




MASUD RAHMAN, Ph.D.





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CAREER OBJECTIVES




My career objectives are (a) conducting cutting edge research in the area of Software Engineering, Artificial Intelligence, and challenging myself every day with tough, emerging, interesting research problems, (b) innovating cost-effective, robust, practical solutions to support the developers in managing their *software bugs, features, and source code*, (c) honing my research, development, and supervision skills through constant learning, active collaborations, and self-reflection, and (d) using my talents and skills in the making of the leaders of tomorrow.

EDUCATION

Doctor of Philosophy, Computer Science/Software Engineering

University of Saskatchewan, Canada

September 2014 – September 2019

Thesis Supporting Source Code Search with Context-Aware and Semantics-Driven Query Reformulation   




Advisor Prof. Dr. Chanchal K. Roy

Awards **Governor General's Gold Medal 2019** , **USask Doctoral Thesis Award 2019** , **Best PhD Thesis Award 2019 (CS)**, **Dr. Keith Geddes Award 2017** , **WAGS/ProQuest Innovation in Technology Award 2020 (Nomination)**

Master of Science, Computer Science/Software Engineering

University of Saskatchewan, Canada

September 2012 – August 2014

Thesis Exploiting Context in Dealing with Programming Errors and Exceptions in the IDE   

Supervisor Prof. Dr. Chanchal K. Roy

Award 2014 Best MSc Thesis Award (Nomination)

Bachelor of Science, Computer Science and Engineering

Khulna University, Bangladesh

January 2005 – March 2009

CGPA **3.91/4.00**, 1st class 1st

Thesis Information Retrieval by Modified Term Weighting Method using Random Walk Model with Query Term Position Ranking 

Supervisor Prof. Dr. Abu Shamim Mohammad Arif

Award **2010 Chancellor Gold Medal** 

[2023]

- [1] P. Mahbub, O. Shuvo, and **M. Masudur Rahman**, “*Explaining Software Bugs Leveraging Code Structures in Neural Machine Translation*”, In Proceeding of The 45th IEEE/ACM International Conference on Software Engineering (**ICSE**), pp. 12, 2023 (Acceptance rate: **26%**) (to appear).
- [2] **M. Masudur Rahman** and C. K. Roy, “*A Systematic Review of Automated Query Reformulations in Source Code Search*”, ACM Transactions on Software Engineering and Methodology (**TOSEM**), pp. 81, 2023 (Impact Factor=**3.69**) (to appear)
- [3] O. Shuvo, P. Mahbub, and **M. Masudur Rahman**, “*Recommending Code Reviews Leveraging Code Changes with Structured Information Retrieval*”, In Proceeding of The 39th IEEE International Conference on Software Maintenance and Evolution (**ICSME**), pp. 12, October 2023 (Acceptance rate: **22.70%**) (to appear).
- [4] S. Jahan and **M. Masudur Rahman** “*Towards Understanding the Impacts of Textual Dissimilarity on Duplicate Bug Report Detection*”, In Proceeding of The 30th IEEE International Conference on Software Analysis, Evolution and Reengineering (**SANER**), pp. 12, 2023 (Acceptance rate: **27%**).
- [5] S. Mondal, **M. Masudur Rahman**, and C. K. Roy, “*Do Subjectivity and Objectivity Always Agree? A Case Study with Stack Overflow Questions*”, In Proceeding of The 20th International Conference on Mining Software Repositories (**MSR**), pp. 12, 2023 (Acceptance rate: 37%) (to appear).
- [6] P. Mahbub, **M. Masudur Rahman**, O. Shuvo, A. Gopal, “*Bugsplainer: Leveraging Code Structures to Explain Software Bugs with Neural Machine Translation*”, In Proceeding of The 39th IEEE International Conference on Software Maintenance and Evolution (**ICSME**), pp. 06, October 2023 (to appear).
- [7] P. Mahbub, O. Shuvo, and **M. Masudur Rahman**, “*Defectors: A Large, Diverse Python Dataset for Defect Prediction*”, In Proceeding of The 20th International Conference on Mining Software Repositories (**MSR**), pp. 5, 2023 (to appear).

[Pre-submission]

- P. Mahbub and **M. Masudur Rahman**, “*Predicting Line-Level Defects by Capturing Code Contexts with Hierarchical Transformers*”, In Proc. SANER, pp. 12, 2024 (Pre-submission).
- M. Shah and **M. Masudur Rahman**, “*How do Software Bugs Affect the Siamese Neural Network? An Empirical Study*”, In Proc. SANER, pp. 12, 2024 (Pre-submission).
- S. Jahan, M. Shah, and **M. Masudur Rahman**, “*Towards Automated Bug Localization in Deep Learning Software Systems*”, In Proc. SANER, pp. 12, 2024 (Pre-submission).
- O. Shuvo, P. Mahbub, and **M. Masudur Rahman**, “*Mind the Gap: Contrasting the Quality of Comments in Code Reviews between Open and Closed-Source Systems*”, In Proc. SANER, pp. 12, 2024 (Pre-submission).
- U. Mukherjee and **M. Masudur Rahman**, “*Answering Follow-up Questions from Bug Reports Leveraging Large Language Models with Structured Information Retrieval*”, In Proc. SANER, pp. 12, 2024 (Pre-submission).


[2022]

- [8] **M. Masudur Rahman**, F. Khomh, and M. Castelluccio, “*Works for Me! Cannot Reproduce – A Large Scale Empirical Study of Non-reproducible Bugs*”, Empirical Software Engineering Journal (**EMSE**), pp. 45, 2022. (Impact Factor=**4.73**)
- [9] S. Mondal, **M. Masudur Rahman**, C. K. Roy, and K. Schneider, “*The Reproducibility of Programming-Related Issues in Stack Overflow Questions*”, Empirical Software Engineering Journal (**EMSE**), pp. 52, 2022. (Impact Factor=**4.73**)
- [10] **M. Masudur Rahman**, F. Khomh, S. Yeasmin, and C. K. Roy, “*The Forgotten Role of Search Queries in IR-based Bug Localization: An Empirical Study*”, Empirical Software Engineering Journal (**EMSE**), pp. 57, 2022. (Impact Factor=**4.73**) (Presented at the Journal First track of **ICSE** 2022)


[2021]

