

Vaishnavi Ananthanarayanan, Ph.D.
Wellcome Trust/DBT-India Alliance Intermediate Fellow
EMBO Young Investigator

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EMPLOYMENT

- **Assistant Professor** **Oct 2017-present**
Centre for BioSystems Science and Engineering, Indian Institute of Science, Bangalore
- **DST INSPIRE Faculty Fellow** **June 2014-Oct 2017**
Indian Institute of Science, Bangalore, India
- **Research Assistant** **June 2009- June 2010**
Microsoft Research India, Bangalore
Project title: Towards a high-level programming language for standardizing and automating biology protocols

EDUCATION

- **Ph.D. Biophysics** **Jan 2014**
Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany
Thesis title: Dynein dynamics during meiotic nuclear oscillations of fission yeast
- **M.Sc. (Hons.) Biological Sciences*** **Aug 2009**
Birla Institute of Technology and Science, Pilani, India
Thesis title: The role of activity in the maintenance of larval olfactory receptor neurons of Drosophila, CGPA: 9.28/10
- **B.E. (Hons.) Computer Science*** **Aug 2009**
Birla Institute of Technology and Science, Pilani, India
Thesis title: The BioCoder programming language for expressing and automating Biology protocols, CGPA: 9.28/10
**Dual Degree*

PUBLICATIONS

- Mehta, K., **Ananthanarayanan, V.*** Cortical tethering of mitochondria by the dynein anchor Mcp5 enables uniparental mitochondrial inheritance during fission yeast meiosis. *bioRxiv* (2019)
- 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.* (2019)
- Thankachan, J. M., Nuthalapati, S. S., Tirumala, N. A., **Ananthanarayanan, V.*** Fission Yeast Myosin I Facilitates PI(4,5)P₂–mediated Anchoring of Cytoplasmic Dynein to the Cortex. *Proc. Nat. Acad. Sci.* 114: E2672-E2681 (2017)
- 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 (2017)
- **Ananthanarayanan, V.***, Activation of the motor protein upon attachment: Anchors weigh in on cytoplasmic dynein regulation. *Bioessays* 38(6): 514-25 (2016)
- **Ananthanarayanan, V.*** and Tolić, I. Single-molecule imaging of cytoplasmic dynein in vivo. *Methods Cell Biol.* 125 (2015)
- 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 (2014)
- **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 (2013)
- **Ananthanarayanan, V.*** and Thies, W.*, Biocoder: A programming language for standardizing and automating Biology protocols. *J. Biol. Eng.* 4: 13 (2010)

**Corresponding author(s)*

AWARDS AND HONORS

- EMBO Young Investigator 2019
- Wellcome Trust/DBT – India Alliance Intermediate Fellowship 2019
- Elected Associate of the Indian Academy of Sciences 2018
- SERB Early Career Research Award 2016
- Innovative Young Biotechnologist Award 2015
- DST INSPIRE Faculty Award 2014
- JNCASR Summer Research Fellowship 2007 (awarded and accepted) and 2008 (awarded but declined)
- Title of Rajiv Gandhi National Talent Science Research Fellow 2007

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)

FUNDING (as Principal Investigator)

- The role of microtubule dynamics in mitochondrial dysfunction during the progression of neurodegeneration (Wellcome Trust-DBT/India Alliance, Jan 2019 – Jan 2024)
- Dynein behavior in vivo and the factors affecting its activation (DST, June 2014 - June 2019)
- Investigation of microtubule-mediated mitochondrial positioning and partitioning (DBT, Aug 2015 – Aug 2018)
- Characterization of the membrane-bound anchor of cytoplasmic dynein using super-resolution microscopy (SERB, Apr 2016-Apr 2019)

