MUSFIQUR RAHMAN

PhD Candidate in Software Engineering | LLMs for Code | ML Systems

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RESEARCH SUMMARY

PhD candidate specializing in LLMs for software engineering with 7+ years of industry and research experience. Expert in building large-scale ML systems, code generation benchmarks, and AI-powered developer tools. Published at top-tier venues (ICSE, MSR, EASE) with 100+ citations. Proven track record of translating research into production systems and mentoring technical teams.

TECHNICAL EXPERTISE

Languages & Frameworks: Python (expert), Java, C/C++, PyTorch, Transformers, Scikit-learn
ML/AI Specializations: LLMs, NLP, Code Generation, Statistical ML, Deep Learning, MLOps
Infrastructure & Tools: Docker, GCP, AWS, Git, PostgreSQL, BigQuery
Research Methods: Empirical studies, benchmark development, large-scale data mining, A/B testing, Bayesian modeling

PROFESSIONAL EXPERIENCE

Artificial Intelligence Engineer *Feb 2018 – Feb 2020*
Pentavere (Health Tech), Toronto, ON
Selected contributions:
- Built and deployed clinical NLP models processing millions of unstructured health records in production
- Designed end-to-end ML pipelines for automated healthcare data extraction and analysis
- Collaborated with cross-functional teams to deliver AI solutions meeting regulatory requirements

Lead Instructor & Subject Matter Expert, Data Science/AI *Feb 2020 – Present*
General Assembly, Remote
Selected contributions:
- Delivered 50+ bootcamp cohorts, training 1000+ professionals in ML, deep learning, and data engineering
- Designed curriculum and built hands-on labs for production-grade ML systems and MLOps
- Mentored and trained instructors globally on technical content delivery and pedagogical approaches
- Served on Future Skills Board identifying emerging industry trends and workforce development needs (2025-Present)

RESEARCH EXPERIENCE

PhD Researcher – LLMs for Software Engineering *May 2022 – Present*
Concordia University, DAS Lab (Advisor: Prof. Emad Shihab), Montréal, QC
Selected Projects during PhD:
CodeProbe: Universal AI-Generated Code Detection System (Sep 2025 - Present)
- Developed contamination-free benchmark for training/evaluating AI code detectors across languages and models
- Built robust detection system using 44 stylometric and complexity features with cross-model generalization
- Designed extraction pipelines preserving code structure for large-scale analysis
OpenClassGen: Large-Scale Class-Level Code Generation Dataset (Apr 2025 - Nov 2025)
- Curated 400k+ real-world Python classes from GitHub, establishing new benchmark for code generation research
- Open-sourced evaluation framework enabling reproducible benchmarking across state-of-the-art LLMs
- Evaluated Claude-3.5-Sonnet, GPT-4o, Qwen2, DeepSeek-Coder on production-realistic code generation tasks
ConfigStability: ML System Reliability Under Environment Variability (Sep 2022 - Dec 2024)
- Investigated stability of AI systems across deployment configurations, identifying critical failure modes
- Developed framework for assessing configuration-induced risks in production ML systems
- Published findings at EASE 2025, providing actionable guidelines for robust ML deployment

M.Sc. Researcher – Code Naturalness & Machine Translation *Sep 2015 – Apr 2018*
Concordia University, CESEL Lab (Advisor: Prof. Peter C. Rigby), Montréal, QC
Selected Projects during M.Sc.:
- Analyzed predictability of programming languages using NLP, published at ICSE 2019 (top-tier venue)
- Created parallel English-Code corpora from StackOverflow for statistical machine translation (MSR 2019)
- Developed data cleaning pipelines and ML models, achieving high-quality code translation

SELECTED PUBLICATIONS

- **M. Rahman**, S. H. Khatoonabadi, E. Shihab. "Beyond Synthetic Benchmarks: Evaluating LLM Performance on Real-World Class-Level Code Generation." arXiv:2510.26130, 2025. *[Under Review - TOSEM]*
- **M. Rahman**, S. H. Khatoonabadi, E. Shihab. "A Large-scale Class-level Benchmark Dataset for Code Generation with LLMs." arXiv:2504.15564, 2025. *[Under Review - MSR 2026]*
- **M. Rahman**, S. H. Khatoonabadi, A. Abdellatif, et al. "The Impact of Environment Configurations on the Stability of AI-Enabled Systems." *EASE 2025* (Acceptance Rate: 27%).
- **M. Rahman**, S. H. Khatoonabadi, et al. "Automatic Detection of LLM-generated Code: A Case Study of Claude 3 Haiku." arXiv:2409.01382, 2024.
- **M. Rahman**, D. Palani, P. C. Rigby. "Natural Software Revisited." *ICSE 2019* (Acceptance Rate: 20%).
- **M. Rahman**, D. Palani, P. C. Rigby, et al. "Cleaning StackOverflow for Machine Translation." *MSR 2019 Data Showcase*.

Impact: 100+ citations | Published at ICSE, MSR, EASE, HICSS

EDUCATION

PhD in Software Engineering *May 2022 – Sep 2026 (Expected)*
Concordia University, Montréal, QC GPA: 4.30/4.30
Thesis: *Large Language Models in Coding: Generation, Detection, and Repair*

M.Sc. in Computer Science *Sep 2015 – Apr 2018*
Concordia University, Montréal, QC GPA: 3.90/4.30
Thesis: *Code Predictability and English-to-Code Statistical Machine Translation*

B.Sc. in Computer Science and Engineering *Jan 2011 – Dec 2014*
East West University, Dhaka, Bangladesh GPA: 3.62/4.00

AWARDS & LEADERSHIP

- **Concordia University Doctoral Fellowship** (2022-2026) – Full PhD funding for research excellence
- **Future Skills Board Member**, General Assembly (2025-Present) – Shaping future workforce development
- **Academic Service:** PC member/reviewer for ICSE-SRC 2026, MSR 2024, 2026, TechDebt 2026, TOSEM, CAIN 2026
- **Campaign for Concordia Graduate Award** (2022) – Outstanding research and academic achievement