- [11] **M. Masudur Rahman**, F. Khomh, S. Yeasmin, and C. K. Roy, “*The Forgotten Role of Search Queries in IR-based Bug Localization: An Empirical Study*”, Empirical Software Engineering Journal (**EMSE**), pp. 57, 2021. (Impact Factor=**4.73**) (Invited at Journal First track by SANER 2022)
- [12] M. Vahedi, **M. Masudur Rahman**, F. Khomh, G. Uddin, and G. Antoniol. “*Summarizing Relevant Parts from Technical Videos*”. In Proceeding of The 28th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2021), pp. 12, Honolulu, HI, USA, March 2021 (Acceptance rate: **42/165=25.00%**)
- [13] R. F. Silva, **M. Masudur Rahman**, C. E. Dantas, C. Roy, F. Khomh, and M. A. Maia. “*Improved Retrieval of Explained Programming Solutions Using a Multi-featured Score*”. Journal of Systems & Software (**JSS**), pp. 31, 2021. (Impact Factor=**3.5**)
- [14] S. Mondal, C M K. Saifullah, A. Bhattacharjee, **M. Masudur Rahman**, and C. K. Roy. “*Early Detection and Guidelines to Improve Unanswered Questions on Stack Overflow*”. In Proceeding of The 13th Innovation in Software Engineering Conference (ISEC 2021), pp. 11, Bhubaneswar, India, February 2021 (Acceptance rate: **22/66=33.33%**).




[2020]

- [15] **M. Masudur Rahman**, F. Khomh, and M. Castelluccio, “*Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion*”, In Proceeding of The 36th International Conference on Software Maintenance and Evolution (**ICSME** 2020), pp. 605–616, Adelaide, Australia, September, 2020. (In Press) (Acceptance rate: **50/201=24.90%**) (Invited for **EMSE** special issue) (**TCSE Distinguished Paper Award 2020***) 
- [16] H. Jebnoun, H. Ben Braiek, **M. Masudur Rahman**, and F. Khomh, “*The Scent of Deep Learning Code: An Empirical Study*”, In Proceeding of The 17th International Conference on Mining Software Repositories (**MSR** 2020), pp. 420–430, Seoul, South Korea, May, 2020 (Acceptance rate: **41/138=29.70%**)
- [17] B. Asmare Muse, **M. Masudur Rahman**, C. Nagy, A. Cleve, F. Khomh, and G. Antoniol, “*On the Prevalence, Impact, and Evolution of SQLcode smells in Data-Intensive Systems*”, In Proceeding of The 17th International Conference on Mining Software Repositories (**MSR** 2020), pp. 327–338, Seoul, South Korea, May, 2020 (Acceptance rate: **41/138=29.70%**)
- [18] Rodrigo F. G. Da Silva, C. K. Roy, **M. Masudur Rahman**, K. Schneider, K. Paixão, M. Maia, and C. E. Dantas, “*CROKAGE: Effective Solution Recommendations for Programming Tasks by Leveraging Crowd Knowledge*”, Empirical Software Engineering Journal (**EMSE**), 25:4707–4758, 2020. (Impact Factor=**4.73**).

[2019]

- [19] **M. Masudur Rahman**, C. K. Roy, and David Lo, “Automatic Query Reformulation for Code Search using Crowdsourced Knowledge”, Empirical Software Engineering Journal (**EMSE**), 24(4):1869–1924, 2019. (Impact Factor=**4.73**) (Invited at Journal First track by VL/HCC 2020, Dunedin, New Zealand)
- [20] **M. Masudur Rahman**, “Supporting Code Search with Context-Aware, Analytics-Driven, Effective Query Reformulation”, In Proceeding of The 41st ACM/IEEE International Conference on Software Engineering (Companion volume, Doctoral Symposium Track) (**ICSE 2019**), pp. 226–229, Montreal, Canada, May, 2019. (Acceptance rate: **9/31=29.03%**)
- [21] S. Mondal, **M. Masudur Rahman** and C. K. Roy, “Can Issues Reported at Stack Overflow Questions be Reproduced? An Exploratory Study”, In Proceeding of The 16th International Conference on Mining Software Repositories (**MSR 2019**), pp. 479–489, Montreal, Canada, May, 2019. (Acceptance rate: **32/126=25.40%**)
- [22] Rodrigo F. G. Da Silva, C. K. Roy, **M. Masudur Rahman**, K. Schneider, K. Paixão, and M. Maia, “Recommending Comprehensive Solutions for Programming Tasks by Mining Crowd Knowledge”, In Proceeding of The 27th IEEE/ACM International Conference on Program Comprehension (ICPC 2019), pp. 358–368, Montreal, Canada, May, 2019. (Acceptance rate: **28/93=30.11%**) (**Featured at Stack Overflow Blog***) 

[2018]

- [23] **M. Masudur Rahman** and C. K. Roy, “Improving IR-Based Bug Localization with Context-Aware Query Reformulation”, In Proceeding of The 26th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE 2018**), pp. 621–632, Florida, USA, November, 2018. (Acceptance rate: **55/295=19.00%**) (ACM Artifact Badges by peer reviews: **Functional* + Available* + Reusable***) 
- [24] **M. Masudur Rahman** and C. K. Roy, “Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics”, In Proceeding of The 34th International Conference on Software Maintenance and Evolution (**ICSME 2018**), pp. 516–527, Madrid, Spain, September, 2018. (Acceptance rate: **37/174=21.00%**) (**TCSE Distinguished Paper Award 2018 Nomination***) 
- [25] **M. Masudur Rahman** and C. K. Roy, “Poster: Improving Bug Localization with Report Quality Dynamics and Query Reformulation”, In Proceeding of The 40th International Conference on Software Engineering (**ICSE 2018**), pp. 348–349, Gothenburg, Sweden, May, 2018.
- [26] **M. Masudur Rahman** and C. K. Roy, “NLP2API: Query Reformulation for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics”, In Proceeding of The 34th International Conference on Software Maintenance and Evolution (Artifact Track) (**ICSME 2018**), pp. 714, Madrid, Spain, September, 2018. (Artifact **Verified & Accepted***) 

[2017]

- [27] **M. Masudur Rahman** and C. K. Roy, “Improved Query Reformulation for Concept Location using CodeRank and Document Structures”, In Proceeding of The 32nd IEEE/ACM International Conference on Automated Software Engineering (**ASE 2017**), pp. 428–439, Urbana-Champaign, Illinois, USA, October, 2017. (Acceptance rate: **65/314=21.00%**)
- [28] **M. Masudur Rahman** and C. K. Roy, and R. G. Kula, “Predicting Usefulness of Code Review Comments using Textual Features and Developer Experience”, In Proceeding of The 14th International Conference on Mining Software Repositories (**MSR 2017**), pp. 215–226, Buenos Aires, Argentina, May, 2017. (Acceptance rate: **37/121=30.60%**)

- [29] **M. Masudur Rahman** and C. K. Roy, and David Lo, “*RACK: Code Search in the IDE using Crowdsourced Knowledge*”, In Proceeding of The 39th International Conference on Software Engineering (Companion Volume) (**ICSE 2017**), pp. 51–54, Buenos Aires, Argentina, May, 2017. (Acceptance rate: **18/57=31.58%**)
- [30] **M. Masudur Rahman** and C. K. Roy, “*STRICT: Information Retrieval Based Search Term Identification for Concept Location*”, In Proceeding of The 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017), pp. 79–90, Klagenfurt, Austria, February 2017. (Acceptance rate: **34/140=24.00%**)
- [31] **M. Masudur Rahman** and C. K. Roy, “*Impact of Continuous Integration on Code Reviews*”, In Proceeding of The 14th International Conference on Mining Software Repositories (**MSR 2017**), pp. 499–502, Buenos Aires, Argentina, May, 2017.

