

Aravind Chandrasekaran

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Education and Training

B.Tech. *Chemical Engineering*, Anna University, India, **Advisor:** Prof. T.R. Kubendran May, 2011
M.Sc. *Bioinformatics and Structural Biology*, National Tsing Hua University, Taiwan, Feb., 2014
Advisor: Prof. Lee-Wei Yang
Ph.D. *Chemistry*, University of Maryland, College Park, **Advisor:** Prof. Garegin Papoian July, 2021
Postdoctoral scholar, *Mechanical and Aerospace Engineering*, University of California Aug., 2021-
San Diego, **Advisor:** Prof. Padmini Rangamani Present

Professional Experience

Graduate Engineering Trainee, Clean Fuels Project, Reliance Industries Limited, India July- Dec. 2011
Research Assistant, Computational Biology Lab, National Tsing Hua University, Taiwan Feb. -May, 2014

Fellowships, Honors and Awards

- Chosen for the Summer Research Fellowship Programme (2010), Indian Academy of Sciences
 - Awarded the International Student Scholarship (2012, 2013), National Tsing Hua University, Taiwan
 - Awarded the Dean's Fellowship (2019, 2015, 2014), University of Maryland, College Park
 - Awarded NIH-UMD Partnership Fellowship, 2018, 2019, 2020), NINDS, NIH
 - Chosen for the Rising Stars in Soft and Biological Matter Symposium (2023), University of Chicago
 - Chosen for the Summer School 2024: Self-Organizing Matter: From Inanimate to the Animate (2024), University of Colorado Boulder
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Platform Presentations

- "Myosin and crosslinker mechanokinetics as well as actin filament treadmilling rate control actin bundle stability" at *Annual Meeting of the International Physics of Living Systems (iPoLS) Network*, May, 2018.
 - "Towards a computational model for actomyosin driven axonal guidance" at *Drosophila Neuroscience Club Seminar*, National Institutes of Neurological Diseases and Stroke (NINDS) Sep., 2019.
 - "To bundle or not - morphological transitions in actin bundles are determined by their initial polarity, myosin activity, crosslinking, and filament treadmilling" at Annual Meeting of American Institute of Chemical Engineers, Nov., 2019.
 - "Determinants of actin organization within VASP droplets - physical and kinetic", at Annual Meeting of The American Society for Cell Biology, 2023.
 - "Kinetic trapping determines actin filament organization, thereby controlling the shape of liquid droplets", at the Rising Stars in Soft and Biological Matter Symposium, 2023
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Professional Membership

- Biophysical Society (2015-16, 2019-20, 2022-Present)
 - American Society of Cell Biology (2022-23, 2024-Present)
 - American Institute for Chemical Engineers (2019-20)
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Professional Service

Leadership and Mentoring

- Daniel Mansour, 2024-Present, PhD student, Rangamani Lab, University of California San Diego
- Nathaniel Zimmerberg, 2021, PhD student, Papoian Lab, University of Maryland, College Park
- Qin Ni, 2015-2017, PhD student, Papoian Lab, University of Maryland, College Park
- Haoran Ni, 2016-2020, PhD student, Papoian Lab, University of Maryland, College Park

Outreach

- Aug., 2021 - July 2022 - Co-organized a multi-lab weekly seminar series attended by members of the Allen Institute of Cell Science, Drubin/Barnes Lab, UC Berkeley, and Rangamani Lab, UC San Diego
- Oct., 2020 - Prepared and facilitated a panel discussion on addressing impostor syndrome as part of “Grow PoLS virtual workshop: Growing equity, inclusion and diversity for the Physics of Living Systems network”
- April, 2016 - Volunteered at the *Biophysical Society* booth as part of the US Science & Engineering Festival

Manuscript Reviews

- Reviewer for *PLOS One*, *Biophysical J.*, *J. Chem. Inf. and Modeling*
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Teaching Experience

Teaching Assistant for Laboratory courses

- CHEM483 Physical Chemistry Lab I - UMD Spring 2017, Fall 2017, Spring 2018, Spring 2020
- CHEM232 Organic Chemistry Lab I - UMD Spring 2015
- CHEM132 General Chemistry Lab - UMD Fall 2014

Teaching Assistant for Lecture courses

- CHEM131 General Chemistry I - UMD Spring 2021
 - CHEM684 Chemical Thermodynamics - UMD Fall 2016 (Graduate)
 - Computational Biology - NTHU Spring 2014 (Graduate)
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Publications

