

Wylie W. Ahmed

CONTACT INFORMATION	California State University, Fullerton College of Natural Sciences & Mathematics Department of Physics 800 N. State College Blvd. Fullerton, CA 92831	<i>Office:</i> MH-661 <i>Phone:</i> (657) 278-2188 <i>E-mail:</i> wahmed@fullerton.edu <i>WWW:</i> www.SLAM-Lab.com
Professional Appointments	Assistant Professor , California State University, Fullerton, California Faculty, Department of Physics Member, Center for Computational and Applied Mathematics (CCAM) Member, Center for Applied Biotechnology Studies (CABS) Member, Group for Dynamics of Small-scale Systems (DynSS) Mentor, Maximizing Access to Research Careers (MARC)	2016 - present
	Marie Skłodowska-Curie Research Fellow , Institut Curie, Paris, France Department of Physical Chemistry (UMR168)	2013 - 2016
	Instructor , Université Paris Descartes, Paris, France Center for Interdisciplinary Research (CRI)	2014 - 2016
	Researcher , Max Planck Institute, Stuttgart, Germany Department of New Materials and Biosystems	2008
Education	University of Illinois , Urbana, IL USA Ph.D., Department of Mechanical Sciences and Engineering	2008 - 2013
	University of Illinois , Urbana, IL USA B.S., Department of Mechanical Sciences and Engineering	2003 - 2008
Research Interests	Soft and active matter, biological physics, materials science, statistical physics, mechanics of materials, bionanotechnology, high-resolution imaging, opto-mechanical force measurement, rheology	
Grants & Fellowships	NSF Grant - Active noise in the dynamics of self-propelled particles (co-PI, \$364,582)	2020-2023
	NSF Grant - Enzyme-Powered, Programmable Active matter (PI, \$253,117)	2020-2023
	CSUF RSCA Grant - Extracting the signature of life from noise (PI, \$15,000)	2019
	LSAMP International REU Collaborative Research Initiation Award (\$5000)	2018
	CSUF RSCA Grant - Microscopic jiggling, schools of fish, and flocks of birds (Co-PI, \$15,000)	2018
	CSUF RSCA Grant - A microfluidic negative pressure device (Co-PI, \$15,000)	2018
	CSUF FEID Grant - Physics for the life sciences (PI, \$4,500)	2017
	CSUF RSCA Grant - Defining the properties of living matter (PI, \$7,500)	2017
	Marie Skłodowska-Curie Actions Research Fellowship (€195,000)	2014-2016
	Pierre-Gilles de Gennes Foundation Postdoctoral Fellowship (€55,000)	2013
	Mavis Future Faculty Fellowship for Excellence in Engineering Education (\$5,000)	2012
	Beckman Institute Graduate Research Fellowship (\$30,000)	2010

Honors & Awards	Outstanding Achievements in Teaching, CSUF	2019
	Faculty Advisor of Distinction, CSUF	2019
	Woodward Faculty Achievement Award	2018
	Labex CelTisPhyBio Oral Presentation Award	2015
	Lindau Nobel Laureate, 65th Annual Meeting - Selected Young Scientist	2015
	Institut Curie - Young Investigator Travel Award	2014
	Institute for Energy Technology - Geilo Soft Matter Confinement Travel Award	2013
	Institute for Complex Adaptive Matter - PhysCell: Soft and Living Matter Travel Award	2012
	BMES-SPRBM Cellular and Molecular Bioengineering Conference Travel Award	2012
	BMES Outstanding Paper in Cellular and Molecular Engineering	2011
	Shu Chien NSF-BMES Award for Excellence in Mechanobiology and Mechanotransduction	2011
	National Science Foundation Graduate Research Fellowship Honorable Mention	2010
	Excellence in Bioengineering Award, University of IL	2010
	Carl Zeiss Microscopy and Digital Imaging Application Library - <i>Drosophila</i> Embryo Axons	2010
	Institute of Genomic Biology - Microscopy and Imaging Facility - Image of the Month	2009
	NSF International Research and Education in Engineering (IREE) Travel Grant	2008
Teaching	Instructor , Phys 380 - Methods of Experimental Physics (Cal State Fullerton) F19, S21 Developing content and teaching an intermediate course on experimental physics covering analog, digital, integrated circuits, and their applications.	
	Instructor , Phys 320 - Classical Mechanics (Cal State Fullerton) S19, S20, F20 Developing content and teaching an intermediate course on classical mechanics covering Newtonian, Lagrangian, and Hamiltonian formulations.	
	Instructor , CNSM 101 - Think Like Einstein (Cal State Fullerton) F18 Developing content and teaching an introduction to critical thinking in science course. Leading the case study on the physics of Brownian motion.	
	Instructor , Phys 225L - Mechanics (Cal State Fullerton) S20, F20 Lab section of introductory calculus based physics course on mechanics.	
	Instructor , Phys 225 - Mechanics (Cal State Fullerton) F16, S17, F17, S18, S19 Developing content and teaching an introductory calculus based physics course on mechanics.	
	Instructor/Coordinator , Scientific Communication (Univ. Paris Descartes) Sep. - Dec. 2015 Developed content and taught a course on scientific writing, presentation, and communication to undergraduate students at the Center for Research and Interdisciplinarity.	
	Instructor , Bootcamp in Quantitative Biology (Univ. Paris Diderot) Sept. 2015 Developed content and taught a course on physics and chemical kinetics for Masters level students at the Center for Research and Interdisciplinarity.	
	Instructor , Bootcamp in Quantitative Biology (Univ. Paris Diderot) Sept. 2014 Developed content and taught a course on physics for Masters level students at the Center for Research and Interdisciplinarity.	
	Teaching Assistant , ME370 - Mechanical Design I (Univ. of Illinois) Jan. - May 2013 Instructed an undergraduate laboratory course on kinematics and dynamics of machinery.	
	Instructor , Introduction to Biomechanics (Univ. of Illinois) Jul. 2011	

Taught a course on the relationship between structures and biomechanics in a summer camp for high-school girls interested in science.