[2016]

- [32] **M. Masudur Rahman**, C. K. Roy, and Jason Collins, “*CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience*”, In Proceeding of The 38th International Conference on Software Engineering (Companion Volume) (**ICSE 2016**), pp. 222–231, Austin Texas, USA, May 2016. (Acceptance rate: **28/108=26.00%**)
- [33] **M. Masudur Rahman** and C. K. Roy, “*QUICKAR: Automatic Query Reformulation for Concept Location Using Crowdsourced Knowledge*”, In Proceeding of The 31st IEEE/ACM International Conference on Automated Software Engineering (**ASE 2016**) (New Ideas Track), pp. 220–225, Singapore, September 2016.
- [34] **M. Masudur Rahman**, C. K. Roy, Jesse Redl, and Jason Collins, “*CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies*”, In Proceeding of The 31st IEEE/ACM International Conference on Automated Software Engineering (**ASE 2016**) (Tool Demo Track), pp. 792–797, Singapore, September 2016.
- [35] **M. Masudur Rahman**, C. K. Roy, and David Lo, “*RACK: Automatic API Recommendation using Crowdsourced Knowledge*”, In Proceeding of The 23rd IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2016), pp. 349–359, Osaka, Japan, March 2016. (Acceptance rate: **52/140=37.00%**)
- [36] Amit K. Mondal, **M. Masudur Rahman** and C. K. Roy, “*Embedded Emotion-based Classification of Stack Overflow Questions Towards the Question Quality Prediction*”, In Proceeding of The 28th International Conference on Software Engineering & Knowledge Engineering (SEKE 2016), pp. 521–526, San Francisco Bay, California, USA, July 2016.

[2015]

- [37] **M. Masudur Rahman**, C. K. Roy, and Iman Keivanloo, “*Recommending Insightful Comments for Source Code using Crowdsourced Knowledge*”, In Proceeding of The 15th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2015), pp. 81–90, Bremen, Germany, September 2015. (Acceptance: **24/68=35.00%**)
- [38] **M. Masudur Rahman** and C. K. Roy, “*Recommending Relevant Sections from a Webpage about Programming Errors and Exceptions*”, In Proceeding of The 25th International Conference on Computer Science and Software Engineering (CASCON 2015), pp. 181–190, Markham, Canada, November 2015. (Acceptance rate: **21/71=29.57%**)















- [39] **M. Masudur Rahman** and C. K. Roy, “*An Insight into the Unresolved Questions at Stack Overflow*”, In Proceeding of the 12th Working Conference on Mining Software Repositories (Challenge Track) (**MSR** 2015), pp. 426–429, Florence, Italy, May 2015.
- [40] **M. Masudur Rahman** and C. K. Roy, “*TextRank Based Search Term Identification for Software Change Tasks*”, In Proceeding of the 22nd IEEE International Conference on Software Analysis, Evolution, and Reengineering (ERA Track) (**SANER** 2015), pp. 540–544, Montreal, Canada, March 2015.
- [2014]
- [41] **M. Masudur Rahman**, S. Yeasmin, and C. K. Roy, “*Towards a Context-Aware Meta Search Engine for IDE-Based Recommendation about Programming Errors and Exceptions*”, In Proceeding of the IEEE CSMR-18/WCRE-21 (CSMR/WCRE 2014), pp. 194–203, Antwerp, Belgium, February 2014. (Acceptance rate: **27/87=31.00%**)
- [42] **M. Masudur Rahman** and C. K. Roy, “*On the Use of Context in Recommending Exception Handling Code Examples*”, In Proceeding of the 14th IEEE International Working Conference on Source Code Analysis and Manipulation (SCAM 2014), pp. 285–294, Victoria, Canada, September 2014. (Acceptance rate: **26/82=31.70%**)
- [43] **M. Masudur Rahman** and C. K. Roy, “*SurfClipse: Context-Aware Meta Search in the IDE*”, In Proceeding of the 30th International Conference on Software Maintenance and Evolution (Demo Track) (**ICSME** 2014), pp. 617–620, Victoria, Canada, September 2014.
- [44] **M. Masudur Rahman** and C. K. Roy, “*An Insight into the Pull Requests of GitHub*”, In Proceeding of the 11th Working Conference on Mining Software Repositories (Challenge Track) (**MSR** 2014), pp. 364–367, Hyderabad, India, May 2014.
- [2013]
- [45] **M. Masudur Rahman**, S. Yeasmin, and C. K. Roy, “*An IDE-Based Context-Aware Meta Search Engine*”, In Proceedings of the 20th Working Conference on Reverse Engineering (ERA Track) (WCRE 2013), pp. 467–471, Koblenz, Germany, October 2013.

[2009–2012]

- [46] A. S. Mohammad Arif, **M. Masudur Rahman**, and S. Y. Mukta, “*Information Retrieval by Modified Term Weighting Method using Random Walk Model with Query Term Position Ranking*”, In Proceedings of International Conference on Signal Processing Systems (ICSPS 2009), pp. 526–530, Singapore, May 2009. (Acceptance: **170/570=29.82%**)
- [47] H. Rahman, M. M. Rashid, and **Masudur Rahman**, “*Heritage Interpretation: Collective Reconstruction of Sompur Mahavihara, Bangladesh*”, In Proceedings of International Conference on Virtual Systems and Multimedia (VSMM 2010), pp. 163–170, Seoul, South Korea, October 2010.

AWARDS (29)

- [1] [2022] **JSS Best Reviewer Award:** Awarded by Journal of Systems and Software (JSS) for high-quality peer reviews and feedback.
- [2] [2021] **MSR Distinguished Reviewer Award:** Awarded by the International Conference on Mining Software Repositories (MSR) for high-quality peer reviews and feedback.
- [3] [2021] **President’s Research Excellence Award Nomination:** Nominated by the Faculty of Computer Science for this prestigious, university-wide award competition within Dalhousie University.

