symposium]. The 2023 Meeting of the Mathematical Cognition and Learning Society, Loughborough, UK.
- Nathan, M. J., Walkington, C., **Closser, A. H.**, Ottmar, E., Alibali, M. W., & Smith, H. (November, 2022). Embodied Mathematical Imagination and Cognition (EMIC) Research Colloquium. In Lischka, A. E., Dyer, E. B., Jones, R. S., Lovett, J. N., Strayer, J., & Drown, S. (Eds.), *Proceedings of the Forty-Fourth Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, pp. 2170-2172. Middle Tennessee State University. <https://doi.org/10.51272/pmna.44.2022>
- Closser, A. H.**, Chan, J. Y. C., & Ottmar, E. R. (May, 2022). Resisting the urge to calculate: The relation between inhibition skills and perceptual cues in arithmetic performance. In Gordon, R. (Chair), *The Dynamic Relations Between the Presentation of Math Problems, Individual Cognitive Factors, and Problem-Solving Strategies*. Symposium presented at the Mathematical Cognition and Learning Society 2021 Online Conference.
- Nathan, M. J., Soto, H., **Closser, A. H.**, Ottmar, E., Abrahamson, D., & Walkoe, J. (2021). Embodied Mathematical Imagination and Cognition (EMIC) Working Group. In Olanoff, D., Johnson, K., & Spitzer, S. M. (Eds), *Proceedings of the forty-third annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Philadelphia, PA. (pp. 1935-1937). Cinvestav /AMIUTEM / PME-NA. <https://doi.org/10.51272/pmna.42.2020-12>
- Closser, A. H.**, Lotero, E.\*, & Botelho, A. F. (2021, June). Following up: Accounting for Classroom IDs in Student-Level RCTs. In *The 2021 International Conference on Educational Data Mining Workshop on Causal Inference*, Paris, France. (Virtually) [link]
- Nathan, M. J., **Harrison, A.**, Smith, H., Ottmar, E., Abrahamson, D., & Williams-Pierce, C. (2020). Embodied Mathematical Imagination and Cognition (EMIC) Working Group. In A.I. Sacristán, J.C. Cortés-Zavala & P.M. Ruiz-Arias, (Eds.), *Mathematics Education Across Cultures: Proceedings of the 42nd Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. Mexico (pp. 166-168). Cinvestav /AMIUTEM / PME-NA. <https://doi.org/10.51272/pmna.42.2020-12>

- Harrison, A. (Moderator)**, Smith, H., & Tsarava, K. (November, 2020). *Defining, Measuring, and Teaching Computational Thinking*. Panel session presented at the virtual Learning Sciences Graduate Student Conference (proceedings pp. 121-122).
- Harrison, A.**, Erickson, J., Ottmar, E. R., & Heffernan, N. T. (July, 2020). Causal inference in online tutoring systems: Identifying appropriate analyses for randomized controlled trials. In *The Thirteenth International Conference on Educational Data Mining Workshop on Causal Inference in EDM*, Virtual Workshop.
- Ottmar, E., **Harrison, A.**, Walkington, C., Abrahamson, D., Nathan, M. J., & Smith, C. (2019). Embodied Mathematical Imagination and Cognition (EMIC) Working Group. In S. Otten, Z. de Araujo, A. Candela, & C. Munter (Eds.), *“Against a new horizon”—Proceedings of the 41st Annual Conference of the North-American Chapter of the International Group for the Psychology of Mathematics Education* (pp. 1913–1923). St. Louis, MO: University of Missouri.
- Harrison, A.** (July, 2018). *Utilizing movement and action for mathematics learning in an online algebra game*. Doctoral Consortium presented at the 11<sup>th</sup> International Conference on Educational Data Mining. Buffalo, New York.
- Harrison, A. (Chair)**, Ottmar, E., Arroyo, I., Rosenbaum, R., Bakker, A., Abrahamson, D., Hulse, T., Manzo, D., & Landy, D. (April, 2018). *Embodiment and Action in Mathematics Games*. Symposium held at the American Psychological Association conference on Technology, Mind and Society in Washington, D.C.

## **CONFERENCE PAPER & POSTER PRESENTATIONS**

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\*Denotes undergraduate mentee; ^ Denotes high school student mentee.

