Dr. Tilendra Choudhary, Ph.D.

CONTACT INFORMATION

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OBJECTIVE

Placement in an academic or industrial research and development position that allows advanced research in the area of data science, signal processing, and machine learning (ML).

INTERESTS

Physiological signal analysis, health informatics, AI and ML for healthcare and other domains

EDUCATION

Ph.D, Electronics and Electrical Engineering, 2020
Indian Institute of Technology Guwahati (IIT G), Assam

M.Tech., Electronics and Communication Engineering (CGPA: 8.93/10), 2015
Indian Institute of Technology Bhubaneswar (IIT BBS), Odisha

B.E., Electronics and Telecommunication Engineering (CPI: 8.21/10), 2012
Chhattisgarh Swami Vivekanand Technical University (State Govt.), Bhilai, Chhattisgarh

EXPERIENCE IN R&D (FULL TIME)

*__Post-doctoral Research Fellow__, **2024 Mar. - Present**
Dept. of Surgery, Duke University, Durham, NC-27707, USA

__Post-doctoral Research Fellow__, **2022 Apr. - 2024 Feb.**
Dept. of Biomedical Informatics, Emory University, Atlanta, GA-30322, USA
[Jointly with] Georgia Institute of Technology (Georgia Tech), Atlanta, USA
Domains: To develop DSP and ML-based smart algorithms to analyze multimodal biosignals and EHR-data for assessing critical complications such as sepsis and ARDS. To analyze effect of VNS neuromodulation on PTSD patients using physiological and behavioral analysis.

*__Post-doctoral Industrial Experience:__
Research Consultant **2021 Nov. - 2022 Mar.**
Research Engineer **2021 Feb. - 2021 Oct.**
Brigosha Technologies Pvt Ltd (R&D), #780 HSR Layout Bangalore, Karnataka-560102, India
Domain: Autonomous driving and machine learning: Developed a deep learning-based traffic scene perception from LiDAR 3-D sensor-data and assisted tracking, *Tools:* Python, MATLAB

*__Ph.D. Research Scholar__ **2015 July - 2020 Oct.**
Department of EEE, IIT Guwahati, Guwahati, Assam-781039, India
Dissertation: Waveform Delineation and Analysis of Seismocardiographic Signals
Focus: With signal processing and machine learning, I developed several SCG characterization and delineation frameworks for different applications (e.g., cardiac event detection, heart rate variability, breathlessness identification) and also developed sensing hardware devices, GUIs and mobile applications. *Tools:* MATLAB, Python, NI Multisim, BIOPAC system, Arduino

*__M.Tech. Scholar__ **2013 July - 2015 July**
School of Electrical Sciences, IIT Bhubaneswar, Argul, Khordha, Odisha-752050, India
Dissertation: Delineation Frameworks for PPG and ECG Signals. *Tools:* MATLAB

SELECTED JOURNAL PUBLICATIONS

- **Tilendra Choudhary** et al., "Derivation and Validation of Generalized Sepsis-induced Acute Respiratory Failure Phenotypes Among Critically Ill Patients: A Retrospective Study," *BMC Critical Care*, vol. 28, no. 1, pp. 321, Oct. 2024. (#citations:1, IF: 8.8)
- **Tilendra Choudhary** et al., "Identification of Human Breathing-States Using Cardiac-Vibrational Signal for m-Health Applications," *IEEE Sensors Journal*, vol. 21, no. 3, pp. 3463-3470, 2021. DOI: 10.1109/JSEN.2020.3025384. (#citations:18, IF:4.3)
- **Tilendra Choudhary** et al., "Automatic Detection of Aortic Valve Opening using Seismocardiography in Healthy Individuals," *IEEE Journal of Biomedical and Health Informatics*, vol. 23, no. 3, pp. 1032-1040, 2019. (#citations:69, IF:7.7, **It was featured on the cover of journal's sub-column, and as an 'Editor's Pick' for the May 2019 issue.**)

- **Tilendra Choudhary**, M.K. Bhuyan, and L.N. Sharma, "Delineation and Analysis of Seismocardiographic Systole and Diastole Profiles," *IEEE Transactions on Instrumentation and Measurement*, vol. 70, Art no. 4000108, pp. 1-8, 2021. (#citations:12, IF:5.6)

Patents Filed

1) "Method and Technology for Accelerometric Signal Recording of a Novel Vibrocarotidogram (ViCG) with Seismocardiogram (SCG)," in *Indian Patent*, 2020. Ref. No.: 202031026802