- [4] [2020] **TCSE Distinguished Paper Award:** Awarded by the Technical Council of Software Engineering for the ICSME 2020 paper – “*Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion.*” 
- [5] [2020] **2019 Governor General’s Gold Medal:** Awarded by the Governor General of Canada. The highest academic award that a Canadian PhD student can be awarded for academic and research excellence in the PhD program in the Canadian universities. 
- [6] [2020] **2019 U of S Doctoral Thesis Award:** Awarded by the University of Saskatchewan for the best PhD thesis in the area of Physical and Engineering Science. 
- [7] [2020] **2019 Best PhD Thesis Award:** Awarded by the Department of Computer Science, University of Saskatchewan.
- [8] [2020] **WAGS/ProQuest Innovation in Technology Award Nomination:** My PhD thesis was nominated by the University of Saskatchewan for this national-level PhD dissertation contest. 
- [9] [2018] **TCSE Distinguished Paper Award Nomination:** Nominated for TCSE Distinguished Paper Award for the ICSME 2018 paper – “*Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics.*” 
- [10] [2017] **Dr. Keith Geddes Award, Student of the Year:** Awarded to *only one* PhD student by the Department of Computer Science, University of Saskatchewan, for outstanding research and academic performance in the ongoing **PhD** program. Award value: \$2,500. 
- [11] [2010] **Chancellor Gold Medal:** Awarded by the President, Peoples’ Republic of Bangladesh and Chancellor, Khulna University. I scored the highest CGPA **3.91/4.00** in the year 2008 among 200 students from five departments of the School of Science, Engineering and Technology (SET), Khulna University. Award value: \approx \$1,000.  
- [12] [2020] **2019 Best PhD Thesis Award Nomination:** Nominated by the PhD advisory board for thesis awards. 
- [13] [2019] **ACM SIGSoft CAPS Award:** Awarded by ACM SIGSoft for attending ICSE 2019, held at Montreal, Canada, based on research and academic excellence. Award value: \$400 USD. 
- [14] [2017] **ACM SIGSoft CAPS Award:** Awarded by ACM SIGSoft for attending ASE 2017, held at University of Illinois Urbana-Champaign, IL, USA, based on research and academic excellence. Award value: \$600 USD. 
- [15] [2020] **Wiley Reviewer Recognition:** Awarded by Journal of Software Evolution and Process for high-quality journal reviews. 
- [16] [2019] **Springer Reviewer Recognition:** Awarded by Empirical Software Engineering journal for high-quality journal reviews. 
- [17] [2018] **Elsevier Reviewer Recognition:** Awarded by Journal of Systems and Software for high-quality journal reviews. 
- [18] [2011] **Prime Minister Gold Medal Nomination:** Nominated by School of Science, Engineering and Technology, Khulna University. I scored the highest CGPA 3.91/4.00 in B.Sc in Computer Science and Engineering, Khulna University
- [19] [2014] **Best MSc Thesis Award Nomination:** My MSc thesis was nominated for the Best MSc Thesis Award 2014 by the Department of Computer Science, U of S

- [20] **[2014] Best Graduate Award Nomination:** I was nominated for the Best Graduate Award 2014 from the Department of Computer Science, U of S
- [21] **[2014] Graduate Research Video Contest Winner:** One of three winners of the video contests arranged by the Department of Computer Science, U of S. Award value: \$100.
- [22] **[2016] Vanier Graduate Scholarship Nomination:** I was nominated for Vanier Graduate Scholarship by the Department of Computer Science, U of S.
- [23] **[2016] Microsoft PhD Fellowship Nomination:** I was nominated for Microsoft PhD Fellowship by the Department of Computer Science, U of S.
- [24] **[2010] Service Excellence Award:** Awarded by NOCHALLENGE TECHNOLOGY LLC for service excellence as a professional software developer during 2009–2010. 
- [25] **[2007–2008] Programming Contest Award Winner** of Khulna University.
- [26] **[2018] Graduate Travel Award:** Awarded by University of Saskatchewan for ICSME 2018 travel to Madrid, Spain. Award value: \$550.
- [27] **[2015] Graduate Travel Award:** Awarded by University of Saskatchewan for CASCON 2015 travel to Markham, Canada. Award value: \$250.
- [28] **[2014] Graduate Travel Award:** Awarded by GrammaTech for SCAM 2014 travel to Victoria, Canada. Award value: \$150.
- [29] **[2013] Graduate Travel Award:** Awarded by University of Saskatchewan for WCRE 2013 travel to Koblenz, Germany. Award value: \$550.



RESEARCH GRANTS (12)


[1] [2021] NSERC Discovery Grant

Title Mining, Intelligence and Automation in Tackling Machine-Learning Bugs
Role Primary applicant
Duration April 2021 – March 2026
Amount **\$145,000** (\$29,000×5 years)

[2] [2021] NSERC Discovery Launch Supplement

Role Primary applicant
Duration April 2021 – March 2022
Amount \$12,500

[3] [2021] Mitacs Accelerate International

Title Explaining Faulty Software Code with Artificial Intelligence
Role Primary applicant
Duration May 2022 – June 2023
Amount **\$90,000** (6 Internship units)
Partner Metabob Inc. 

[4] [2020] Dalhousie Belong Fellowship

Title Making Software Development Efficient Using Artificial Intelligence in Code Reviews
Role Primary applicant
Duration January 2021 – December 2023
Amount \$5,000

[5] [2022] Climate Action and Awareness Fund

Title Climate Action Evaluation: Development of a Bottom-up, Activity-based Transport Network and Emissions Modelling System
Role Co-applicant
Duration March 2022 – December 2026
Amount **\$3,620,000**
Allocated \$120,000 (as co-applicant)

[6] [2022] NSERC Alliance Fund

Title Mobility and Greenhouse Gas Emissions: Partnerships for Innovation through Bottom-up Modelling and Monitoring at Local Levels
Role Co-applicant
Duration 2022 – 2025
Amount **\$620,159**

[7] [2020] Dalhousie University Tenure-Track Startup Fund

Role Primary applicant
Duration July 2020 – June 2022
Amount **≈\$165,000** (\$25,000 + Funding for two MSc students, \$70,000/student)

[8] [2019] NSERC Postdoctoral Fellowship (Declined)

Title Towards Automated Reproduction of Software Bugs and Failures from Incomplete Bug Reports
Role Primary applicant
Duration March 2021 – February 2023
Amount **\$90,000**

[9] [2023] Electrification for Resilient and Decarbonized Communities Fund (Under Review)

Title Towards a New Integrated Energy Model: Digital Twin Modelling of Renewable Energy Systems in Canadian Municipalities
Role Co-Principal Investigator

[10] [2023] AWS Research Awards (Not Awarded)

Title Towards Improving Bug Reproducibility with Intelligent Question-Answering
Role Primary applicant
Amount \$70,000


[11] [2023] NSERC CREATE Grant (Not Awarded)


Title EMPATHETIC: The Impact of Intradisciplinary Human-Centered Methods in Computer Science
Role Co-applicant

[12] [2021] NSERC Discovery Horizons (Not Awarded)

Title Tackling Quality Control Challenges in Urban System Simulation with Artificial Intelligence
Role Primary applicant

SCHOLARSHIPS (9)

[1] **[2016] NSERC Industry Engage Grant:** Awarded by NSERC for industry collaboration with Vendasta Technologies, Saskatoon, Canada. Grant value: \$6,300, \$700/month for 9 months. Duration: March 2016–November 2016. 

