Haleh Alimohamadi

Department of Mechanical and Aerospace Engineering
University of California San Diego, 9500 Gilman Dr, La Jolla, CA, 92093
Email: halimoha@ucsd.edu
Webpage: https://haleh-alimohamadi.github.io

Research Interests

Cell mechanics, Soft matter physics, Transport in biological systems, Continuum mechanics, Biofluid

Education

2016–Present **PhD candidate**, *University of California San Diego (UCSD)*, La Jolla, USA.
Mechanical and Aerospace Engineering, Supervisor: Professor Padmini Rangamani

2012–2014 **Master of Science**, *University of Tehran*, Tehran, IR.
Mechanical Engineering

2008–2012 **Bachelor of Science**, *University of Tehran*, Tehran, IR.
Mechanical Engineering

Research Experience

2016–Present **Laboratory for Computational Cellular Mechanobiology**, *UCSD*, La Jolla, USA.
Mechanical and Aerospace Engineering, Supervisor: Professor Padmini Rangamani

2015–2016 **Industrial and Biological Multiphysics Laboratory**, *University of British Columbia*, Vancouver, CA.
Mechanical Engineering, Supervisor: Professor Dana Grecov

2012–2014 **Non-Newtonian Fluid Mechanics Laboratory**, *University of Tehran*, Tehran, IR.
Mechanical Engineering, Supervisor: Professor Kayvan Sadeghy

2011–2012 **Hydraulic Machinery Research Institute**, *University of Tehran*, Tehran, IR.
Mechanical Engineering, Supervisor: Professor Mehrdad Raisee Dehkordi

2010–2011 **Vehicle, Fuel, and Environment Research Institute**, *University of Tehran*, Tehran, IR.
Mechanical Engineering, Supervisor: Professor Vahid Esfahanian

Awards and Honors

2020 **Selected as the Siebel Scholar** ($35,000) [UCSDnews], the most prestigious annual award for academic excellence and demonstrated leadership from leading graduate schools in Bioengineering.

2020 **Distinguished PhD Student Fellowship** ($20,000), recognized as a distinguished graduate students with exceptional performance in the research, teaching activities, publications, and service to the community. Mechanical and Aerospace Engineering, UCSD.

2019 **Selected as the Rising Stars**, Mechanical Engineering, Stanford University.

2019 **Travel Grant Award**, American Society of Cell Biology (ASCB).

2017 **Outstanding Graduate Students Award**, Mechanical and Aerospace Engineering, UCSD.

2016-2018 **Visible Molecular Cell Consortium (VMCC) Fellowship**, UCSD

2016 **Mechanical and Aerospace Engineering Recruitment Fellowship**, UCSD.

2015 **Four Years Graduate Fellowship (4YF)**, the most prestigious graduate scholarship at University of British Columbia.

2012 **Exempted from Nationwide M.Sc. Entrance Exam as an Exceptionally Talented Undergraduate**, University of Tehran.

2008-2012 **Full Undergraduate Scholarship Award**, University of Tehran.

2008-2012 **Exceptional Elite Scholarship**, University of Tehran.

2008 **Ranked 366th** amongst more than 400,000 competitor in Nationwide University Entrance Exam for B.Sc. degree.

Publications (Google Scholar – Citation:149)

Journals:

PNAS, 2021 F. Yuan, **H. Alimohamadi**, B. Bakka, A. N. Trementozzi, N. L. Fawzi, P. Rangamani, J. C. Stachowiak, "Membrane bending by protein phase separation", *PNAS*, , vol. 118, no. 11, pp. e2017435118, 2021.

biorxiv, 2021 R. Nowak*, **H. Alimohamadi***, K. Pestonjamasp, P. Rangamani, V. Fowler, "Nanoscale organization of actin filaments in the red blood cell membrane skeleton", *biorxiv*, 2021. (* denotes equal contribution.)

PLoS Comput. Bio, 2020 **H. Alimohamadi**, A. Smith, R. Nowak, V. Fowler, P. Rangamani, "Non-uniform distribution of myosin-mediated forces governs red blood cell membrane curvature through tension modulation", *PLoS Computational Biology*, vol. 16, no. 5, pp. e1007890, 2020.

Sci. Rep. 2020 **H. Alimohamadi**, B. Ovryn, P. Rangamani, "Modeling membrane nanotube morphology: the role of heterogeneity in composition and material properties", *Nature, Scientific Reports*, vol. 10, no. 1, pp. 1-15, 2020.