Advising & Mentorship

<i>Undergraduate Researcher</i> , Farbod Movagharnemati (Physics) Non-equilibrium dynamics of centimeter-scale active matter.	Sept 2020 - present
<i>Undergraduate Researcher</i> , Alistair Dumaup (Physics) Non-equilibrium dynamics of millimeter-scale active matter.	Jan 2020 - present
<i>Graduate Researcher</i> , Ryan Muoio (Physics) Entropy production in non-equilibrium systems.	May 2019 - present
<i>Undergraduate Researcher</i> , Anthony Estrada (Physics) Non-equilibrium dynamics of centimeter-scale active matter.	May 2019 - present
<i>Graduate Researcher</i> , Hunter Seyforth (Physics) Active baths of bacteria and enzymes.	May 2019 - present
<i>Undergraduate Researcher</i> , Mauricio Gomez (Physics) Active microrheology with optical tweezers.	June 2017 - present
<i>Undergraduate Researcher</i> , Lauren Nguyen (Chemistry) Non-equilibrium dynamics of millimeter-scale active matter.	May 2019 - May 2020
<i>Graduate Researcher</i> , Sara Al Bassri (Physics) Non-equilibrium dynamics of self-propelled colloids.	Jul 2018 - May 2020
<i>Undergraduate Researcher</i> , Alex Vidal (Computer Science) Digital image analysis of microscopic dynamics.	Jan 2018 - May 2020
<i>Undergraduate Researcher</i> , Corbyn Jones (Physics and Engineering) Developing and calibrating optical-mechanical measurements for biophysical studies.	Aug. 2016 - May 2020
<i>Undergraduate Researcher</i> , Lovell Willmore (Computer Science) Computational modelling of active matter.	Nov 2016 - Dec 2019
<i>Undergraduate Researcher</i> , Monika Tadrous (Mechanical Engineering) Low-cost rapid fabrication of microfluidic systems.	Sept 2016 - Dec 2019
<i>High School Internship</i> , Maria Alexandrescu and Karin Sherb Macroscopic active matter made from camphor swimmers.	June - Aug 2018
<i>Undergraduate Researcher</i> , Abi Mendez (Biomedical Engineering) Low-cost rapid fabrication of microfluidic systems (Project RAISE student).	June - Aug 2017
<i>Undergraduate Researcher</i> , Nicole La (Chemistry) Nonequilibrium dynamics of self-propelled colloids (Project RAISE student).	June - Aug 2017
<i>Undergraduate Researcher</i> , Hunter Seyforth (Physics) Developing a custom microscope to study Brownian motion.	May 2017 - 2019
<i>Undergraduate Researcher</i> , Paris Pijuan (Physics) Nonequilibrium dynamics of self-propelled colloids.	Apr 2017 - Aug 2018
<i>Undergraduate Researcher</i> , Sara Al Bassri (Biochemistry) Fluid physics of swimming micro-organisms.	Mar 2017 - May 2018
<i>Undergraduate Researcher</i> , Danielle Posey (Biology)	Aug 2016 - May 2018

Nonequilibrium vesicle dynamics in fibroblasts.

Graduate Researcher, Samantha Knoll (Applied Mechanics) **Aug. 2011 - May 2016**
Investigating nanoscale oscillations of cellular motion on soft deformable hydrogels.

Senior Thesis Project, Aaron Silver (Biology) **May 2010 - Jul. 2012**
Investigated subcellular dynamics of neurons using nanometer precision particle tracking.

Undergraduate Researcher, Julia Belopolsky (Biology) **Jan. - Jul. 2011**
Investigated the role of mechanical signal transduction in cancer cell metastasis.

High School Student, Han Raut (High School Student) **Summer 2010 - 2011**
Investigated the beating dynamics of *in vitro* cardiac cells using high-speed video microscopy.

Graduate Researcher, Shabana Afsar (Nanotechnology) **Mar. - May 2010**
Investigated the beating dynamics of *in vitro* cardiac cells using high-speed video microscopy.

Undergraduate Researcher, Emily Havansek (Biology) **Dec. 2009 - May 2010**
Investigated growth and development of *in vitro* neuron-myocyte co-cultures on various surfaces.

Undergraduate Researchers, Phil Bell and Jana DiDomenico (Biology) **Dec. 2009 - May 2010**
Investigated the mechanical sensitivity of cancer cells on hydrogels of varying stiffness.

Graduate Researcher, Mehmet Kural (Physics) **May - Aug. 2009**
Investigated actin dynamics in transfected fibroblasts in response to applied mechanical strain.

Graduate Researcher, Wagner Nishitani (Bioengineering) **Sept. 2007 - Jan. 2008**
Trained in embryonic dissection, immunocytochemical staining, and fluorescent imaging.

Outreach

BuzzFeed Science Section **Jan. 2017**
Served as the physics expert for a popular science video created about floating on mashed potatoes. (<https://www.buzzfeed.com/kater11/can-you-float-on-mashed-potatoes>)

Science Magazine (AAAS) - Science in the Classroom **2014 - 2015**
Developed annotated research papers and teaching materials designed to help students understand the structure and workings of professional scientific research. (<http://scienceintheclassroom.org/research-papers/cells-mix-things-actively-stirring-their-insides/university>)

Institut Curie Integration Day Demonstration **Nov. 2014**
Presented introductory concepts of biophysical research with a demonstration of optical tweezers to incoming non-research hospital staff.

Ecole Polytechnique Student Demonstration **Nov. 2013**
Presented introductory biophysical concepts and an experimental demonstration to M1 students from Ecole Polytechnique to introduce them to scientific research at the Institut Curie.

