Harikrishnan N. B.

CONTACT INFORMATION	Assistant Professor, D-262, Department of CS&IS, BITS Pilani K. K. Birla Goa Campus, NH 17B, Bypass, Road, Zuarinagar, Sancoale, Goa 403726, India Tel: +91-7339534649	Homepage: https://www.bits-pilani.ac.in/goa/harikrishnannb/profile GS: https://scholar.google.com/citations?user=9fMmKMEAAAAJ&hl=en Linkedin: https://in.linkedin.com/in/harikrishnan-n-b-aa3b2a87 GitHub: https://github.com/HarikrishnanNB ✉ E-mail: harikrishnannb07@gmail.com

OBJECTIVE — My long-term goal is to establish a strong academic career focused on data-driven science, and engagement in *brain-inspired learning and design of novel data driven algorithms for control, causality and prediction.*

CURRENT AFFILIATION

Assistant Professor, Department of Computer Science & Information Systems, BITS Pilani K K Birla Goa Campus. **May'23 – Current**

Adjunct Faculty, Consciousness Studies Programme, National Institute of Advanced Studies, Indian Institute of Science Campus, Bengaluru, India. **July'23 – Current**

PREVIOUS AFFILIATION

Visiting Faculty, Department of Computer Science & Information Systems, BITS Pilani K K Birla Goa Campus. **August'22 – April'23**

RESEARCH INTEREST — Brain Inspired Artificial Intelligence, Machine Learning, Signal Processing, Information Theory, Chaos/Nonlinear Dynamics and its Applications.

EDUCATION

Doctor of Philosophy
Thesis: **"Investigations into Learning Algorithms in Intelligent Machines"** **Dec'18–July'22**
Thesis Advisor: Dr. Nithin Nagaraj, Associate Professor, NIAS, IISc Campus.
Research Institute: **National Institute of Advanced Studies (NIAS)**, IISc Campus, Bengaluru, India.
University Affiliation: **The University of Trans-Disciplinary Health Sciences and Technology (TDU)**, Bengaluru, Karnataka, India. PhD thesis defended at NIAS on: 21 October 2022.

Master of Technology (Computational Engineering and Networking, 2018)
Amrita Vishwa Vidyapeetham, Coimbatore, Tamil Nadu, India. **Aug'16–Aug'18**
CGPA: 8.72/10, **First class with distinction**.

Bachelor of Technology (Electronics and Communication Engineering, 2016)
Amrita Vishwa Vidyapeetham, Amritapuri Campus, Kerala, India. **Aug'12–Aug'16**
CGPA: 8.2/10, **Distinction**.

JOURNAL PUBLICATIONS

J1 Remya Ajai A.S., **Harikrishnan N B**, Nithin Nagaraj, "Analysis of logistic map based neurons in neurochaos learning architectures for data classification, *Chaos, Solitons & Fractals*, Volume 170, 113347, ISSN 0960-0779, March 2023.

J2 Deeksha Sethi, Nithin Nagaraj, **Harikrishnan N B**, "Neurochaos feature transformation for Machine Learning", *Integration (Elsevier)*, January 2023.

J3 **Harikrishnan NB**, Pranay SY, Nithin Nagaraj, "Classification of SARS-CoV-2 Viral Genome Sequence Using Neurochaos Learning", accepted for publication in *Medical & Biological Engineering & Computing Journal*, April 2022.

J4 **Harikrishnan NB**, Nithin Nagaraj, "When Noise Meets Chaos: Stochastic Resonance in Neurochaos Learning", *Neural Networks*, Volume 143, Pages 425-435. ISSN 0893-6080, November 2021.

J5 **Harikrishnan NB**, Aditi Kathpalia, Snehanshu Saha, Nithin Nagaraj, "ChaosNet: A Chaos Based Artificial Neural Network Architecture For Classification", *Chaos: An Interdisciplinary Journal of Non-linear Science*, Volume 29, No. 11, Pages 113125-1 – 113125-17, October 2019.

CONFERENCE PROCEEDINGS / PRESENTATIONS / POSTERS

CP1 Aditi Kathpalia, **Harikrishnan NB**, Nithin Nagaraj, "A Hybrid Neurochaos Learning-Reservoir Computing Architecture for Prediction", *Dynamic Days US 2023*, Jan. 9, 2023. (POSTER-HNB)

CP2 **Harikrishnan NB**, Diptendu Chatterjee, Nithin Nagaraj, "Revisiting the XOR problem using Neurochaos Learning", *Conference on Nonlinear Systems and Dynamics 2022*, IISER Pune, 16 December 2022. (ORAL-HNB)

CP3 **Harikrishnan NB**, Aditi Kathpalia, Nithin Nagaraj, "Causality Preserving Chaotic Transformation for Classification using Neurochaos Learning", In *Advances in Neural Information Processing Systems*, NeurIPS 2022.

