Ritvik Vasan

Data and modeling scientist
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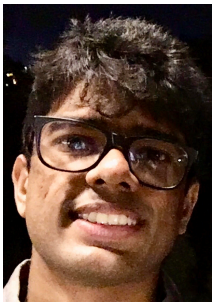

PROFILE

I am a data scientist and computational physicist with expertise in applying theoretical and statistical algorithms to biophysical problems.

EDUCATION

UC SAN DIEGO
PH.D IN MECHANICAL ENGINEERING
Expected 2020 | San Diego, CA

UC SAN DIEGO
M.S IN MECHANICAL ENGINEERING
June 2017 | San Diego, CA
Cum. GPA: 3.97/4.00

BITS PILANI
BE IN MECHANICAL ENGINEERING
Aug 2015 | Pilani, Rajasthan
Cum. GPA: 8.76/10.00

SKILLS

PROGRAMMING
Python • PyTorch • TensorFlow • MATLAB • Github • Git • C++ • OpenCV • R

SOFTWARE PACKAGES
Solidworks • COMSOL • Inventor • Cadence • LabView • AutoCAD

HARDWARE PLATFORMS
Raspberry Pi • Beaglebone Black • Arduino • Electronic sensors

PRESS RELEASES

• Measuring cell-cell forces from snapshots using time-lapse images
*phys.org/news/*2019 − 11 − *cell* − *cell* − *snapshots* − *time* − *lapse* − *videos* − *cells.html*
jacobsschool.ucsd.edu/news/news_releases/release.sfe?id = 2887

EXPERIENCE

ALLEN INSTITUTE FOR CELL SCIENCE | TRAINEE
June 2019 - September 2019 | Seattle, WA
- Built a fully factorizable probabilistic model of cell structures using a conditional variational autoencoder. github.com/AllenCellModeling/CVAE_testbed.
- Mentor. Dr. Gregory Johnson

ALLEN INSTITUTE FOR CELL SCIENCE | TRAINEE
June 2018 - September 2018 | Seattle, WA
- Created an open source force-inference Python package named DLITE to estimate cell-cell forces from max projects of z-stacks in segmented images. github.com/AllenCellModeling/DLITE.
- Mentors: Dr. C. Dave. Williams, Dr. Molly M. Maleckar.

LABORATORY FOR CELLULAR AND COMPUTATIONAL MECHANOBIOLOGY |PHD CANDIDATE
Dec 2015 - Present | UC San Diego, CA
- Developed theoretical frameworks adopting differential geometry techniques used in computer graphics to estimate forces from cell membrane shapes at the nanometer length scale. github.com/ritvikvasan/EMM
- Designed a pipeline that models the spatio-temporal distribution of actin filaments during mammalian clathrin-mediated endocytosis. github.com/DrubinBarnes/AkamatsuCMEmanuscript
- Validated a 3D membrane mechanics Iso-Geometric Analysis (IGA) framework using axisymmetric modeling to investigate constriction and scission of tubular membrane necks. github.com/ritvikvasan/Membrane-neck-formation
- Led collaborative teams of scientists across multiple universities.
- Mentor: Prof. Padmini Rangamani

NANO-BIO IMAGING AND DEVICES LAB | RESEARCH ASSISTANT
Sep 2015 - Dec 2015 | UC San Diego, CA
- Implemented preliminary protocols to develop nano-bowls for targeted drug delivery.
- Mentor: Prof. Ratneshwar Lal

APPLIED PHYSICS AND INSTRUMENTATION LAB | RESEARCH ASSISTANT
July 2014 - Sep 2015 | Indian Institute of Science, Bangalore
- Designed a proof of concept of an affordable and portable cell-phone microscope for malaria diagnosis.
- Selected as one of the top innovation projects in India for the Gandhian award by SRISTI.
- Publicized work through national newspapers and networks.
- Mentors: Prof. Sai Siva Gorthi, Prof. Anil Gupta.

LEADERSHIP

- Teaching assistant for MAE 209 (Continuum mechanics applied to medicine/ biology) , MAE 110A (Thermodynamics), Software Carpentry workshop (a 4 day workshop on UNIX, Git, Python and R)
- Graduate mentor for the Center for Talented Youth (CTY) and ENLACE - 2 summer outreach programs designed to guide talented high school students
- Graduate mentor to 3 CS undergraduate students working on ImageJ plugin extensions of DLITE (Dynamin Local Intercellular Tension Estimation) and EMM (Endocytic Membrane Modeling)
- Graduate mentor to an ME masters student working on a Python implementation of SPHARM-MECH, a 3D preferred curvature based energy minimization toolkit

AWARDS

2017 Outstanding Graduate Student
2016 Frontiers of Innovation and Scholars Program (FISP)

PUBLICATIONS

2019 Vasan*, Rowan, Lee, Johnson,Rangamani, Holst .
Applications and challenges of machine learning to enable realistic cellular simulations

2019 Vasan*, Rudraraju, Akamatsu, Drubin,Garikipati, Rangamani .
A mechanical model reveals that non axisymmetric buckling lowers the energy barrier associated with membrane neck constriction

2019 Akamatsu, Vasan*, Serwas, Ferrin, Rangamani, Drubin .
Branched actin filament self-organization and force generation during Clathrin-mediated endocytosis

2019 Vasan*, Maleckar, Williams, Rangamani .
DLITE uses cell-cell interface movement to better infer cell-cell forces.

2018 Vasan*, Alimohamadi, Hassinger, Stachowiak, Rangamani
The role of traction in membrane curvature generation

2018 Vasan*, Akamatsu, Schoeneberg, Rangamani
Intracellular membrane trafficking: modeling local movements in cells

CONFERENCES

2019 Chair, Biophysical Society meeting
Cell mechanics, mechanosensing and motility

2019 Talk, Biophysical Society meeting
Self-organization and force production by the branched actin cytoskeleton during mammalian Clathrin-mediated endocytosis

2019 Talk, Biophysical Society meeting
Inferring cell colony forces across time from tight junction intersections in human induced pluripotent stem cells

2019 Poster, American Society for Cell Biology .
A new method for tracking cell-cell forces reveals that tension changes during colony rearrangement

2018 Poster, Biophysical Society meeting
Actin generated forces during mammalian endocytosis

2017 Poster, Biophysical Society meeting
Energetics of membrane necking: role of forces and protein induced curvature