



# Shailesh Appukuttan

Postdoctoral Researcher (Jan 2017 – Present)

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I am interested in the application of computational techniques to biological research. My doctoral work involved the development of smooth muscle models to interpret their syncytial functioning. Currently, I am employed in the Human Brain Project (HBP). My work involves the design and development of a model validation framework for neuroscience, and its integration into existing model development workflows, along with development of other related scientific tools.

## Date of Birth:

26<sup>th</sup> April, 1987

## Nationality:

Indian

## Sex:

Male

## Languages:

English: *Fluent*

Hindi: *Fluent*

Malayalam: *Average*

Portuguese: *Beginner*

French: *Beginner*

## Website:

<http://www.shailesh-appukuttan.com/>

## ORCID:

<https://orcid.org/0000-0002-0148-8023>

## Education

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|------|--|
| 2015 | <b>Integrated Masters + Ph.D. – Biomedical</b><br>Indian Institute of Technology, Mumbai, India<br>Obtained: CPI 9.52/10.00<br>GATE 2009 CS Rank: 239, Percentile: 99.43 |
| 2008 | <b>Bachelor of Engineering – Computer Science</b><br>SIES Graduate School of Technology, Navi Mumbai, India<br>Obtained: 69.15%, 58 <sup>th</sup> Rank in University     |
| 2004 | <b>Intermediate /+2 – Computer Science</b><br>Atomic Energy Junior College, Mumbai, India<br>Obtained: 90.33%  |
| 2002 | <b>Matriculation</b><br>Atomic Energy Central School -2, Mumbai, India<br>Obtained: 89.90%   |

## Work Experience

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|------------------|---|
| 2017 – till date | <b>UNIC, CNRS – Postdoctoral Researcher</b> <ul style="list-style-type: none"><li>• Design and development of model validation framework</li><li>• Developing multi-simulator model representation format</li></ul>               |
| 2015-2016        | <b>IIT Bombay – Research Associate</b> <ul style="list-style-type: none"><li>• Continued on my doctoral research project</li><li>• Parallely initiating a project on Parkinson's Disease</li></ul>                                |
| 2016             | <b>NMIMS SD-School Of Science – Visiting Faculty</b> <ul style="list-style-type: none"><li>• Invited to teach an undergraduate course on Linux &amp; R</li><li>• 15 hours of lectures + 60 hours of practicals</li></ul>          |
| 2009-2011        | <b>TechShiksha – Co-founder and Technical Head</b> <ul style="list-style-type: none"><li>• Educational initiative to instill scientific thinking in children</li><li>• Worked with government, private schools and NGOs</li></ul> |
| 2008-2009        | <b>TechMahindra – Technical Associate</b> <ul style="list-style-type: none"><li>• Worked on Siebel platform on a project for British Telecom</li><li>• Topped both 'Induction training' and 'Siebel training'</li></ul>           |

