Vaishnavi Ananthanarayanan, Ph.D.

EMBL Australia Group Leader

Single Molecule Science, University of New South Wales

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EMPLOYMENT

- **EMBL Australia Group Leader** **Nov 2020 - present**

Single Molecule Science Node, University of New South Wales, Sydney

- **Assistant Professor** **Oct 2017-Nov 2020**

Centre for BioSystems Science and Engineering, Indian Institute of Science, Bangalore

- **DST INSPIRE Faculty Fellow** **June 2014-Oct 2017**

Centre for BioSystems Science and Engineering, Indian Institute of Science, Bangalore

- **Research Assistant** **June 2009- June 2010**

Microsoft Research India, Bangalore

EDUCATION

- **Ph.D. Biophysics** **July 2010- Jan 2014**

Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany

- **B.E. (Hons.) Computer Science and M.Sc. (Hons.) Biological Sciences** (dual degree) **Aug 2004- Aug 2009**

Birla Institute of Technology and Science, Pilani, India (CGPA: 9.28/10)

PUBLICATIONS

Research Articles/Reviews

2021
- Tirumala, N. A.* and **Ananthanarayanan, V.*** Single-molecule imaging of cytoplasmic dynein reveals the mechanism of motor activation and cargo capture. ***bioRxiv***
- Shah, M., Chacko, L. A., Joseph, J. P., **Ananthanarayanan, V. *** Mitochondrial dynamics, positioning and function mediated by cytoskeletal interactions. ***Cell Mol. Life Sci.***
- Kumar, H., and **Ananthanarayanan, V. *** Friend or foe: The role of the host cytoskeleton in cellular responses to bacterial pore forming toxins. ***J. Indian I. Sci.*** 101, 63–71

2020
- Tirumala, N. A.* and **Ananthanarayanan, V.*** Role of dynactin in the intracellular localization and activation of cytoplasmic dynein. ***Biochemistry.*** 59, 2, 156–162

2019
- Chacko, L. A., Mehta, K., **Ananthanarayanan, V.*** Cortical tethering of mitochondria by the anchor protein Mcp5 enables uniparental inheritance. ***J. Cell Biol.*** 218 (11) 3560-3571
- Mehta, K., Chacko, L. A., Chug, M. K., Jhunjhunwala, S., **Ananthanarayanan, V**.* Association of mitochondria with microtubules inhibits mitochondrial fission by precluding activity of the fission protein Dnm1. ***J. Biol. Chem.*** 294(10) 3385–3396
- Chacko, L. A. and **Ananthanarayanan, V.*** Quantification of mitochondrial dynamics in fission yeast. ***Bio-protocol*** 9(23): e3450.

2017
- Thankachan, J. M., Nuthalapati, S. S., Tirumala, N. A., **Ananthanarayanan, V**.* Fission Yeast Myosin I Facilitates PI(4,5)P_2–mediated Anchoring of Cytoplasmic Dynein to the Cortex. ***Proc. Nat. Acad. Sci.*** 114: E2672-E2681
- Meka, S., Chacko, L. A., Ravi, A., Chatterjee, K., **Ananthanarayanan, V.*** Role of Microtubules in Osteogenic Differentiation of Mesenchymal Stem Cells on 3D Nanofibrous Scaffolds. ***ACS Biomater. Sci. Eng.*** 3: 551-559

2016
- **Ananthanarayanan, V.***, Activation of the motor protein upon attachment: Anchors weigh in on cytoplasmic dynein regulation. ***Bioessays*** 38(6): 514-25

2015
- **Ananthanarayanan, V.*** and Tolić, I. Single-molecule imaging of cytoplasmic dynein in vivo. ***Methods Cell Biol.*** 125

2014 • Krull, A., Steinborn. A, **Ananthanarayanan, V.**, Ramunno-Johnson, D., Petersohn, U., Tolić-Nørrelykke, I*. A divide-and-conquer strategy for the maximum likelihood localization of low intensity objects. ***Opt. Express*** 22(1), 210-228

2013 • **Ananthanarayanan, V**., Schattat, M., Vogel, S. K., Krull, A., Pavin, N.*, Tolić-Nørrelykke, I.*. Dynein Motion Switches from Diffusive to Directed upon Cortical Anchoring. ***Cell*** 153: 1526-1536

