VIKRANT YADAV

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EDUCATION

Ph.D. in Physics (2009–2015)
Department of Physics, Clark University, Worcester, Massachusetts, USA
Advisor: Prof. Arshad Kudrolli

M.Sc. in Physics (2007-2009)
Indian Institute of Technology-Kharagpur, Kharagpur, West Bengal, India

M.Sc. in Physics (2006-2007) (Discontinued to join Indian Institute of Technology)
Jawaharlal Nehru University, New Delhi, India

B.Sc. in Physics and Mathematics (2003-2006)
Feroze Gandhi College, Rae Bareli, Uttar Pradesh, India

ACADEMIC POSITIONS

Associate Research Scientist (10/2021–Present)
Department of Biomedical Engineering, Yale University, New Haven, CT, USA
Systems Biology Institute, Yale University, New Haven, CT, USA

Post Doctoral Fellow (10/2017–10/2021)
Department of Biomedical Engineering, Yale University, New Haven, CT, USA
Advisor: Prof. Michael Murrell

Post Doctoral Fellow (06/2015–07/2017)
Department of Physics, University of Massachusetts, Amherst, MA, USA
Advisor: Prof. Jennifer Ross

PUBLICATIONS

1. "Active Regulation of Pressure and Volume Defines an Energetic Constraint on the Size of Cell Aggregates, M.S. Yousafzai*, **V. Yadav***, S. Amiri, Y. Errami, S. Amiri, and M.P. Murrell, **Physical Review Letters, 128**, 048103, (2022)
2. "Detailed Balance Broken by Catch Bond Kinetics Enables Mechanical-Adaptation in Active Materials", A.P. Tabatabai, D.S. Seara, J. Tibbs, **V. Yadav**, I. Linsmeier, and M.P. Murrell, **Advanced Functional Materials, 31**, (10), 2006745, (2020)
3. "Can Simulated Lab Experiences Replace Real Physics Labs in a Post-Covid India", V. Yadav, A. Darbinyan, **V. Yadav**, and A. Darbinyan, **Higher Education Going Online**, Eds. R Ramaswamy, S Babu, Indian Academy of Science (2020)
4. "Filament Nucleation Tunes Mechanical Memory in Active Polymer Networks," **V. Yadav**, D.S. Banerjee, A.P. Tabatabai, T.Y. Kim, D. Kovar, S. Banerjee, and M.P. Murrell, **Advanced Functional Materials**, **29**, 1905243, (2019)
5. "Entropy Production Rate is Maximized in Non-Contractile Actomyosin," D.S. Seara, **V. Yadav**, I. Linsmeier, A.P. Tabatabai, P. Oakes, S.M. Ali Tabei, S. Banerjee, and M.P. Murrell, **Nature Communications**, **9**, 1 (2018)

6. "Contractility in an Extensile System," K. T. Stanhope, **V. Yadav**, C. D. Santangelo and J. L. Ross, **Soft Matter**, **13**, 23 (2017)
7. "Effect of Aspect Ratio on the Development of Order in Vibrated Granular Rods," **V. Yadav**, J. Y. Chastaing and A. Kudrolli, **Physical Review E**. **88**, 052203 (2013)
8. "Diffusion of Granular Rods on a Rough Vibrated Substrate," **V. Yadav** and A. Kudrolli, **European Physical Journal E 35**, 104 (2012)
9. "Radar Remote Sensing Application in Wetland Habitat: IV: A Case Study of Keoladeo National Park using SAR Texture Analysis," H.S. Srivastava, P. Patel, Y. Sharma, **V. Yadav**, KCA Arun Prasad, L. Vijayan, S.N. Prasad, Proceedings of International Conference on Microwaves, Antenna, Propagation and Remote Sensing (2005)

Manuscripts in review

10. "Tissue Pressure and Cell Traction Compensate to Drive Robust Aggregate Spreading", S. Yousafzai, **V. Yadav* et. al. Draft available on Biorxiv.**
11. "Membrane Adhesion Regulates Actin Flows in a Biomimetic Model Cortex" **V. Yadav et. al. Draft available on request.**
12. "Active Stresses Drive Marangoni Flow in Cell Aggregates", M.S. Yousafzai, **V. Yadav* et. al. Draft available on request.**
13. "Branched F-actin inhibits myosin-based force generation by steric constraints on thick filament motion", C. Muresan*, Z.G. Sun*, **V. Yadav et. al. Draft available on request.**