S.W.E. Graduate Education Seminar **Feb. 2013**
Co-lectured a seminar to teach research skills and techniques for effective literature review.

S.W.E. Undergraduate Education Seminar **Oct. 2011**
Co-lectured a seminar organized by the Society of Women Engineers (SWE) to provide guidance on obtaining an undergraduate research position.

G.A.M.E.S. Camp Lab Instructor **Jul. 2011**
Designed, coordinated, and instructed a course on the interface of biomechanics and structural mechanics to promote engineering and science among young women.

	S.W.E. Graduate Education Panel	Apr. 2011
	Participated in a panel organized by the Society of Women Engineers (SWE) to promote graduate education among women and minorities.	
	The Art of Science	Mar. 2011
	Presented an artistic microscopy image of a <i>Drosophila</i> embryo at an art gallery in downtown Champaign to promote science in the community. The image is currently on public display at Willard Airport in Champaign, IL.	
	G.A.M.E.S. Camp Student Recruitment	Feb. 2011
	Recruited students for Girls Adventures in Math, Engineering, and Science summer camp run by the Women in Engineering (WIE) Program.	
Grants Awarded	NSF DMS AM - Collaborative Proposal	2020-2023
	<i>Active noise in the dynamics of self-propelled particles — stochastic modeling and experiment</i>	
	Co-PI on a collaborative grant (w/ N. Brubaker at CSUF) to develop a mathematical framework to model active noise in self-propelled particles and its connection to physical law. Active self-propelled particles that consume energy to drive persistent motion are a model building block of many complex dynamical systems. Investigating how active noise drives dynamics holds promise to revolutionize our understanding of non-equilibrium systems and the associated mathematical techniques, much like our mathematical understanding of thermal noise revolutionized thermodynamics and material science. (\$364,582 to CSUF)	
	NSF DMR CMP - Collaborative Proposal	2020-2023
	<i>Enzyme-Powered, Programmable Active Matter</i>	
	PI on a collaborative grant (w/ J. Ross at Syracuse Univ. and B. Rogers at Brandeis Univ.) to create a series of active matter particles, powered by enzymes that span the nanoscale to mesoscale. The particles will be characterized individually and serve as an active bath to understand how energy is used and dissipated to gain work from noise in non-equilibrium systems. (\$824,208 total, \$253,117 to CSUF)	
	CSU Fullerton - RSCA Award	2019
	<i>Extracting the signature of life from noise</i>	
	PI on an intramural grant (Research Scholarly and Creative Activities) to investigate the non-equilibrium energetics of a micro-swimmer and generate preliminary data for external grant applications. (\$15,000)	
	CSU Fullerton - RSCA Award	2018
	<i>Making the connection between microscopic jiggling, schools of fish, and flocks of birds</i>	
	Co-PI on an intramural grant (Research Scholarly and Creative Activities) to investigate a model for active matter via computational and experimental approaches and generate preliminary data for external grant applications. (\$15,000)	
	CSU Fullerton - RSCA Award	2018
	<i>Development of a microfluidic negative pressure device</i>	
	Co-PI on an intramural grant (Research Scholarly and Creative Activities) to investigate how plants can create negative pressure to drive fluid motion and generate preliminary data for external grant applications. (\$15,000)	
	CSU Fullerton - FEID Award	2017
	<i>Physics for life and health sciences</i>	
	PI on an intramural grant (Faculty Enhancement and Instructional Development) to develop educational materials for PHYS211 - Mechanics targeted towards example relevant in the life and health sciences. (\$4,500)	

CSU Fullerton - RSCA Award **2017**
Defining the properties of living matter
PI on an intramural grant (Research Scholarly and Creative Activities) to investigate defining the nonequilibrium properties of living matter and generate preliminary data for external grant applications. (\$7,500)

Research Executive Agency - European Union **2014-2016**
The mechanics and transport of the active cytoskeleton in biomimetic and living cellular systems
Wrote a Marie Curie Actions research fellowship proposal (Physics division) to investigate the role of non-equilibrium activity in determining the mechanics and transport occurring in biological systems by utilizing minimal biomimetic model systems and living cells. (€194,047)

Pierre-Gilles de Gennes Fondation **2013**
The mechanics of the actin cortex in cancer cells
Collaborated with team leader to write a research proposal for postdoctoral funding to investigate membrane cortex interactions in living cells. (€55,000)

NSF Equipment Proposal **2011**
Towards a Neuro-mechanical Memory Element
Wrote a supplemental equipment proposal for an EM-CCD camera and high-resolution oil immersion optics for investigating subcellular dynamics using fluorescent biosensors. (\$32,000)

NSF International Research and Education in Engineering **2008**
Thermomechanical studies of cells with nano-probes
Participated in the proposal process to obtain funding for a 6 month international research collaboration with the Max Planck Institute in Germany. (\$20,000)

**Workshops &
Schools**

UCSF-QCB Cell Modeling Hackathon (Half Moon Bay, California) **Jan 2020**
A workshop funded by NSF designed to bring together experimentalists and modelers to develop collaborations. Selected as one of 30 participants.

NSF-MPS New Investigators Workshop (Alexandria, VA) **Sept 2019**
A workshop for new PI's to introduce the funding initiatives at the National Science Foundation.

Negative pressure in Multiphase Environments (Ulm, Germany) **Apr 2019**
An interdisciplinary workshop to discuss the physics and chemistry of negative pressure systems with multiple phases with the motivation of developing new ways to understand water transport in plants.

UCSF-QCB Cell Modeling Hackathon (Half Moon Bay, California) **Jan 2019**
A workshop funded by NSF designed to bring together experimentalists and modelers to develop collaborations. Selected as one of 30 participants.