- Closser, A. H.**, Westerberg, L., Geer, E., Duncan, R., Schmitt, S., & Purpura, D. (March, 2023). *How do spatial skills take shape? Examining preschoolers’ performance on 2D and 3D assembly tasks*. Poster presented at the 2023 Society for Research in Child Development (SRCD) Biennial Meeting, Salt Lake City, Utah.
- Smith, H. S., Ngo, V., Sales, A., **Closser, A. H.**, Chan, J. Y. C., & Ottmar, E. (June, 2022). *To wait or not to wait: Adding to the debate on immediate versus delayed feedback* [Poster paper]. Presented at the 16th International Conference of the Learning Sciences - ICLS 2022. Hiroshima, Japan: International Society of the Learning Sciences.
- Chan, J. Y. C., **Closser, A. H.**, Ngo, V., Smith, H., & Ottmar, E. (April, 2022). *From performance to perception: A laboratory-based task to detect changes in students’ perception of math equivalence in technology interventions* [Roundtable Session]. Presented at the 2022 Annual Meeting of the American Educational Research Association (AERA), San Diego, CA. doi: 10.3102/IP.22.1882721
- Bye, J., Lee, J. E., Chan, J. Y. C., **Closser, A. H.**, Shaw, S., & Ottmar, E. (April, 2022). *Perceiving precedence: Order of operations errors are predicted by perception of equivalent expressions* [Poster]. Presented at the 2022 Annual Meeting of the American Educational Research Association (AERA), San Diego, CA.
- Closser, A. H.**, Smith, H., Chan, J. Y. C., & Ottmar, E. R. (March, 2022). Adding embodiment to worked examples: Exploring the value of student action and self-explanation. Lightning talk presented at the Mathematical Cognition and Learning Society 2021 Online Conference.

- Closser, A. H.**, & Shaw, S. (February, 2021). *Promoting open science, open access, and replication through instructional materials*. Session presented for the Center for Open Science's 2022 Unconference on Open Scholarship Practices in Education Research Online Conference.
- Ngo, V., Perez, L., **Closser, A. H.**, & Ottmar, E. (January, 2022). *The effects of operand position and superfluous brackets on student performance in math-problem solving*. Lightning talk presented at the Mathematical Cognition and Learning Society 2021 Online Conference.
- Ngo, V., Perez, L., **Closser, A. H.**, & Ottmar, E. (October, 2021). *The effects of operand position and superfluous brackets on student performance in math-problem solving*. Poster presented at the 43rd Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (PME-NA 43).
- Botelho, A., Chan, J. Y. C., Trac, C.\*, **Closser, A. H.**, Smith, H., Drzewiecki, K. C., & Ottmar, E. (July, 2021). *State vs. Trait: Examining gaming the system in the context of math perception task*. Poster presented at the Annual Meeting of the Cognitive Science Society.
- Chan, J. Y. C., Ottmar, E., Smith, H., **Harrison, A.**, Drzewiecki, K. (April, 2021). *Effects of numbers vs. variables on students' expression transformation processes and strategies*. Lightning talk presented at the Biennial Meeting of the Society for Research in Child Development. Minneapolis, MN.
- Closser, A. H.**, Smith, H., Chan, J. Y. C., Trac, C.\*, & Ottmar, E. R. (April, 2021). *The effect of worked example presentation on student learning* [Paper session]. Paper presented virtually at the 2021 Annual Meeting of the American Educational Research Association, Orlando, Florida.
- Arroyo, I., Castro, F., Smith, H., **Closser, A. H.**, & Ottmar, E. R. (April, 2021). *Augmenting embodied mathematics classrooms with mobile tutors* [Roundtable Session]. Presented at the 2021 Annual Meeting of the American Educational Research Association, Orlando, Florida.
- Arroyo, I., Smith, H., **Closser, A. H.**, & Ottmar, E. R. (April, 2021). *Mobile tutors augment the embodied mathematics classroom* [Poster session]. Presented at the 2021 Annual Meeting of the American Educational Research Association, Orlando, Florida.
- Harrison, A.**, Smith, H., Ottmar, E., Arroyo, I. (June, 2020). *The language of gestures: Developing a novel coding guide*. Poster accepted for presentation at the 2020 Mathematical Cognition and Learning Society Conference. Dublin, Ireland. (Conference Canceled)
- Smith, H., **Harrison, A.**, Chan, J.Y.C., Ottmar, E. (June, 2020). *Dynamic vs. static: Which worked examples work best?* Poster accepted for presentation at the 2020 Mathematical Cognition and Learning Society Conference. Dublin, Ireland. (Conference Canceled)
- Harrison, A.**, Smith, H., Hulse, T. & Ottmar, E. R. (2020, April 17 - 21). *Spacing Out! Manipulating spatial features in math expressions affects performance* [Roundtable Session]. AERA Annual Meeting San Francisco, CA. <http://tinyurl.com/tqotv47> (Conference Canceled)
- Smith, H., **Harrison, A.**, Ottmar, E., & Arroyo, I. (2019). *Supporting technology-augmented game creation and play through a teacher professional development program*. Paper presented at the 2019 annual meeting of the Northeastern Educational Research Association. Trumbull, Connecticut.



