Tharun Reddy Kandukuri, PhD Cantab

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Analytically minded professional and PhD in Engineering candidate with a passion for MedTech innovation, biomedical electronics and Machine Learning (ML). Played key role supporting developments in neural network-driven optimisation and wearable technology for healthcare while driving projects across both academia and industry. Receptive to emerging developments in medical technology (MedTech); extensive portfolio of high-impact publications and projects focused on enhancing device functionality and patient outcomes. Enjoyed impressive academic achievements - top-ranking CGPA of 3.99/4.0 at the State University of New York.

- Contributed to developments in electrical and electronics engineering with a focus on innovating supervised learning and regression models, supporting resolution of real-world challenges in MedTech.
- Authored numerous high-impact journal publications and technical documentation to bridge gaps between complex scientific concepts and industry applications.
- Passionate about cutting-edge developments in photonics, high-speed communication technologies and bioelectronics, including deep brain stimulation. Completed training in Bio Electronics, Bio Sensors and advanced engineering.

CORE COMPETENCIES

- Machine Learning (ML)
- Data Analysis
- Neural Networks
- Regression Models
- Biomedical Engineering
- Electrochemical Sensing
- Sensor Technology
- Academic Leadership
- Curriculum Development
- Interpersonal Communication
- Analytical Thinking
- Technical Writing

Languages: English (fluent), Hindi (fluent), Telugu (fluent)

EDUCATION AND QUALIFICATIONS

UNIVERSITY OF CAMBRIDGE, ST EDMUND'S COLLEGE, Cambridge
PhD Cantab Engineering (Biomedical Electronics and ML) 09/2020-12/2024

- *Neural Network-Driven Optimisation for Engineering Design:* Developed a deep neural network algorithm for enhancing engineering design; applied across energy harvesters and materials selection.
- *Piezoelectric Energy Harvester Model:* Engineered a sustainable power-generating piezoelectric energy harvester. Optimised for low-energy environments and wearable device integration. *Findings published in MDPI Sensors.*
- *Pathogen Detection Sensor Using Impedance Spectroscopy:* Led development of a pathogen detection sensor for influenza. Achieved high sensitivity and precision using custom electrodes. *Results documented in MDPI Sensors.*
- *Machine Learning for Silent Speech Recognition:* Oversaw creation of graphene-based electrodes for silent speech recognition wearables; utilised advanced ML for signal detection and interpretation. *Findings published in IEEE Sensors.*
- *SPD Stress Project (Collaboration with GSK):* Directed development of an electrochemical sensor for stress biomarkers; overcame COVID-19 related challenges with remote collaboration, while building skills in electrochemical sensing and project management.
- *Cambalance:* Directed Cambalance, a biosignal tracking system for menopausal transition. Developed and integrated multiple biosensors into an IoT device.
- *P2Care (Periodontal Disease Detection):* Contributed to innovations in non-invasive oral healthcare diagnostics having developed saliva biosensors for early periodontal disease detection, focused on high specificity biomarker detection.

BINGHAMTON UNIVERSITY, STATE UNIVERSITY OF NEW YORK, Binghamton, New York, USA
BSc. in Electrical Engineering (Multiple Dean's Honour Awards / Summa Cum Laude) 05/2020

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TEACHING EXPERIENCE

UNIVERSITY OF CAMBRIDGE, Cambridge
Demonstrator for Electrical Logic Experiments 01/2023-07/2023
Supervisor, AC Power Course 01/2022-07/2022

- Supported second-year engineering students during electrical engineering experiments as part of their practical coursework, including technical support and troubleshooting within a lab environment.
- Taught second-year Engineering students (IBP5), focusing on core engineering principles and applications.

OXFORD SUMMER SCHOOLS, Oxford
Tutor 07/2022-12/2023

- Delivered personal tutoring and lecturing in engineering fundamentals. Developed course materials for resident summer school students.

