

# (1) Research, Publication, Grants or Other Funded Research Activities

## Publications

1. **[Proceeding]** Chamberlain Jr., D., McGuinness, P., Faulconer, E., & Wood, B. (pending acceptance, Feb 2024). Using Trees to See a Forest: Leveraging Machine Learning to Classify Student Thinking. Proceedings of the 26th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Omaha, NE. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Software, Writing - Original Draft, Writing - Review & Editing.
2. **[Book Chapter]** Reed, Z. & Chamberlain Jr., D. (abstract submitted Mar 2023, accepted for chapter submission Jul 2023, chapter submission Nov 2023). A Framework for Analyzing Asynchronous Discussion Activities. Teaching and Learning Mathematics Online 2e, CRC Press, FL. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft.
3. **[Journal]** Chamberlain Jr., D. (2023). How one instructor can teach a large-scale, mastery-based College Algebra course online. Problems, Resources, and Issues in Mathematics Undergraduate Studies. DOI: <https://doi.org/10.1080/10511970.2023.2190183>.
4. **[Proceeding]** Chamberlain Jr., D., Reed, Z., & Keene, K. (2023, Feb 23-25). Adapting the Argumentative Knowledge Construction Framework to Asynchronous Mathematical Discussions. Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Omaha, NE. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
5. **[Journal]** Faulconer, E., Chamberlain Jr., D., & Wood, B. (2022). A Case Study of Community of Inquiry Presences and Cognitive Load in Asynchronous Online STEM Courses. Online Learning Journal. DOI: <http://dx.doi.org/10.24059/olj.v26i3.3386>. CRediT Roles: Data Curation, Formal Analysis, Methodology, Software, Visualization, Writing - Original Draft, Writing - Review & Editing.
6. **[Proceeding]** Bailey, T., Chamberlain Jr., D., & Christodouloupoulou, K. (2022, Feb 24-26). Undergraduate's covariational reasoning across function representations. Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Boston, MA. URL: <http://sigmaa.maa.org/rume/RUME24.pdf>. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Project Administration, Writing - Original Draft, Writing - Review & Editing.
7. **[Proceeding]** Reed, Z., Chamberlain Jr., D., & Keene, K. (2022, Feb 24-26). Argumentative knowledge construction in asynchronous calculus discussion boards. Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Boston, MA. URL: <http://sigmaa.maa.org/rume/RUME24.pdf>. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Funding Acquisition, Investigation, Methodology, Visualization, Writing - Original Draft.
8. **[Journal]** Chamberlain Jr., D. & Vidakovic, D. (2021). Cognitive trajectory of proof by contradiction for Transition-to-Proof students. Journal of Mathematical Behavior. DOI: <https://doi.org/10.1016/j.jmathb.2021.100849>. CRediT Roles: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Project Administration, Writing - Original Draft, Writing - Review & Editing.

## Grants

1. **[External Grant]** (Pending Support) Principal Investigator, NSF CAREER Grant: Machine Learning Affordances in Collegiate Mathematics Education Research, 2024-2029. Award amount: \$500,000.
2. **[External Grant]** Principal Investigator, Doenet (NSF DUE-1915294, DUE-1915363, DUE-1915438) Mini-Grant: Asynchronous Discovery Activity - Learning to Fly with the Wind. 2023-2024. Award amount: \$500.
3. **[External Grant]** Co-Principal Investigator, NSF IUSE: Undergraduate Research for Fully Online STEM Students: Impact of Expanded Curricular Options on STEM Attitudes, Identity, & Career

Ambitions, with Robert Deters (PI), Emily Faulconer (co-PI), Brent Terwilliger (co-PI). 2023-2026. Award amount: \$382,578.

4. **[External Grant]** Co-Principal Investigator, NSF IUUE: Community of Inquiry and Cognitive Load in Online STEM: Persistence, Performance, and Perspectives, with Emily Faulconer (PI) and Beverly Wood (co-PI). 2021-2024. Award amount: \$233,298.
5. **[Internal Grant]** Principal Investigator, ERAU-W Faculty Seed Grant: Collective Knowledge Progression and Proliferation in Asynchronous Calculus Discussion Boards, with Zackery Reed (co-PI) and Karen Keene (co-PI). 2023. Award amount: \$6,000.
6. **[Internal Grant]** Principal Investigator, ERAU-W Faculty Seed Grant: Developing Autonomous, Targeted Feedback in Precalculus, 2021-2022. Award amount: \$4,069.