2) "Device and Method for Seismocardiography Recording and Monitoring in Mobile Device for Healthcare Applications," in *Indian Patent*, 2020. Ref. No.: 202031027314

Achievements & Other Experiences

- **#PUBLICATIONS:** 16 Journals, 12 Conferences, 2 Preprints, 2 filed patents.
- EPIC system deployment of the sepsis-induced ARF phenotyping model is currently under process at Emory University for its prospective use in ICU.
- Administered brain imaging and physiological waveform data acquisition of acute stressed and PTSD patients at Emory University Hospital.
- Project member of a working group to standardize the physiological waveforms format in the Bridge2AI for Clinical Care Project [zenodo link].
- Worked in collaboration with Evren Technologies Inc., GeorgiaTech, University of Pittsburgh, MIT, Altanta VA medical center.
- Mentored many PhD, MS and undergraduate students.
- MHRD, Govt. of India Scholarship for my PhD (2015-20) & MTech (2013-15).
- Young Researcher Award 2021 by Institute of Scholars (InSc), 2021.
- **Invited talks:**
  - Speaker, Research Friday Duke University, "ML-derived Unique Phenotypes for Sepsis-induced Acute Respiratory Failure (ARF) in ICU", Oct. 18, 2024.
  - Speaker, AI in Healthcare Engineering, NECBH, IIT Guwahati, Mar. 28-30, 2019,
  - Speaker, Workshop on MATLAB, RSF-EEE, IIT Guwahati, Mar. 09-10 2019.
- Reviewer of many IEEE, Elsevier, npj, Nature and ACM, journals and conferences.
- **Grant proposal development experience:** Assisted for **NIH R01** submission, Jul 2023.
- Developed hardware circuit design for SCG and ViCG signals acquisition.
- Devised biometric recognition systems using ECG/PPG signals.
- Contributed for book-preparation, "Computer Vision and Image Processing: Fundamentals and Applications," CRC Press, 2019.
- Attended workshop on "Tutorial Series on Deep Learning using Tensorflow (TSDLT)," IEEE Branch, IIT Guwahati, Oct. 2018.

Teaching Assistance

Digital Electronics Circuit Lab, Analog Electronics Lab, Signal and System Lab and Tutorial, Design Laboratory, Basic Electronics Tutorial, Probability and Randam Processes Tutorial

Editorial Experience

*Review Editor, Biomedical Signal Processing, Frontiers in Signal Processing (SP)
*Topic Editor, Smart Biomedical Signal Analysis with Machine Intelligence, Frontiers in SP

Media Coverage

- **Physician's Weekly:** Sepsis-Induced ARF Phenotypes Show Special Organ Injury Characteristics & Clinical Outcomes Differences, Oct 2024. [Link]
- **MedScape:** Transcranial VNS Tied to Improved Cognition in PTSD, Jul 2023. [Link]
- **GLOBE NEWSWIRE:** gammaCore (Non-Invasive Vagus Nerve Stimulation; nVNS) Improves Attention and Memory in Patients with PTSD, Jul 2023. [Link]
- **GLOBE NEWSWIRE:** gammaCore nVNS Improves Attention and Working Memory in Patients with Post Traumatic Stress Disorder (PTSD), Sept 2023. [Link]

Skills

Coding skills : MATLAB, Python, basic C/C++, Pytorch, Tensorflow
Software editor tools : Spyder, Pycharm, Cloudcompare, Dataiku
Simulation skills : NI Multisim, MATLAB, Simulink, PSpice
Embedded programming skills : Arduino; **Type-setting skills :** LaTeX, MS Office
Lab-equipments handled : DSO, BIOPAC system (MP36,45,150,160), CNAP 500 BP monitor

References Available to Contact

Dr Rishikesan Kamaleswaran, Asso. Prof. Duke Univ., USA, r.kamaleswaran@duke.edu[url]
Prof M.K. Bhuyan, Prof. Dept. of EEE, IIT Guwahati, India, mkb@iitg.ac.in [url]]
Prof Shaik Rafi Ahamed, Prof. Dept. of EEE, IIT Guwahati, India, rafiahamed@iitg.ac.in[url]
Dr L.N. Sharma, Senior Technical Officer, Dept. EEE, IIT Guwahati, India, lns@iitg.ac.in [url]