- Valente, R.\*, **Harrison, A.**, Ottmar, E., & Arroyo, I. (October, 2019). *Using action and movement to develop students' understanding of measurement in a technology-augmented game*. Poster presented at the 2019 annual meeting of the Northeastern Educational Research Association. Trumbull, Connecticut.
- Hulse, T., **Harrison, A.**, Manzo, D., & Ottmar, E. (September, 2019). *Developing measures of mathematical proficiency in a learning technology*. Research report presented at the Annual Research Meeting of the National Council of Teachers of Mathematics (NCTM).
- Smith, H., **Harrison, A.**, Ottmar, E., & Arroyo, I. (June, 2019). *Quantity and quality of gestures are related to performance on an embodied geometric estimation task*. Poster presented at the 2019 meeting of the Mathematical Cognition and Learning Society in Ottawa, Canada.
- Hulse, T., **Harrison, A.**, Arroyo, I., & Ottmar, E. (November, 2018). *Developing methods to implement embodied game design for mobile learning technologies in STEM classrooms*. Poster presented at the 2018 conference of the North American Chapter of the Psychology of Mathematics Education. Greenville, South Carolina.
- Djotas, A., **Harrison, A.**, & Hulse, T. (November, 2018). *Implicit biases: Who associates men with science?* Poster presented at the 58<sup>th</sup> Annual Meeting of the New England Psychological Association. Worcester, Massachusetts.
- Harrison, A.**, Hulse, T., Manzo, D., Micciolo, M., Ottmar, E., & Arroyo, I. (June, 2018). *Computational thinking via game design*. Presented at the "Gamification of Intelligent Educational Systems" workshop at the 19<sup>th</sup> International Conference on Artificial Intelligence in Education. London, U.K.
- McCarthy, V., **Harrison, A.**, & McCarthy, F. (April, 2014). Sustainable organizations and leadership development: Developing self-efficacy and a growth mindset in employees. Paper presented at the 2014 *Institute of Strategic and International Studies Conference*. Paris, France.
- Harrison, A.**, Matta, K., Canning, L., Crawford, B., & Landy, D. (January, 2014). *Adaptation to technologically altered auditory input*. Poster presented at the 26th annual Association for Psychological Science Conference. San Francisco, California.
- Hempfling, J., **Harrison, A.**, & Knouse, L. (January, 2013). *Can deficits in executive functioning predict risky drinking behavior in undergraduate students?* Poster presented at the 25<sup>th</sup> annual Association for Psychological Science conference. Washington, D.C.

## UNIVERSITY PRESENTATIONS

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- Shripal, A.\*, Ha, B.\*, Panzade, A.\*, **Closser, A. H.**, Purpura, D. (2023). Child Automated Speech-to-Text Transcription (CAST): HMMs for Speech Recognition. Research Talk presented at Purdue University's undergraduate research conference.
- Ottmar, E., Douglas, E., **Harrison, A.**, Hulse, T., & Daigle, M.\* (April, 2019). *WIN Women's Young Investigator Fellowship: Providing WPI students and faculty with mentorship and research conference opportunities*. Poster presented at the annual "Elevating Women in STEM" event by the Women's Impact Network at Worcester Polytechnic Institute.
- Harrison, A.** (February, 2019). *The language of gestures: Developing a novel coding guide*. Poster presented at the 2019 Graduate Research Innovation Exchange (GRIE) competition at Worcester Polytechnic Institute.