[2] **[2014–2017] International Dean’s Scholarship:** Awarded by University of Saskatchewan for PhD in Computer Science/Software Engineering. Scholarship amount: **\$66,000** (\$22,000/year for 3 years). Duration: September 2014–August 2017. 

- [3] **[2017–2018] SK Innovation & Opportunity Scholarship:** Awarded by University of Saskatchewan, for research and academic excellence in the ongoing PhD program. Scholarship amount: \$20,000/year for 1 year. Duration: September 2017– August 2018. 
- [4] **[2016–2018] Faculty Scholarship:** Awarded by the Department of Computer Science, University of Saskatchewan for the research excellence in the ongoing PhD program as top ups. Scholarship amount: \approx \$8,000.
- [5] **[2018–2019] Faculty Scholarship:** Awarded by the Department of Computer Science, University of Saskatchewan for the research excellence in the ongoing PhD program. Scholarship amount: \$23,000/year.
- [6] **[2012–2014] Faculty Scholarship & Graduate Teaching Fellowship:** Awarded by the Department of Computer Science, University of Saskatchewan for the Masters program. Scholarship amount: \$17,500/year for 2 years. 
- [7] **[2006–2009] Dean’s Merit List Scholarship:** Awarded by Khulna University during 2006 to 2009. I scored the 1st position in all four academic years of B.Sc in CSE.
- [8] **[2005–2007] Merit List Scholarship:** Awarded by Government Education Board (Jessore) during 2005 to 2007 for excellence in 2003 HSC exam.
- [9] **[2001–2002] Merit List Scholarship:** Awarded by Government Education Board (Jessore) during 2001 to 2002 for excellence in 2001 SSC exam.

EMPLOYMENT HISTORY (5)

Assistant Professor, Dalhousie University

Duration July 2020 – Current

Responsibilities Appointed as a tenure-track Assistant Professor in the Faculty of Computer Science. My job responsibilities include (a) establishing an independent research program by securing research grants, supervising graduate and undergraduate students, (b) teaching undergraduate and graduate level courses, and (c) delivering administrative service.

Postdoctoral Fellow, Polytechnique Montreal

Duration October 2019 – June 2020

Responsibilities Appointed as a Postdoctoral Fellow in the SWAT laboratory led by Prof. Dr. Foutse Khomh. I was accounted for research and development, co-supervising graduate students, and writing research grant proposals.

Lecturer, Khulna University

Duration November 2009 – August 2012

Responsibilities Appointed as a full-time faculty member in the Department of Computer Science and Engineering, Khulna University. I was accounted for (1) teaching undergraduate classes, curricular innovation, course planning, course evaluation, conducting exams and publishing grades, (2) conducting research, supervising student theses, (3) conducting academic projects, organizing student contests, leading students in the regional/national level contests, and (4) conducting administrative affairs such as admission test management, departmental purchase inspection, and various other official decision making.

Graduate Research & Teaching Assistant, University of Saskatchewan

Duration September 2012 – September 2019

Responsibilities Appointed as a graduate research & teaching assistant in the Department of Computer Science from 2012 to 2019. I was accounted for graduate research & development, leading tutorials of *CMPT 370: Intermediate Software Engineering*, and for marking three other undergraduate courses.

Software Developer, NOCHALLENGE TECHNOLOGY LLC

Duration May 2009 – July 2012

Responsibilities Appointed as a junior software developer, and later promoted as the *lead software developer* due to outstanding development, problem-solving and leadership skills. I was accounted for (1) developing professional e-commerce applications for buying and selling real estate and businesses, (2) handling client communications from overseas, (3) leading multiple mid-level software projects, and (4) hiring and training junior developers.

MEDIA MENTIONS & PUBLICITY (6)

- Imagine ‘– Celebrating 75 Years, CGPS, University of Saskatchewan
- Partnership with Metabob Inc. through Mitacs Accelerate Program
- DAL News: Recognizing the Rich Diversity of DAL Research
- Department of Computer Science, University of Saskatchewan
- Department of Computer Science, University of Saskatchewan
- University of Saskatchewan
- Stack Overflow Blog, TechRepublic, SDTimes, ACM Tech News, and I-Programmer.

RESEARCH

Overview: Software bugs and failures are responsible for trillion-dollar financial losses every year. Traditional ad hoc practices to deal with software bugs and feature requests also claim up to **60%** of the total development budget. I have been developing **novel, cost-effective, and robust solutions** to support the developers in dealing with their software bugs and features. In particular, my solutions aim to carefully automate different steps of a typical software change process such as (1) bug localization, (2) concept location, and (3) code reviews. In my research, I make use of Information Retrieval (IR), static code analysis, Machine/Deep Learning (ML/DL), natural language processing, and software repository mining (e.g., Stack Overflow, GitHub) to come up with these solutions.

Journal Reviewer

[1] IEEE Transactions on Software Engineering (TSE)

Reviewer since April 2020

Reviewed 07

[2] ACM Transactions on Software Engineering and Methodology (TOSEM)

Reviewer since March 2020

Reviewed 05

[3] Empirical Software Engineering Journal (EMSE)

Reviewer since December 2018

Reviewed 12

[4] **Journal of Systems and Software (JSS)**

Reviewer since January 2019

Reviewed 30

Award **JSS Distinguished Reviewer 2022***

[5] **IEEE Transactions on Service Computing (TSC)**

Reviewer since November 2021

Reviewed 02

[6] **IEEE Transactions on Dependable and Secure Computing (TDSC)**

Reviewer since January 2021

Reviewed 01

[7] **IEEE Transactions on Reliability (TR)**

Reviewer since February 2021

Reviewed 02

[8] **Software Quality Journal (SQJ)**

Reviewer since January 2020

Reviewed 02

[9] **Information and Software Technology (IST)**

Reviewer since August 2019

Reviewed 09

[10] **Journal of Software Evolution & Process (JSME)**

Reviewer since May 2020

Reviewed 06

[11] **Journal of Software: Practice and Experience (SPE)**

Reviewer since August 2020

Reviewed 01

[12] **Journal of Web Engineering (JWE)**

Reviewer since June 2021

Reviewed 01

[13] **Journal of Automated Software Engineering (AUSE)**

Reviewer since January 2020

Reviewed 01

Program/Organization Committee Member

[2024]

