CURRICULUM VITAE

University of Idaho

NAME: Sarah Castle **DATE:** 14 December 2023

RANK OR TITLE: Assistant Professor

DEPARTMENT: Mathematics and Statistical Science

OFFICE LOCATION AND CAMPUS ZIP:

Brink 326
875 Perimeter Drive, MS 1103
Moscow, ID 83844-1103

EMAIL: scastle@uidhao.edu
WEB:

DATE OF FIRST EMPLOYMENT AT UI: August 13th 2023

DATE OF TENURE: Untenured

DATE OF PRESENT RANK OR TITLE: Assistant Professor

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

Ph.D. *Michigan State University*, *East Lansing, MI,* Mathematics Education June 2023

M.S. *Michigan State University, East Lansing, MI,* Mathematics December 2022

B.S. *Whitworth University, Spokane, WA,* Engineering Physics May 2016
B.A. *Whitworth University, Spokane, WA,* Mathematics May 2016

Certificates and Licenses: N/A

EXPERIENCE:

Teaching, Extension and Research Appointments

- SEISMIC Collaboration Research Member (2020 – Present)
- Transition to Proof Research Assistant, Michigan State University (2018 – 2023)
- CERL Research Member, Michigan State University (2018, 2021-Present)
- Research Intern, Argonne National Laboratory (2017)
- Instructor of Record, Mathematics Department Michigan State University (2020-2022)
- Instructor, Summer STEM Academy, Mead School District (2016)

Academic Administrative Appointments: N/A

Non-Academic Employment including Armed Forces: (N/A

Consulting: N/A

TEACHING ACCOMPLISHMENTS: (Academic and Extension teaching)

Areas of Specialization: Mathematics Education and Applied & Computational Mathematics

Courses Taught:
EDCI 434 - Secondary Mathematics Methods (Fall 2023)

EDCI 454 - Secondary Mathematics Practicum (Fall 2023)
EDCI 411 - Geometric Reasoning (Spring 2024)
MTHE 410 - Proof & Viable Argumentation (Spring 2024)

Students Advised:

Undergraduate Students: (advised to completion of degree, number per year)
Caitlin Fakrieh (Fall 2023 due to Sabbatical of Rob Ely)
Graduate Students:
Advised to completion of degree-major professor (student name, degree, and date)

Served on graduate committee (student name, degree, and date)
Jennifer Kruger (Ph.D. Education, Fall 2023 – Current)

Materials Developed: (non-scholarship activity)

Courses Developed:

Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:

Honors and Awards:

SCHOLARSHIP ACCOMPLISHMENTS: (Including scholarship of teaching and learning, artistic creativity, discovery, and application/integration)

Publications, Exhibitions, Performances, Recitals:

Refereed/Adjudicated: (i.e. books, book chaps., journals, proc., abstr., etc.; provide citations-author, date, title, publisher)

Castle, S. D., (Accepted, In Press). *Coding for Conjecturing: How Machine-Based Coding Can Support Mathematical Practice and Computational Thinking*, In 15th International Congress on Mathematical Education Conference Proceedings.

Castle, S. D., (Accepted, In Press). Embracing Mathematical Conjecture Through Coding and Computational Thinking, *Accepted to 54th ACM Technical Symposium on Computer Science Education.*

Levin, M., Smith III, J. P., Karunakaran, S. S., Hwang, J., **Castle, S. D.,** Küchle, V., Elmore, B., Lu, Y., Abreu, S. (Accepted, In Press) Re-conceptualizing the Construct of Mathematical Autonomy: From Individual Trait to Quality of Action in Context. To appear in Cook, S., Katz, B., & Moore-Russo, D. (Eds.). In *Proceedings of the 26th Annual Conference on Research in Undergraduate Mathematics Education* Omaha, NE

Küchle, V. A., Karunakaran, S. S., Levin, M., Smith III, J. P., **Castle, S.,** Hwang, J., Lu, Y., & Elmore, R. A. (2023). Collapsing Spaces, Colliding Places: Leveraging Constructs from Humanistic Geography to Explore Mathematics Classes. Journal of Humanistic Mathematics, 13(1), 54-69.