PUBLICATIONS

T.R. Kandukuri, et al. "Pathogen Detection via Impedance Spectroscopy-Based Biosensor." Sensors, 2024, 24(3), 856. DOI: 10.3390/s24030856.

T.R. Kandukuri, et al. "Modelling and Optimisation of Energy Harvesters for Specific Applications." Sensors, 2024, 24(23), 7509. DOI: 10.3390/s24237509.

D. Ravenscroft, **T.R. Kandukuri**, et al. "Machine Learning Methods for Automatic Silent Speech Recognition Using a Wearable Graphene Strain Gauge Sensor." Sensors, 2021, 22(1), 299. DOI: 10.3390/s22010299.

M. Jabri, T**.R. Kandukuri,** et al. "Human Skin-Heat Harvesting for Fully Self-Powered Wearable Electronics: A Numerical Study of Flexible Thin-Film Thermoelectric Generators on Skin." Nano Energy, 2024, 129, 110001. DOI: 10.1016/j.nanoen.2024.110001.

D. Ravenscroft, **T.R. Kandukuri**, et al. "A Wearable Graphene Strain Gauge Sensor with Haptic Feedback for Silent Communications." *2021 IEEE International Conference on Flexible and Printable Sensors and Systems (FLEPS), Manchester, UK, 2021.*

V. Pecunia, **T.R. Kandukuri**, et al. "Roadmap on Printable Electronic Materials for Next-Generation Sensors." *Nano Futures, 2024, 8(3), 032001.*

WORK EXPERIENCE

IMMERSE EDUCATION, Cambridge
Engineering Course Developer 01/2023-03/2023

Developed introductory engineering course content for this leading provider of summer courses. Enhanced student engagement and understanding by embedding basic concepts with hands-on activities.

Key achievements

- Maximised course content relevance and applicability by engaging with university faculty to ensure alignment with academic and departmental objectives.
- Improved learning outcomes by providing practical applications of theoretical concepts; created innovative hands-on activities and case studies.
- Embedded high standards of education by designing curriculum literature aimed at driving foundational knowledge in engineering.

ETA KAPPA NU, Binghamton University, USA
Vice President of External Affairs 04.2019-05/2020

Called upon strong leadership qualities to organise and deliver multiple engineering events designed to enhance practical skills of first-year and sophomore students while facilitating professional growth through networking opportunities.

Key achievements

- Maximised internship and job opportunities for engineering students by organising campus meets with industry professionals.
- Enhanced academic outcomes of early-stage students by leading engineering events tailored to share essential tools and skills.

PROFESSOR DHAKAL, Binghamton University, USA
Research Assistant 08/2018-10/2018

Supported critical sustainable energy solutions having scoped and completed research to enhance solar cell efficiency through innovative design and technology.

Key achievements

- Optimised power output and energy storage having developed autonomous tracking system to dynamically adjust solar panel orientation based on the sun's position.
- Delivered breakthroughs in solar technology efficiency via analysis and dissemination of impacts of solar panel orientation on power efficiency.

PROFESSIONAL DEVELOPMENT

- Developing Explainable AI (XAI)
- Interpretable Machine Learning
- Explainable Machine Learning (XAI)
- Introduction to Transformer Models for NLP
- Programming Foundations: Inside Computing Hardware
- SQL Essential Training

TECHNICAL SKILLS

AI/ ML: Neural Networks, Regression Models, Deep Learning, TensorFlow, PyTorch, Simulink
Data Science and Analysis: Data Analysis, Predictive Analytics
Biomedical Engineering and Technologies: Bioelectronics, High-Speed Communication Technologies, Wearable Technologies
Sensor Technology and Diagnostics: Electrochemical Sensing, Graphene-Based Technologies, Pathogen Detection, Impedance Spectroscopy
Design and Prototyping: Microfluidics, IoT Devices, System Design
Programming / Software Development: Python, C, C++, R, MATLAB, SQL

REFERENCES

Prof. Luigi G. Occhipinti
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