- [1] *PC Member:* International Conference on Software Engineering (**ICSE 2024**) (Tool Demo Track)
- [2] *PC Member:* The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE 2024**) (Research Track)
- [3] *PC Member:* International Conference on Software Analysis, Evolution, and Reengineering (SANER 2024) (Research Track)
- [4] *PC Member:* International Conference on Mining Software Repositories (**MSR 2024**) (Research Track)
- [5] *PC Member:* International Conference on Program Comprehension (ICPC 2024) (ERA Track)

[2023]

- [3] *PC Member:* International Conference on Automated Software Engineering (**ASE 2023**) (NIER Track)
- [4] *PC Member:* The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE 2023**) (SRC Track)

- [5] *PC Member*: International Working Conference on Source Code Analysis and Manipulation (SCAM 2023) (NIER Track)
- [6] *PC Member*: International Conference on Software Maintenance and Evolution (ICSME 2023) (NIER Track)
- [7] *Judge*: ACM Student Research Competition (Grand Finale)
- [8] *PC Member*: International Conference on Mining Software Repositories (**MSR** 2023) (Research Track)

[2022]

- [9] *Track Co-chair*: 15th Innovations in Software Engineering Conference (ISEC 2022) (SRC Track)
- [10] *Judge*: ACM Student Research Competition (SRC 2022) (Grand Finale)
- [11] *PC Member*: The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE 2022**) (Artifact Evaluation Track)
- [12] *PC Member*: International Conference on Automated Software Engineering (**ASE** 2022) (AE Track)
- [13] *PC Member*: International Conference on Program Comprehension (ICPC 2022) (ERA Track)
- [14] *PC Member*: International Conference on Program Comprehension (ICPC 2022) (RENE Track)
- [15] *PC Member*: International Working Conference on Source Code Analysis & Manipulation (SCAM 2022) (Research Track)
- [16] *PC Member*: International Conference on Mining Software Repositories (**MSR** 2022) (Research Track)
- [17] *PC Member*: International Conference on Mining Software Repositories (MSR 2022) (Tool & Data Showcase Track)
- [18] *PC Member*: International Conference on Mining Software Repositories (MSR 2022) (Shadow PC Track)
- [19] *Publicity & Social Media Co-Chair*: International Conference on Mining Software Repositories (MSR 2022)
- [20] *PC Member*: International Conference on Technical Debt (TechDebt 2022) (Research Track)
- [21] *PC Member*: 15th Innovations in Software Engineering Conference (ISEC 2022) (Doctoral Symposium Track)

[2021]

- [22] *PC Member*: The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE** 2021) (Artifact Evaluation Track)
- [23] *PC Member*: The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (**ESEC/FSE** 2021) (Student Research Competition Track)
- [24] *PC Member*: International Conference on Automated Software Engineering (**ASE** 2021) (AE Track)
- [25] *PC Member*: International Working Conference on Mining Software Repositories (**MSR** 2021) (Research Track) (**MSR Distinguished Reviewer***)
- [26] *PC Member*: International Conference on Mining Software Repositories (MSR 2021) (Data Showcase Track)
- [27] *Virtualization Co-Chair*: International Conference on Mining Software Repositories (MSR 2021)
- [28] *PC Member*: International Conference on Software Analysis, Evolution and Reengineering (SANER 2021) (Tool Demo Track)
- [29] *PC Member*: International Conference on Program Comprehension (ICPC 2021) (Replication Track)

[2018–2020]

- [30] *PC Member*: International Conference on Automated Software Engineering (**ASE** 2020) (Late Breaking Result Track)
- [31] *Proceedings Chair*: International Conference on Source Code Analysis and Manipulation (SCAM 2020)
- [32] *PC Member*: International Conference on Program Comprehension (ICPC 2019) (RENE Track)
- [33] *Web Chair*: International Conference on Source Code Analysis and Manipulation (SCAM 2019)
- [34] *Web Publicity Chair*: International Conference on Program Comprehension (ICPC 2018)

Sub-Reviewer (2013–2019)

- International Conference on Software Engineering (**ICSE**) [Sub-reviewer]
- International Conference on Automated Software Engineering (**ASE**) [Sub-reviewer]
- International Conference on Software Maintenance and Evolution (**ICSME**) [Sub-reviewer]
- International Conference on Software Maintenance (**ICSM**) [Sub-reviewer]
- International Conference on Software Analysis, Evolution, and Reengineering (SANER) [Sub-reviewer]
- International Working Conference on Reverse Engineering (WCRE) [Sub-reviewer]
- International Working Conference on Mining Software Repositories (**MSR**) [Sub-reviewer]
- International Working Conference on Source Code Analysis and Manipulation (SCAM) [Sub-reviewer]
- International Conference on Computer Science and Software Engineering (CASCON) [Sub-reviewer]

Research Projects (23)

[Software bugs, Code smells, and Code changes]

[1] Investigating the non-reproducibility of software bugs and failures

Overview We conduct an empirical study to investigate why software bugs might be non-reproducible and how developers tackle them. We also design a machine learning model to separate the non-reproducible bugs from the reproducible ones, explain our prediction results using SHAP framework, and then provide actionable insights for the software researchers and practitioners.

Duration 2020 – 2022

Outcome **ICSME** x 1 (**TCSE Distinguished Paper Award***) and **EMSE** x 1

Details Please check here [!\[\]\(d5d7044e5caf6907399af2dced8d6ff8_img.jpg\)](#)

[2] Investigating the role of search queries in IR-based bug localization

Overview We investigate how the importance of search queries might be overlooked in IR-based bug localization. We demonstrate that bug reports often contain meaningful keywords but the existing techniques are not sufficient to find them. We also suggest how poor search queries can be improved using several lightweight heuristics.

Duration 2019 – 2021

Outcome **EMSE** x 1 and **ICSE** x 1 (Journal First track)

Details Please check here [!\[\]\(b538fe54c1f3a7343e37e85cc2d00497_img.jpg\)](#)

[3] Context-aware query reformulation for IR-based bug localization

Overview We design a context-aware query reformulation technique for IR-based bug localization. We first detect the contextual information in a bug report and then employ appropriate graph-based techniques to find the meaningful keywords as a search query.

