

# Katelyn J. Jarvis

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## Education

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### University of California, Davis

Davis, CA

*PhD Candidate, Applied Mathematics*

2015-present

Emphasis: Mathematical Biology, Advisor: Sam Walcott

*Master of Science, Applied Mathematics*

2017

Emphasis: Mathematical Biology, Advisor: Sam Walcott

*Bachelor of Science, Mathematics*

2015

Major: Mathematics, Minors: Spanish and Education

## Research Experience

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### University of California, Davis

Davis, CA

*Graduate Student Researcher*

April 2016 - Present

Advised by Dr. Sam Walcott

Developing a computational model of the mechanics of muscle contraction to better understand the molecular mechanisms of contraction and fatigue, with a focus on extending model results from the molecular to cellular levels to provide a quantitative theory of contraction

### NASA Ames Research Center

Mountain View, CA

*Pathways Intern, Diagnostics and Prognostics Group and System-Wide-Safety Project* July 2020 - Present

Researched algorithmic approaches for the prediction step of a general prognostics algorithm, with emphasis on improving computational efficiency of prediction in resource-constrained settings

### Rensselaer Polytechnic Institute

Troy, NY

*Visiting Researcher in the Swank Lab*

2019

Assisted and observed experimental work including dissection and mechanics measurements of skinned muscle fibers from *Drosophila* flight muscle

### Sandia National Laboratory

Livermore, CA

*Computational Fluid Dynamics Department Intern*

2013

Advised by Dr. Habib Najm

Implemented Monte Carlo simulations to study uncertainty quantification and global sensitivity analysis

## Honors and Awards

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Fellowships.....

### 2020 UC Davis Dissertation Year Fellowship

Full funding for final year of PhD work

### 2019 Schwall Dissertation Year Fellowship in Medical Research

Awarded to five students annually

Fellowships (continued).....

2019 **Eva Schicke Memorial Fund for Service in Social Justice and Gender Equity**  
Awarded for work relating to gender equity and social justice, funding specifically provided for Pioneer Women in STEM Organization

Awards.....

2020 **People's Choice Award for Conference Talk**  
Talk presented in ECR session at the Annual Meeting of Australian Society for Biophysics

2019 **Henry L. Alder Award for Excellence in Teaching**  
Awarded annually for the graduate student deemed top teacher among all graduate students in the UC Davis mathematics department

2019 **Graduate Student Association Travel Award**, University of California, Davis

2017 **Inspirational Aggies Award**

President of Association for Women in mathematics in spring of 2017 when the organization was named the "Inspirational Aggies of the Year" award for encouraging an inclusive environment at UC Davis

2014 **California Teacher's Association Scholarship Recipient**

## Publications

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Peer-Reviewed Publications.....

2018 **Jarvis, K**, Woodward M, Debold EP, Walcott S. "Acidosis affects muscle contraction by slowing the rates myosin attaches to and detaches from actin", *Journal of Muscle Research and Cell Motility* 39.3-4 (2018) 135-147. **Available here on Springer.**

2020 **Jarvis, K**, Bell, K, Loya, A, Swank, D, Walcott, S. "Force-velocity and tension transient measurements from *Drosophila* jump muscle reveal the necessity of both weakly-bound cross-bridges and series elasticity in models of muscle contraction", *Archives of Biochemistry and Biophysics*. In press.

## Presentations

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Invited Talks.....

2020 **Courant Institute of Mathematical Sciences: Biomathematics and Computational Biology Colloquium**  
*From molecular interactions to whole muscle strength: the challenges of modeling muscle across scales*, New York, NY, Scheduled April, 2020 (cancelled due to covid-19)

2020 **Stanford: Spudich Lab Meeting Presentation**  
*Weakly-bound cross-bridges are necessary but not sufficient to consistently model muscle measurements*, Palo Alto, CA, January 2020.

Invited Talks (continued) .....

- 2019 **UC Davis: Mathematical Biology Seminar**  
*A mathematical model of muscle contraction requires viscous drag and nonlinear cross-bridge elasticity to consistently model muscle measurements, Davis, CA, October, 2019.*
- 2019 **Leadership Giving Society Annual Gala**, University of California, Davis  
*Testimonial: Women in STEM, Davis, CA, October, 2019.*
- 2019 **Worcester Polytechnic Institute: Applied Mathematics Seminar**  
*A mathematical model of muscle contraction requires viscous drag to consistently model muscle measurements, Worcester, MA, September, 2019.*
- 2018 **UC Davis: Math and Applied Math Graduate Student Seminar**  
*A minimal model for the effects of pH and phosphate on muscle, Davis, CA, February, 2018.*
- 2018 **STEM Educator's Conference**, University of California, Davis  
**Keynote Speaker:** *Keeping the Joy and Wonder in our STEM Classrooms, Davis, CA, May, 2018.*

Contributed Talks.....