France/USA Workshop in Translational Chemistry (Toulouse, France) **Jun 2018**
A workshop funded by NSF, Fulbright, and LSAMP, to promote interdisciplinary undergraduate research. Attended as LSAMP iREU mentor.

AAAS Science in the Classroom (Washington, DC) **Sept 2017**
A workshop developed by the American Association for Advancement of Science to use their SitC platform to bring primary literature into high-school and university classrooms. Selected as one of 28 participants.

Lindau Nobel Laureate Meeting (Lindau, Germany) **June 2015**
The 65th meeting highlighted Nobel Laureates and young scientists in the fields of physiology and

medicine, physics, and chemistry. The meeting was an informal venue for discussion between current and future scientific leaders.

Weizmann-Curie Biological Physics Workshop (Rehovot, Israel) **Apr. 2015**
A workshop to develop interdisciplinary collaborations between Institut Curie and the Weizmann Institute on topics in physics of biological systems.

Circle Meeting on Biological Physics (AMOLF Amsterdam, Netherlands) **Apr. 2015**
A meeting to bring together students, postdocs, and PIs centered around cytoskeletal architecture, multicellular systems, and cell signaling. Acted as a session chair.

Modeling Cellular Processes in Space and Time (EMBL - Porquerolles, France) **Oct. 2014**
A workshop on mathematical modeling of biological systems with a focus on practical work in small groups to cover modern modeling methods and advanced computational tools.

Forces in Tissues (Universite Paris 7 Diderot, France) **May 2014**
A workshop focused on 'chalk talks' on measuring forces and stresses in-situ in living tissues to understand the interplay between genetics and mechanics. Resulted in joint publication.

Leadership and Management Course (Institut Curie Paris, France) **May 2014**
A course focused on developing leadership, management, and communication skills to minimize conflict and maximize productivity in a teamwork-oriented environment.

Circle Meeting on Biological Physics (MPI-PKS Dresden, Germany) **Apr. 2014**
A meeting to bring together students, postdocs, and PIs that apply experimental and theoretical approaches in physical biology ranging from the molecular, cellular, and tissue level.

CRI Teaching Leadership Workshop (CRI Paris, France) **Mar. 2014**
A leadership program focused on bringing together world leaders in education with young teachers and researchers to develop innovative approaches to "Learning and Teaching Through Research". Featured in video: <https://vimeo.com/118113927>

P-G. de Gennes Advanced School on Cellular Biophysics (Hyerres, France) **Sept. 2012**
An advanced summer school aimed at researchers at the interface of biology and physical science.

Nano-biophotonics Summer School (Urbana, IL) **Oct. 2009**
Principles of nano-biophotonics with a emphasis on technologies used in bimolecular sensing.

GEM4 Summer School - Cellular and Molecular Mechanics (Urbana, IL) **Jun. 2009**
Introduction for young researchers to mechanics and thermodynamics of biological systems through experiment and theory with a focus on enabling technologies.

Center for Cell Mechanics Course Summer School (Urbana, IL) **Jul. 2007**
Introduction for young researchers to basics of cell mechanosensitivity through lectures and hands-on experiments with nano fabrication and cell culture.

Peer-reviewed Publications

* indicates equally contributing 1st authorship

† indicates corresponding author

CSUF student researchers are underlined

19. M. Leoni*, M. Paoluzzi*, S. Eldeen, A. Estrada, L. Nguyen, M. Alexandrescu, K. Sherb, **W. Ahmed**[†]. "Surfing and crawling macroscopic active particles under strong confinement — inertial dynamics". *Physical Review Research*. 2020 (DOI: 10.1103/PhysRevResearch.2.043299)
18. S. Eldeen, R. Muoio, P. Blaisdell-Pijuan, N. La, M. Gomez, A. Vidal, **W. Ahmed**[†]. "Quan-