2010 • **Ananthanarayanan, V**.* and Thies, W.*, Biocoder: A programming language for standardizing and automating Biology protocols. ***J. Biol. Eng.*** 4: 13

Science outreach

- Muralidhar, S*. **and Ananthanarayanan, V*.** TrendsTalk - BiasWatchIndia. ***Trends Genet.*** (2021)
- **Ananthanarayanan, V.*** Voices of the new generation: Mentorship as a junior PI. ***Nat. Rev. Mol. Cell Biol.*** (2020)
- **Ananthanarayanan, V.*** and Mylavarapu, S. V. S.* Meeting report – the Microtubules, Motors, Transport and Trafficking (M2T2) 2019 meeting. ***J. Cell Sci.*** (2020)
- **Ananthanarayanan, V.*** My INSPIRE'd Journey. ***IndiaBioScience*** (2019)
- **Ananthanarayanan, V.*** Plugging the 'Leaky Pipeline': Need for women-friendly workplaces in academia and how we can create them in the future. ***IndiaBioScience*** (2019)

**Corresponding author(s)*

AWARDS AND RECOGNITION

2020 Medal for Young Scientists, Indian National Science Academy

2019 Member of the Editorial Advisory Board, Journal of Cell Science
'Cell Scientist to Watch', Journal of Cell Science
Women Excellence Award, Science and Engineering Research Board (India)
RI Mazumdar Young Investigator Award
BITS Alumni Association Global 30 Under 30 Award

2018 EMBO Young Investigator
Wellcome Trust/DBT – India Alliance Intermediate Fellowship
Associate of the Indian Academy of Sciences

2016 Early Career Research Award, Science and Engineering Research Board (India)

2015 Innovative Young Biotechnologist Award, Department of Biotechnology (India)

2014 INSPIRE Faculty Award, Department of Science and Technology (India)

2007 JNCASR Summer Research Fellowship
Rajiv Gandhi National Talent Science Research Fellow

FUNDING (as Principal Investigator)

- Cellular organization across scales: from single molecules to whole organelles, (EMBL Australia funding from UNSW, Nov 2020-Nov 2025) ~EUR 1,128,850
- EMBO Young Investigator Grant (2020 – until grant runs out) EUR 15,000
- Role of microtubule-mitochondrial attachment in the maintenance of cell polarity and establishment of symmetry during cell division (Science and Engineering Research Board (India), May 2019 – Nov 2020*) ~EUR 18,900
- Role of microtubule dynamics in mitochondrial dysfunction during the progression of neurodegeneration (Wellcome Trust-DBT/India Alliance, Jan 2019 – Nov 2020*) ~EUR 393,905
- Intramural grant from the Indian Institute of Science (Jan 2018 – Dec 2019) ~EUR 314,826
- Dynein behavior in vivo and the factors affecting its activation (Department of Science and Technology (India), June 2014 - June 2019) ~ EUR 108,295
- Investigation of microtubule-mediated mitochondrial positioning and partitioning (Department of Biotechnology (India), Aug 2015 – Aug 2018) ~EUR 55,620
- Characterization of the membrane-bound anchor of cytoplasmic dynein using super-resolution microscopy (Science and Engineering Research Board (India), Apr 2016-Apr 2019) ~EUR 48,295

Total **~EUR 2,084,691**

*(*terminated due to move to UNSW)*

TRAVEL AWARDS

- EMBO Travel Award (Frontiers in Cytoskeleton Research 2017, Pune, India)
- EMBO Conference Fee Waiver (Meiosis Meeting 2017, Hvar, Croatia)
- EMBO Conference Fee Waiver (Microtubules: Structure, Regulations and Functions Conference 2016, Heidelberg, Germany)
- DST International Travel Support (Microtubules: Structure, Regulations and Functions Conference 2014, Heidelberg, Germany)
- Max Planck Society Travel Grant (64th Lindau Nobel Laureate Meeting 2014, Germany)
- MPI-CBG Travel Grant (Annual Meeting of the American Society for Cell Biology 2012, San Francisco, USA)
- FEBS Travel Grant (27th Cytoskeletal Forum Meeting 2012, Pecs, Hungary)
- IRB Barcelona Travel Grant (2nd IRB Student Symposium 2011, Barcelona, Spain)
- Pombe 2011 Travel Grant (6th International Fission Yeast Meeting 2011, Boston, USA)
- SynBERC Travel Grant (International Workshop on Biodesign Automation 2009, San Francisco, USA)

