

Akash Venkateshwaran

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EDUCATION

University of British Columbia

2022 – Present

M.A.Sc. in Mechanical Engineering, Grades: 90.2%

Vancouver, Canada

- Thesis: A Decision-Support System for Minimizing Underwater Radiated Noise from Ships
- Coursework: Computational Optimization, Machine Learning, Industrial Robotics and Deep Learning with Graph
- Honors and Awards: Mitacs Globalink Graduate Fellowship, International Tuition Award

Vellore Institute of Technology

2018 – 2022

B.Tech in Mechanical Engineering, Grades: 9.62/10

Chennai, India

- Honors and Awards: Achieved 5th rank in the mechanical engineering department

EXPERIENCE

Graduate Research Assistant

September 2022 – Present

Computational Multiphysics Laboratory (CML) - University of British Columbia

Vancouver, Canada

- **RC-CAN**: Developed a conditional CNN achieving 90% SSIM accuracy for far-field acoustic modeling in oceans
- **MMUTE-DSS**: Designed a ROS-based DSS for ship voyage planning, incorporating real-time 3D ship noise signature mapping, route optimization, and vessel speed adjustment to reduce environmental impact
- **MOOF**: Published a paper on meta-heuristic multi-objective optimization framework for fixed-route ship voyages, showcasing a real-world case study that achieved a 90.7% noise reduction with just a 0.8% increase in fuel consumption

R&D Co-op Intern

September 2024 – December 2024

IPEX Technologies Inc.

Mississauga, Canada

- Designed and implemented multiple Gaussian process regression models to predict polymer material properties
- Performed comprehensive data preprocessing, including cleaning, formatting, and polymer feature engineering
- Improved predictive accuracy significantly across various material properties, with an example being an R^2 score increase from 0.63 to 0.82 for modulus of elasticity prediction, surpassing baseline models offered by Uncountable

Software Engineer

September 2023 – September 2024

UBC Sailbot

Vancouver, Canada

- Led the navigation systems team in formulating optimization problems, defining design variables, and establishing constraints for autonomous sailboat navigation
- Developed a decision-making algorithm based on sensor data fusion to enable real-time autonomous navigation

Mitacs Globalink Research Intern

June 2021 – August 2022

Environmental Hydro-Dynamics (EHD) Laboratory - York University

Toronto, Canada

- Simulated surge wave dynamics using OpenFOAM, analyzing turbulence and vortex structures on Compute Canada
- Developed algorithms for Reynolds stress analysis, statistical evaluation, and visualization of wake dynamics
- Constructed reduced-order models using POD-DMD, contributing to journal and conference publications

Research Intern

September 2020 – March 2021

Integrated MechanoBioSystems Lab - National Cheng Kung University

Tainan, Taiwan

- Proposed a method for cervical cell segmentation and classification using the multicellular tumor spheroid dataset, employing Mask R-CNN for cell region partitioning
- Utilized ResNet as the backbone for Mask R-CNN to exploit spatial information and prior knowledge, achieving high segmentation performance with precision (0.92 ± 0.06), recall (0.91 ± 0.05), and ZSI (0.91 ± 0.04)
- Developed a VGGNet for classifying segmented cell regions, achieving over 0.95 accuracy with low standard deviation

PEER-REVIEWED PUBLICATIONS

- A. Venkateshwaran, I. K. Deo, J. Jelovica, and R. K. Jaiman, "A multi-objective optimization framework for reducing the impact of ship noise on marine mammals," *Ocean Eng.*, vol. 310, no. July 2024
- I. K. Deo, A. Venkateshwaran, and R. K. Jaiman, "Continual Learning of Range-Dependent Transmission Loss for Underwater Acoustic using Conditional Convolutional Neural Net," pp. 1–14, 2024, *ArXiv*
- A. Venkateshwaran, Z. Li, and S. Karimpour, "Turbulent characteristics and anisotropy in breaking surge waves: A numerical study," *Phys. Fluids*, vol. 35, no. 1, 2023

TECHNICAL SKILLS

Advanced: Python, PyTorch, PyTorch Geometric, ROS, Keras, NumPy, scikit-learn, Pymoo, Matplotlib, OMPL, LaTeX

Intermediate: Git, Docker, Pandas, SMAC3, Linux, HTML