- tifying the non-equilibrium activity of an active colloid”. *Soft Matter*. 2020 (DOI: 10.1039/D0SM00398K)
17. A. Colin, G. Letort, N. Razin, M. Almonacid, **W. Ahmed**, T. Betz, M-E. Terret, N. Gov, R. Voituriez, Z. Gueroui, M-H Verlhac. “Active diffusion in oocytes nonspecifically centers large objects during prophase I and meiosis I”. *Journal of Cell Biology*, 219(3). 2020 (DOI:10.1083/jcb.201908195)
 16. D. Posey, P. Blaisdell-Pijuan, S. Knoll, T. Saif, **W. Ahmed**[†]. “Small-scale displacement fluctuations of vesicles in fibroblasts”. *Scientific Reports* 8,13294. 2018 (DOI: 10.1038/s41598-018-31656-3)
 15. **W. Ahmed**^{*,†}, E. Fodor^{*}, M. Almonacid^{*}, M. Bussonnier, M-H. Verlhac, N. Gov, P. Visco, F. van Wijland, T. Betz. “Active mechanics reveal molecular-scale force kinetics in living oocytes”. *Biophysical Journal*. 2018 (DOI: 10.1016/j.bpj.2018.02.009)
 14. E. Fodor^{*}, **W. Ahmed**^{*}, M. Almonacid^{*}, M. Bussonnier, N.S. Gov, M-H. Verlhac, T. Betz, P. Visco, F. van Wijland. “Nonequilibrium dissipation in living oocytes”. *Europhysics Letters*. 2016 (DOI: 10.1209/0295-5075/116/30008)
 13. M. Almonacid^{*}, **W. Ahmed**^{*}, M. Bussonnier, P. Maily, T. Betz, R. Voituriez, N. Gov, M-H. Verlhac. “Active diffusion positions the nucleus in mouse oocytes”. *Nature Cell Biology*. 2015 (DOI: 10.1038/ncb3131)
 12. **W. Ahmed**, T. Betz. “Dynamic cross-links tune the solid-fluid behavior of living cells”. *Proceedings of the National Academy of Sciences USA*. 2015 (DOI: 10.1073/pnas.1507100112)
 11. **W. Ahmed**[†], E. Fodor, T. Betz. “Active cell mechanics - measurement and theory”. *Biochimica et Biophysica Acta - Molecular Cell Research*. 2015 (DOI: 10.1016/j.bbamcr.2015.05.022)
 10. S. G. Knoll, **W. Ahmed**, T. A. Saif. “Contractile dynamics change before morphological cues during fluorescence illumination”. *Scientific Reports* 5. 2015 (DOI: 10.1038/srep18513)
 9. **W. Ahmed**, T. A. Saif. “Active transport of vesicles in neurons is modulated by mechanical tension” *Scientific Reports* 4, 4481. 2014 (DOI: 10.1038/srep04481)
 8. C. Cha, E. Antoniadou, M. Lee, J. Jeong, **W. Ahmed**, T. A. Saif, S. A. Boppart, H. Kong. “Tailoring hydrogel adhesion to polydimethylsiloxane substrates using polysaccharide glue” *Angewandte Chemie IE*. 2013 (DOI: 10.1002/anie.201302925)
 7. **W. Ahmed**, B. Williams, A. Silver, T. A. Saif. “Measuring non-equilibrium vesicle dynamics in neurons under tension” *Lab on a Chip*. 2013 (DOI:10.1039/C2LC41109A)
 6. E. de Souza, **W. Ahmed**, V. Chan, R. Bashir, T. A. Saif. “Cardiac myocytes’ dynamic behavior differs depending on heart segment” *Biotechnology and Bioengineering*. 2012 (DOI: 10.1002/bit.24725)
 5. **W. Ahmed**, J. Rajagopalan, A. Tofangchi, T. A. Saif. “Neuromechanics: The role of tension in neuronal growth and memory” *Nano and Cell Mechanics*. 2012 (DOI: 10.1002/9781118482568.ch3)
 4. **W. Ahmed**, T. Li, S. Rubakhin, A. Chiba, J. Sweedler, T. A. Saif. “Mechanical tension modulates local and global vesicle dynamics in neurons” *Cellular and Molecular Bioengineering*. 2012 (DOI: 10.1007/s12195-012-0223-1)
 3. **W. Ahmed**, T. Li, S. Rubakhin, A. Chiba, J. Sweedler, T. A. Saif. “The mechanical sensitivity of vesicle dynamics of *in-vitro* and *in-vivo* neurons” *Technical Proceedings of the 2011 NSTI Nanotechnology Conference and Expo, NSTI-Nanotech*, 3 : 436-439. 2011
 2. **W. Ahmed**, M. H. Kural, T. A. Saif. “A novel platform for *in-situ* investigation of cells and tissues under mechanical strain” *Acta Biomaterialia*, 6: 2979-90. 2010 (DOI: 10.1016/j.actbio.2010.02.035)
 1. **W. Ahmed**, T. Wolfram, A. Goldyn, K. Bruellhoff, B. Aragues Rioja, M. Moller, J. P. Spatz, T. A. Saif, J. Groll, R. Kemkemer. “Myoblast morphology and organization on biochemically micro-patterned hydrogel coatings under cyclic mechanical strain” *Biomaterials*, 31: 250-8. 2010 (DOI: 10.1016/j.biomaterials.2009.09.047)

Publications in progress

* indicates equally contributing 1st authorship

† indicates corresponding author

CSUF student researchers are underlined

3. C. Jones*, M. Gomez*, R. Muoio*, A. Vidal, N. Brubaker, **W. Ahmed**[†]. “The stochastic force dynamics of a model micro-swimmer — *Chlamydomonas Reinhardtii*”. (*under review*) (arXiv:2011.12415)
2. M. Xu, W.B. Rogers, **W. Ahmed**, J.L. Ross. “Comparison of different approaches to single-molecule imaging of enhanced diffusion of enzymes”. (*in preparation*)
1. L. Willmore, N. Brubaker[†], **W. Ahmed**[†]. “A GUI to study active matter”. (*in preparation*)

Invited Seminars

29. Physics of Living Matter Workshop, Princeton Center of Theoretical Sciences (PCTS), Princeton University. “TBA”, Jan. 2021
28. Biological Physics and Physical Biology Virtual Seminar Series, University of Colorado, Boulder. “Non-equilibrium fluctuations in living matter”, Sec. 2020
27. Colorado State University, Fort Collins, CO, Department of Chemical and Biological Engineering. “Using non-equilibrium physics to learn about living matter”, Feb. 2020
26. Southern California Mechanobiology Day, University of California, Irvine, CA. “Using non-equilibrium physics to learn about living matter”, Oct. 2019
25. California State University, Pomona, CA, Department of Physics. “Using non-equilibrium physics to learn about living matter”, Oct. 2019
24. Frontiers in Soft Matter and Macromolecular Networks, University of San Diego, San Diego, CA. “Extracting activity from the non-equilibrium fluctuations of a micro-swimmer”, Sept. 2019
23. University of San Diego, San Diego, CA, Department of Physics. “Active mechanics and the forces that keep our cells alive”, Feb. 2019
22. Gordon Research Conference - Stochastic Physics in Biology, Ventura, CA. “Quantifying non-equilibrium fluctuations in living matter”, Jan. 2019
21. Harvey Mudd College, Claremont, CA, Department of Physics. “Active mechanics - The forces that keep our cells alive”, Oct. 2018
20. American Physical Society Far West Section, Plenary Lecture. “Active mechanics - The forces that keep our cells alive”, Oct. 2018
19. California State University, Los Angeles, CA, Department of Physics. “Active mechanics - The forces that keep our cells alive”, Oct. 2018
18. World Congress of Biomechanics, Dublin, Ireland. “Nonequilibrium dissipation in living oocytes”, July 2018
17. Universite Grenoble Alpes, Laboratoire Interdisciplinaire de Physique . “Active mechanics - The forces that keep our cells alive”, July 2018
16. California Institute of Technology, Pasadena, CA. Condensed Matter Physics. “Nonequilibrium dissipation in living oocytes”, May 2017
15. California State University, Fullerton, CA. Center for Computational and Applied Mathematics. “Active mechanics keeps our cells alive”, Apr. 2017
14. California State University, Fullerton, CA. Department of Biological Science. “Active mechanics keeps our cells alive”, Nov. 2016
13. Max Planck Institute for Intelligent Systems, Stuttgart, Germany. “Active mechanics reveal molecular-scale kinetics in living oocytes”, Jul. 2016
12. Materials Research Society, Phoenix, AZ. “Quantifying active mechanical properties and molecular-scale driving forces in living cells”, Mar. 2016