CONFERENCE PARTICIPATION

Invited Talks

2021 Vienna Doctoral School, Austria

Dynamic Cell IV, Annual Conference of the British Society for Cell Biology and Biochemical Society

2020 'Mysteries of Microbes' Webinar Series, MSU Baroda, India

World Laureates Forum, China (selected as Young Laureate)

*EMBO Workshop on Birth and Fission of Cellular Compartments, Leioa, Spain

Nanoengineering for Mechanobiology, Camogli, Italy 2020 (Keynote Speaker)

Biophysical Society Meeting on the Spatial Organization of Biological Functions, ICTS Bangalore, India

Statistical Biological Physics: From Single Molecule to Cell, ICTS Bangalore, India

*(*postponed due to COVID-19 pandemic)*

2019 Center for Regenerative Therapies, Dresden, Germany

EMBO Young Investigator Meeting, Singapore

Unravelling Cellular Processes – Models and Experiments Meeting, Coorg, India

85th Annual Meeting of the Indian Academy of Sciences, Hyderabad, India

Motors, Microtubules, Trafficking and Transport Meeting, NBRC, Manesar, India

Discussion Meeting – Thirsting for Theoretical Biology, ICTS Bangalore, India

43rd Indian Biophysical Society Meeting, IISER Kolkata, India

2018 87th Annual Conference of the Society of Biological Chemists (India), Manipal, India

RCB Bioimaging School, RCB Faridabad, India

2017 Ruder Boskovic Institute, Zagreb, Croatia

Natural and Artificial Molecular Machines, IIT Bombay, India

Current Trends in Intracellular Trafficking and Molecular Motors, TIFR Mumbai, India

Mitochondria and Metabolism Networking Conference, IISER Pune, India

Collective Dynamics Of-, On- and Around Filaments in Living Cells: Motors, Maps, Tips and Tracks, ICTS Bangalore, India

2016 15th Anniversary Symposium of the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany

Computational and Experimental Studies of Microtubules and Microtubule based Motor Proteins, IIT Bombay, India

Current Trends in Intracellular Trafficking and Molecular Motors, TIFR Mumbai, India

Mitochondria and Metabolism Networking Conference, IISER Pune, India

Contributed Talks (selected from abstract)

2019 JCS Cell Dynamics: Organelle-Cytoskeleton Interactions Meeting, Lisbon, Portugal

2017 EMBO Frontiers in Cytoskeleton Research, IISER Pune, India

EMBO Meiosis Meeting, Hvar, Croatia

2016 Mechanical Forces in Cell Biology 2016, Bangalore, India

2012 Annual Meeting of the American Society for Cell Biology, San Francisco, USA

27th Cytoskeletal Forum Meeting, Pecs, Hungary

Microtubules: Structure, Regulations and Functions Conference, Heidelberg, Germany

35th Annual Meeting of the German Society for Cell Biology, Dresden, Germany

2011 2nd IRB Student Symposium- Life in Dynamics, Barcelona, Spain

2009 International Workshop on Biodesign Automation, San Francisco, USA

Poster Presentations

2018 Gordon Research Conference on Cytoskeletal Motors, Vermont USA

2017 Actin and microtubule cytoskeleton: bridging scales from single molecules to tissues 2017, Roscoff, France

2016 Microtubules: Structure, Regulations and Functions, Heidelberg, Germany

2014 Microtubules: Structure, Regulations and Functions, Heidelberg, Germany

2011 6th International Fission Yeast Meeting, Boston, USA

TEACHING

Courses

- **Cell Mechanics (2019)**

30 hours of teaching in a semester to a class of ~25 Undergraduate and Graduate students.

- **Biology and Physiology for Engineers (with Prof. Siddharth Jhunjhunwala, BSSE, 2018 – present)**

7.5 hours of teaching in a semester to a class of ~25 Graduate students.