* co-first author

MEDIA COVERAGE

- "Molecular memories are made of this", published on westcampus.yale.edu/news, reappeared on www.techonology.org, and www.nanowerk.com
- "From Science to Middle Eastern Politics", published in The Armenian Weekly
- "Nature Active Matter Collection" featured our work on entropy production in actomyosin networks.
- Kaleidoscope section of journal Physical Review-E featured an image from publication titled "Effect of Aspect Ratio on the Development of Order in Vibrated Granular Rods"

TEACHING EXPERIENCE

Co-Instructor for graduate "Molecular & Cellular Biomechanics" course (Spring 2020)
Yale University, New Haven, CT
Teaching cytoskeletal mechanics of cells using simulation package AFINES.

Co-Instructor for undergraduate "Introduction to Biomechanics" course (Fall 2019)
Yale University, New Haven, CT
Teaching biomechanics based on continuum mechanics, fluid mechanics, and thermodynamics.

Co-Instructor for undergraduate "Frontiers in Biomath" course (Fall 2016)
Smith College, Northampton, MA
Teaching to simulate microtubule dynamics using Molecular Dynamics and Monte Carlo approaches to an all women undergraduate class.

AWARDS AND FELLOWSHIPS (Academic)

- **Best Poster, Cancer and Systems Biology Conference at Yale - 2018**
- **Junior Scientist Travel Award, Active and Smart Matter Conference - 2016**
- **Partial Support from Chair's Fund, Gordon Research Conference - 2014**
- **Partial Support from Chair's Fund, Gordon Research Seminar - 2014**
- **Graduate Student Research Travel Award – 2014** by Clark University
- **Graduate Student Research Travel Award - 2012** by Clark University
- **Partial Support for Researchers in Early Career - 2011** by Interdisciplinary Summer School: Granular Flows: From Simulations to Astrophysical Applications, at University of Maryland at College Park
- **Graduate Student Fellowship – 2009-2014** (100% Tuition Waiver with Stipend) by Clark University
- **MCM Scholarship** – **2007-2008** (Equivalent to 60% of Tuition) by Indian Institute of Technology-Kharagpur
- **All India Rank 72** in Indian Institute of Technolgy Joint Admission to Masters (IIT-JAM) entrance exam.
- **Indian Academy of Science Summer Research Fellowship** - **2008** by Indian Academy of Sciences
- **Summer Research Fellowship** - **2007** by Raman Research Institute, Bangalore, India
- **Meritorious Student Scholarship** – **2003-2006** by Feroze Gandhi College
- **National Award for Best Essay on Science by a High School Student - 2001** by Indian National Science Congress.

AWARDS AND GRANTS (Entrepreneurial)

- **Winner - Annual Stock Trading Award- 2013** by Graduate School of Management, Clark University
- **Annual Graduate Business Plan Award - 2012** by Graduate School of Management, Clark University

INVITED TALKS

- "Equation of State of a Tissue", Physics Seminar, Augsburg University, Minneapolis, USA. (September, 2021)
- "Aggregate Surface Tension Determines Modes of Cellular Migration", Research in Progress Seminar, Yale University, New Haven, USA. (July, 2021)
- "Can Simulated Labs Replace Real Physics Labs", Panel Discussion organized by Forum for Online Teaching, Indian Academy of Science, India (April, 2021)
- "How 200 Year Old Mechanics is Redefining Our Understanding of Cancer and Information Processing", Faculty Development Program at Abul Kalaam Technical University, Lucknow, India (July, 2019)
- "Active Matter in Action: From Phantom Traffic Jams to Programmable Biomaterials", Mount Holyoke College, South Hadley, MA (February, 2017)
- "On demand dynamics of microtubule networks", 5 College Biophysics Consortium, University of Massachusetts, Amherst. (December, 2016)