11. California State University, San Luis Obispo, CA. Department of Physics. “Active mechanics keeps our cells alive”, Feb. 2016
10. Lehigh University, Bethlehem, PA. Department of Physics. “Active mechanics keeps our cells alive”, Feb. 2016
9. Boston University, Boston, MA. Department of Mechanical Engineering. “Active mechanics keeps our cells alive”, Feb. 2016
8. University of California, Davis, CA. Department of Materials Science. “Active mechanics keeps our cells alive”, Feb. 2016
7. California State University, Fullerton, CA. Department of Physics. “Active mechanics keeps our cells alive”, Feb. 2016
6. Brandeis University, Waltham, MA. Department of Physics. “Active mechanics reveal molecular-scale kinetics in living oocytes”, Feb. 2015
5. Institut Curie, Paris, France. Department of Physical Chemistry (UMR168) “Neurons under tension”, Jun. 2013
4. University of California, Berkeley, CA. “Neurons under tension: An active matter approach”, Feb. 2013
3. Stanford University, Stanford, CA. “Cells under tension: A study of mechanical sensitivity”, Jan. 2013
2. University of Illinois at Urbana-Champaign, Urbana, IL. Department of Mechanical Engineering. “Neurons under tension”, Oct. 2011
1. Beckman Institute for Advanced Science and Technology, Urbana, IL. “The mechanical sensitivity of vesicle dynamics in neurons”, Feb. 2011

**Research
Presentations
& Posters**

CSUF student researchers are underlined

53. **W. Ahmed**. “The active force spectrum of a microswimmer - modeling and experiments”, American Physical Society Meeting, Mar. 2019, Boston, MA.
52. M. Gomez, C. Jones, **W. Ahmed**. “Optical tweezer measurements in Chlamydomonas”, American Physical Society Meeting, Mar. 2019, Boston, MA.
51. H. Seyforth, **W. Ahmed**. “Building a custom microscope to study Brownian motion and active matter”, American Physical Society Meeting, Mar. 2019, Boston, MA.
50. C. Jones, M. Gomez, **W. Ahmed**. “The stochastic force spectrum of a micro-swimmer”, American Physical Society Meeting, Mar. 2019, Boston, MA.
49. **W. Ahmed**. “Nonequilibrium Dissipation in Living Oocytes”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
48. P. Blaisdell-Pijuan, M. Gomez, N. La **W. Ahmed**. “Nonequilibrium Dynamics of Active Colloids”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
47. D. Posey, P. Blaisdell-Pijuan, **W. Ahmed**. “Small-scale fluctuations of cytoplasmic vesicles”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
46. M. Tadrous, A. Mendez, **W. Ahmed**. “A Low-cost Microfluidic Device to Study Nonequilibrium Physics of Colloids”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
45. S. Al Bassri, A. Vidal, **W. Ahmed**. “Visualizing Fluid Physics of Microswimmers”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
44. L. Willmore, N. Brubaker, **W. Ahmed**. “A GUI to study Active Matter”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
43. C. Jones, **W. Ahmed**. “Optical Tweezers for Force Measurement in Living Cells”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.