Invited Instructor

- **Introduction to image analysis**

A hands-on introduction to image analysis on Fiji/ImageJ. Taught at:

  - RCB Bioimaging Workshop, Regional Centre for Biotechnology, India, 2018
  - International Workshop on Modern Biophysical Tools and Techniques, IIT Bombay,India, 2017
  - QIP Course on Modern Biophysical Tools and Techniques, IIT Bombay, India, 2017
  - Workshop of Biennial Meeting of the Indian Society of Developmental Biologists, IISER Pune, India, 2017

- **Cytoskeleton and Motor Proteins**

(As a part of the Bioengineering Workshop held at, Indian Institute of Science, 2018)

- **Advances in Cell Biology – Protein Trafficking**

(As a part of Indian Science Academies' Refresher Course for College Teachers)

MENTORING

Postdoctoral Fellows

- Gregory Redpath — Feb 2021 – present

PhD Students

- Joel Joseph — Dec 2019 – Nov 2020*
- Harsh Kumar (*jointly with Prof. Sandhya S. Visweswariah, IISc*) — Aug 2019 – present
- Mitali Shah — Aug 2018 – Nov 2020*
- Nireekshit Addanki Tirumala — July 2015 – Nov 2020

Master's Students

- Leeba Ann Chacko (*Junior Research Fellow*) — Dec 2017 – Nov 2020
- Rishabh Singh (*Project Assistant, now: MS Boston Univ., USA)* — July 2017 – June 2018
- Kritika Mehta (*Junior Research Fellow, now: PhD UIUC, USA*) — July 2017 – July 2018
- Tirthankar Sengupta (*Research Associate*) — Sept 2016 – Nov 2017

- Stephen Nuthalapati (*Junior Research Fellow, now: PhD GLU Geisen, Germany)* July 2016 – July 2017
- Ashwini Ravi (*Project Assistant, now: PhD Bangalore Univ., India*) July 2015 – July 2017
- Jerrin Mathew Thankachan (*Junior Research Fellow, now: PhD IISc, India*) July 2015 – June 2016

Undergraduate Students

- Lauren Raasch *(SN Bose Summer Research Fellow from U. Michigan, USA)* Jun 2019 – Aug 2019
- Ananya Rajagopal *(Research Intern)* May 2019 – July 2019
- Anand Sankar *(Project Assistant)* Aug 2018 – Sept 2018
- Reshma Raj (*Research Intern)* Aug 2017 – Aug 2018
- Elsa Barron *(SN Bose Summer Research Fellow from U. Notre Dame, USA)* July 2018 – Aug 2018
- Aditya Jeevannavar *(Research Intern)* May 2018 – July 2018
- Keval Pandya (*MBBS Research Intern)* May 2018
- Manish Ayushman (*Research Intern, now: PhD Stanford Univ., USA*) May 2017 – July 2017
- Parth Sharma (*MBBS Research Intern*) May 2017
- Amoolya Girish (*Research Intern, now: MS U. Florida, USA*) Sept 2016 – Dec 2016
- Milind Singh (*Research Intern, now: PhD Yale Univ., USA*) May 2015 – July 2015

*(*terminated due to move to UNSW)*

PROFESSIONAL SERVICE

- Co-organizer of 'NeurofemIndia 2021: A BiasWatchIndia Conference' 2021
- Co-organizer of 'Thirsting for Theoretical Biology 2021'
- Co-chair of the 'Emerging Topics' session of the 'Microtubules: From Atoms to Complex Systems' Virtual Meeting 2020
- Co-organizer of 'Signatures of Non-equilibrium Fluctuations in Life' Meeting 2020, ICTP, Trieste, Italy (independently raised EUR 3000 from EMBO) – *postponed due to COVID-19 pandemic*
- Co-organizer of Young Investigator Meeting 2020, Mahabalipuram, India (independently raised ~EUR 6250 from the Indian Institute of Science)
- Guest Editor of the Special Issue on Cytoskeletal Mechanics, Journal of the Indian Institute of Science, 2021
- Ad-hoc reviewer for Developmental Cell, Journal of Cell Science, Biophysical Journal, Communications Biology, PLoS One, Scientific Reports, RSC Advances, Matters, ACS Applied Materials and Interfaces, ACS Biomaterials Science and Engineering, Journal of Biomaterials Science, Journal of the Indian Institute of Science
- Ad-hoc reviewer for Biotechnology and Biological Sciences Research Council grant, UK
- Co-founder of BiasWatchIndia, an initiative to document and combat gender-biased panels at Indian science conferences and meetings
- Contributions in India and IISc: PhD thesis examiner (2 students), Comprehensive Exam/Thesis Advisory Committee Member (11 students)
- Member of the Graduate Student Review Panel, School of Medicine, UNSW