POURIA A. MISTANI

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EDUCATION

University of California, Santa Barbara, USA *Sep 2020*
Ph.D. in Mechanical Engineering, emphasis in Computational Science & Engineering (CSE)
Title: *Large Scale Simulations and Stochastic Modeling of Interfacial Transport Processes*
Advisor: Prof. Frédéric G. Gibou

University of California, Riverside, USA *Jun 2016*
M.S. in Physics, emphasis in Computational Astrophysics

Sharif University of Technology, Iran *Jun 2013*
B.S. in Aerospace Engineering & Physics (double major)

RESEARCH INTERESTS

- Computational Complex Systems
- Multiscale Modeling & Simulations
- High Performance Scientific Computing
- Artificial Intelligence (AI)

EXPERIENCE

Merck & Co. Oct 2020 - present
Postdoctoral Research Fellow *Merck Research Laboratory (MRL)*

· Multiscale modeling of biotherapeutics and vaccines. Developing next-generation computational and statistical tools to predict and mitigate physical instability challenges in protein-based formulations.

University of California Santa Barbara Sep 2016 - Sep 2020
Teaching/Research Assistant/Associate *Departments of Mechanical Engineering & Physics*

· Engineering Dynamics (main instructor)
· Engineering Statics; Fluid Mechanics I, II (twice each); Engineering Vibrations (twice)
· Intermediate Mechanics

University of California Riverside Sep 2013 - Jul 2016
Teaching/Research Assistant *Department of Physics*

· General Physics Discussions (sections 2A, 2B, 2C)
· Physics General Labs (sections 2LA, 2LC, 2C)

Research Center of Intelligent Signal Processing Jan 2012 - Apr 2013
Scientific Software Developer *Tehran, Iran*

· I worked on development of a real-time star identification system.

Sharif University of Technology Sep 2009 - Jun 2013
Teaching Assistant *Aerospace Engineering Department*

· Orbital Mechanics: I TA'ed for Prof. Nima Assadian for 4 consecutive semesters, and another semester for Prof.Seid Hossein Pourtakdoust.
· Aircraft Design II: I TA'ed for Prof. Afshin Banazadeh.

HONORS & AWARDS

- **2020:** Graduate Division Dissertation Fellowship Award, UC Santa Barbara, USA
- **2019:** Travel award (est. value $650) for SIAM conference on computational science and engineering, Spokane, USA
- **2017:** Finalist for the 3^{rd} edition of the IEEE entrepreneurship forum and startup contest IEEE Robotics and Automation Society (IEEE RAS)
- **2015:** FIELDS Fellowship for Big Data and Visualization, NASA MIRO program, USA
- **2015:** Michael Devirian award for outstanding research by a 2^{nd} year graduate student in department of physics, UC Riverside
- **2014:** Visiting Scientist Scholarship (est. value $\$2,000$) at Institute for Theory and Computation (ITC), Harvard-Smithsonian Center for Astrophysics (CfA), Harvard University
- **2013:** Winner of Dean's Distinguished Fellowship Award, UC Riverside, USA
- **2013:** Merit based admission offer to the graduate program in aerospace engineering, Sharif University of Technology, Iran
- **2013:** Ranked 1^{st} among BS students in department of aerospace engineering, Sharif University of Technology, Iran
- **2008:** Top 0.1% (rank 258) among more than $300,000$ high school students in the national university entrance exam, Iran
- **2007:** 4 year National Elite Foundation Undergraduate Fellowship Award, Iran
- **2007:** Elected member of the Iranian National Elite Foundation (INEF)
- **2007:** Silver Medal in the third National Olympiad in Astronomy, Iran
- **2006:** Ranked 1^{st} in the first National Basij Olympiad in Astronomy, Iran

TECHNICAL SKILLS

Computer Languages	C++, Qt, Python, MATLAB, HTML
Scientific Computing	MPI, PETSc, Boost, Voro++, Scipy, Scikit-Learn, Tensorflow, Keras
Visualization	Paraview, Matplotlib, Seaborn
Tools	Git, Vim, Qt Creator
Supercomputing	Stampede/-2 (TACC), Odyssey (Harvard), Comet (SDSC).