42. H. Seyforth, A. Vidal, **W. Ahmed**. “Building a Custom Microscope - An advanced lab to study Brownian motion”, American Physical Society Meeting, Mar. 2018, Los Angeles, CA.
41. **W. Ahmed**. “Soft, Living and Active Matter Lab”, Aspen Center for Physics - Fundamental Problems in Active Matter, Feb. 2018, Aspen, CO.
40. A. Mendez, M. Tadrous, **W. Ahmed**. “Quantifying forces and flows in a microfluidic device for biophysical studies”, CSUF Project RAISE Symposium, Aug. 2017, Fullerton, CA.
39. A. Mendez, M. Tadrous, **W. Ahmed**. “Low-cost microfluidic device for biophysical measurements”, CSUF Project RAISE Symposium, Aug. 2017, Fullerton, CA.
38. N. La, **W. Ahmed**. “Nonequilibrium dynamics of light-activated colloids”, CSUF Project RAISE Symposium, Aug. 2017, Fullerton, CA.
37. L. Willmore, **W. Ahmed**, N. Brubaker. “Computational studies of active matter”, CSUF Student Creative Activities Research Day, Apr. 2017, Fullerton, CA.
36. L. Willmore, **W. Ahmed**, N. Brubaker. “Computational studies of active matter”, CSUF NSM ICC Symposium, Mar. 2017, Fullerton, CA.
35. **W. Ahmed**. “Nonequilibrium dissipation in living oocytes”, Gordon Research Conference - Complex Active and Adaptive Material Systems, Jan. 2017, Ventura, CA.
34. **W. Ahmed**, T. Betz. “Active mechanics reveals molecular-scale force kinetics in living oocytes”, American Physical Society Meeting, Mar. 2016, Baltimore, MD.
33. **W. Ahmed**, T. Betz. “Active mechanics reveals molecular-scale force kinetics in living oocytes”, Biophysical Society Meeting, Feb. 2016, Los Angeles, CA.
32. S. Knoll, **W. Ahmed**, T. Saif. “Time Evolution of Photodamage in Fibroblasts as a Measure of Cell Contractility”, Biomedical Engineering Society Conference, Oct. 2015, Tampa, FL.
31. **W. Ahmed**, T. Betz. “Active mechanics in living oocytes reveals molecular-scale kinetics”, PhysCell2015 - From molecules to systems, Sept. 2015, Bad Staffelstein, Germany.
30. **W. Ahmed**, T. Betz. “Active mechanics in living oocytes reveals molecular-scale kinetics”, Gordon Research Conference - Motile and Contractile Systems, Jul. 2015, New London, NH.
29. **W. Ahmed**, T. Betz. “Active mechanics in living oocytes reveals molecular-scale kinetics”, Aspen Center for Physics - Single Molecule Biophysics, Jan. 2015, Aspen, CO.
28. E. Fodor, **W. Ahmed**, T. Betz, M. Bussonnier, N. S. Gov, M. Guo, V. Mehandia, D. Riveline, P. Visco, D. Weitz, F. van Wijland. “Modeling active fluctuations in living matter”, Condensed Matter in Paris, Aug. 2014, Paris, France
27. **W. Ahmed**, T. Betz. “Active mechanics and learning”, Gordon Research Conference - Physics Research and Education, Jun. 2014, South Hadley, MA.
26. **W. Ahmed**, M. Bussonnier, T. Betz. “Nonequilibrium mechanics in living oocytes”, Max Planck Institute for Physics of Complex Systems - Circle Meeting, Apr. 2014, Dresden, Germany.
25. **W. Ahmed**, M. Bussonnier, T. Betz. “Nonequilibrium activity softens the sparse actin meshwork and facilitates vesicle motion in oocytes”, Institut Curie - Physico-Chimie Department Seminar, Apr. 2014, Paris, France.
24. **W. Ahmed**, M. Bussonnier, T. Betz. “Living cells: Active at long times but passive at short times”, German Physical Society - Biological Physics, Apr. 2014, Dresden, Germany.
23. **W. Ahmed**, T. A. Saif. “Axonal force and transport in Aplysia neurons”, Global Congress on NanoEngineering for Medicine and Biology, Feb. 2014, San Francisco, CA.
22. **W. Ahmed**, T. A. Saif. “Active transport of vesicles in neurons is modulated by mechanical tension”, Biomedical Engineering Society Conference, Sept. 2013, Seattle, WA.
21. S. Knoll, **W. Ahmed**, T. A. Saif. “Active nanoscale fluctuations in cellular mechanosensing”, Biomedical Engineering Society Conference, Sept. 2013, Seattle, WA.

20. T. A. Saif, **W. Ahmed**. “Neuromechanics of neuronal transport”, Society of Engineering Science, Jul. 2013, Providence, RI.
19. **W. Ahmed**, A. Tofangchi, T. A. Saif. “Vesicle transport in in vivo neurons in response to mechanical stretch”, ASME International Mechanical Engineering Congress, Nov. 2012, Houston, TX.
18. **W. Ahmed**, B. Williams, A. Silver, T. A. Saif. “Mechanical strain affects local dynamics of vesicles in neurons”, Biomedical Engineering Society Conference, Oct. 2012, Atlanta, GA.
17. **W. Ahmed**, B. Williams, A. Silver, T. A. Saif. “Vesicle dynamics in neurons under tension: Exploration via experiments and modeling”, Physics of Cells - From Soft to Living Matter, Sept. 2012, Hyeres, France.
16. **W. Ahmed**, T. A. Saif. “Tension modulates vesicle dynamics in neurons”, BMES-SPRBM Inaugural Conference on Cellular and Molecular Bioengineering, Jan. 2012, San Juan, Puerto Rico.
15. **W. Ahmed**, T. Li, S. Rubakhin, A. Chiba, J. Sweedler, T. A. Saif. “Mechanical tension modulates local and global vesicle dynamics”, Society for Neuroscience Conference, Nov. 2011, Washington, DC.
14. **W. Ahmed**, T. Li, S. Rubakhin, A. Chiba, J. Sweedler, T. A. Saif. “Mechanical tension modulates local and global vesicle dynamics”, Biomedical Engineering Society Conference, Oct. 2011, Hartford, CT.
13. **W. Ahmed**, T. Li, S. Rubakhin, A. Chiba, J. Sweedler, T. A. Saif. “The mechanical sensitivity of vesicle dynamics of *in-vitro* and *in-vivo* neurons”, Nanotech 2011 Conference, Jun. 2011, Boston, MA.
12. **W. Ahmed**, S. Rubakhin, T. Li, A. Chiba, J. Sweedler, T. A. Saif. “Mechanical stimulation perturbs vesicle dynamics in *in-vitro* and *in-vivo* neurons”, ASME Applied Mechanics and Materials Conference, May 2011, Chicago, IL.
11. T. Li, F. Carrero-Martinez, S. Siechen, J. Sun, **W. Ahmed**, T. A. Saif, A. Chiba. “Mechanical force initiates the neuromuscular synapse”, Drosophila Research Conference, Mar. 2011, San Diego, CA.
10. **W. Ahmed**, T. Li, A. Chiba, T. A. Saif. “The mechanical sensitivity of neurotransmitter accumulation at *in vivo* synapses”, Society for Neuroscience Conference, Nov. 2010, San Diego, CA.
9. **W. Ahmed**, S. Rubakin, J. Sweedler, T. A. Saif. “Compressive force disrupts vesicle dynamics in neuronal growth cones”, Society for Neuroscience Conference, Nov. 2010, San Diego, CA.
8. **W. Ahmed** and T. A. Saif. “*In-situ* high resolution optical imaging of cells and tissues on a stretchable substrate”, 6th World Congress of Biomechanics (WCB 2010), Aug. 2010, Singapore.
7. **W. Ahmed**, T. A. Saif. “*In-situ* investigation of cells under applied mechanical strain”, Center for Nanoscale Science and Technology Workshop, May. 2010, Urbana, IL.
6. **W. Ahmed**, M. H. Kural, T. A. Saif. “Live-imaging of cells and tissues under applied mechanical strain”, Institute for Genomic Biology (IGB) Fellows Symposium, Apr 2010, Urbana, IL.
5. **W. Ahmed**, M. H. Kural, T. A. Saif. “Live-imaging of cells and tissues under applied mechanical strain”, Bioengineering @ Illinois Day, Apr. 2010, Urbana, IL.
4. **W. Ahmed**, T. A. Saif. “A study of myoblast mechanosensing”, NSF STC Site Visit for Emergent Behavior of Integrated Cellular Systems (EBICS) at MIT, Oct. 2009, Boston, MA.
3. **W. Ahmed**, T. A. Saif. “*In-vivo* live imaging of motor neurons in Drosophila embryos under applied mechanical strain”, Biomedical Engineering Society Conference, Oct 2009, Pittsburgh, PA.

