

RAKTIM MONDOL

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📍 Sydney, NSW, Australia

OBJECTIVE

Data Scientist, AI Engineer, and Researcher with a PhD in Computer Science, specializing in the end-to-end development of AI solutions. Expertise spans generative AI (GenAI), natural language processing (NLP), large language models (LLMs), AI agents, and computer vision. Proven ability to analyze large-scale datasets and design deep learning architectures for real-world applications. Proficient in Python, R, and MLOps principles, with a strong foundation in statistical modeling and algorithm design. A collaborative and results-oriented professional dedicated to building and deploying cutting-edge, impactful AI applications.

EDUCATION

PhD in Computer Science and Engineering 2021 - 2025
University of New South Wales (UNSW), Sydney, Australia

Masters by Research, Computer Science & Bioinformatics 2017 - 2019
RMIT University, Melbourne, Australia
Result: High Distinction (85%)

EXPERIENCE

UNSW Sydney Mar 2021 – Jan 2025
Doctoral Researcher *Sydney, NSW*

- Developed and implemented novel deep learning models (Python, TensorFlow/PyTorch) for complex prediction tasks (e.g., cancer prognosis, gene expression prediction) using large-scale, multimodal datasets (histopathology images, TCGA genomics).
- Applied advanced statistical analysis and machine learning techniques for survival risk stratification and biomarker discovery.
- Engineered feature extraction pipelines and data fusion methodologies to integrate diverse data sources effectively.
- Investigated and implemented Explainable AI (XAI) techniques (e.g., graph-based methods) to interpret model predictions, contributing to responsible AI development.
- Collaborated closely with domain experts (pathologists, biologists) to define research problems and validate findings.
- Authored and co-authored multiple publications in peer-reviewed journals and international conferences.

UNSW Sydney Jul 2021 – Present
AI & Deep Learning Instructor (Casual) *Sydney, NSW*

- Mentored undergraduate students in advanced AI, Deep Learning, and Computer Vision concepts, translating complex theories into practical understanding.
- Led hands-on lab sessions focused on Python and ML frameworks (PyTorch/TensorFlow), guiding students through practical implementation and problem-solving.

RMIT University Mar 2017 – Oct 2019
Graduate Researcher & Instructor *Melbourne, VIC*

- Designed and trained an Adversarial Autoencoder (Python, TensorFlow) to classify cancer subtypes from high-dimensional gene expression data as primary research focus.

- Developed bioinformatics pipelines for identifying relevant genes and potential novel mutations, demonstrating proficiency in handling structured biological data.
- Instructed laboratory classes for Software Engineering Design and Engineering Computing, reinforcing core programming and design principles for aspiring engineers.

SKILLS

Languages	Python, R, SQL, L ^A T _E X
Data Science	Statistical Modelling, Hypothesis Testing, Feature Engineering, Data Visualization (Matplotlib, Seaborn), Large-scale Data Processing (Pandas, NumPy)
Machine Learning	Frameworks: PyTorch, TensorFlow, Scikit-learn, Hugging Face (Models, Datasets)
Natural Language Processing	AI Agent Design, Retrieval-Augmented Generation (RAG), Prompt Engineering, Fine-tuning Open Source LLMs, Embeddings, LangChain, SpaCy, NLTK
Tools & Platforms	Development: Git, GitHub, VS Code, Jupyter, RStudio Databases: Vector Databases (ChromaDB, Pinecone), SQL Cloud & MLOps: AWS, Docker (basic)
Soft Skills	Analytical Thinking, Problem Solving, Collaboration, Technical Communication