CP4 **Harikrishnan NB**, Nithin Nagaraj, "Why does Neurochaos Learning work? The Role of Chaos and Noise in Neurochaos Learning", *Conference on Nonlinear Systems & Dynamics (CNSD-2021)*, Sastra University (online), 22 December 2021.

CP5 **Harikrishnan NB**, Nithin Nagaraj, "Neurochaos Inspired Hybrid Machine Learning Architecture for Classification", *2020 International Conference on Signal Processing and Communications (SPCOM)*, Bengaluru, India, July 2020.

CP6 **Harikrishnan NB**, Nithin Nagaraj, "A Novel Chaos Theory Inspired Neuronal Architecture", *IEEE conference on Global Conference for Advancement in Technology (IEEE GCAT)*, Bengaluru, 18 October 2019.

TEACHING/MENTORING EXPERIENCE

Teaching Experience

- BITS: Machine Learning (BITSF464)   **Aug'22 to Dec'22**
- BITS: Introduction to Data Science (BA ZG523/CSI ZG523)   **Jan'23 to May'23**
- NIAS: Teaching assistant for the course modules on "Topics in Information Theory, Chaos and Causal Learning" (Course Instructor: Dr. Nithin Nagaraj, National Institute of Advanced Studies, Bengaluru, Karnataka, India).   **Jan'20–May'20**

TECHNICAL SKILLS

Mathematical Modelling, Linear Algebra, Machine Learning, Python, MATLAB, Keras, LaTeX.

INVITED TALKS

1. **Interplay of Chaos and Noise in Machine Learning**, (online seminar) Indian Institute of Technology Mandi, 03 March 2023.

2. **Dynamical System Proof of Infinitude of Primes**, National Institute of Advanced Studies, Indian Institute of Science Campus, Bengaluru, Karnataka, India, 08 December 2021, [Video].

3. **Neurochaos Learning**, online talk at ARTPARK, Indian Institute of Science, Bengaluru, Karnataka, India, 02 September 2021, [Video].

4. **From Coffee Space to Vector Space: Foundations of Linear Algebra**, online talk at Society for Industrial and Applied Mathematics (SIAM -IISc Student Chapter), Indian Institute of Science, Bengaluru, Karnataka, India, 28 August 2021, [Video].

5. **How do Intelligent Machines Learn From Experience? Learning From Data**, Quintessence of Being: Examining Existence and Experience online course conducted by the Consciousness Studies Programme, National Institute of Advanced Studies on 15 October 2020, [Video].

6. **"Learning" from the Coronaviruses: Genome Classification and Complexity**, NIAS Wednesday Discussion meeting (online - along with co-speakers Dr. Nithin Nagaraj and Dr. Pranay S Yadav), National Institute of Advanced Studies, Indian Institute of Science Campus, Bengaluru, Karnataka, India, 3 June 2020, [Abstract].

7. **A Gentle Introduction to Chaos**, an invited talk as part of a workshop on "A primer on AI and Data Science" for faculty and students, at Centre for Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore, 28 January 2020, [Slides].

8. **Turing Test - An Imitation Game to Determine Machine Intelligence**, a technical talk for Reading Glass Presentation at Consciousness Studies Programme, National Institute of Advanced Studies, Bengaluru, 16 August 2019, [Video].

9. **Mathematical Techniques to Remove EEG Artifacts**, at NIMHANS Bengaluru, 5 July 2019. This was part of a series of invited lectures at NIMHANS by Dr. Nithin Nagaraj on Mathematical Foundations in Neuroscience & Consciousness Studies Research.

10. **Foundations of Linear Algebra, PCA, SVD with Applications**, an invited talk organized by Bengaluru School of AI community, NUMA Bengaluru, 6 April 2019, [Abstract].

PROFESSIONAL SOCIETY

IEEE Member, **Chairperson of Signal Processing Society**, Amrita IEEE Student Branch, Amrita Vishwa Vidyapeetham, Amritapuri Campus, Kollam, Kerala, India.   **Feb'15–Feb'16**

HONORS/AWARDS

1. Awarded outstanding volunteer award in recognition of the contributions to the Amrita Vishwa Vidyapeetham IEEE Student Branch activities.   **2015**.

2. Certificate of appreciation for excellent contribution towards IEEE Student Branch activities of Amrita Vishwa Vidyapeetham.   **2014**