2. **W. Ahmed**, R. Kemkemer, T. A. Saif. “A study of myoblast mechanosensing - An Undergraduate Research Experience”, NSF EEC Awardees Conference, Feb. 2009, Reston, VA.
1. **W. Ahmed**, T. A. Saif. “Thermo mechanical studies of cells with nano probes on Si Substrate”, NSF IREE 2008 Grantees Conference, May 2008, Washington, D.C.

University Service

Co-organizer, CSUF Center for Applied Biotechnology Studies Conference **2017-present**

Co-organizing a conference to bring experts in biotechnology to the CSUF campus.

Safety Officer, CSUF - College of Natural Sciences and Mathematics **2016-present**

Served as the Safety Officer for the Department of Physics.

Deans Business Council **Oct. 2011**

Presented Illinois Business Consulting (IBC) to business executives to share success stories, promote the organization, and solicit advice for future engagements and growth of the organization.

Illinois Business Consulting Advisory Board **Oct. 2011**

Presented a project success story and participated in discussions with business executives to define the growth of the organization.

MechSE Department Student Recruitment **Feb. 2011**

Presented “Cell mechanics, and some neuroscience” to potential graduate students.

MechSE Department Student Recruitment **Mar. 2010**

Presented “Mechanics of muscles and neurons” to potential graduate students.

MechSE Department Head Search Committee **Apr. 2009**

Participated in a committee to interview and recommend a candidate for MechSE Department Head

MechSE Department Student Recruitment **Mar. 2009**

Presented “Mechanics of the small” to potential graduate students.

Professional Service

Review Editor, *Frontiers in Physics — Soft Matter Physics* 2020 - present

Member, Biophys. Soc. Committee for Prof. Opportunities for Women (CPOW) 2018 - 2020

Reviewer, *Soft Matter* (Royal Society of Chemistry) 2019 - present

Reviewer, *Nature Physics* (Nature Publishing Group) 2019 - present

Reviewer, *Journal of Chemical Physics* (American Institute of Physics) 2018 - present

Reviewer, *Experimental Mechanics* (Society for Experimental Mechanics) 2018 - present

Reviewer, *Biophysical Journal* (Cell Press) 2014 - present

Reviewer, *Scientific Reports* (Nature Publishing Group) 2014 - present

Reviewer, *Review of Scientific Instruments* (American Institute of Physics) 2013 - present

Member, Biophysical Society 2013 - present

Member, American Physical Society 2013 - present

Professional Experience

Entrepreneurship Bridge Initiative **Jun. 2012 - 2013**

Managing Partner

Developed strategies to promote communication between engineering and business students to collaborate in entrepreneurship. Focused on connecting research, technology, and business to solve interdisciplinary problems.

Healthcare Technology Startup

Jul. 2011 - 2012

Project Manager

Oversaw the development of a new technology venture in the field of telemedicine. Managing a team of students in analysis of the competition, regulations, and the technology infrastructure.

Glebe Electronics Inc., Arlington, VA USA

Aug. 2008 - Present

Technical Consultant

Provided technical expertise on a variety of topics including electromechanical design, circuit board manufacturing, and new technology ventures.

Illinois Business Consulting, Urbana, IL USA

Mar. 2011 - Jun. 2012

Student Leadership Team

Served as a team member to define the culture of the organization and develop strategies to ensure growth and success.

Senior Manager

Led three teams of project managers and consultants to complete projects in nanotechnology, metal mining, and biopharmaceuticals. (projects ranged from *pro-bono* to \$25k)

Development Manager

Developed a metric to quantify performance of consultants and project managers. Streamlining the flow of talent through the organization. Defining strategic goals for future growth.

Project Manager

Led a team of seven consultants to research technology needs among target demographics and developed strategies for market penetration for a large international mobile communications company.

Consultant

Collaborated with a team of 7 consultants to conduct a market analysis and projected revenue model of emerging technologies for a Fortune 500 company.

Congressional Federal Credit Union, Oakton, VA USA

May 2004 - Aug. 2004

Information Systems Intern

Simulated and deployed Microsoft Project Server and SQL Server for large scale management and backup of databases.

Glebe Electronics Inc., Arlington, VA USA

May 2000 - 2003

Technical Service Assistant

Conducted electromechanical maintenance and service, alarm installation and preventative maintenance, and refurbished business equipment.