Soft Matter. 2020 R. R. Molina, S. Liese, **H. Alimohamadi**, P. Rangamani, A. Carlson"Diffuso-kinetic membrane budding dynamics", *Soft Matter*, 2020.

biorxiv, 2020 **H. Alimohamadi** , M. Bell, S. Halpain, P. Rangamani, J. C. Stachowiak, "Mechanical principles governing the shapes of dendritic spines", *biorxiv*, 2020.

Mol. Biol. Cell 2018 **H. Alimohamadi***, R. Vasan*, J. Hassinger, J. Stachowiak, P. Rangamani, "The role of traction in membrane curvature generation", *Molecular Biology of the Cell*, vol. 29, no. 16, pp. 2024-2035, 2018. (* denotes equal contribution.)

Biomolecules 2018 **H. Alimohamadi**, P. Rangamani, "Modeling membrane curvature generation due to membrane-protein interactions", *Biomolecules*, vol. 8, no. 4, pp. 120-145, 2018. * Our paper has been selected as a hot paper by the editors and has been posted at the Editor's Choice Articles page [Link].

Korea-Aust Rheol J 2016 **H. Alimohamadi**, M. Akram, K. Sadeghy, "Flow of a casson fluid through a locally-constricted porous channel: a numerical study", *Springer/Korea-Australia Rheology Journal*, vol. 28, no. 2, pp. 129137, 2016.

J. Rheol 2016 **H. Alimohamadi**, K. Sadeghy, "On the use of magnetic fields for controlling the temperature of hot spots on porous plaques in stenosis arteries", *Journal of the Society of Rheology*, vol. 43, pp. 135-144, 2016.

IJFMR 2015 **H. Alimohamadi**, M. Imani, B. Forouzandeh "Computational analysis of transient non-Newtonian blood flow in magnetic targeting drug delivery in stenosed carotid bifurcation artery", *International Journal of Fluid Mechanics Research*, vol. 42, no.2, pp. 149-169, 2015.

IJCMESM 2014 **H. Alimohamadi**, M. Imani, "Transient non-Newtonian blood flow under magnetic targeting drug delivery in an aneurysm blood vessel with porous walls", *Taylor and Francis/ International Journal for Computational Methods in Engineering Science & Mechanics*, vol. 15, no. 6, pp. 522-533, 2014.

IJCMESM 2014 **H. Alimohamadi**, M. Imani, "Finite element simulation of two-dimensional pulsatile blood flow through a stenosed artery in the presence of external magnetic field", *Taylor and Francis/ International Journal for Computational Methods in Engineering Science & Mechanics*, vol. 15, no. 4, pp. 390-400, 2014.

Manuscripts in preperation:

1- **H. Alimohamadi** and P. Rangamani, "The role of red blood cell tension in protecting human erythrocyte against malaria invasion".

Conferences:

Biophysical 2021 **H. Alimohamadi**, M. Bell, S. Halpain, P. Rangamani, "Biophysical Modeling of Dendritic Spine Morphology", *Biophysical Society*, pp. 47a, 2021.

Biophysical 2020 **H. Alimohamadi**, A. Smith, R. Nowak, V. Fowler, P. Rangamani, "Red blood cell curvature is controlled by the non-uniform distribution of myosin-mediated forces and membrane tension", *Biophysical Society*, pp. 231a, 2020.

Biophysical 2020 C. Uysalel, **H. Alimohamadi**, A.M. Sokac, P. Rangamani, Computational analysis of BAR domain dependent membrane modeling of microvilli formation during drosophila cellularization", *Biophysical Society*, 2020.

GRC 2019 **H. Alimohamadi**, R. Vasan, S. Rudraraju, K. Garikipati, V. Fowler,A. Smith, M. Akamatsu, P. Rangamani, "From phenomenology to membrane biology", *Gordon Research Conferences* , 2019.

Biophysical 2018 R. Vasan, J. Hassinger, **H. Alimohamadi**, David Drubin, P. Rangamani, "Energetics and stability of neck formation in yeast and mammalian endocytosis", *Biophysical Society*, pp. 281a, 2018.

Biophysical 2018 **H. Alimohamadi**, B. Ovryn, P. Rangamani, "Protein-mediated beads-on-a-string structure formation along membrane nanotubes in live cells", *Biophysical Society*, pp. 392a, 2018.

Biophysical 2018 **H. Alimohamadi**, R. Vasan, J. Hassinger, J. Stachowiak, P. Rangamani, "The role of traction in membrane curvature generation", *Biophysical Society*, pp. 281a, 2018.