## (2) Presentation of Scholarly Work

1. **[National]** Chamberlain Jr., D., Faulconer, E., Wood, B. (pending acceptance, Feb 2024). Using Trees to See a Forest: Leveraging Machine Learning to Classify Student Thinking. 26th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Omaha, NE.
2. **[National]** Chamberlain Jr., D. (2023, Aug 2). Technology Use in Undergraduate Mathematics Classrooms. 2023 MAA MathFest, Tampa, FL.
3. **[Local]** Chamberlain Jr., D. (2023, Mar 29). Predicting Students' Thoughts to Provide Elaborative Feedback. Invited by California State University Bakersfield Mathematics Department Seminar Series.
4. **[National]** Chamberlain Jr., D., Reed, Z., & Keene, K. (2023, Feb 23). Adapting the Argumentative Knowledge Construction Framework to Asynchronous Mathematical Discussions. 25th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Omaha, NE.
5. **[Regional]** Chamberlain Jr., D., Reed, Z., Rister, A., & Velez, M. (2023, Feb 7). Roundtable discussion: Practical Suggestions to Improve Online Discussions Across Disciplines. 2023 Academic Innovation Virtual Conference hosted by ERAU-W.
6. **[Local]** Faulconer, E., Bourdeau, D., Kiernan, K., & Chamberlain Jr., D. (2023, Jan 21). Non-Traditional Scholarly Publication. Invited by Embry-Riddle Aeronautical University – Worldwide Research Scholars Program.
7. **[Local]** Chamberlain Jr., D. & Faulconer, E. (2022, Apr 21). How We Manage Large-Scale Data Collection. Invited by Embry-Riddle Aeronautical University – Worldwide College of Arts and Sciences Brown Bag Lunch & Learn Series.
8. **[National]** Faulconer, E., Chamberlain Jr., D., & Wood, B. (2022, April 13). Instructional Efficiency in Asynchronous Online Discussions. Online Learning Consortium Innovate Conference, Dallas, TX.
9. **[National]** Paolucci, C., Chamberlain Jr., D., & Vancini, S. (2022, Apr 7). Investigating alternatively-certified teachers' mathematical knowledge for teaching calculus. Joint Mathematics Meeting, Seattle, WA.
10. **[National]** Bailey, T., Chamberlain Jr., D., & Christodouloupoulou, K. (2022, Feb 25). Undergraduate's covariational reasoning across function representations. Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Boston, MA.
11. **[National]** Reed, Z., Chamberlain Jr., D., & Keene, K. (2022, Feb 24). Argumentative knowledge construction in asynchronous calculus discussion boards. Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Boston, MA.
12. **[Regional]** Chamberlain Jr., D., Reed, Z., & Keene, K. (2021, Nov 20). Investigating social construction of knowledge during asynchronous discussions. 5th Northeastern Conference on Research in Undergraduate Mathematics Education. New Brunswick, NJ (virtual).

### (3) Unfunded Research Activities

### (4) Creative Works and Projects

### (5) Other Professional Activities, Contributions, and Achievements Indicative of Professional Growth

1. **[Conference Session Organization]** Chamberlain Jr., D. & Barber, R. (2023, Aug 2). Session: Unspoken Research Components. 2023 MAA MathFest, Tampa, FL.
2. **[Conference Session Organization]** Chamberlain Jr., D. & Barber, R. (2023, Aug 2). Session: Building a Research Program. 2023 MAA MathFest, Tampa, FL.
3. **[Workshop Participant]** Developing Online Learning Experiments Using Doenet (2023, May 22-26). NSF funded project (DUE-1915294, DUE-1915363, DUE-1915438) hosted by Institute for Mathematics and its Applications, University of Minnesota.
4. **[Conference Workshop Organization]** Chamberlain Jr., D., Reed, Z., & Keene, K. (2023, Feb 23). Workshop: Research on Technology in Undergraduate Mathematics Education. 25th Annual Conference on Research in Undergraduate Mathematics Education: SIGMAA on RUME, Omaha, NE.
5. **[Conference Session Organization]** Chamberlain Jr., D., Acu, B., & Gasiorek, S. (2023, Jan 3). Session: Navigating the Early Years of the Faculty Experience. 2023 Joint Mathematics Meeting, Boston, MA.