MENTORING

- Menghang (David) Wang, College of Creative Studies, UC Santa Barbara 2019 - 2020

PROPOSALS AND GRANTS

Co-PI of Summer Undergraduate Research Fellowship (SURF) 2019
Project: Globular clusters as cosmic tracers of galaxy cluster environment

· College of Creative Studies, UCSB. PI: Frederic Gibou; Undergraduate Student: Menghang Wang

Co-PI of TACC *Stampede* computing grant 2016
Project: Dwarf Galaxies as Cosmological Laboratories of Galaxy Formation

· AST160006, $740,082.0$ of cpu cores-hours (est. value $\$25,697.52$). PI: Laura Sales

PUBLICATIONS

Journal Papers

- A fractional stochastic theory for interfacial polarization of cell aggregates,
  P Mistani, S Pakravan, F Gibou; *Under Review* 2020
- Solving inverse-PDE problems using physics-aware neural networks,
  S Pakravan[†], P Mistani[†], MA Aragon-Calvo, F Gibou ([†]equal contribution); *Under Review* 2020
- A parallel Voronoi-based approach for meso-scale simulations of cell aggregate electropermeabilization,
  P Mistani, A Guittet, C Poignard, F Gibou; *Journal of Computational Physics* 2019
- Island dynamics model on parallel Quadtree grids,
  P Mistani, D Bochkov, A Guittet, J Schneider, D Margetis, C Ratsch, F Gibou;
  Journal of Computational Physics 2018
- On the assembly of dwarf galaxies in clusters and their efficient formation of globular clusters,
  P Mistani, L Sales, A Pillepich, R Sanchez-Janssen, M Vogelsberger, D Nelson, V Rogriguez-Gomez,
  P Torrey, and L Hernquist; *Monthly Notices of the Royal Astronomical Society* 2016

Book Chapters

- Towards a tensor network representation of complex systems,
  P Mistani, S Pakravan, F Gibou
  Sustainable Interdependent Networks II, *Springer International Publishing*, 2019
- Tensor network renormalization as an ultra-calculus for complex system dynamics,
  P Mistani, S Pakravan, F Gibou
  Sustainable Interdependent Networks II, *Springer International Publishing*, 2019

PRESENTATIONS

Contributed Talks

- SIAM Conference on Computational Science and Engineering, Spokane, Washington, USA 2019
  "Towards a realistic tissue simulation engine: multi-scale simulations of cell aggregate electroporation"

Poster Presentations

- Southern California Applied Mathematics Symposium (SOCAMS) 2018
  "Multi-scale simulations of cell aggregate electropermeabilization"
  "Multi-scale simulations of epitaxial growth: mound formation"
- 8^{th} Sackler Conference on Dark Matter, Center for Astrophysics, Harvard University 2014
  "Velocity Dispersion Profile of Cetus Dwarf Spheroidal Galaxy"

OUTREACH AND SERVICE

UCSB Physics Undergraduate Summer Research Program Mentor 2019

- Advised physics student summer research project on environmental influences of galaxy clusters on evolution of globular cluster systems within `illustris-TNG` simulations, leading to a symposium talk at Kavli Institute for Theoretical Physics (KITP) at UC Santa Barbara.

Peer Review 2017 - present

- Journal of Computational Physics

Press Release 2019

- *Pulsating Cells:* Army Research Lab (ARL), The UCSB Current, EurekAlert!, Texas Advanced Computing Center (TACC), Extreme Science and Engineering Discovery Environment (XSEDE), HPCwire, insideHPC, Phys.org, Futurity, Primeur Magazine, Science Daily