Castle, S. D. (2023) Exploring How Computation Can Foster Mathematical Creativity in Linear Algebra Modules. In Cook, S., Katz, B., & Moore-Russo, D. (Eds.). In *Proceedings of the 25th Annual Conference on Research in Undergraduate Mathematics Education* (pp. 582-590) Omaha, NE

Castle, S. D. (2023). Leveraging Computational Science Students' Coding Strengths for Mathematics Learning. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education* V. 1 (pp. 263-269). https://doi.org/10.1145/3545945.3569861

Castle, S. D. (2022). If Creativity Return Computing: Exploring the Impact of Computing on Students' Mathematical Creativity in Linear Algebra. In *Proceedings of the 2022 ACM Conference on International Computing Education Research-Volume 2* (pp. 24-25).

Pearson, M. I., **Castle, S**. **D.,** Matz, R. L., Koester, B. P., & Byrd, W. C. (2022). Integrating Critical Approaches into Quantitative STEM Equity Work. *CBE—Life Sciences Education*, 21(1)

Hwang, J., **Castle, S. D.,** & Karunakaran, S. S. (2022). One is the Loneliest Number: Groupwork within Linguistically Diverse Classrooms*. PRIMUS*, 1-13.

Castle, S. D., Smith III, J. P., Levin, M., Hwang, J., Karunakaran, S. S., Küchle, V., & Elmore, R. (2022). Shifts in External Authority and Resources for Sense-making in the Transition to Proof-Intensive Mathematics: The Case of Amelia. In Karunakaran, S. S., & Higgins, A. (Eds.). *Proceedings of the 24th Annual Conference on Research in Undergraduate Mathematics Education.* (pp.100-107) Boston, MA.

Castle, S. D., Byrd, W. C., Koester, B. P., Boenem, E., Caporale, N., Cwik, S., Denaro, K., Denaro, D., Fiorini, S., Matz, R., Mead, C., Whitcomb, K., Singh, C., Levesque-Bristol, C., & McKay, T. (2021) Equity in the STEM Landscape: A Multi-Institutional Approach to Mapping Systemic Advantages Within STEM Courses, *2021 American Education Research Association Annual Meeting Proceedings.* https://doi.org/10.3102/1689325

Castle, S. D., (2021) Connecting Computation: Mediating Mathematical Knowledge Through Computational Modules, In Karunakaran, S. S., & Higgins, A. (Eds.). *2021 Research in Undergraduate Mathematics Education Reports.* (pp.30-38).

Levin, M., Smith III, J. P., Karunakaran, S. S., Küchle, V., **Castle, S. D.,** Hwang, J., Elmore, B., Bae, Y. (2020). Math and Moral Reasoning in the Age of the Internet: Undergraduate Students' Perspectives on the Line Between Acceptable Use of Resources and Cheating, In Karunakaran, S. S., Reed, Z. & Higgins, A. (Eds.). *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education.* (pp.366-373) Boston, MA.

Smith III, J. P., Küchle, V., **Castle, S. D.**, Karunakaran, S. S., Bae, Y., Hwang, J., Levin, M., Elmore, B. (2020). Dimensions of Variation in Group Work within the "Same" Multi-Section Undergraduate Course. In Karunakaran, S. S., Reed, Z. & Higgins, A. (Eds.). In *Proceedings of the 23rd Annual Conference on Research in Undergraduate Mathematics Education.* (pp.606-613) Boston, MA.

Levin, M., Smith, J. P., Karunakaran, S., Küchle, V. A., & **Castle, S. D.** (2020). Conceptualizing STEM Majors' Developing Agency and Autonomy in Undergraduate Mathematics. In Gresalfi, M. and Horn, I. S. (Eds.), *The Interdisciplinarity of the Learning Sciences*, 14th International Conference of the Learning Sciences (ICLS) 2020, Volume 2 (pp. 887-888). Nashville, Tennessee: International Society of the Learning Sciences.