- Ottmar, E., Douglas, E., **Harrison, A.**, Hulse, T., & Daigle, M.\* (April, 2018). *WIN Women's Young Investigator Fellowship: Providing WPI students and faculty with mentorship and research conference opportunities*. Poster presented at the annual "Elevating Women in STEM" event by the Women's Impact Network at Worcester Polytechnic Institute.
- Harrison, A.** (April, 2018). *Hands-on geometry: Exploring fine motor actions during problem solving*. Poster presented at the 2018 Graduate Research Innovation Exchange (GRIE) competition at Worcester Polytechnic Institute.
- Harrison, A.**, Aizpuru, M., Twedt, E., & Crawford, L. (April, 2015). *Shifting perceptions: Exploring with the rubber hand illusion*. Poster presented at the 2015 Arts & Sciences Student Symposium in Richmond, Virginia.
- Harrison, A.**, Soos, A., Twedt, E., & Crawford, L. (April, 2015). *Memory for hand placement using an Xbox Kinect*. Poster presented at the 2015 Arts & Sciences Student Symposium in Richmond, Virginia.
- Harrison, A.**, Crawford, B., & Blair, J. (April, 2013). *Handy hearing: Exploring the use of moveable ears*. Poster presented at the 2013 Arts & Sciences Student Symposium in Richmond, Virginia.

## HONORS & AWARDS

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|-----------|---|
| 2022      | Postdoctoral Supplemental Travel Grant (university; \$600)  |
| 2021      | Finalist: AAC&U K. Patricia Cross Future Leaders Award  |
| 2021      | Scholarship for the Simon Initiative's LearnLab Summer School at Carnegie Mellon University   |
| 2021      | Selected participant in Intl. Society of the Learning Sciences Doctoral Consortium  |
| 2021      | Selected participant in the AERA Division C Graduate Student Seminar  |
| 2021      | Second Place: APA Psych Science in 3 (PS-in-3) Competition (national; \$1,000)  |
| 2021      | Second Place: WPI's 3-Minute Thesis (3MT) Competition (university; \$500)   |
| 2021      | First Place: Graduate Research Innovation Exchange "Business & Social Sciences" Poster Competition; People's Choice Award (university; \$500) |
| 2020      | Finalist: Graduate Research Innovation Exchange Poster Competition (university; \$250)  |
| 2015      | Outstanding Research by an Undergraduate Award (departmental)   |
| 2014      | John Neasmith Dickinson Memorial Research Award (departmental; \$1,000)   |
| 2013-2014 | University of Richmond School of Arts & Sciences Travel Grants (\$2,000)  |

## TEACHING EXPERIENCE

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### Teaching Positions

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|------|--|
| 2021 | <p><b>Adjunct Professor, Worcester Polytechnic Institute</b><br/>         PSY 1800 Special Topics: Learning &amp; Cognition</p> <ul style="list-style-type: none"> <li>I designed and taught an online course on major learning mechanics and their underlying cognitive mechanisms for undergraduate students.</li> </ul> |
| 2020 | <p><b>Graduate Teaching Fellow, Worcester Polytechnic Institute</b><br/>         Great Problem Seminar: Heal the World</p>   |

- I designed and taught units on evidence-based writing for first-year students. I also received mentoring on developing project-based learning (PBL) courses.

- 2016-2017      **English Teacher, *Bilingual English Development and Assessment***,  
Madrid, Spain  
Conversational English (Grades preK-6)
- I instructed 18 classes weekly of preK-6th grade students in conversational English in a semi-private school in Madrid. I also incorporated aspects of English-speaking cultures in lessons to impart a well-rounded English education and instill motivation for learning English as a second language.
- 2015- 2016      **English Teacher, *Mediakids Academy***, Bangkok, Thailand  
Conversational English (Grades 7-12)
- I taught conversational English to 14-18 year-old students in public schools. I developed lesson plans for, instructed 23 hours weekly, and assessed a total of 858 students to improve their English skills.
- 2013-2015      **Undergraduate Teaching Fellow, *University of Richmond***  
Introduction to Psychology
- I co-instructed the weekly, 75-minute laboratory component of the introductory psychology course with another undergraduate. I was also responsible for grading, holding office hours, and revising lesson plans for a total of 6 course sections of 30 students.

### **Guest Lectures**

- 2023      “Single and Multi-Step Problem Solving”, *Teaching Mathematics in Preschool and Primary Grades* undergraduate course, Purdue University.
- 2019-2023      “How People Learn”, *Fundamentals of Scientific Teaching and Pedagogy* course for graduate students and postdoctoral researchers, WPI.
- 2022      “Pathways in Psychology”, *Introduction to Psychology* undergraduate course, Assumption College.
- 2022      “Synergies Between Cognitive Theory and Educational Technologies”, *User Modeling* graduate course, WPI.
- 2020, 2021      “Problem Solving”, *Cognitive Psychology* undergraduate course, WPI.
- 2020      “Developmental Science”, *Introduction to Psychology* undergraduate course, WPI.
- 2020      “Evidence-Based Writing”, *Heal the World* first-year undergraduate course, WPI.