- "Networks, Traffic and All things Active"**,** Department of Physics, Bundelkhand University, Jhansi, India (December, 2015)
- "Anisotropic Diffusion of vibrated Semi-flexible Granular rods", Biophysics Group, Worcester Polytechnic Institute, Worcester. (April 15, 2012)

OUTREACH TALKS

- "How much protein do you need to record all Harry Potter Books", ARS Norian Youth Connect Program, New Haven, USA. (November, 2019)
- "Nonequilibrium Physics: The Swiss Army Knife", Bundelkhand University, Jhansi, India. (November, 2017)
- "Nontrivial Application of Physics in Biology, Finance and Social Systems", Feroze Gandhi Institute of Engineering and Technology, India. (December, 2015)
- "The Physics of Video Games", SPLASH-2015, Clark University, Worcester, USA. (April, 2015)
- "The Physics of Wall Street", SPLASH-2014, Clark University, Worcester, USA. (April, 2014)

SCHOOLS AND WORKSHOPS

- **Boulder School on Soft Condensed Matter**, University of Colorado, Boulder, CO, (June 8th-June 30th, 2015)
- **2011 Interdisciplinary Summer School: Granular Flows: From Simulations to Astrophysical Applications,** University of Maryland at College Park, College Park, MD, (June 13-17, 2011),
- **4th Annual Summer School on Soft Solids and Complex fluids**, University of Massachusetts at Amherst, Amherst, MA, (May 29 – June 2, 2011),.
- **TIFR Winter School on Astro-particle Physics,** (December 20-28, 2007) Darjeeling, India.

TEACHING AND DIVERSITY TRAINING

- **Understanding Implict Bias**, Yale University, New Haven, CT (October, 2021)
- **Inclusive Teaching in Classroom**, Yale University, New Haven, CT (October, 2020)
- **1-Day Workshop on Effective Conflict Resolution**, University of Massachusetts, Amherst, MA (August 2016)
- **Liberal Education and Effective Practice: A 8-Week Workshop for Mentors**, Clark University, Worcester, MA (June-July 2013).
- **Entrepreneurship for Developing Economy**, Federation of Indian Chambers of Commerce and Industries, India (May, 2006)

SKILLS

- **Hardware:** 3D X-Ray Micro CT Scanner, Microscopy
- **Automation:** LabVIEW.

- **Languages and Packages:** MATLAB (Advanced Scientific Programming with an expertise in 3-Dimensional Particle Tracking), IDL, C++, Cytosim, AFINES.
- **General:** 2D and 3D Imaging, 3D Non-spherical Particle Tracking, Particle Image Velocimetry, Instrumentation.

PROFESSIONAL ACTIVITIES

- **Referee:** Nature Physics (with Michael Murrell), Nature Communications (with Michael Murrell), PNAS (with Michael Murrell)**,** Soft Matter, Physical Review E**,** Physica Scripta, Rheologica Acta, RSC Advances
- **Member:** American Physical Society, Sigma-Xi Scientific Honors Society

SERVICE

- **Organizer,** Soft Matter Journal Club, Department of Physics, University of Massachusetts, Amherst (Fall 2015-2017)
- **President**, Graduate Student Council of Clark University (2013-2014)
- **Principal Organizer**, 12th Annual Graduate Student Multidisciplinary Conference-2014, Clark University
- **Graduate Student Representative**, Board of Graduate Studies at Clark University (2012-13)
- **M.Sc. Student Representative,** Society of Physics Students, Indian Institute of Technology – Kharagpur (2007-2009)

REFERENCES

- Prof. Arshad Kudrolli
  Professor, Department of Physics, Clark University
  Tel: 1-508-793-7752, Email: akudrolli@clarku.edu
- Prof. Jennifer L. Ross
  Professor, Department of Physics, Syracuse University
  Tel: 1-413-297-7692 Email: jlross@syr.edu
- Prof. Michael P. Murrell
  Associate Professor, Department of Biomedical Engineering and Department of Physics, Yale University
  Tel: 1-203-737-6618 Email: michael.murrell@yale.edu