Duration 2017 – 2018

Outcome **ESEC/FSE** x 1 and **ICSE** x 1 (poster)

Details Please check here [🔗](#)

[4] Explaining software bugs with neural machine translation of human-written patches

Overview We design a generative model using transformer and attention mechanism to generate natural language explanations for software bugs. We have been collaborating with *Metabob Inc.* for this, and the project has been funded by *Mitacs Accelerate* program.

Duration 2021 – 2023

Outcome **ICSE** x 1, **ICMSE** x 1 (tool), and **MSR** x 1 (dataset)

Details Please check here [🔗](#)

[5] Investigating the textually similar and textually dissimilar duplicate bug reports

Overview We investigate how the textually similar and textually dissimilar duplicate bug reports differ in their structures, syntax, and semantics.

Duration 2021 – 2022

Outcome **SANER** x 1

Details Please check here [🔗](#)

[6] Query reformulation for concept location using CodeRank and document structures

Overview We design a technique that reformulates queries using CodeRank and source document structures for concept location. It uses graph-based term weighting, query difficulty analysis, machine learning, and Information Retrieval for query reformulation.

Duration 2016 – 2017

Outcome **ASE** x 1

Details Please check here [🔗](#)

[7] Search term identification from change requests using graph-based keyword selection

Overview We design a technique to identify search terms from a change request using graph-based term weighting (PageRank), natural language processing, and Information Retrieval.

Duration 2015 – 2017

Outcome **SANER** x 2

Details Please check here [🔗](#)

[8] Detecting the scent of deep learning code

Overview We detect code smells in the deep learning code and contrast between DL-based systems and traditional systems in terms of their code smell prevalence and bug-proneness.

Duration 2019 – 2020

Outcome **MSR** x 1

Details Please check here [🔗](#)

[9] Detecting the scent of data-intensive code

Overview We detect SQL code smells in the data-intensive systems and contrast between data-intensive and traditional systems in terms of their smell prevalence and bug-proneness

Duration 2019 – 2020

Outcome **MSR** x 1

Details Please check here [🔗](#)

[10] Answering follow-up questions from bug reports with LLM

Overview We designed BugMentor that answers follow-up questions from bug reports leveraging large language models (e.g., CodeT5) with structured information retrieval


Duration 2021 – 2023


[Code reviews]

[11] Code reviewer recommendation for pull requests at GitHub

Overview We design a novel technique that mines cross-project experience and specialized technology experience of the developers, and suggests appropriate code reviewers for a pull request. The solution was packaged as a Google Chrome plug-in and a web service.

Duration 2015 – 2016

Outcome **ICSE** x 1 and **ASE** x 1 (tool) 

Details Please check here 

[12] Predicting usefulness of code review comments

Overview We conduct an empirical study to contrast between useful and non-useful code review comments. We also design a machine learning model to predict the usefulness of review comments using textual features from review comments and the experience of developers involved.

Duration 2016 – 2017

Outcome **MSR** x 1

Details Please check here 

[13] Recommending code review comments using structured Information Retrieval

Overview We designed a technique namely RevCom for recommending code reviews that can leverage various code changes from diffs using structured Information Retrieval. Our technique was able to outperform the deep-learning based solutions.

Duration 2022 – 2023

Outcome **ICSME** x 1

[14] Generating insightful comments for source code using crowd knowledge

Overview We design a technique to automatically generate insightful comments for source code using crowd knowledge from Stack Overflow. It uses data mining, topic modelling and heuristics for extracting such insights.

Duration 2013 – 2015

Outcome **SCAM** x 1

Details Please check here 

[Code search, Programming Q&A, and Data mining]

[15] A systematic review of automated query reformulations in source code search

Overview We conduct a systematic review of 70 primary studies on query reformulations targeting source code search. We determine the methodologies used for query reformulations, adopted metrics or methods for evaluation, and their encountered challenges and limitations. Finally, we provide actionable insights and recommend future research directions on this topic.

Duration 2018 – 2022

Outcome **TOSEM** x 1

Details Please check here 

[16] Query reformulation for code search using crowd knowledge

Overview We design a novel technique that suggests relevant API classes for a natural language query leveraging crowd knowledge stored in the Stack Overflow Q&A site. It also expands the query with relevant API classes to improve code search on Internet.

Duration 2016 – 2019

Outcome **SANER** x 1, **EMSE** x 1, and **ICSE** x 1 (tool) 

Details Please check here 

[17] Query reformulation using crowd knowledge & data analytics


Overview We design a technique that reformulates a natural language query intended for code search using crowd knowledge and extra-large data analytics derived from Stack Overflow Q & A site.

Duration 2017 – 2018

Outcome ICSME x 1 (**TCSE Distinguished Paper Award Nomination***) and ICSME x 1 (Artifacts)

Details Please check here 

[18] Recommending comprehensive programming solutions from Stack Overflow

Overview We design a technique that delivers comprehensive solutions from Stack Overflow for a programming task where each solution contains both relevant, working code examples and complementary explanations. This work was featured at Stack Overflow Blog .

Duration 2018 – 2019

Outcome ICPC x 1 and EMSE x 1

Details Please check here 

[19] Investigating the reproducibility of programming issues in Stack Overflow questions

Overview We (1) investigate whether the programming issues reported at Stack Overflow questions could be reproduced or not, and (2) provide tool supports for automatically detecting their reproducibility.

Duration 2019 – 2021

Outcome MSR x 1 and EMSE x 1

Details Please check here 

[20] Recommending programming solutions from YouTube videos

Overview We design a technique that accepts a programming task description, analyses the contents from relevant videos of YouTube and then delivers a comprehensive video summary for the task.

Duration 2020 – 2021


Outcome SANER x 1

Details Please check here 

[21] Recommending programming solutions using a context-aware, meta search engine.

Overview We design a context-aware meta search engine namely SurfClipse for recommending programming solutions in the IDE. We combine the results from Google, Bing, Yahoo!, and Stack Overflow to deliver an enriched set of solutions against programming errors and exceptions encountered in the IDE

Duration 2013 – 2014

Outcome SANER x 2 and ICSME x 1 (tool) 

Details Please check here 

[22] Recommending exception handling code examples

Overview We design a context-aware search engine to recommend relevant code examples from effective exception handling within the IDE.

Duration 2013 – 2014

Outcome SCAM x 1


Details Please check here 

[23] Mining challenges from MSR

Overview In this competition, researchers from all over the world are challenged with a new dataset every year, and only novel and interesting findings are accepted for publication through a double-blind peer-review process. I took part in mining three different datasets: GitHub pull requests, Stack Overflow questions, and Travis CI dataset.

