TANUKA BHATTACHARJEE

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SUMMARY

Researcher with **8+ years of total experience** in **Signal Processing, Time Series Analysis and Machine Learning**, including 6 years of **PhD experience** from India's top research institute **IISc, Bangalore**. Experience in both industrial and academic research, with **6 granted patents and 27 published papers** in top-tier journals and conferences. Seeking opportunities in **research-focused roles** to contribute to advanced R&D and innovation.

SKILLS

- Speech signal processing
- Time series analysis
- Physiological signal processing
- Machine learning
- Deep learning
- Experimental design
- Data collection and analysis
- Python, PyTorch, Keras
- Matlab

EDUCATION

08/2019 - 11/2025

Doctor of Philosophy, Speech Signal Processing
Indian Institute of Science, Bengaluru

- Thesis: Characterization and Enhancement of Dysarthric Speech for Amyotrophic Lateral Sclerosis: A Source-Filter Perspective
- Publications: 2 journal articles and 12 conference papers
- CGPA: 9.4 / 10 (Coursework)

06/2015 - 06/2017

Master of Engineering, Electronics & Tele-communication Engineering
Jadavpur University, Kolkata

- Dissertation: Intelligent brain-inspired algorithms for the next generation robots
- Publications: 1 journal article and 3 conference papers
- CGPA: 10 / 10

05/2011 - 05/2015

Bachelor in Technology, Electronics & Communication Engineering
Techno India, Salt Lake, Kolkata

- CGPA: 9.57 / 10

EXPERIENCE

08/2025 - Present

Researcher
TCS Innovation Lab, Bengaluru

- Conducting advanced research in CTO-headed Innovation Lab, contributing to strategic R&D initiatives.
- Developing explainable AI solutions for cardiac health monitoring Electrocardiogram (ECG) and Phonocardiogram (PCG, Heart sound) signals with Large Language Models (LLMs) and Kolmogorov-Arnold Networks (KANs).
- Co-authored **1 peer-reviewed paper** presented at a leading international conference.

07/2022 - 04/2023

Teaching assistant
NPTEL, Online

- Courses: Pattern Recognition and Application; Deep Learning

08/2021 - 12/2021 **Teaching assistant**

Indian Institute of Science, Bengaluru

- Course: Stochastic Models and Applications

07/2017 - 07/2019 **Researcher**

TCS Innovation Lab, Kolkata

- Developed non-invasive physiological signal processing and machine learning solutions for cardiac and mental health monitoring applications.
- Ranked **8th globally** in the **PhysioNet Challenge 2018** for sleep apnea detection.
- Contributed to innovative research and technological development resulting in **6 granted patents**.
- Authored and co-authored **8 peer-reviewed papers** published at leading international conferences.

PATENTS

- **T. Bhattacharjee** et al., "Heart rate driven unsupervised techniques for continuous monitoring of arousal trend of users", **U.S. Patent** 11045136, issued June 29, 2021; **European Patent** 3586746, issued March 13, 2024.
- **T. Bhattacharjee** et al., "System and method for non-apnea sleep arousal detection", **U.S. Patent** 11419542, issued August 23, 2022; **European Patent** 3637432, issued March 23, 2022.
- D. Das, **T. Bhattacharjee** et al., "System and method for classification and quantitative estimation of cognitive stress", **U.S. Patent** 10716501, issued July 21, 2020; **European Patent** 3498169, issued June 12, 2024.
- D. Das, S. Datta, **T. Bhattacharjee** et al., "Method and system for clustering users using cognitive stress report for classifying stress levels", **U.S. Patent**11354339, issued June 7, 2022; **European Patent** 3594854, issued December 31, 2025.
- V. Sharma, C. Bhattacharyya, **T. Bhattacharjee** et al., "Discriminating features based sepsis prediction", **U.S. Patent** 11817217, issued November 14, 2023.
- S. Kimbahune, S. Shinde, A. Pal, S. Khandelwal, **T. Bhattacharjee** et al., "Method and system for screening and monitoring of cardiac diseases", **U.S. Patent** 12274536, issued April 15, 2025; **European Patent** 3760107, issued November 5, 2025.