CONFERENCE PARTICIPATION

INVITED TALKS

- 87th Annual Conference of the Society of Biological Chemists (India), Manipal Academy of Higher Education, Manipal, 2018, *Microtubule dynamics regulates mitochondrial fission*
- Pre-workshop tutorial, ICME Approaches to Innovation in Biomedical Implants, IISc, Bangalore, 2018, *Microtubule dynamics regulates mitochondrial fission*
- RCB Bioimaging School, RCB Faridabad, 2018, *Microtubule dynamics regulates mitochondrial fission*
- Current Trends in Intracellular Trafficking and Molecular Motors, TIFR, 2017, *Microtubule dynamics regulates mitochondrial fission*
- Natural and Artificial Molecular Machines, IIT Bombay, 2017, *Microtubule dynamics regulates mitochondrial fission*
- Mitochondria and Metabolism Networking Conference, IISER Pune, 2017, *Microtubule dynamics regulates mitochondrial fission*
- Collective Dynamics Of-, On- and Around Filaments in Living Cells: Motors, Maps, Tips and Tracks, ICTS Bangalore, 2017, *Quantitative Biology of the Cytoskeleton during Division, Differentiation and Disease*
- Ruder Boskovic Institute, Zagreb, Croatia, 2017, *Quantitative Biology of the Cytoskeleton during Division, Differentiation and Disease*
- Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore, 2017, *Quantitative Biology of the Cytoskeleton during Division, Differentiation and Disease*
- Molecular Biophysics Unit, Indian Institute of Science, Bangalore, 2017, *Quantitative Biology of the Cytoskeleton during Division, Differentiation and Disease*

- Workshop on Image Analysis at the Biennial Meeting of the Indian Society of Developmental Biologists 2017, IISER Pune, India, *Microtubule-mediated mitochondrial dynamics in fission yeast*
- Computational and Experimental Studies of Microtubules and Microtubule based Motor Proteins, IIT Bombay, 2016, *The Curious Case of Cytoplasmic Dynein: Regulation of Localization and Activity by Myosin I*
- 15th Anniversary Symposium of the Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany, 2016, *The Curious Case of Cytoplasmic Dynein: Regulation of Localization and Activity by Myosin I*
- Birla Institute of Technology and Science (BITS) Pilani, Goa Campus, 2016, *Anchors weigh in on cytoplasmic dynein regulation*
- Indian Institute of Science Education and Research (IISER), Pune, 2013, *Life of a single dynein in vivo*
- Department of Molecular Reproduction, Development and Genetics of the Indian Institute of Science, Bangalore, 2009, *Towards a High-Level Programming Language for Standardizing and Automating Biology Protocols*

CONTRIBUTED TALKS

- EMBO Frontiers in Cytoskeleton Research, IISER Pune, 2017, *Microtubule dynamics regulates mitochondrial fission*
- EMBO Meiosis Meeting, Hvar, Croatia 2017, *Fission Yeast Myo1 Facilitates PI(4,5)P₂-Mediated Anchoring of Cytoplasmic Dynein to the Cortex*
- Meeting on Mechanical Forces in Cell Biology 2016, Bangalore, India, *Fission Yeast Myo1 Facilitates PI(4,5)P₂-Mediated Anchoring of Cytoplasmic Dynein to the Cortex*
- Annual Meeting of the American Society for Cell Biology 2012, San Francisco, USA, *Characterization of dynein by single-molecule investigations in vivo*
- 27th Cytoskeletal Forum Meeting 2012, Pecs, Hungary, *Characterization of dynein by single-molecule investigations in vivo*
- Microtubules: Structure, Regulations and Functions Conference 2012, Heidelberg, Germany, *Characterization of dynein by single-molecule investigations in vivo*
- 35th Annual Meeting of the German Society for Cell Biology 2012, Dresden, Germany, *Characterization of dynein by single-molecule investigations in vivo*
- 2nd IRB Student Symposium 2011- Life in Dynamics, Barcelona, Spain, *Dynein dynamics during meiotic nuclear oscillations of fission yeast*
- International Workshop on Biodesign Automation 2009, San Francisco, USA, *Towards a High-Level Programming Language for Standardizing and Automating Biology Protocols*