1. **Chandrasekaran, A.** and Jain, S. R. (2012) Kac’s ring: Entropy and Poincaré recurrence. *Phys. A Stat. Mech. and its Appl.*, **391**, 3702
2. Li, H., Sakuraba, S., **Chandrasekaran, A.**, and Yang, L. W. (2014) Molecular binding sites are located near the interface of intrinsic dynamics domains (IDDs). *J. Chem. Inf. Model.*, **54**, 2275
3. **Chandrasekaran, A.**, Chan, J., Lim, C., and Yang, L. W. (2016) Protein Dynamics and Contact Topology Reveal Protein-DNA Binding Orientation. *J. Chem. Theory Comput.*, **12**, 5269
4. **Chandrasekaran, A.**, Upadhyaya, A., and Papoian, G. A. (2019) Remarkable structural transformations of actin bundles are driven by their initial polarity, motor activity, crosslinking, and filament treadmilling. *PLOS Comput. Biol.*, **15**(7) e1007156
5. Floyd, C, **Chandrasekaran, A.**, H Ni, Q Ni, GA Papoian (2021) Segmental Lennard-Jones interactions for semi-flexible polymer networks. *Molecular Physics*, e1910358.
6. Ciocanel, M.-V., **Chandrasekaran, A.**, Mager, C., Ni, Q., Papoian, G. A., Dawes, A. (2022). Simulated actin reorganization mediated by motor proteins. *PLOS Comput. Biol.*, **18**(4), e1010026
7. **Chandrasekaran, A.**, Papoian, G. A., and Giniger, E. (2022). Nucleation causes an actin network to fragment into multiple high-density domains. *Biophys. J.*, **121**(17), 3200
8. **Chandrasekaran, A.**, Clarke, A., McQueen, P., Fang, H.Y., Papoian, G. A., and Giniger, E. (2022). Computational simulations reveal that Abl activity controls cohesiveness of actin networks in growth cones. *Mol. Biol. of the Cell*, **33**(11), 3:ar92, 1 (Recommended to [Faculty Opinions](#))
9. Graham, G., **Chandrasekaran, A.**, Wang, L., Ladak, A., Lafer, E.M., Rangamani, P., Stachowiak, J.C. (2023). Liquid-like VASP condensates drive actin polymerization and dynamic bundling, *Nature Physics*. (Featured in [Physics Today](#))
10. Fang, H.Y., Forghani, R., Clarke, A., McQueen, P., **Chandrasekaran, A.**, O’Neil, K., Losert, W., Papoian, G. A., and Giniger, E. (2023). Enabled primarily controls filopodial morphology, not actin organization, in the TSM1 growth cone in *Drosophila*, *Mol. Biol. of the Cell*, **34**(8), 34:ar83, 1
11. Forghani, R., **Chandrasekaran, A.**, Papoian, G. A., and Giniger, E. (2023). A new view of axon growth and guidance grounded in the stochastic dynamics of actin networks, *Open Biology*, **13**: 220359
12. Graham, G., **Chandrasekaran, A.**, Wang, L., Ladak, A., Lafer, E.M., Rangamani, P., Stachowiak, J.C. (2024). Liquid-like condensates mediate competition between actin branching and bundling, *PNAS*, **121**(3), e2309152121
13. **Chandrasekaran, A.**, Graham, G., Stachowiak, J.C., Rangamani, P. (2024). Kinetic trapping organizes actin filaments within liquid-like protein droplets, *Nature Communications*, **15**, 3139

14. Walker, C., **Chandrasekaran, A.**, Mansour, D., Graham, K., Torres, A., Wang, L., Lafer, E.M., Rangamani, P., Stachowiak, J.C. (2024). Liquid-like condensates that bind actin drive filament polymerization and bundling *bioRxiv* : 10.1101/2024.05.04.592527 (Provisionally accepted with Developmental Cell)

Preprints

1. Zhu, K., Guo, X., **Chandrasekaran, A.**, Miao, X., Rangamani, P., Zhao, W., Miao, Y. (2024). Membrane curvature catalyzes actin nucleation through nano-scale condensation of N-WASP-FBP17 *bioRxiv* : 10.1101/2024.04.25.591054
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Dissertations

- Ph.D., Emergent network organizations in linear and dendritic actin networks revealed by mechanochemical simulations, University of Maryland, College Park, 2021
 - M.Sc., Protein dynamics and contact topology studies reveal characteristics of Protein-DNA binding and distribution of enzyme catalytic sites, National Tsing Hua University, Hsinchu, Taiwan, 2014
 - B.Tech., Plant Design for Manufacture of Selegiline Hydrochloride, Anna University, Chennai, 2011
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Poster Presentations

- “Dynamics features of binding residues in DNA binding proteins,” at 18th Biophysics Conference, Taiwan, July, 2013.
 - “Stability and dynamics of unipolar bundles: α - actinin, NMII-A minifilament dependence”, at Annual Meeting of the International Physics of Living Systems (iPoLS) Network, July, 2016.
 - “Stability and dynamics of unipolar bundles: α - actinin, NMII-A minifilament dependence”, at Biophysical Society Pennsylvania Network Meeting, Oct., 2016.
 - “Filament polarity and myosin concentration determine untethered actomyosin bundle stability and contractility”, at Biophysical Symposium, UMD, April, 2017.
 - “Filament polarity and myosin concentration determine untethered actomyosin bundle stability and contractility”, at Annual Meeting of the International Physics of Living Systems (iPoLS) Network, May, 2017.
 - “Towards a computational model for Abl signaling”, at Annual meeting of the Biophysical Society, March, 2019.
 - “Towards a computational model for Abl signaling”, at NINDS Annual retreat, June 2019.
 - “Computational study of Abl guidance based axonal guidance”, at Physics of Living Systems (iPoLS) Network, June, 2020.
 - “Abl tunes actin networks between cohesive and weakly-coupled states primarily through changes to actin nucleation”, at Annual Meeting of Biophysical Society, 2022.
 - “Determinants of actin organization within VASP droplets - physical and kinetic”, at Annual Meeting of The American Society for Cell Biology, 2023.
 - “Kinetic trapping determines actin filament organization, thereby controlling the shape of liquid droplets”, at Annual Meeting of Biophysical Society, 2024.
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