### **Mentoring**

#### Undergraduate Students

- Katherine Allen (2023-Present)  
Elizabeth Clark (2023-Present)  
Lilly-Beth Linnell (2022)

Stephanie Reis (2022)  
Paul Pacheco (2021-2022)  
Cindy Trac (2019-2021)  
Hailey Anderson (2019-2020)  
Luisa Perez (2017-2019)  
Richard Valente (2017-2019)

### High School Students

Jailimar Montanez (2021)  
Amina Djotas (2017-2018)

## **INVITED TALKS**

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2022 Guest speaker: “*Can’t You See: Applying Cognitive Theory in Math Education*” at the Purdue University Cognitive Colloquium.

2021 Guest speaker: “*The Women’s Young Investigator Fellowship*” at the WPI Women’s Impact Network Grant Proposals Information Session.

2021 Workshop leader: “*Writing Workshop*” for the WPI Learning Sciences & Technologies Colloquium Series.

2019, 2020, 2021 Panelist: “*NSF GRFP Boot Camp – Overview and Panel Session*” for undergraduate and graduate students at Worcester Polytechnic Institute

2020 Guest speaker: “*Elevating Women in STEM: Making an Impact On-Campus and Beyond*” for the Women’s Impact Network at WPI.

2020 Panelist: “*Fireside Chat*” by the International Learning Sciences Student Association.

2019 Lightning Talk: “*Watch, Do, Learn*” presented for undergraduates, graduates, and faculty at the Worcester Polytechnic Institute Arts & Sciences Week.

2018 Panelist: “*Interested in Grad School? Panel Discussion with Grad Students*” session at the 58<sup>th</sup> Annual Meeting for the New England Psychological Association.

2015 Panelist: “*Making the Most of a Psychology Major*” workshop, University of Richmond.

## **SERVICE**

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### **Professional Organization Committees**

2023-2025 Mathematical Cognition & Learning Society Trainee Board: Practice and Policy Chair

2023 CIRCLS ‘23 Convening Program Committee

2021-2022 CIRCLS Emerging Scholars Affinity Groups Steering Committee

### **University Committees & Series**

2023-Present Women’s Impact Network: Impact Committee (WPI; philanthropy)

2023-Present Organizer: ReproducibiliTEA Open Science Journal Club (Purdue)

2022-2023 Human Development & Family Science Diversity, Equity and Inclusion Committee (Purdue)

2021-2022 Arts & Sciences Sustainable Inclusive Excellence Faculty Committee (WPI)

2019-2022 Arts & Sciences Graduate Student Advisory Council (WPI)

2018-2022 Organizer: Women’s Young Investigator (WYI) Fellowship Program Leader (WPI)

2019-2021 Organizer: Learning Sciences & Technologies Colloquium Series Leader (WPI)

**Local Community & Profession**

2023 Volunteer judge at Purdue Spring Undergraduate Research Conference

2018, 2019, 2021 Volunteer for Touch Tomorrow Science Festival, Worcester Polytechnic Institute

2018, 2019, 2022 Volunteer judge at the annual Mass Academy High School STEM Fair

2019 Volunteer at the National Council of Teachers of Mathematics (NCTM) regional conference in Boston, MA

2019 Co-led a 14-week professional development for local teachers

2018 Worked with students at the Central Community Branch YMCA

2015 Lobbied with National Alliance for Mental Illness (NAMI) for Mental Health

2015 Advocacy Day at the Virginia General Assembly Building

**Editorial Review Board Member**

2023-Present *Journal of Interactive Learning Research*

**Ad-hoc Reviewer**

*Educational Technology Research and Development*  
*Contemporary Issues in Technology and Teacher Education - General*  
*Contemporary Issues in Technology and Teacher Education - Math*

**Conference Reviews**

*American Educational Research Association*  
*International Society of the Learning Sciences*  
*Psychology of Mathematics Education - North America*  
*American Psychological Association - Division 15*

**RELEVANT PROFESSIONAL EXPERIENCE**

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2017-2022 **Graduate Research Assistant, Learning Sciences & Technologies**  
Worcester Polytechnic Institute, Massachusetts

- Math, Abstraction, Play, Learning, & Embodiment Lab (2017-2022)
- Advanced Learning Technologies Lab (2017-2019)

