

JULIE E. SIMONS

RESEARCH INTERESTS

Mathematical biology, fluid mechanics, cellular motility, scientific computing, data science education.

PROFESSIONAL EXPERIENCE

Associate Professor, 2021–present

Department of Sciences & Mathematics, California State University Maritime Academy

Assistant Professor, 2015–2021

Department of Sciences & Mathematics, California State University Maritime Academy

Postdoctoral Researcher and Lecturer, 2012–2015

Department of Mathematics and the Center for Computational Science, Tulane University

Postdoctoral Researcher and Lecturer, 2010–2011

Departments of Mathematics and Ecology and Evolutionary Biology, University of California, Irvine

EDUCATION

PhD, Mathematics: University of Wisconsin–Madison, 2010

Specialty: Applied Mathematics

Minor: Computational Biochemistry

MA, Mathematics: University of Wisconsin–Madison, 2006

BA, Mathematics: University of California–Berkeley, May 2004

Minor: Statistics

PUBLICATIONS

- (1) **Simons, J.** and A. Rosenberger (2021). *Flagellar Cooperativity and Collective Motion in Sperm*, Fluids, 6, 353.
- (2) **Simons, J.** and S. Olson (2018). *Sperm motility: models for dynamic behavior in complex environments*, Cell Movement, Birkhäuser, Cham, pp. 169–209.
- (3) **Simons, J.** and L. Fauci (2018). *A model for the acrosome reaction in mammalian sperm*, Bulletin of Mathematical Biology, Volume 80, Issue 9, pp. 2481–2501.
- (4) Cripe, P., Richfield, O., and **J. Simons** (2016). *Sperm pairing and measures of efficiency in planar swimming models*, Spora: A Journal of Biomathematics, Volume 2, Issue 1, Article 5.
- (5) **Simons, J.**, Fauci, L. and R. Cortez (2015). *A fully three-dimensional model of the interaction of driven elastic filaments in a Stokes fluid with applications to sperm motility*, Journal of Biomechanics, Volume 48, Issue 9, pp. 1639–1651.
- (6) De Pillis, L., Hood, K., Graham, E.J., Ma, Y., Radunskaya, A. and **J. Simons** (2015). *Injury-initiated clot formation under flow: a mathematical model with warfarin treatment*, Applications of Dynamical Systems in Biology and Medicine. The IMA Volumes in Mathematics and its Applications, Vol. 158, pp. 75–98.
- (7) **Simons, J.**, Olson, S., Cortez, R. and L. Fauci (2014). *The dynamics of sperm detachment from epithelium in a coupled fluid-biochemical model of hyperactivated motility*, Journal of Theoretical Biology 354C, pp. 81–94.
- (8) **Simons, J.** and P. Milewski (2011). *The volcano effect in bacterial chemotaxis*, Mathematical and Computer Modelling, Special Issue on Biophysical Phenomena. Volume 53, pp. 1374–1388.

GRANTS

- AWARDED:
 - Pedagogical or Curricular Development:
 - * California Learning Lab, Building and Bridging Data Science Opportunities in Solano County (2023–2026), **\$185,000 (PI)**.
 - * CSU Graduation Initiative 2025, Maritime Math Education (2019–2020), **\$45,000 (PI)**.
 - * CSU Graduation Initiative 2025, iPads for Active Learning (2019–2020), **\$17,000 (PI)**.
 - * CSU Maritime Provost’s Curriculum Redesign Grant, Statistics-Critical Thinking co-Teaching Design (2018), **\$10,000 (PI)**.
 - * CSU Course Redesign with Technology, Bringing Technology into Intro Statistics (2017–2018), **\$8,209 (PI)**.
 - Research Program:
 - * COAST (CSU Council on Ocean Affairs, Science & Technology), Undergraduate Research Award (2022–23), **\$1,250** (Faculty Advisor).
 - * CSU Maritime: Research, Scholarly & Creative Activities Award (2021–2022), **\$1,000 (PI)**.
 - * CSU STEM-NET (STEM Consortium) Seed Grant (2019–2020), **\$17,000 (PI)**.
 - * CSUPERB (Biotechnology Affinity Group) New Investigator Award (2019–2020), **\$12,200 (PI)**.
 - * CSU Maritime: Research, Scholarly & Creative Activities Award (2017–2018), **\$1,520 (PI)**.
 - Service-related:
 - * CSU Graduation Initiative 2025 Maritime Gender Equity Project (2020–22), **\$30,000 (PI)**.
- Under review or unfunded:
 - PI, CURM Mini Grant (2019), \$12,500
 - PI, CSUPERB New Investigator Award (2018), \$12,750.
 - PI, CSU Course Redesign with Technology Grant, Scientific Computing Proposal (2017), \$8,709

HONORS AND AWARDS

- CSU STEM-NET Faculty Fellow, 2023–24
- Mission Achievement in Academic Excellence, CSU Maritime, 2021
- CSU Wang Family Outstanding Faculty Service Award nominee, 2019
- Outstanding Service Award, CSU Maritime Faculty Awards, 2019
- [Outstanding Scholar Award, CSU Maritime Faculty Awards, 2018](#)
- Outstanding Teaching nominee, CSU Maritime Faculty Awards, 2016–18, 2021–2023
- [ePortfolio Award, CSU Course Redesign with Technology Program, 2018](#)
- Research cited in [SIAM NEWS](#) article, “[Biofluids of Reproduction: Oscillators, Viscoelastic Networks, and Sticky Situations.](#)” [September, 2016](#)
- Newcomb Fellow, in support of co-curricular programming and leadership opportunities for women. Tulane University, 2012
- Elizabeth Hirschfelder Award for Outstanding Graduate Research. Department of Mathematics, UW–Madison, Spring 2009
- Scholarship for International Graduate Students, Ecole Normale Supérieure de Cachan, France
- BACTER Institute graduate training fellowship. Spring 2005–Spring 2010
- NSF VIGRE fellowship recipient, University of Wisconsin, Spring 2005

COURSES TAUGHT

- Introductory Statistics
- Precalculus and Trigonometry
- Calculus I, II, III

- Ordinary Differential Equations
- Linear Algebra
- Introduction to Applied Mathematics (includes topics from ODEs, linear algebra, and modeling)
- Partial Differential Equations in Applied Mathematics
- Scientific Computing and Numerical Methods
- Introduction to Programming in R

PROFESSIONAL AND CIVIC ACTIVITIES

- **CSU-Wide Service**

- (1) Campus representative for CSU-BIOTECH (CSU Biotechnology Affinity Group) Faculty Consensus Group, involves campus outreach, reviewing grant proposals from across the CSU and steering the program's future, 2019–2023.
- (2) University Faculty Advisor (UFA) to CSU STEM-NET Consortium, involves campus outreach and steering future development of the program, 2019–2022.
- (3) Reviewer for CSU travel grant program through CSUPERB, 2018, 2021.
- (4) Reviewer for CSUPERB New Investigator Seed Grant, 2021.
- (5) Reviewer for CSUPERB Glenn Nagel Undergraduate Award, 2021.
- (6) Faculty Ambassadors for the Cadet Experience (FACE) mentor, 2020–21.
- (7) Campus representative for CSU Chancellor's Office Executive Order math-related compliance webinars and meetings, 2018–2020.
- (8) CSU Math Council (CSU math department chairs) representative, 2015–2016.

- **CSU Maritime Service**

- **Committee/Council Membership:**

- (1) DEI Council Co-Chair, Fall 2022–present.
- (2) Departmental Senator, Faculty Senate, 2023–present.
- (3) Title IX Assessment Implementation Team, 2023.
- (4) Inclusive Excellence Strategic Planning Committee, 2020–present.
- (5) General Education (GE) Committee member, 2018–present.
- (6) California Faculty Association Maritime Chapter Faculty Rights Chair, 2023–present.
- (7) California Faculty Association Maritime Chapter Executive Board Member, 2019–present.
- (8) Departmental Retention, Tenure, & Promotion Committee, Sciences & Mathematics, 2021–24.
- (9) Departmental Retention, Tenure, & Promotion Committee, Library, 2022–23.
- (10) Senator At Large, Faculty Senate, 2020–2022.
- (11) Gender Equity Committee Chair, 2019–2022.
- (12) California Faculty Association CSU Maritime Chapter Treasurer, 2019–2021.
- (13) Honorary Degree Committee member, 2016–21.
- (14) Departmental Web Developer, 2015–present.
- (15) Instructionally-Related Activities (IRA) Committee member, 2016–19.
- (16) Marketing Advisory Committee member, 2017.
- (17) Hiring Committees: Director of Inclusion Initiatives (2022), Dean of Cadets (2022), AVP of Enrollment (2021), VP of Student Affairs (2020), Commandant (2 positions, 2019), Mathematics Education (2017, 2019), Oceanography (2017, 2018), School of Letters and Sciences Dean Search (2017–2018), International Business and Logistics (2017), and Physics (2016).

- **Other Activities:**

- (1) Faculty Title IX Liaison, Spring 2023.
- (2) Facilitator, State of Campus Culture and DEI, Faculty Development Seminar, CSUM, Fall 2022.
- (3) Cal Maritime Corporation Board Member, Spring 2022–present.
- (4) Common Reading Orientation Week discussion leader (for new students), 2017, 2022.
- (5) Co-leader, “Making Space for Critical Conversations” (with Dr. Aparna Sinha), Faculty Development Workshop at CSU Maritime, 2021.
- (6) Putnam Mathematics Competition Faculty Sponsor, CSU Maritime, 2019, 2021.

- (7) Mathematics curricular development leader for GI 2025-related grants, 2018–2020.
- (8) Gender Equity: initiated the development of Gender Equity Group in Spring 2018, which was awarded ad hoc committee status in 2019.
- (9) “My First Year at Cal Maritime” panelist, New Faculty Orientation, 2016, 2019.
- (10) Women in Maritime Leadership Conference participant, 2016–2019.
- (11) Campus Safety Walk participant, 2018.
- (12) Co-PI, instructionally-related activities grant for a mechanical engineering workshop, 2017.
- (13) Judicial hearing officer for student conduct issues, 2016.
- (14) Drafted mission and vision statements for the School of Letters and Sciences, 2016.
- (15) Faculty Panelist for Living Learning Community program on college success for first year engineering students, 2016.
- (16) Initiated faculty website capabilities and co-developed the faculty development seminar “Web Wizards: Workshop on Creating your Professional Web Page,” 2016.

• **Wider Mathematics and STEM Community Activities:**

- (1) Reviewer for NSF Biomechanics and Mechanobiology (BMMB) grant program, 2022–23.
- (2) Mathematical Association of America (MAA):
 - (a) MathFest 2024 Speaker Committee
 - (b) Golden Section Representative Nomination Committee, 2022
 - (c) Chair and Program Chair of the Golden Section of the MAA, 2021–22
 - (d) Vice Chair of the Golden Section of the MAA, 2020–21.
- (3) Reviewer for scientific journals including Biophysical Journal, PLOS One, MDPI Mathematics, Fluids, Royal Society Interface, Bulletin of Mathematical Biology, Letters in Biomathematics, Spora: A Journal of Biomathematics, the American Journal for Undergraduate Research, and the Proceedings of the 2017 Women Advancing Mathematical Biology: Understanding Complex Biological Systems with mathematics (WAMB).
- (4) Reviewer for a chapter in the book entitled, *A Celebration of the EDGE Program’s Impact on the Mathematics Community and Beyond*, 2018.
- (5) Judge for undergraduate research awards for the annual International Symposium on Biomathematics and Ecology, Education and Research, 2017, 2018.
- (6) Bay Area Math Olympiad Volunteer, 2016–2018, 2020.

• **Activities Prior to CSU Maritime Position:**

- (1) Workshop Leader & Program Developer, Mathematical Biology, Girls in STEM at Tulane (GiST), 2012–2015.
- (2) Workshop for Women in Applied Math, Institute for Mathematics and its Applications, 9/2013.
- (3) Workshop for Young Researchers, Mathematical Biosciences Institute, 8/2013.
- (4) Organizer, Careers in Computational Biomathematics: High School Outreach Day, Metairie Park Country Day School, 2013.
- (5) Tutor for Success in Math and Focus Academy, Irvine, 2012.
- (6) COSMOS Instructor, UC–Irvine, Mathematical Game Theory and Computer Programming, 2011.
- (7) Sonia Kovalevsky Day Talk, UC–Irvine, 2011.
- (8) Mentor for high school women in mathematics program, UW–Madison, 2005, 2007, 2008.
- (9) Study group leader, Athletic Study Center, UC–Berkeley, 2003–2004.
- (10) Instructor, Math, Engineering, & Science Achievement (Americorps), Berkeley, CA, 2002–2003.

PROFESSIONAL DEVELOPMENT ACTIVITIES

• **CSU-wide Workshops, Courses or Meetings:**

- (1) Increasing Enrollment and Success for College Men of Color, Cora Learning Webinar, 5/2023.
- (2) ACUE Inclusive Teaching for Equitable Learning Microcredential, Fall 2022.
- (3) Mental Health First Aid (MHFA) Training, 9/2022.

- (4) CSU Biotechnology Symposium (CSUPERB annual conference on biotechnology education and research), 2020–2023.
- (5) COAST & CSUPERB: A Conversation on Power, Structural Racism, and Perceptions of Normality in STEM Through a Lens of Critical Race Theory, 5/2021.
- (6) CSUPERB Preparing for Fall 2020 Webinar, 8/2020.
- (7) Assessing Student Learning Outcomes in Undergraduate STEM Courses, CSU Webinar, 6/2020.
- (8) Introduction to Teaching Online, CSU Quality Learning and Teaching Program (QLT), 6/2020.
- (9) Inquiry-Based Learning, CSU Webinar, 4/2020.
- (10) CSU Math Teaching and Solidarity COVID-19 Webinar Series, 4/2020–5/2020.
- (11) Equity-Minded Practices for Remote Teaching, CSU Webinar, 4/2020.
- (12) CSU Major Institutional Grants, CSU STEM-NET Webinar, 3/2020.
- (13) Conflict Psychology: Seven Fundamental Cognitive Biases, CSU Webinar, 2/2020.
- (14) Mid-Course Check-Ins to Improve Teaching and Learning, CSU Webinar, 2/2020.
- (15) The Better Book Project: A Continuously-Improving Interactive Textbook for Introductory Statistics, CSU Webinar, 12/2019.
- (16) Campus representative for CSU Institute for Teaching and Learning Summer Retreat: Building Capacity to Create Equitable Learning Environments, 6/2019.
- (17) Student Success in First-Year Mathematics/Quantitative Reasoning: Stretching Maths and Minds in Year-Long Courses (EO1110 Workshop), 5/2019.
- (18) Corequisite Math Courses: Lessons from the First Year (EO1110 Workshop), 5/2019.
- (19) Introducing EQUIP, a Free Web App to Promote Equitable Teaching in Math/QR Classrooms, 4/2019.
- (20) Pathway to Stats Meeting about EO1110 implementation progress, 11/2018.

- **CSUM Faculty and Professional Development:**

- (1) Edwards Leadership Development Program: Train the Trainer, Center for Creative Leadership, August 2023.
- (2) Title IX Liaison Training, Spring 2023.
- (3) Intro to Canvas Workshops, 1/2023.
- (4) Setting the Stage for a Successful Semester and Transparent Assignment Design Workshops, 8/2022.
- (5) Student Panel: Learning from a Distance, Faculty Panel: Learning from a Distance, Quick Tips for Engaging your Online Class, Introducing Voicethread in Brightspace, and Introducing Ally in Brightspace Workshops, 1/2021.
- (6) Best Practices for Brightspace Course Design, 8/2020.
- (7) Best Practices for Incorporating Videos in Brightspace, 8/2020.
- (8) Best Zoom Practices for Synchronous Online Learning, 8/2020.
- (9) Immersive Learning Experiences, 8/2019.
- (10) What Students Want Faculty to Know: Female cadets discuss their perspective on the teaching and learning environment at Cal Maritime, 4/2019.
- (11) Brightspace training, 2/2019, 8/2019.

- **Activities Outside the CSU:**

- (1) National Workshop on Data Science Education, UC Berkeley, 6/2023.
- (2) Mastery Grading Conference (<https://www.masterygrading.com/>), 6/2020.
- (3) TPSE Math's Options and Advice for Assessing Students' Learning Online Webinar, 5/2020.
- (4) International Symposium on Biomathematics & Ecology Education Research, Education Sessions, 2014, 2016–2019, 2021.

PRESENTATIONS

- *The First Year Transition in the COVID Era: Reflections from Small Cohorts*, International Symposium on Biomathematics and Ecology Education Research, Richmond, VA, November 2023.
- *Advocacy & Allyship*, Panelist, Pride in Maritime Summit, CSUM, October 2023.
- *Reproductive Implications of Swimming in 3D*, Applied Math Seminar, UC Merced, April 2023.

- *The Maritime Industry Post Midshipman X*, Panelist, Admiralty Disruption Conference of the American Bar Association, New Orleans, March 2023.
- *Swimming Filaments in 3D*, Invited Speaker, World Congress of Biomechanics, Taipei, July 2022.
- *Models for Flagellar Motion in 3D*, Applied Math (HCAM) Seminar, Hunter College, March 2022.
- *Models for Flagellar Motion in 3D*, Seminar for the Center for Computational Science, Tulane University, February 2022.
- *Swimming Filaments in 3D*, The Interdisciplinary Center for Quantitative Modeling in Biology (ICQMB), UC-Riverside, February 2022.
- *Collective Swimming and Its Implications for Reproduction*, SIAM Annual Meeting, July 2021.
- *Sperm Motility in Groups*, International Symposium on Biomathematics and Ecology Education Research, La Crosse, WI, October 2019.
- *The Mathematics of Sperm Motility*, Mathematics Seminar, St. Olaf College, Northfield, MN, October 2019.
- *Calcium Signaling in the Sperm Head*, International Symposium on Biomathematics and Ecology Education Research, Phoenix, AZ, October 2018.
- *Calcium Signaling in the Sperm Head*, Annual Meeting of the Society for Mathematical Biology, Sydney, Australia, July 2018.
- *Heads AND Tails*, International Symposium on Biomathematics and Ecology Education Research, Normal, IL, October 2017.
- *Investigating Life's Mysteries with Mathematical Modeling*, California Maritime Academy Scholar Series, December 2016.
- *Rodents of Unusual Sperm and Other Topics*, Seminar for the Center for Computational Science, Tulane University, New Orleans, LA, October 2016.
- *Rodents of Unusual Sperm*, International Symposium on Biomathematics and Ecology Education Research, Charleston, SC, October 2016.
- *Sperm Motility in Populations*, Sonoma State University, March 2016.
- *Sperm Motility in Populations*, Mathematics Colloquium, University of San Francisco, October 2015.
- *Sperm Motility in 3D: Towards an Understanding of Swimming in Groups*, International Congress on Industrial and Applied Mathematics, Beijing, August 2015.
- *Free versus Fixed: Boundaries in Stokes Flow*, International Congress on Industrial and Applied Mathematics, Beijing, August 2015.
- *Sperm Motility Near Surfaces in 3D*, Society for Mathematical Biology Annual Meeting, July 2015.
- *Sperm Motility in 3D*, SCALA Meeting, New Orleans, LA, March 2015.
- *Cooperative Swimming in Viscous Environments*, SIAM-CSE, Salt Lake City, UT, March 2015.
- *The Fluid Mechanics of Sperm Motility*, University of New Mexico, Albuquerque, NM, February 2015.
- *The Fluid Mechanics of Sperm Motility*, University of Portland, Portland, OR, February 2015.
- *Planar versus 3D Models in Sperm Motility*, International Symposium on Biomathematics and Ecology Education Research, Claremont, CA, October 2014.
- *Sperm Motility and Cooperativity in Epithelial Detachment*, MathFest, Portland, OR, August 2014.
- *Sperm Altruism and Motility Near Surfaces*, SIAM Life Sciences, Charlotte, NC, August 2014.
- *The Role of Sperm Motility and Cooperativity in Epithelial Detachment*, World Congress of Biomechanics, Boston, MA, July 2014.
- *Understanding Sperm Motility in Changing Environments*, Society for Engineering Sciences Meeting, Providence, RI, July 2013.
- *Understanding Sperm Motility*, SCALA Meeting, New Orleans, February 2013.
- *One and Two Dimensional Models for the Volcano Effect*, Department of Mathematical Sciences, University of Bath, Applied Mathematics Seminar, September 2011.
- *The Volcano Effect in Bacterial Chemotaxis: new models for a biological and computational phenomena*, FOM Institute for Atomic and Molecular Physics, Amsterdam, Netherlands. Systems biology seminar, July 2009.
- *The Volcano Effect in Bacterial Chemotaxis: a multiscale modeling approach*, Ecole Normale Supérieure de Cachan, France. Seminar of the Centre de Mathématiques et Leurs Applications, April 2009.

- *The Volcano Effect in Bacterial Chemotaxis*, South African Symposium on Numerical and Applied Mathematics, Stellenbosch, South Africa, April 2009.

OTHER RELEVANT PROFESSIONAL EXPERIENCE

- 1/2014 to 5/2014** **Division of Hematology** **St. Louis, MO**
Dr. J. Evan Sadler Lab Visiting Scientist
- Collaborated on kinetic models for blood clotting mechanisms.
- 8/2008 to 1/2009** **Department of Biochemistry, UW–Madison** **Madison, WI**
Donohue and Weibel Lab Scientist
- Performed bacterial chemotaxis wet-lab assays.
- 5/2006 to 8/2006** **Centre for Mathematical Biology, Oxford University** **Oxford, UK**
VIGRE Summer Intern
- Collaborated with Oxford University mathematics and biology faculty.
- 6/2003 to 8/2003** **National Security Agency** **Ft. Meade, MD**
Summer Mathematics Research Intern
- Cryptography research, resulting in an internal publication & presentation for the Director of the NSA.

PROFESSIONAL MEMBERSHIPS

Society for Mathematical Biology, Mathematical Association of America, Association for Women in Mathematics, Society of Industrial and Applied Mathematics.