Ritvik **Vasan**

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Skills

General	Biophysics, Computational Methods, Data Science, Statistical methods, Machine Learning
Programming	Python, R, SQL, LaTeX, PyTorch, MATLAB, Jython, Git, ImageJ, COMSOL, SolidWorks
Soft	Communication, Collaboration, Presentation, Analytical Ability, Versatility, Creativity

Summary

I am a Scientist at the Allen Institute for Cell Science with significant experience in biophysical modeling. I leverage interdisciplinary skills including applied mathematics, computational methods, machine learning, software engineering and quantitative biology to answer complex biophysical questions. Along the way, I develop usable tools for the community. I am interested in expanding my experience in data-driven biophysical modeling and machine learning to make a lasting impact.

Education

University of California, San Diego
San Diego, CA

PhD in Mechanical Engineering (3.97/4.00) — *2017 - 2020*

M.S. in Mechanical Engineering (3.97/4.00) — *2015 - 2017*

BITS Pilani
Pilani, Rajasthan, India

B.S. in Mechanical Engineering (8.76/10.00) — *2011 - 2015*

Experience

Allen Institute for Cell Science
Seattle, WA

Scientist — *July 2020 - Present*

- Executed research using both *data-driven biophysical* models and *advanced machine learning* based data-driven models.
  - Initiated project leveraging *Conditional Variational Autoencoders* to analyze 33000 cell image features.
  - Implemented and published a force-inference *Python package* named DLITE to estimate forces from cell monolayers.
- Worked in an *open-science* and *team-science* environment.
- Coordinated collaboration between the Allen Institute for Cell Science and UCSD.

Laboratory for computational and cellular mechanobiology, UCSD
San Diego, CA

PhD candidate — *Dec 2015 - Present*

- Transitioned research from *bio-medical device prototyping* to *computational biophysics*.
- Published *6 peer reviewed papers in 3 years*, before most peers.
- Participated as *chair and platform speaker* in 3 international conferences including *Biophysical Society*.
- Awarded competitive *Frontiers of Innovation and Scholars Program (FISP)* fellowship and the *UCSD outstanding graduate student award* ($\sim$ 2 % acceptance rate).
- Created 1 open-source tool that has received press attention from websites like *phys.org, sciencedaily.com and jacobsschool.ucsd.edu*.
- Led collaborative teams of scientists across 4 universities.

Nano-bio imaging and devices lab, UCSD
San Diego, CA

Research assistant — *Sept - Dec 2015*

- Implemented preliminary protocols to develop *nano-bowls* for targeted drug delivery.
- Systematically analyzed for the presence of nano-bowls using a Scanning Electron Microscope (SEM).
- Briefed supervisors on my assessment of the capabilities of nano-bowl technology.

Applied physics and instrumentation lab, Indian Institute of Science
Bangalore, India

Research assistant — *July 2014 - Aug 2015*

- Designed a proof of concept of an *affordable* and *portable* cell-phone microscope for malaria diagnosis.
- Implemented machine learning algorithms for the detection of malaria parasite.
- Created a company *MuScope* and acquired seed funding worth 10000 USD.
- Selected as one of the *top innovation projects in India* for the Gandhian award by SRISTI.
- Publicized work through national newspapers and networks.

Mechanical engineering lab, Indian Institute of Science
Bangalore, India

Research assistant — *May - July 2014*

- Determined stiffness of MCF-7 breast cancer cells using cell aspiration techniques, atomic-force microscopy (AFM) and micro-grippers.

Activities

- **Startup competitions**: Winner, 2019 IPHatch, Hong Kong. Pitched a business plan and technical details for a startup utilizing image processing IP made available through the competition.
- **Social innovation competitions**: Winner, 2014 SRISTI grant, India. Pitched a preliminary prototype of a cellphone microscope and received funding for executing a market-viable product.
- **Graduate mentor**: Directed 4 undergraduates and 1 junior graduate student on software engineering tasks and their research.
- **Teaching assistant**: Held discussion sessions and designed assignments for various biomechanics classes and a workshop on Git, Python and UNIX.
- **Outreach**: Designed and advised research projects for high school students through outreach programs like the Center for Talented Youth (CTY) and ENLACE.
- **Web development**: Created 2 research-lab websites and a side-project website at *happyhoursinbangalore.appspot.com* to return happy hour information for every bar near a given location in Bangalore.

Publications

(* denotes equal contribution)

2020	**Applications and challenges of machine learning to enable realistic cellular simulations** **Vasan**, Rowan, Lee, Johnson,Rangamani, Holst	*Frontiers in Physics*
2020	**Branched actin filament self-organization and force generation during clathrin-mediated endocytosis** Akamatsu, **Vasan**, Serwas, Ferrin, Rangamani, Drubin	*eLife*
2019	**A mechanical model reveals that non-axisymmetric buckling lowers the energy barrier associated with membrane neck constriction** **Vasan**, Rudraraju, Akamatsu, Drubin,Garikipati, Rangamani	*Soft Matter*
2019	**DLITE uses cell-cell interface movement to better infer cell-cell forces** **Vasan**, Maleckar, Williams, Rangamani	*Biophysical Journal*
2018	**The role of traction in membrane curvature generation** Alimohamadi*, **Vasan***, Hassinger, Stachowiak, Rangamani	*Molecular Biology of the Cell*
2018	**Intracellular membrane trafficking: modeling local movements in cells** **Vasan**, Akamatsu, Schoeneberg, Rangamani	*Springer*

Conferences

2019	**Chair** Cell mechanics, mechanosensing and motility, Biophysical Society meeting	*Baltimore, MD*
2019	**Platform speaker** Biophysical Society meeting	*Baltimore, MD*
2018	**Poster** American Society for Cell Biology meeting	*San Diego, CA*
2018	**Poster** Biophysical Society meeting	*San Diego, CA*
2017	**Platform speaker** FISP symposium	*San Diego, CA*
2017	**Poster** Biophysical Society meeting	*New Orleans, LA*

Awards

2017	**Outstanding graduate student** Mechanical and Aerospace Engineering	*UCSD*
2016	**Frontiers of Innovation and Scholars Program (FISP) fellowship**	*UCSD*
2014	**Social innovation grant**	*SRISTI*
2011	**Merit scholarship** $\sim$ 1 % acceptance	*BITS Pilani*
2011	**KVPY scholarship** $\sim$ 1 % acceptance	*Indian Institute of Science*
2011	**INSPIRE scholarship** $\sim$ 1 % acceptance	*CBSE*

References

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