JOURNAL ARTICLES

- **T. Bhattacharjee** et al., "Source and filter characteristics based transfer learning for dysarthria severity classification in Amyotrophic Lateral Sclerosis", **Speech Communication**, Elsevier, vol. 178, 2026, pp. 103367.
- **T. Bhattacharjee** et al., "Inter-speaker acoustic differences of sustained vowels at varied dysarthria severities for Amyotrophic Lateral Sclerosis", **JASA Express Letters**, vol. 4, no. 12, 2024, pp. 125203.
- A. Sadhu, A. Konar, **T. Bhattacharjee**, and S. Das, "Synergism of Firefly algorithm and Q-learning for robot arm path planning", **Swarm and Evolutionary Computation**, Elsevier, vol. 43, 2018, pp. 50-68.

CONFERENCE PUBLICATIONS

- 5 ICASSP, 3 first author
- 5 Interspeech, 2 first author
- 5 EMBC, 2 first author
- 9 others, 3 first author

SELECTED PUBLICATION LIST

- **T. Bhattacharjee** et al., "Transfer learning to aid dysarthria severity classification for patients with Amyotrophic Lateral Sclerosis", In **Interspeech** 2023, pp. 1543-1547.
- **T. Bhattacharjee** et al., "Static and dynamic source and filter cues for classification of Amyotrophic Lateral Sclerosis patients and healthy subjects", In IEEE **ICASSP** 2023, pp. 1-5.
- **T. Bhattacharjee** et al., "Exploring the role of fricatives in classifying healthy subjects and patients with Amyotrophic Lateral Sclerosis and Parkinson's disease", In IEEE **ICASSP** 2023, pp. 1-5.
- **T. Bhattacharjee** et al., "Source and vocal tract cues for speech-based classification of patients with Parkinson's disease and healthy subjects", In **Interspeech** 2021, pp. 2961-2965.
- **T. Bhattacharjee** et al., "Effect of noise and model complexity on detection of Amyotrophic Lateral Sclerosis and Parkinson's disease using pitch and MFCC", In IEEE **ICASSP** 2021, pp. 7313-7317.
- **T. Bhattacharjee** et al., "Robust beat-to-beat interval from wearable PPG using RLS and SSA", In IEEE **EMBC** 2019, pp. 4946-4952.
- **T. Bhattacharjee** et al., "A heart rate driven Kalman filter for continuous arousal trend monitoring", In IEEE **EMBC** 2018, pp. 3572-3577.
- **T. Bhattacharjee** et al., "SleepTight: Identifying sleep arousals using inter and intra-relation of multimodal signals", In IEEE **Computing in Cardiology Conference** (CinC) 2018, pp. 1-4.
- **T. Bhattacharjee** et al., "A general type-2 fuzzy set induced single trial P300 detection", In **FUZZ-IEEE** 2017, pp. 1-6.
- C. Pandey, A. Choudhury, **T. Bhattacharjee**, and A. Sinha, "Correlation-weighted KAN attribution for explainable AF detection using single-lead ECG", accepted in IEEE **International Conference on Pervasive Computing and Communications Workshops** (PerCom Workshops) 2026.

ACHIEVEMENTS

- **Prime Minister Research Fellowship** for pursuing PhD
- **University topper in M.E.** among all departments at Jadavpur University - *Received Sarojini Radhakanta Majumdar Memorial Gold Centered Silver Medal*
- Ministry of Human Resources Development **(MHRD), Govt. of India, scholarship** (through GATE) for pursuing M.E.
- **University topper in B.Tech**. in Electronics & Communication Engineering department at Maulana Abul Kalam Azad University of Technology - *Received Gold Medal*
- **Best Outgoing Student Award** 2014-15 in Techno India, Salt Lake from Cognizant
- **Qualcomm Innovation Fellowship India 2020 Finalist** for the proposal titled 'A Voice Conversion Approach for Amyotrophic Lateral Sclerosis (ALS) Speech Enhancement'