POSTER PRESENTATIONS

- Gordon Research Conference on Cytoskeletal Motors, 2018, Vermont USA, *Single-molecule characterization of cytoplasmic dynein in vivo*
- Young Investigator Meeting, Trivandrum, 2018, *Microtubule dynamics regulates mitochondrial fission*
- Actin and microtubule cytoskeleton: bridging scales from single molecules to tissues 2017, Roscoff, France, *Microtubule-mediated mitochondrial dynamics*
- Microtubules: Structure, Regulations and Functions Conference 2016, Heidelberg, Germany, *PI(4,5)P₂ Mediates the Anchoring of Cortical Dynein in Fission Yeast*
- Microtubules: Structure, Regulations and Functions Conference 2014, Heidelberg, Germany, *The role of microtubules and associated proteins in clathrin-independent endocytosis*
- Young Investigator Meeting, Hyderabad, 2014, *Life of a single dynein in vivo*
- 6th International Fission Yeast Meeting 2011, Boston, USA, *Dynein dynamics during meiotic nuclear oscillations*

TEACHING

- **Introduction to image analysis**

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

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

- **Cytoskeleton and Motor Proteins**

(As a part of the Bioengineering Workshop held at the Centre for Continuing Education, IISc, 2018)

- **Biology and Physiology for Engineers**

(Co-taught the course with Prof. Sandhya S. Visweswariah and Prof. Aditya Murthy, BSSE, 2015) Basic aspects of Cell Biology, specifically dealing with Eukaryotic Cells, Cytoskeleton, Extracellular Structures, Cell Membranes, Membrane Transport, Exocytosis and Endocytosis.

- **Biomechanics**

(Co-taught the course with Prof. G. K. Ananthasuresh, BSSE, 2016) Biomechanics of Motor Proteins and the Cytoskeleton

- **Conversational French**

Taught basic French to ~100 peers at BITS-Pilani, Goa Campus (2006)

MENTORING

• Mitali Shah (Ph.D. student)	Aug 2018 – present
• Savyasachee Jha (<i>Ph.D student</i>)	Jan 2018 – present
• Leeba Ann Chacko (<i>Junior Research Fellow</i>)	Dec 2017 – present
• Nireekshit Addanki Tirumala (<i>Ph.D. student, jointly with Prof. G. K. Ananthasuresh</i>)	July 2015 – present
• Anand Sankar (<i>Project Assistant</i>)	Aug 2018 – Sept 2018
• Reshma Raj (<i>Research Intern</i>)	Aug 2017 – Aug 2018
• Elsa Barron (<i>SN Bose Summer Research Fellow</i>)	July 2018 – Aug 2018
• Aditya Jeevannavar (<i>Research Intern</i>)	May 2018 – July 2018
• Keval Pandya (<i>MBBS Research Intern</i>)	May 2018
• Rishabh Singh (<i>Project Assistant</i>)	July 2017 – June 2018
• Kritika Mehta (<i>Junior Research Fellow</i>)	July 2017 – July 2018
• Manish Ayushman (<i>Research Intern</i>)	May 2017 – July 2017
• Parth Sharma (<i>MBBS Research Intern</i>)	May 2017
• Dr. Tirthankar Sengupta (<i>Research Associate, jointly with Prof. Ganapathy Ayappa</i>)	Sept 2016 – Nov 2017
• Amoolya Girish (<i>Research Intern</i>)	Sept 2016 – Dec 2016
• Stephen Sukumar Nuthalapati (<i>Junior Research Fellow</i>)	July 2016 – July 2017
• Ashwini Ravi (<i>Project Assistant</i>)	July 2015 – July 2017
• Jerrin Mathew Thankachan (<i>Junior Research Fellow</i>)	July 2015 – June 2016
• Milind Singh (<i>Research Intern</i>)	May 2015 – July 2015
• Leeba Ann Chacko (<i>Project Assistant</i>)	July 2014 – June 2015

PROFESSIONAL SERVICE

Ad-hoc reviewer for 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.