2019-2021 **Graduate Writing Tutor, The Writing Center**

- Worcester Polytechnic Institute, Massachusetts
- Mentored undergraduate and graduate students in scientific and academic writing
- 2019 **Academic Program Curriculum Coordinator**, *Pre-Collegiate Outreach*  
Worcester Polytechnic Institute, Massachusetts
- Coordinated the annual week-long SPARK: Women in Science Day Camp for local middle school students
- 2018 **Qualitative Researcher**, *Department of Social Sciences & Policy Studies*  
Worcester Polytechnic Institute, Massachusetts
- Qualitatively explored department course syllabi to question source and authorship diversity in course materials
- 2014-2015 **Counseling and Psychological Services Outreach Intern**, *Department of Psychology*  
University of Richmond, Virginia
- Organized events to promote student mental health and campus-wide services
- 2014 **Statistics Note Taker**, *Department of Psychology*  
University of Richmond, Virginia
- Selected to provide a student with physical assistance notetaking in PSYC 200 Methods and Analyses course based on prior performance in the course
- 2012-2015 **Undergraduate Research Assistant**, *Department of Psychology*  
University of Richmond, Virginia
- Cognitive Psychology Lab (2013-2015)
  - Clinical Psychology Lab (2012-2013)

## PROFESSIONAL DEVELOPMENT

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### Teaching

- 2020 *Fundamentals of Scientific Teaching*, WPI, 5-week online graduate course
- 2020 *Online Pedagogy Workshop*, WPI, 4-week faculty course  
*Project-Based Learning Institute*, WPI, multi-day online faculty workshop
- 2019 *Supporting Social Justice in STEM for Culturally-Diverse Learners*,  
Northeastern Educational Research Association

### Research Methods

- 2021 *Foundations and Applications of R: Tidying, Visualizing, Modeling*,  
University of Minnesota, full-time 5-day online workshop

2021

*Simon Initiative's LearnLab Summer School: Educational Data Mining*,  
Carnegie Mellon University, 5-day online program

## **POPULAR PRESS**

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March 10, 2023: Deblina Pakhira, Alistair Windsor, Arun Balajiee Lekshmi Narayanan, Avery Closser, Kathryn McCarthy, Maggie Deagon, Rita Fennelly-Atkinson, Sa Liu. (2023). Reflections on Researcher-Practitioner Co-design of SEERNet Research Questions. <https://seernet.org/reflections-on-researcher-practitioner-co-design-of-seernet-research-questions/>

March 9, 2023: Rebecca Hoffa. (2023). Purdue's Center for Early Learning Prepares Children to Take Giant Leaps in Early STEM Learning. <https://www.purdue.edu/hhs/news/2023/03/purdues-center-for-early-learning-prepares-children-to-take-giant-leaps-in-early-stem-learning/>

June 22, 2021: Luke, A. (2021). ASSISTments Teachers For Research & Feedback (TFRF) researcher spotlight: Avery Closser. <https://new.assistments.org/blog-posts/teachers-for-research-feedback-tfrf-researcher-spotlight-avery-closser>

December 22, 2020: Closser, A. H. (2020). Bringing the beef: Program-wide debates on topics in educational research. Feature included in the AERA Graduate Student Newsletter, *The Manual*, 7, pp. 8. [https://drive.google.com/file/d/1OxL82Q\\_qWi5JToRtnsXsvQc9DZWg3Uqg/view](https://drive.google.com/file/d/1OxL82Q_qWi5JToRtnsXsvQc9DZWg3Uqg/view)

June 15, 2020: Manning, D. (2020). WPI Insider: Avery Harrison, '19. <https://wp.wpi.edu/journal/articles/avery-harrison-19/>

December 5, 2019: WPI Researchers Awarded Grant to Help K-12 Students Design Math Games. <https://www.wpi.edu/news/wpi-researchers-awarded-grant-help-k-12-students-design-math-games>

## **PROFESSIONAL & PHILANTHROPIC AFFILIATIONS**

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International Society of the Learning Sciences (ISLS)  
Mathematical Cognition and Learning Society (MCLS)  
Society for Research in Child Development (SRCD)  
Psychology of Mathematics Education - North America (PME-NA)  
American Educational Research Association (AERA)  
American Psychological Association (APA; Division 15)  
WPI Women's Impact Network (WIN)

## **CERTIFICATIONS**

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2020            200-hour Registered Yoga Teacher Training  
2015            PADI Open-Water Diver

2015

120-hour Internationally Accredited Teaching English to Speakers of Other Languages (TESOL)