# SUBHAMOY BISWAS


CONTACT

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## EDUCATION

**Master of Applied Science**, Electrical and Computer Engineering
University of Waterloo (UW), ON, Canada **Sep 2022 - Aug 2024**

- Specialization: Biomedical Engineering
- Thesis title: Machine learning-assisted continuous glucose and ketone monitoring for diabetic ketoacidosis
- Supervisor: Mahla Poudineh (UW)

**Bachelor of Engineering (Honours)**, Electrical Engineering
Jadavpur University (JU), WB, India **Jul 2018 - May 2022**

- Specialization: Advanced Instrumentation

## HONOURS

**Waterloo Institute of Nanotechnology (WIN) Nanofellowship**
University of Waterloo **Jun 2023**

- Awarded to top graduate students pursuing nanotechnology research at UW, valued at $10,000

**International Master's Award of Excellence**
University of Waterloo **Mar 2022**

- Awarded based on academic excellence demonstrated through application for admission to graduate program, valued at $12,500

**Mitacs Globalink Graduate Fellowship**
Mitacs Inc. **Mar 2022**

- Awarded for pursuing research masters in Canada, valued at $15,000

**Senior Scholarship**
Jagadis Bose National Science Talent Search, India **Dec 2018**

- Awarded to "top 73/2000+" undergraduate applicants in West Bengal, India, based on a 3-level competition in natural sciences, valued at $3,500

## RESEARCH EXPERIENCE

**Graduate Research Assistant**
IDEATION Lab, University of Waterloo **Sep 2022 - Aug 2024**

- Developed sequence-to-sequence time series models for long-term glucose forecasting in diabetic patients
- Proposed a mathematical framework to quantify sensing delays in interstitial fluid-based biosensing and to use them in providing personalized ISF responses

- Developed decision-tree models to predict blood ketone levels using in vivo studies on microneedle (MN)-based sensors
- Denoised data from continuous glucose and ketone monitoring devices
- Briefly fabricated minimally-invasive MNs for blood ketone detection

Supervisor: Mahla Poudineh (UW)

**Undergraduate Research Assistant**

University of Minnesota, Duluth, MN (remote) **Aug 2019 - Feb 2022**

- Developed alignment-free algorithms to numerically characterise mutations in viral proteins
- Proposed a novel mathematical model to detect peptide vaccine targets in viruses
- Developed a Python application to automate the detection of vaccine targets

Supervisors: Subhash C. Basak (University of Minnesota); Ashesh Nandy (Center for Interdisciplinary Research and Education, India)

**Mitacs Globalink Intern**

Université de Montréal (UdeM) **Jun 2021 - Aug 2021**

- Simulated action potentials during atrial fibrillation (A-fib) in a computer model of the heart
- Used clustering algorithms to detect mismatched activations that trigger A-fib
- Examined the spatiotemporal properties of such activations using simple statistical approaches

Supervisor: Vincent Jacquemet (UdeM)

**Research Intern**

Indian Institute of Technology (IIT), Kharagpur **Jun 2020 - Aug 2020**

- Developed time series models to predict the requirement of emergency facilities in hospitals to accommodate COVID affected comorbid patients

Supervisors: Goutam Sen and Sayak Roychowdhury (IIT Kharagpur)

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## Journal Publications

Ausri I, Sadeghzadeh S, **Biswas S**, Zheng H, GhavamiNejad P, Huynh MDT, Keyvani F, Shirzadi E, Rahman FA, Quadrilatero J, GhavamiNejad A, Poudineh M. (2024) "Catechol-Quinone Mediated Sensing for Wearable Ketone Monitoring". Advanced Materials. 36(32). [DOI]

Saliani A, **Biswas S**, Jacquemet V. (2022) "Simulation of atrial fibrillation in a non-ohmic propagation model with dynamic gap junctions". Chaos. 32(4):043113. [DOI]

**Biswas S**, Dey S, Chatterjee S, Nandy A. (2022) "Combatting future variants of SARS-CoV-2 using an in-silico peptide vaccine approach by targeting the spike protein". Medical Hypotheses. 161:110810. [DOI]

**Biswas S**, Manna S, Nandy A, Basak SC. (2021) "New Computational Approach

for Peptide Vaccine Design Against SARS-COV-2". International Journal of Peptide Research and Therapeutics. 27(4):2257-2273. [DOI]

**Biswas S**, Manna S, Dey T, Chatterjee S, Dey S. (2022) "Identification of Generalized Peptide Regions for Designing Vaccine Effective for All Significant Mutated Strains of SARS-CoV-2". Combinatorial Chemistry and High Throughput Screening. 25(3):414-428. [DOI]

Manna S, Dey S, **Biswas S**, Nandy A, Basak SC. (2021) "Current Perspective of Zika Virus and Vaccine Development". Exploratory Research and Hypothesis in Medicine. 6(1):9-17. [DOI]

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## Conference Articles

**Biswas S**, Motamed PK, GhavamiNejad P, Ausri I, Etemad A, Poudineh M. (2024) "Learning the Sensing Delay for Personalized Continuous Diabetes Monitoring". ICLR Workshop on Learning from Time Series for Health. [link]

**Biswas S**, Dey T, Chatterjee S, Manna S, Nandy A, Das S, Nandy P, Basak SC. (2020) "Novel Algorithms for In Silico Peptide Vaccine Design with Reference to Ebola Virus," IEEE International Conference on Computer, Electrical and Communication Engineering, Kolkata, India. 1-8. [DOI]

Dey T, **Biswas S**, Chatterjee S, Manna S, Nandy A, Basak SC. (2020) "2D Polar Coordinate Representation of Amino Acid Sequences with some applications to Ebola virus, SARS and SARS-CoV-2". MDPI Mol2Net-06, UMN Duluth. [DOI]

**Biswas S**, Chatterjee S, Dey T, Dey S, Manna S, Nandy A, Basak SC. (2020) "In Silico Approach for Peptide Vaccine Design for CoVID 19", MDPI Mol2Net-06, UMN Duluth. [DOI]

**Biswas S**, Chatterjee S, Dey T, Manna S, Nandy A, Das S, Nandy P, Basak SC. (2019) "A novel approach to Peptide Vaccine Design for Ebola virus". MDPI Mol2Net-05, UMN Duluth. [DOI]

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## Industrial Experience

**Technology Consulting Intern**

PricewaterhouseCoopers (PwC), India **May 2021 - Jul 2021**

- Developed a customer relationship management (CRM) system using Microsoft Dynamics 365 for interaction with hospital patients and admits

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## Skills

- Deep learning frameworks: TensorFlow, Keras
- Languages: Python, R, MATLAB
- Data processing and ML libraries: NumPy, pandas, scikit-learn, SciPy, matplotlib
- Electrical simulation and prototyping: OrCAD PSpice, Proteus, Arduino

- Engineering design: AutoCAD
- Documentation: LaTeX

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## Memberships

**Graduate Student Researcher**

Waterloo Institute of Nanotechnology, UW **Sep 2022 - Aug 2024**

- Investigating ML-based bioanalyte detection for diabetic ketoacidosis

**Student Member**

Institute of Engineering and Technology (IET), UK **Sep 2018 - Aug 2022**

- Volunteered in tech-events organized by Jadavpur University's IET Chapter