ASME 2013 P. Sarmadi, **H. Alimohamadi**, M. Raisee, "Modeling and comparing pressure and temperature contours of synovial fluid in healthy knee and osteoarthritis knee joint", *Annual International Conference on Mechanical Engineering*.

Teaching Assistant

Spring 2019 **Continuum Mechanics Applied to Medicine/Biology (MAE/BENG 209)**, *UCSD, MAE Department*.
Instructor: Prof. Padmini Rangamani
∗ 100 % recommend me as a TA for this course

Winter 2019 **Thermodynamics (MAE 11)**, *UCSD, MAE Department*.
Instructor: Prof. Padmini Rangamani,
∗189 students in the class, 86% recommend me as a TA for this course

2013-2015 **Lecturer: Teaching Physics and Mathematics to high school students**, *Kherad high school, Tehran*.

Talks and Presentations

Feb. 2021 Poster presentation in Biophysical Society, Virtual.
Feb. 2020 Poster presentation in Biophysical Society, San Diego.
Dec. 2019 Poster presentation in American Society of Cell Biology (ASCB), Washington D.C.
Oct. 2019 Poster presentation in Mechbio symposium, University of California Irvine.
Jan. 2019 Poster presentation in CTSBB/VMCC workshop, Jacobs School of Engineering, UCSD.
April. 2018 Poster presentation in Research Expo'18, UCSD, Jacobs School of Engineering, La Jolla.
Feb. 2018 Talk in Biophysical Society, San Francisco.
Feb. 2018 Poster presentation in Biophysical Society, San Francisco.
April. 2017 Poster presentation in Research Expo'17, Jacobs School of Engineering, UCSD, La Jolla.
Aug. 2013 Poster presentation in ICEEE conference, Tehran.
May. 2013 Poster presentation in ASME conference, Tehran.

Mentorship

Volunteered to participate in several programs aiming to support undergraduate and minority research.

- **MAE mentorship program**: an undergraduate mentorship program for mechanical and aerospace engineering, UC San Diego.
  2019-2020 Richard Escamilla, Dhanvi Desu, and Dustin Tengdyantono
- **JUMP**: an undergraduate mentorship program at UC San Diego.
  2018-2019 Josephine Shia, Robert Korman, and Nerija Janovskyte
- **ENLACE**: a bi-national summer research program at tries to encourage the participation of high school and college students in research, while promoting cross-border friendships in the Baja California/San Diego.
  2018 Mariana Navarro and Mariana Payán (High school students),
  Project: Segmentation techniques for applications in solving partial differential equations

Service

Reviewer

- Journal of Biomechanics
- Computer Methods in Biomechanics and Biomedical Engineering
- International Journal for Computational Methods in Engineering Science & Mechanics
- Ain Shams Engineering Journal
- Journal of Porous Media
- Special Topics & Reviews in Porous Media
- Thermal and Fluids Engineering Conference

Outreach

- Volunteer for tutoring at Math Open House at UCSD (2020).
- Grading master comprehensive exam in the MAE department at UCSD (June and December, 2019).
- Volunteer for PhD visiting day in the MAE department at UCSD (March, 2019).
- Volunteer for the Johns Hopkins Center for Talented Youth workshop at UCSD (Oct, 2016).
- Organizing committee member of the Mechbio symposium at UCSD (Aug, 2016).
- Member of MAE Graduate Women's Group at UCSD (2016-Present).
- Organizing committee member of 17^{th} International Conference of Mechanical Engineering (ISME), University of Tehran (Dec, 2008).

Professional Memberships

- American Physical Society (2020).
- American Society of Cell Biology (2018-present).
- Biophysical Society (2016-present).

References

- **Dr. Padmini Rangamani**, Professor
  Department of Mechanical and Aerospace Engineering, University of California San Diego
  ✉ padmini.rangamani@eng.ucsd.edu +1 (858) 534-4734 Homepage
- **Dr. Velia Fowler**, Professor and Chair
  Department of Biological Sciences, University of Delaware
  ✉ vfowler@udel.edu +1 (302) 831-4296 Homepage
- **Dr. Andrew McCulloch**, Distinguished Professor
  Department of Bioengineering Engineering and Medicine, University of California San Diego
  ✉ amcculloch@ucsd.edu +1 (858) 534-2547 Homepage
- **Dr. Jeanne Stachowiak**, Associate Professor
  Department of Biomedical Engineering , University of Texas at Austin
  ✉ jcstach@austin.utexas.edu +1 (512)471-5477 Homepage