Sankaran, K., French, A., **Gady, S.,** Wisniewski, T., & Woodkey, M. (2014). Evaluation of Electric Propulsion Systems for Asteroid and Comet Sample-Return Missions. In *50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference* (p. 3720). https://doi.org/10.2514/6.2014-3720.

Peer Reviewed/Evaluated: (i.e. journals, articles, proceedings, abstracts, etc.)

Refereed Conference Presentations

**Denotes presenter*

Castle, S. D.* (2023, April 27-29) *Constructing Creativity: Exploring the effects of computing enacted through coding on students' mathematical understanding, mathematical creativity, and relationship to mathematics* [Poster Presentation]. Symposium on Coding, Computational Modelling, & Equity in Mathematics Education: St. Catharines, Ontario, CA

Castle, S. D.* (2023, March 15-18). *Leveraging Computational Science Students' Coding Strengths for Mathematics Learning* [Paper Presentation]. 54th ACM Technical Symposium on Computer Science Education: Toronto, Ontario, CA

Castle, S. D.* (2023, February 23-25) *Exploring How Computation Can Foster Mathematical Creativity in Linear Algebra Modules* [Paper Presentation]. 25th Annual Conference on Research in Undergraduate Mathematics Education: Omaha, NE

Hwang, J.*, **Castle, S. D.**, Karunakaran, S. S. (2023, January 4-7) *Two students' groupwork experiences in a linguistically diverse classroom* [Abstract Presentation], 2023 Joint Mathematics Meetings: Boston, MA.

Castle, S. D.* (2022, August 7-10). *If Creativity Return Computing: Exploring the Impact of Computing on Students' Mathematical Creativity in Linear Algebra* [Abstract Presentation]. 2022 ACM Conference on International Computing Education Research, Lugano, Switzerland.

Sweeder, R.*, **Castle, S. D.,** Koester, B. P., Byrd, W. C.; Pearson, M.; Boenem, E., Caporale, N., Cwik, S., Denaro, K., Fiorini, S., Levesque-Bristol, C.; Matz, R., Mead, C., Brownell, S., Molinaro, M., Singh, C., McKay, T. (2022, March 20-24) *Exposing inequity: A multi-institutional analysis of systematic advantages in introductory STEM courses* [Abstract Presentation]. ACS (American Chemical Society) Spring 2022 National Meeting, San Diego, CA.

Castle, S. D.*, Smith III, J. P., Levin, M., Hwang, J., Karunakaran, S. S., Küchle, V., & Elmore, R. (2022, February 24-26). *Shifts in External Authority and Resources for Sense-making in the Transition to Proof-Intensive Mathematics: The Case of Amelia* [Paper Presentation]. 24th Annual Conference on Research in Undergraduate Mathematics Education, Boston, MA

Castle, S. D.*, Byrd, W. C., Koester, B. P., Boenem, E., Caporale, N., Cwik, S., Denaro, K., Denaro, D., Fiorini, S., Matz, R., Mead, C., Whitcomb, K., Singh, C., Levesque-Bristol, C., & McKay, T. (2021, April 8-12) *Equity in the STEM Landscape: A Multi-Institutional Approach to Mapping Systemic Advantages Within STEM Courses* [Paper Presentation], 2021 American Education Research Association Annual Meeting

Levin, M.*, Smith III, J. P., Karunakaran, S. S., Küchle, V., **Castle, S. D.,** (2021). *Conceptualizing Agency and Autonomy in Tertiary Mathematics* [Abstract Presentation], In 14th International Congress on Mathematical Education Conference Proceedings.

Caporale, N.*, **Castle, S. D.*,** Denaro, K. (2020, November) *Developing Multi-institutional Collaborations in Student Analytics* [Poster Presentation], AAC&U Transforming STEM Higher Education, Virtual.