- 2020 **Meeting of Australian Society for Biophysics**  
*Models of muscle contraction must include force-dependent weakly-bound cross-bridges and series elasticity to describe stretch-activation in Drosophila jump muscle fibers, Virtual conference, December, 2020.*
- 2020 **SIAM Life Sciences Annual Meeting**  
*Weakly-bound cross-bridges are required, but are not sufficient, to self-consistently model the Fenn effect, force-velocity and tension transients in muscle fibers, Orange County, CA, Scheduled June, 2020 (cancelled due to covid-19).*
- 2020 **Biophysical Society Annual Meeting**  
*Weakly-bound, non-linear elastic cross-bridges are necessary to self-consistently model the Fenn effect, force velocity and tension transients in muscle fibers, San Deigo, CA, February, 2020.*
- 2018 **Biophysical Society Annual Meeting**  
*A minimal model for the effects of pH and phosphate on muscle provides molecular basis for cellular measurements, San Francisco, CA, February, 2018.*

Posters.....

- 2021 **Biophysical Society Annual Meeting**  
*Stretch-activation in Drosophila jump muscle fibers is described by a minimal cross-bridge model that includes force-dependent weakly-bound cross-bridges and series elasticity, Virtual conference, February, 2021.*
- 2019 **Biophysical Society Annual Meeting**  
*Muscle measurements show weakly-bound cross-bridges act as a viscous drag, Baltimore, MD, March, 2019.*

## Teaching

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- Summer 2019 **Associate Instructor: Differential Equations**, University of California, Davis
- 2018 - 2019 **Substitute Lecturer**, University of California, Davis  
Graduate level: Dynamical Systems, Asymptotic Analysis and Perturbation Methods  
Undergraduate level: Multivariate Calculus for Biological Sciences
- Summer 2018 **Associate Instructor: Differential Equations**, University of California, Davis
- Summer 2017 **California State Summer School for Mathematics and Science (COSMOS) Teaching Assistant**, University of California, Davis
- Summer 2016 **Associate Instructor: Calculus for Biological Sciences**, University of California, Davis
- 2015 - 2016 **Teaching Assistant: Calculus for Biological Sciences**, University of California, Davis

## Leadership and Service

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- 2020 **Co-chair of ECR Session at Australian Society for Biophysics Annual Meeting**
- 2019 **Space Health Innovation Conference Committee Member**, Mission Bay, CA  
- Hosted by UCSF and Translational Research Institute for Space Health (TRISH)
- 2019 - present **Vice President, Biophysical Society Student Chapter**, University of California, Davis  
- Founding secretary (2019) and current VP (2020) of the BPS Student Chapter
- 2019 - present **Founder of "Pioneer Women in STEM" Club**, Pioneer High School, CA  
- Founded a bi-weekly club for female students at low socioeconomic status high school  
- Mission to show young students what STEM means outside of the classroom, expose students to future careers, and connect young women with female professionals
- 2019 **Coding Workshop Series**, Davis High School  
- Established and facilitated a coding workshop at Davis High school  
- Taught students basic coding skills through application of Project Euler
- 2017 - 2019 **President, Association for Women in Mathematics Student Chapter**, University of California, Davis  
- Established an on-going outreach program through AWM, visiting local schools and teaching young students about the value of mathematics  
- Mentorship program coordinator (2018) pairing undergraduates, graduates, and faculty in mentor/mentee pairs to foster community in mathematics department  
- Attended and helped with AWM hosted workshops on social justice issues
- 2017 - 2020 **K-12 Outreach**, Sacramento Area  
- Visited local schools, particularly in underprivileged areas, gave short presentation on real-world math applications, inspired students to appreciate math with a new perspective  
- Schools Visited: Lee Middle School (Oct 2017, Jan 2019), Will C. Wood Middle School (Feb 2018), Pioneer High School (2017 - 2020), Davis High School (Oct 2018, Oct 2019)

Leadership and Service (continued) .....

- 2016            **Panel Moderator: UC Davis STEMCom**, University of California, Davis
  - Education panel moderator for STEM communication workshop hosted by Professors for the Future Fellows
  
- 2016            **Panelist: Women in STEM Panel**, University of California, Davis
  - Invited panelist for event on women in STEM hosted by the student chapter of the Society for Women Engineers
  
- 2016            **Vice-President, Association for Women in Mathematics Student Chapter**, University of California, Davis
  - Founding member of the AWM Student Chapter