# Kathryn G. Link

Krener Assistant Professor
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https://kathrynglink.github.io

**RESEARCH INTERESTS**
*Applied mathematics, mathematical biology, dynamical systems, fluid dynamics, porous media, flagellar dynamics, blood clotting, innate immunity*

**ACADEMIC POSITIONS**

University of California, Davis
*Krener Assistant Professor*                                           2020 - present
Department of Mathematics
Mentor: Robert D. Guy, Becca Thomases

**EDUCATION**

University of Utah, Salt Lake City, UT
*Ph.D., Mathematics*                                                              2020
        Advisor: Aaron L. Fogelson, Ph.D.
Bryn Mawr College, Bryn Mawr, PA
*B.A., Mathematics*                                                               2012
        Advisors: Victor Donnay, Ph.D. and Sean Laverty, Ph.D.

**PUBLICATIONS**

C.K. Buhler, R.S. Terry, **K.G. Link**, and F.R. Adler. "When does adaptive therapy work? Comparing cancer treatment strategies across mathematical models and outcome objectives." *Mathematical Biosciences and Engineering,*18.5 (2021): 6305-6327.
*https://doi.org/10.3934/mbe.2021315*.

**K.G. Link**, N.A. Danes, M.G. Sorrells, K. Leiderman, K.B. Neeves, A.L. Fogelson. "A mathematical model of platelet aggregation in an extravascular injury under flow." *Multiscale Model. Simul.*, 2020;18(4), 1489–1524. *https://doi.org/10.1137/20M1317785.*

**K.G. Link**, M. T. Stobb, D. M. Monroe, A. L. Fogelson, K.B. Neeves, S.S. Sindi, and K. Leiderman. "Computationally Driven Discovery in Coagulation." *Arterioscler Thromb Vasc Biol.* 2020;40.
*https://doi.org/10.1161/ATVBAHA.120.314648*.

**K.G. Link**, M.T. Stobb, M.G. Sorrells, M. Bortot, K. Ruegg, M. J. Manco-Johnson, J.A. Di Paola, S.S. Sindi, A.L. Fogelson, K. Leiderman, K.B. Neeves, "A mathematical model of coagulation under flow identifies factor V as a modifier of thrombin generation in hemophilia A. *JTH* 2020;18(2):306-317.*https://doi.org/10.1111/jth.14653.*

**K.G. Link**, M.T. Stobb, J.A. Di Paola, K.B. Neeves, A.L. Fogelson, S.S. Sindi, K. Leiderman, "A local and global sensitivity analysis of a mathematical model of coagulation and platelet deposition under flow." *PLOS ONE* (2018), 13(7): e0200917.
*https://doi.org/10.1371/journal.pone.0200917.*

H.T. Banks, S. Hu, **K. Link**, E.S. Rosenberg, S. Mitsuma, and L. Rosario, "Modeling Immune Response to BK Virus Infection and Donor Kidney in Renal Transplant Recipients." *Inverse Problems in Science & Engineering* (2016), 24(1): 127-152.*https://doi.org/10.1080/17415977.2015.1017484.*

H.T. Banks, B.E. Banks, **K. Link**, J.A. Rosenheim, C. Ross, and K.A. Tillman, "Model Comparison Tests to Determine Data Information Content." *Applied Mathematical Letters* (2015),43,10-18.
*https://doi.org/10.1016/j.aml.2014.11.002.*

H.T. Banks, D.F. Kapraun, **K.G. Link**, W.C. Thompson, C. Peligero, J. Argilaguet, A. Meyerhans, "Analysis of Variability in Estimates of Cell Proliferation Parameters for Cyton-Based Models Using CFSE-Based Flow Cytometry Data." *Journal of Inverse and Ill-posed Problems* (2014), 23(2) 135-171, *https://doi.org/10.1515/jiip-2013-0065.*

T. Huffman, **K. Link**, J. Nardini, L. Poag, K. Flores, H.T. Banks, B. Blasco, J. Jungfleisch, J. Diez, "A Mathematical Model of RNA3 Recruitment in the Replication Cycle of Brome Mosaic Virus." *International Journal of Pure and Applied Mathematics* (2013), 89(2) 251-274, *https://doi.org/10.12732/ijpam.v92i1.3.*

H.T. Banks, S. Hu, M. Joyner, A. Broido, B. Canter, K. Gayvert, **K. Link**, "A comparison of computational efficiencies of stochastic algorithms in terms of two infection models." *Mathematical Biosciences & Engineering* (2011), 9(3) 487-526.*https://doi.org/10.3934/mbe.2012.9.487.*

**FELLOWSHIPS AND AWARDS**

**Mathematical Sciences Postdoctoral Research Fellowship**: Multiscale Modeling and Simulation of Flagellar Movement (PI)