Levin, M., Smith III, J. P., Karunakaran, S. S., Küchle, V., **Castle, S. D.*,** Hwang, J., Elmore, B., Bae, Y. (2020). *Math and Moral Reasoning in the Age of the Internet: Undergraduate Students' Perspectives on the Line Between Acceptable Use of Resources and Cheating* [Paper Presentation], 23rd Annual Conference on Research in Undergraduate Mathematics Education, Boston, MA.

Smith III, J. P.*, Küchle, V., **Castle, S. D.**, Karunakaran, S. S., Bae, Y., Hwang, J., Levin, M., Elmore, B. (2020). *Dimensions of Variation in Group Work within the "Same" Multi-Section Undergraduate Course* [Paper Presentation]. 23rd Annual Conference on Research in Undergraduate Mathematics Education, Boston, MA.

Levin, M.*, Smith III, J. P., Karunakaran, S. S., Küchle, V. A., & **Castle, S. D.** (2020, June 19-23). *Conceptualizing STEM Majors' Developing Agency and Autonomy in*

Undergraduate Mathematics [Paper Presentation], 14th International Conference of the Learning Sciences (ICLS).

Gady, S.* (2019, February 28 - March 2). *Integrating Integration: Deepening Mathematical Understanding Through Computation* [Abstract Presentation], 22nd Annual Conference on Research in Undergraduate Mathematics Education, Oklahoma City, OK.

Gady, S.*, Kubota, S., & Johnson, I. (2015, November 16-20). *Comparison of a 3-D GPU-Assisted Maxwell Code for Synthetic Diagnostics on ITER* [Poster Presentation], 57th Annual Meeting of the APS Division of Plasma Physics, Savannah, GA.

Sankaran, K.*, French, A., **Gady, S.,** Wisniewski, T., & Woodkey, M. (2014, July 28-30). *Evaluation of Electric Propulsion Systems for Asteroid and Comet Sample-Return Missions* [Paper Presentation]. 50th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cleveland, OH.

French, A.*, **Gady, S.*,** & Sehgal, A.* (2014, May 1-3). *Evaluation of Electric Propulsion Systems for Asteroid Sample-Return Missions* [Poster Presentation], Annual Meeting of the Northwest Section of the APS, Seattle, WA.

Other: (reports, proceedings, papers, citations and references, performances)

Gady, S., & Munson, T. (2017). Stochastic Cogeneration System Design Applied to University Campus. Argonne National Laboratory MCS Internal Report.

Refereed/Adjudicated (currently scheduled or submitted): (provide citations)

Castle, S. D., Pearson, M. I., Byrd, W. C., Koester, B. P., Boenem, E., Caporale, N., Cwik, S., Denaro, K., Denaro, D., Fiorini, S., Matz, R., Mead, C., Sweeder, R., Singh, C., Levesque-Bristol, C., & McKay, T. (2023, Resubmitted after Revise and Resubmit) Foregrounding Systems and Structures of Inequity: A Multi-Institutional Analysis Examining Systemic Advantage Manifestation Within Introductory STEM Courses. *Submitted to The International Journal for STEM Education*

Peer Reviewed/Evaluated (currently scheduled or submitted):

Presentations and Other Creative Activities:

Castle, S. D.* (2023, May 12-13) *Constructing Creativity: Exploring the effects of computing enacted through coding on students' mathematical understanding, mathematical creativity, and relationship to mathematics* [Poster Presentation]. Symposium – Culturally Relevant Integration of CS and Mathematics: Kennesaw, GA

Castle, S. D.* (2022, June) Exploring the Impact of Computing on Students' Mathematical Creativity, University of Oslo Physics Education Research Summer Institute, Oslo, Norway

Castle, S. D.* (2021, November) Systemic Advantages Within Introductory STEM Courses, University of Pittsburgh dB-SERC Colloquium, Pittsburgh, PA.