PROJECTS

- Multimodal Data Fusion for Cancer Survival Prediction (BioFusionNet/MM-SurvNet):** Developed deep learning models integrating histopathology images and genomic data (TCGA) to improve breast cancer survival risk stratification. Utilized Python, PyTorch, and advanced statistical survival analysis techniques. (Published IEEE JBHI 2024).
- Explainable AI for Histopathology Analysis (GRAPHITE):** Built a novel graph-based deep learning framework to enhance model interpretability in breast cancer image analysis, aiding pathologist trust and understanding. Focused on XAI methods. (Published CBM 2025).
- Cross-Domain Gene Expression Prediction (hist2RNA):** Created an efficient DL architecture (Python, TensorFlow) to predict gene expression directly from histopathology images, bridging imaging and genomics domains. (Published Cancers 2023).
- Adversarial Learning for Biomarker Discovery (AFExNet):** Designed an Adversarial Autoencoder to differentiate cancer subtypes and extract biologically relevant genes from high-throughput genomic data. (Published IEEE/ACM TCBB 2021).
- Hardware Acceleration for ML Models (FPGA):** Designed and implemented hardware architectures on FPGAs for regression models (anemia detection, chlorophyll estimation) and face recognition systems, demonstrating understanding of efficient computation. (Published ICIEV 2014, SKIMA 2014, ICHIECS 2015).

PUBLICATIONS

Journal Papers

- Mondol R.K., Millar E.K.A., Graham P.H., Browne L., Sowmya A., Meijering E. "GRAPHITE: Graph-Based Interpretable Tissue Examination for enhanced explainability in breast cancer histopathology" Journal of Computers in Biology and Medicine, 2025. [\[ScienceDirect\]](#)
- Mondol R.K., Millar E.K.A., Sowmya A., Meijering E. "BioFusionNet: Deep Learning-Based Survival Risk Stratification in ER+ Breast Cancer Through Multifeature and Multimodal Data Fusion." *IEEE J. Biomed. Health Inform.*, 2024. [\[IEEE Xplore\]](#)

- Mondol R.K., Millar E.K.A., Graham P.H., Browne L., Sowmya A., Meijering E. "hist2RNA: An Efficient Deep Learning Architecture to Predict Gene Expression from Breast Cancer Histopathology Images" *Cancers*, 2023. [\[MDPI\]](#)
- Mondol R.K., Truong N.D., Reza M., Ippolito S., Ebrahimie E., Kavehei O. "AFExNet: An Adversarial Autoencoder for Differentiating Breast Cancer Sub-Types and Extracting Biologically Relevant Genes" *IEEE/ACM Trans. Comput. Biol. Bioinform.*, 2021. [\[IEEE Xplore\]](#)

Conference Proceedings

- Mondol R.K., Millar E.K.A., Sowmya A., Meijering E. "MM-Survnet: Deep Learning-Based Survival Risk Stratification..." *IEEE ISBI*, Athens, Greece, 2024. [\[IEEE Xplore\]](#)
- Khan M.I., Mondol R.K., Zamee M.A., Tarique T.A. "Hardware architecture design of anemia detecting regression model based on FPGA," *ICIEV*, 2014. [\[IEEE Xplore\]](#)
- Khan I., Mondol R.K. "FPGA based leaf chlorophyll estimating regression model," *SKIMA*, 2014. [\[IEEE Xplore\]](#)
- Mondol R.K., Khan I., Mahbubul Hye Md. A.K., Hassan A. "Hardware architecture design of face recognition system based on FPGA," *ICIECS*, 2015. [\[IEEE Xplore\]](#)
- Hassan A., Mondol R.K., Hasan M.R. "Computer network design of a company — A simplistic way," *ICACCS*, 2015. [\[IEEE Xplore\]](#)

HONORS & AWARDS

- UNSW PhD Scholarship (Tuition Fee and Stipend), 2021-2025
- Masters by Research completed with High Distinction, RMIT University, 2019
- RMIT Research Stipend Scholarship & International Tuition Fee Scholarship, 2017
- Multiple Academic Excellence Awards (Vice Chancellor/Dean), BRAC University, 2010-2013

PROFESSIONAL DEVELOPMENT

- Trained in NGS RNA Seq. & DNA Seq. Data Analysis (ArrayGen), 2019
- Presented Poster at AMSI BioinfoSummer (Monash University), 2017
- Presented Thesis in 3 Minute Thesis (3MT) Competition (RMIT University), 2017
- Trained in High Performance Computing (HPC) (Monash University), 2017