- Sponsor: National Science Foundation (DMS 1502851)

- Duration: 7/1/2021–6/30/2024

- Award amount: $150,000

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| *AWM Dissertation Award*, $500 | 2020 |
| *NSF RTG Fellow (RTG-1148230)*, University of Utah | 2014-2015, 2019 |

*Travel Awards:*

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| NSF-RTG Travel Grant for SIAM Northern States Session | 2019 |
| ISTH Early Career Travel Grant | 2019 |
| IMA Workshop for Women in Mathematical Biology | 2018 |

**TECHNICAL SKILLS**

**Languages & Software:** (Most proficient to least) MATLAB, Python, Fortran, R, XPP, Jupyter Notebook, Maple,TensorFlow, Java, C, SAS.

**Others:** Latex, CSS, HTML, Linux

**SELECTED TALKS & POSTERS**

**Invited Talks:**

*Flagellar Waveforms in Viscoelastic Fluids and their Emergent Properties.*
Joint Mathematics Meetings (JMM)                    January 2022
AWM Special Session on Women in Mathematical Biology

*Emergent Properties of Flagellar Waveforms in Viscoelastic Fluids*
SMB MS09-MFBM                                      July 2021
Emergent behavior across scales: locomotion, mixing, and collective motion in active swimmers

*Platelet plug formation in flow-mediated extravascular blood clotting.*
SIAM Life Sciences MS81                             June 2020

**Selected Contributed Talks & Posters:**

*A Mathematical Model of Platelet Accumulation in an Extravascular Injury with Force-Mediated Bond Formation and Breaking.*
SIAM Annual Meeting                                 July 2020
AWM Workshop Poster Session

*Platelet Plug This Hole: A mathematical model of flow-mediated platelet accumulation in an extravascular injury.*
JMM AMS Contributed Paper Session                   January 2020

*A reduced order mathematical model of platelet aggregation in an extravascular injury and the effects of soluble agonist-dependent platelet activation.*
SIAM Northern States Annual Meeting                 September 2019

*A mathematical model of flow-mediated coagulation identifies FV as a modifier of thrombin generation in hemophilia A.*
ISTH 2019 Congress                                 July 2019

*A Model of Flow-Mediated Platelet Accumulation in an Extravascular Injury.*
GRS/GRC Hemostasis                                 July 2018
Waterville Valley, NH

**MENTORSHIP**

**Undergraduate Research Mentorship**              2018-present

- *Project Title: Mathematical Modeling of Swimming.* UC Davis Summer REU 2021. Students developed computational methods that solve the equations that describe the coupled mechanics of active swimmers with the surrounding fluids. The project resulted in a manuscript in preparation.

- *Project Title: Mathematical modeling of the rumen and enteric fermentation.* Katarina Merk is scheduled to graduate with a B.S. in Mathematics from the University of California, Davis and is planning on an honors thesis submission.

- *Project Title: The role of tissue-factor pathway inhibitor (TFPI) isoforms in blood clotting models.* Belle Barnes completed her honors thesis and graduated in December 2020 with a B.S. in Mathematics from the University of Utah.

- *Project Title: Mathematical Modeling of Adaptive Therapy in Prostate Cancer.* Cassie Buhler graduated in May 2019 with a B.S. in Mathematics from the University of Utah. She is currently a graduate student in Business Analytics at Drexel University. This work resulted in a recent publication.

**TEACHING**  Taught a range of undergraduate math courses as **instructor of record**.
- Spring 2021: Ordinary Diff Equations, [MAT 119B, UC Davis, 40 students]
- Winter 2021: Applied Linear Algebra, [MAT 167, UC Davis, 70 students]
- Summer 2019: Online Trigonometry, [Math 1060, U. Utah, 40 students]
- 2015 - 2016: Business Algebra [Math 1090, U. Utah, 60 students]

**SERVICE**  *Symposium Organizer*
- <u>Special Session:</u> Recent advances in mathematical biology.
  2022 AWM Research Symposium                                    July 2022

- <u>Mini-Symposium:</u> The versatility of mathematical modeling in biology: from proposing mechanism to validating hypotheses.
  SIAM Northern States Annual Meeting                       September 2019

  *UC Davis Departmental Activities*                              2020-present
- Mathematical Biology Seminar Organizer/Moderator, AWM Mentor

  *Journal Referee*                                              2019-present
- Int J Numer Method Biomed Eng, Bull. Math. Biol, Curr. Opin. Biomed. Eng.

**WORKSHOPS**  *WPI STEM Faculty Launch*                          October 2019
Invited Participant
Worcester Polytechnic Institute, Worcester, MA

*IMA Workshop for Women in Mathematical Biology*          March 2018
Presenter and Participant