Matz, R.*, Fiorini, S.*, Caporale, N.*, **Castle, S. D.***, Fisher, C.* (2021, May) Analytics to support student success in STEM: *Stories from the Sloan Equity and Inclusion in STEM Introductory Courses (SEISMIC) Measurement Working Group* [Panel Presentation], Indiana University Learning Analytics Summit, Bloomington, IN.

Gady, S.* (2014, September). Modeling Astronaut Central Nervous System Cerebral Fluid Response to Microgravity and Its Effects on Astronaut Vision, Spokane Mathematics Colloquium,

Spokane, WA.

Professional Meeting Papers, Workshops, Showings, Recitals: (provide date and location)

Patents: (provide title/description, patent number and date)

Grants and Contracts Awarded: (provide principal and co investigators, title, sponsor, funding dates, amount)

Honors and Awards:

College of Natural Science Dissertation Continuation Fellowship (*$7500)*	2022
Dr. Marilyn Zweng Endowed Graduate Student Award in Mathematics Education (*$3250)*	2022
SEISMIC Measurement Fellowship (*$5000)*	2021
Michigan State University Distinguished Fellowship *($60,000)*	2018
Michigan State University College of Natural Science Recruiting Fellowship	2018
Department of Energy Computational Science Graduate Fellowship *($161,000)*	2016
Princeton University Gordon Y.S. Wu Fellowship *($23,000)*	2016
Whitworth University Mathematics and Computer Science Research Award (*$300)*	2016
American Physical Society Division of Plasma Physics Student Participation and Travel Grant *($800)*	2015

**All award values given do not include tuition costs*

SERVICE:

Major Committee Assignments:

Departmental Committee - Secondary Education Program Committee, 2023 – Current
Secondary Mathematics Representative

College Committee - Teacher Education Coordinating Committee, 2023 – Current
Mathematics Education Representative

Departmental Committee - Math for Elementary Teachers Course Supervisory Committee, 2023 – Current

Departmental Committee - Master of Arts in Teaching (M.A.T) Committee and Advisor, 2023 – Current

College of Science Student Research Exposition Judge, Fall 2023
Graduate Division Judge

Professional and Scholarly Organizations (including memberships, committee assignments, editorial services, offices held and dates)

SEISMIC Collaboration Council Member, 2022 – Present
Measurement Working Group Representative

SEISMIC Collaboration Taskforce Member, 2021
Conducted structural work for the SEISMIC collaboration to examine existing collaboration structures in order to redress harm and focus on promoting diversity and inclusion

MSU PRIME Colloquium Committee Member, 2019 – 2021

Membership in Professional Societies

American Education Research Association *(AERA)*
Div J - Postsecondary Education
Research in Mathematics Education
Technology as an Agent of Change in Teaching and Learning

Association for Computing Machinery *(ACM)*
Special Interest Group Computer Science Education

Computer Science Teachers Association *(CSTA)*

Mathematical Association of America *(MAA)*
SIGMAA on Research on Undergraduate Mathematics Education

Society for Industrial and Applied Mathematics *(SIAM)*
SIAG on Applied Mathematics Education
SIAG on Computational Science and Engineering

Reviewing Service

MAA SIGMA on RUME, 2018 - Current

ACM SIGSCE, 2022 - Current

International Journal for STEM Education, 2023 - Current

Outreach Service:

PiMUC 2024 Organizer, 2023-2024
Serving as Local Institution Host with Dr. Amy Yielding

Community Service:

Honors and Awards:

PROFESSIONAL DEVELOPMENT: (workshops and seminars attended)

Teaching:

Scholarship:

- ATG – Planning and Writing Successful Grant Proposals (Fall 2023)
- NSF Grants Conference (Fall 2023)
- Palouse Mathematics Education Seminar (Fall 2023)
- PMENA Computational Thinking, Mathematics, and Data Science Working Group (Fall 2023)

Outreach:

Administration/Management: