

Marissa Renardy

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Education

- Ph.D., Mathematics.** The Ohio State University, Columbus, OH. 2013 – 2018
Dissertation: *Parameter analysis in models of yeast cell polarization and stem cell lineage*. Advised by Ching-Shan Chou.
- M.S., Mathematics.** Virginia Tech, Blacksburg, VA. 2011 – 2013
Thesis: *Analysis of the BiCG Method*. Advised by Eric de Sturler.
- B.S., Mathematics.** Virginia Tech, Blacksburg, VA. 2008 – 2012

Employment

- Senior Scientist – Mathematical Modeler (part-time)** August 2020 – present
Applied BioMath, Concord, MA.
- Postdoctoral Research Fellow** May 2018 – present
Department of Microbiology & Immunology, University of Michigan, Ann Arbor, MI.
- Graduate Teaching Associate** July 2013 – May 2018
Department of Mathematics, The Ohio State University, Columbus, OH.
- Graduate Teaching Associate** August 2012 – May 2013
Department of Mathematics, Virginia Tech, Blacksburg, VA.
- Intern** May 2012 – July 2012
Naval Surface Warfare Center, Carderock Division, Philadelphia, PA.
- Instructional Assistant** August 2009 – May 2010
Math Emporium, Virginia Tech, Blacksburg, VA.

Teaching experience

- Recitation instructor, Mathematical Topics for Engineers, Ohio State Fall 2017
- Headstart instructor, Computational Mathematics, Ohio State Summer 2017
- Recitation instructor, Mathematical Topics for Engineers, Ohio State Fall 2016
- Headstart instructor, Intro to Computational ODEs and PDEs, Ohio State Summer 2016
- Recitation instructor, Mathematical Topics for Engineers, Ohio State Spring 2016
- Recitation instructor, Calculus I, Ohio State Fall 2015
- Headstart instructor, Intro to Computational PDEs, Ohio State Summer 2015
- Recitation instructor, College Algebra, Ohio State Spring 2015
- Recitation instructor, Calculus for the Biological Sciences, Ohio State Fall 2014
- Recitation instructor, Calculus I, Ohio State Spring 2014
- Recitation instructor, Calculus I, Ohio State Fall 2013
- Instructional assistant, Virginia Tech Math Emporium Fall 2012 – Spring 2013
- Instructional assistant, Virginia Tech Math Emporium Fall 2009 – Spring 2010

Mentoring

Undergraduates

- Caleb Weissman (University of Michigan, Microbiology major) 2019 – 2020
Assisted in mentoring Caleb in data analysis techniques applied to TB granulomas.

Peer-reviewed journal articles

1. **Marissa Renardy** and Denise Kirschner. Predicting the second wave of COVID-19 in Washtenaw County, MI. *Journal of Theoretical Biology*. 2020; 507:110461.
2. **Marissa Renardy** and Denise Kirschner. A framework for network-based epidemiological modeling of tuberculosis dynamics using synthetic datasets. *Bulletin of Mathematical Biology*. 2020; 82(6):78.
3. **Marissa Renardy**, Caitlin Hult, Stephanie Evans, Jennifer Linderman, and Denise Kirschner. Global sensitivity analysis of biological multi-scale models. *Current Opinion in Biomedical Engineering*. 2019; 11:109–116.
4. **Marissa Renardy**, Timothy Wessler, Silvia Blemker, Jennifer Linderman, Shayn Peirce-Cottler, and Denise Kirschner. Data-driven model validation across dimensions. *Bulletin of Mathematical Biology*. 2019; 81(6):1853–1866.
5. **Marissa Renardy** and Denise Kirschner. Evaluating vaccination strategies for tuberculosis in endemic and non-endemic settings. *Journal of Theoretical Biology*. 2019; 469:1–11.
6. Muhammed Emin Ozturk, **Marissa Renardy**, Yukun Li, Gagan Agrawal, and Ching-Shan Chou. A novel approach for handling soft error in conjugate gradients. *Proceedings of the 25th International Conference on High Performance Computing (HiPC)*. IEEE, 2018.
7. Jill Gallaher, Kamila Larripa, **Marissa Renardy**, Blerta Shtylla, Nesity Tania, Diana White, Karen Wood, Li Zhu, Chaitali Passey, Michael Robbins, Natalie Bezman, Suresh Shelat, Hearn Jay Cho, and Helen Moore. Methods for determining key components in a mathematical model for tumor-immune dynamics in multiple myeloma. *Journal of Theoretical Biology*. 2018; 458:31–46.
8. **Marissa Renardy**, Tau-Mu Yi, Dongbin Xiu, and Ching-Shan Chou. Parameter uncertainty quantification using surrogate models applied to a spatial model of yeast mating polarization. *PLoS Computational Biology*. 2018; 14(5):e1006181.
9. **Marissa Renardy**, Alexandra Jilkine, Leili Shahriyari, and Ching-Shan Chou. Control of cell fraction and population recovery during tissue regeneration in stem cell lineages. *Journal of Theoretical Biology*. 2018; 445:33–50.

Book chapters

10. Louis R. Joslyn*, **Marissa Renardy***, Caleb Weissman, Nicole L. Grant, JoAnne L. Flynn, J. Russ Butler, and Denise E. Kirschner. Temporal and spatial analyses of TB granulomas to predict long-term outcomes. In Yoram Vodovotz and Gary An, editors, *Complex Systems and Computational Biology Approaches to Acute Inflammation: A Framework for Model-based Precision Medicine*. 2020. In press. (*co-first authors)

11. Jill Gallaher, Kamila Larripa, Urszula Ledzewicz, **Marissa Renardy**, Blerta Shtylla, Nesy Tania, Diana White, Karen Wood, Li Zhu, Chaitali Passey, Michael Robbins, Natalie Bezman, Suresh Shelat, Hearn Jay Cho, and Helen Moore. A mathematical model for tumor-immune dynamics in multiple myeloma. In Ami Radunskaya, Rebecca Segal, and Blerta Shtylla, editors, *Understanding Complex Biological Systems with Mathematics*, pages 89–122. Springer, 2018. (peer-reviewed)

Other writing

Pathogen dormancy: origins, mechanisms, and consequences for infection and control. White paper submitted to NSF, 2019.

Grants, honors, and awards

- Landahl Travel Grant (Society for Mathematical Biology) 07/2019
- 1st place, MICDE annual symposium poster competition 04/2019
- Outstanding Graduate/Professional Student Award (OSU Office of Student Life) 03/2018
- Career Development Grant (OSU Council of Graduate Students) 12/2017
- Rhodus Graduate Fellowship (OSU Department of Mathematics) Spring 2017, Spring 2018

Conference presentations

- Predicting the second wave of COVID-19 in Washtenaw County, MI*. Poster. MIDAS Annual Symposium. Online. 11/2020
- A data analytic approach to classifying TB granulomas*. Invited talk (minisymposium). SIAM Life Sciences Meeting. Online. 06/2020
- Temporal and spatial analyses of TB granulomas to predict long-term outcomes*. Contributed talk. Mathematical and Computational Methods in Biology, Mathematical Biosciences Institute, Columbus, OH. 05/2020
- MAA Panel: So You're (Going to Be) a Postdoc: Now What? A Panel Discussion on a Fulfilling Postdoc Experience*. Panelist. Joint Mathematics Meetings (JMM), Denver, CO. 01/2020
- Structural parameter identifiability in age-structured epidemic models*. Contributed talk. Joint Mathematics Meetings (JMM), Denver, CO. 01/2020
- Navigating biological research as an early-career mathematician*. Invited talk. APS Conference on the Interface of Mathematical Models and Experimental Physiology: Organ Function from the Microvascular Perspective, Scottsdale, AZ. 09/2019
- Evaluating vaccination strategies for tuberculosis in endemic and non-endemic settings*. Contributed talk. Society for Mathematical Biology (SMB), Montréal, Canada. 07/2019
- Evaluating vaccination strategies for tuberculosis in endemic and non-endemic settings*. Invited talk (special session). SIAM Great Lakes Sectional Meeting, Ann Arbor, MI. 04/2019
- Evaluating vaccination strategies for tuberculosis in endemic and non-endemic settings*. Poster. MICDE Symposium, Ann Arbor, MI. [This poster won 1st place in the poster competition.] 04/2019
- Modeling tumor immune dynamics in multiple myeloma*. Contributed talk. AWM Research Symposium, Houston, TX. 04/2019
- Modeling tumor immune dynamics in multiple myeloma*. Invited talk (minisymposium). Joint Mathematics Meetings (JMM), Baltimore, MD. 01/2019

- Evaluating vaccination strategies for tuberculosis in endemic and non-endemic settings.* Contributed talk. Joint Mathematics Meetings (JMM), Baltimore, MD. 01/2019
- Control of cell fraction and population recovery during tissue regeneration in stem cell lineages.* Invited talk (minisymposium). SIAM Life Sciences Meeting, Minnesota, MN. 08/2018
- Modeling tumor immune dynamics in multiple myeloma.* Invited talk (minisymposium). SIAM Annual Meeting, Portland, OR. 07/2018
- Parameter uncertainty quantification using surrogate models applied to a spatial model of yeast mating polarization.* Invited talk (minisymposium). AMS Spring Central Sectional Meeting, Columbus, OH. 03/2018
- Parameter uncertainty quantification for a spatial model of cell polarization.* Poster. Symposium on Multi-scale Bioimaging in Systems Biology, Ann Arbor, MI. 01/2018
- A method for sensitivity analysis and parameter estimation applied to a large reaction-diffusion model of cell polarization.* Contributed talk. Joint Mathematics Meetings (JMM), San Diego, CA. 01/2018
- A method for sensitivity analysis and parameter estimation applied to a large reaction-diffusion model of cell polarization.* Invited talk (minisymposium). 10th International Symposium on Biomathematics and Ecology Education and Research (BEER), Normal, IL. 10/2017
- A reaction-diffusion model of cell polarization in yeast.* Poster. SIAM Annual Meeting, AWM Workshop, Pittsburgh, PA. 07/2017
- A reaction-diffusion model of cell polarization in yeast.* Poster. Biology and Medicine through Mathematics (BAMM!), Richmond, VA. 05/2017
- Stem cell lineages: Control of cell fraction and population recovery.* Contributed talk [last minute entry, not on program]. 5th International Conference on Computational and Mathematical Biomedical Engineering (CMBE), Pittsburgh, PA. 04/2017
- A reaction-diffusion model of cell polarization in yeast.* Poster. 5th Annual Midwest Women in Mathematics Symposium (WIMS), Indianapolis, IN. 02/2017
- Choosing a mathematics graduate program.* Invited panelist. 19th Nebraska Conference for Undergraduate Women in Mathematics (NCUWM), Lincoln, NE. 02/2017

Departmental talks and guest lectures

- Predicting the second wave of COVID-19 in Washtenaw County, MI.* CSCS/MIDAS/MICDE Seminar, University of Michigan. Online. 10/20/2020
- Modeling the COVID-19 pandemic,* co-presented with Wasiur KhudaBukhsh. Invited lecture, The Erdős Institute. Online. 05/28/2020
- Mathematical and computational modeling as tools for tuberculosis elimination.* Applied math seminar, The Ohio State University, Columbus, OH. 02/20/2020
- Parameter analysis in yeast cell polarization and stem cell lineages.* Invited lecture, Kirschner Lab, University of Michigan, Ann Arbor, MI. 02/01/2018
- Parameter analysis in yeast cell polarization and stem cell lineages.* Biomath seminar series, North Carolina State University, Raleigh, NC. 01/26/2018
- Parameter estimation for a large model of yeast cell polarization.* Science lecture series, Ohio Wesleyan University, Delaware, OH. 11/09/2017
- A method for parameter sensitivity analysis and parameter estimation using polynomial surrogates* Math graduate student seminar, The Ohio State University, Columbus, OH. 10/24/2017
- A reaction-diffusion model of cell polarization in budding yeast.* Math graduate student seminar, The Ohio State University, Columbus, OH. 04/19/2016

Workshop participation

AMS Mathematical Research Community, <i>Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales</i> .	2020 – 2021
STEM Faculty Launch. Worcester Polytechnic Institute, Worcester, MA.	10/2019
Summit on the Rules of Life. Mathematical Biosciences Institute, Columbus, OH.	06/2019
Women Advancing Mathematical Biology: Understanding Complex Biological Systems with Mathematics. Mathematical Biosciences Institute, Columbus, OH.	04/2017

Professional service

Departmental/Institutional

- Guest lecturer, Michigan Math & Science Scholars (MMSS) Program 06/2020
- Invitations to Industry seminar, Erdős institute
 - Organizer at U of M Department of Mathematics 2019 – 2020
 - Graduate student organizer at OSU Department of Mathematics 2018
- Organizer, 2018 OSU Math Grad DataFest
- Association for Women in Mathematics Student Chapter at The Ohio State University
 - President 2015 – 2018
 - Founder 2015
- OSU Math Graduate Student Association
 - Member 2015 – 2018
 - Travel fund committee member 2017 – 2018
- Judge, 2017 OSU Mathematical Modeling Contest
- Student representative, Graduate Studies Committee, OSU Math Department 2015 – 2016

National/International

- Co-Chair of Membership, Society for Mathematical Biology 2019 – 2020
- Organizing Committee, Society for Mathematical Biology 2020 Annual Meeting 08/2020
- Minisymposium organizer, Society for Mathematical Biology Annual Meeting, Montréal, Canada.
Individual- and agent-based models of within-host disease dynamics. 07/2019
- NSF-related service
 - Organized a working group at MBI on the Rules of Life that resulted in a white paper submitted to NSF. 2019
 - Grant review panel (Mathematical Biology Program of DMS) 2018
- Reviewer for the following journals:
 - Journal of Theoretical Biology (4 papers)
 - Mathematical Biosciences and Engineering (1 paper)
 - Mathematical Medicine and Biology (1 paper)
 - Letters in Biomathematics (1 paper)
 - Heliyon (1 paper)

Professional affiliations

- International Society of Pharmacometrics (ISoP)
- Association for Women in Mathematics (AWM)
- Society for Mathematical Biology (SMB)
- Society for Industrial and Applied Mathematics (SIAM)