## Publications

- ✓ **Appukuttan, S.**, Bologna, L., Migliore, M., Schürmann, F., & Davison, A. (2021). EBRAINS Live *Papers-Interactive resource sheets for computational studies in neuroscience*. OSF Preprints: <https://doi.org/10.31219/osf.io/4uvdy>
- ✓ **Appukuttan, S.**, Brain, K. L., & Manchanda, R. (2021). *Effect of Variations in Gap Junctional Coupling on the Frequency of Oscillatory Action Potentials in a Smooth Muscle Syncytium*. *Frontiers in Physiology*, 12.
- ✓ Sáray, S., Rössert, C. A., **Appukuttan, S.**, Migliore, R., Vitale, P., Lupascu, C. A., ... & Káli, S. (2021). *HippoUnit: A software tool for the automated testing and systematic comparison of detailed models of hippocampal neurons based on electrophysiological data*. *PLoS computational biology*, 17(1), e1008114.
- ✓ **Appukuttan, S.**, Mandge, D., & Manchanda, R. (2020, March). *Implementation of Syncytial Models in NEURON Simulator for Improved Efficiency*. In 2020 28th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP) (pp. 266-273). IEEE.
- ✓ Manchanda, R., **Appukuttan, S.**, & Padmakumar, M. (2019). *Electrophysiology of Syncytial Smooth Muscle*. *Journal of experimental neuroscience*, 13, 1179069518821917.
- ✓ **Appukuttan, S.**, Padmakumar, M., Young, J. S., Brain, K. L., & Manchanda, R. (2018). *Investigation of the syncytial nature of detrusor smooth muscle as a determinant of action potential shape*. *Frontiers in physiology*, 9, 1300.
- ✓ **Appukuttan, S.**, Brain, K. L., & Manchanda, R. (2017). *Modeling extracellular fields for a three-dimensional network of cells using neuron*. *Journal of Neuroscience Methods*, 290, 27-38.
- ✓ **Appukuttan, S.**, Brain, K., & Manchanda, R. (2017). *Investigation of action potential propagation in a syncytium*. *Biomed. Res. J*, 4(1), 102-115.
- ✓ **Appukuttan, S.**, Padmakumar, M., Brain, K. L., & Manchanda, R. (2017). *A Method for the Analysis of AP Foot Convexity: Insights into Smooth Muscle Biophysics*. *Frontiers in bioengineering and biotechnology*, 5.
- ✓ **Appukuttan, S.**, & Manchanda, R. (2016). *Independence of AP propagation velocity to transjunctional voltage dependence of gap junctional coupling*. *The Siberian Scientific Medical Journal*, 36(1), 80-85.
- ✓ **Appukuttan, S.**, Sathe, R., & Manchanda, R. (2016). *Influence of Gap Junction Subtypes on Passive and Active Electrical Properties of Syncytial Tissues*. Accepted at ICSMB 2016, India. IEEE Xplore Digital Library.
- ✓ **Appukuttan, S.**, Brain, K. L., & Manchanda, R. (2015). *A computational model of urinary bladder smooth muscle syncytium*. *Journal of Computational Neuroscience*, 38(1), 167-187.

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- ✓ **Appukuttan, S.,** Brain, K., & Manchanda, R. (2015). *Syncytial basis for diversity in spike shapes and their propagation in detrusor smooth muscle*. *Procedia Computer Science*, 51, 785-794.
- ✓ **Appukuttan, S.,** Sathe, R., & Manchanda, R. (2015). *Modular approach to modeling homotypic and heterotypic gap junctions*. In *Computational Advances in Bio and Medical Sciences (ICCABS), 2015 IEEE 5th International Conference on* (pp. 1-6). IEEE.

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## Memberships

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| 2021 - 2023      | <b>Serving on the Board of Directors of OCNS</b><br>Member of <i>Organization for Computational Neurosciences</i> since 2013 |
| 2020 – till date | <b>Co-chair of INCF/OCNS Software WG</b><br>One of the founding members of the working group                                 |
| 2019 – till date | <b>Member of SANKET consortium</b><br>Multi-institution consortium to further brain research                                 |

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## Teaching Asst.

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|-----------|---|
| 2013-2015 | <b>BB803 – Advanced Cellular Electrophysiology</b><br>Instructor: Prof. Rohit Manchanda, IIT Bombay |
| 2011-2013 | <b>BM636 – Bioelectricity</b><br>Instructor: Prof. Rohit Manchanda, IIT Bombay                      |
| 2011-2013 | <b>BM651 – Biopotentials</b><br>Instructor: Prof. Rohit Manchanda, IIT Bombay                       |
| 2010-2013 | <b>BM627 – Virtual Instrumentation</b><br>Instructor: Prof. Soumyo Mukherji, IIT Bombay             |

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## Other Experience

- ✓ Conducted a tutorial on 'Python for beginners' at CNS 2021 (June 2021)
  - *Organized by INCF/OCNS Software Working Group*
- ✓ Organized EBRAINS Infrastructure Training on Model Validation (May 2021)
  - *4-day workshop on developing model-agnostic validation tests*
- ✓ Member of Program Committee for HBP CodeJam #11 (Nov. 2020)
  - *HBP CodeJams are hands-on events where experts work together*
- ✓ Served as a committee member for PDP conferences (2018 - 2020)
  - *Reviewed submissions for the 'HPC for Neuroscience' track*
- ✓ Member of HBP Data Governance Working Group (2018 - 2019)
  - *Represented sub-project #6 (SP6) in forming data governance policies*
- ✓ Conducted NEURON workshop at GCOE, Chandrapur, India (Feb. 2014)
  - *Invited by college to organize a 3-day workshop on computational modeling*