Duration 2014 – 2017

Outcome MSR x 3 (challenge paper)

Details Please check here 

Global Outreach & Research/Industry Collaborations

[1] Metabob Inc., Mountain View, CA, USA

Duration 2021 – Current

Collaborator Avinash Gopal, Ben Reaves

Outcome Mitacs Accelerate International Grant, ICSE x 1, and ICSME x 1

[2] Mozilla Corporation, UK

Duration 2021 – 2022

Collaborator Marco Castelluccio

Outcome ICSME x 1 and EMSE x 1

[3] Singapore Management University, Singapore

Duration 2016 – 2019

Collaborator David Lo

Outcome SANER x 1, EMSE x 1 and ICSE x 1 (tool)

[4] Osaka University, Japan

Duration 2016 – 2017

Collaborator Raula G. Kula

Outcome MSR x 1

[5] Vendasta Technologies, SK, Canada

Duration 2015 – 2016

Collaborator Jason Collins, Jesse Redl

Outcome ICSE x 1 and ASE x 1 (tool)

[6] Concordia University, Canada

Duration 2013 – 2015

Collaborator Iman Keivanloo

Outcome SCAM x 1

Student Supervision (10)

[Dalhousie University] (Learn more about my team – RAISE Lab)

- [1] [Winter 2022–] **Sigma Jahan (PhD)**: Research interests: Software debugging, bug localization, Deep learning bugs, bug report management, and duplicate bug detection. SANER x 1.
- [2] [Winter 2022–] **Usmi Mukherjee (MCS)**: Research interests: Bug report improvement, natural language processing, Information Retrieval, and Generative AI.
- [3] [Fall 2022–] **Asif Mohammed Samir (PhD)**: Research interests: Bug localization, query reformulation, search engine, Information Retrieval, and Genetic algorithms.
- [4] [Winter 2023–] **Mehil Shah (PhD)**: Research interests: Bug reproduction, Deep learning bugs, machine learning, and data mining.
- [5] [Fall 2023–] **Riasat Mahbub (MCS)**: Research interests: Debugging of simulation models.

- [6] [Spring 2022] **Shihui Gao (BSc)**: Research interests: Code search and query reformulation.
- [7] [Winter 2023] **Lareina Yang (BSc)**: Research interests: Concept location and query reformulation.
- [8] [Spring 2023] **Callum MacNeil (BSc)**: Research interests: Neural code generation, commit message classification, bug understanding, and Generative AI.

[Graduated Students*]

- [9] [Summer 2023] **Parvez Mahbub (MCS)** Thesis: *Comprehending Software Bugs Leveraging Code Structures with Neural Language Models*. ICSE x 1, ICSME x 1, and MSR x 1.
- [10] [Summer 2023] **Ohiduzzaman Shuvo (MCS)** Thesis: *Improving Modern Code Review Leveraging Contextual and Structural Information from Source Code*. ICSME x 1.

Student Mentoring (06)

[Polytechnique Montreal]

- [1] **Biruk Asmare Muse (PhD)**: MSR x 1
- [2] **Hadhemi Jebnoun (MSc)**: MSR x 1
- [3] **Mahmood Vahedi (MSc)**: SANER x 1

[University of Saskatchewan]

- [4] **Rodrigo Fernandes (PhD)**: ICPC x 1, EMSE x 1, and JSS x 1
- [5] **Saikat Mondal (MSc, PhD)**: MSR x 1, EMSE x 1, ISEC x 1, and Graduate Thesis Award 2021
- [6] **Amit Kumar Monda (MSc)** : SEKE x 1

Research Talks/Posters/Demonstrations (43)

- [1] M. Masudur Rahman. 2022, “*The Forgotten Role of Search Queries in IR-based Bug Localization: An Empirical Study*”, ICSE, Pittsburgh, USA (Virtual).
- [2] M. Masudur Rahman. 2020, “*Finding Bugs and Features in the Software Code with Better Search Queries*”, **New Faculty Talk**, Consortium for Software Engineering Research, Canada (Virtual)
- [3] M. Masudur Rahman. 2020, “*Why are Some Bugs Non-Reproducible? An Empirical Investigation using Data Fusion*”, ICSME, Adelaide, Australia (Virtual).
- [4] M. Masudur Rahman. 2020, “*BugDoctor: Finding Bugs and Features in the Software Code with Better Search Queries*”, **Tenure-Track Faculty Seminar**, University of Calgary, Calgary, AB, Canada. (Online Seminar)
- [5] M. Masudur Rahman. 2020, “*BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation*”, **Tenure-Track Faculty Seminar**, Dalhousie University, Halifax, NS, Canada. (Online Seminar)
- [6] M. Masudur Rahman. 2020, “*BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation*”, **Tenure-Track Faculty Seminar**, Queen’s University, Kingston, ON, Canada.
- [7] M. Masudur Rahman. 2020, “*BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation*”, **Tenure-Track Faculty Seminar**, Rochester Institute of Technology (RIT), Rochester, NY, USA.

- [8] M. Masudur Rahman. 2020, “*BugDoctor: Detecting Bugs and Features in Software Code with Context-Aware and Semantics-Driven Query Reformulation*”, **Tenure-Track Faculty Seminar**, Miami University, Oxford, OH, USA.
- [9] M. Masudur Rahman. 2019, “*Supporting Source Code Search with Context-Aware and Semantics-Driven Query Reformulation*”, Thesis Defence, University of Saskatchewan, Canada.
- [10] M. Masudur Rahman. 2019, “*Supporting Code Search with Context-Aware, Analytics-Driven, Effective Query Reformulation*”, Doctoral Symposium, ICSE 2019, Montreal, Canada.
- [11] M. Masudur Rahman. 2019, “*Using version control systems in everyday activities and how to make a better presentation*”, **Guest Lecture**, Software Research Lab, University of Saskatchewan, Canada.
- [12] M. Masudur Rahman. 2019, “*Improving Bug Localization with Context-Aware, Analytics-Driven Query Reformulation*”, **Tenure-Track Faculty Seminar**, York University, Toronto, Ontario, Canada.
- [13] M. Masudur Rahman. 2019, “*Improving Bug Localization with Context-Aware, Analytics-Driven, Effective Query Reformulation*”, **Tenure-Track Faculty Seminar**, University of Manitoba, Winnipeg, Canada.
- [14] M. Masudur Rahman. 2018, “*Improving IR-Based Bug Localization with Context-Aware Query Reformulation*”, ESEC/FSE, FL, USA.
- [15] M. Masudur Rahman. 2018, “*Partial Reproduction of Bug Localization Results from BugLocator, BLUiR and AmaLgam+*”, ROSE Festival, ESEC/FSE, FL, USA.
- [16] M. Masudur Rahman. 2018, “*Effective Reformulation of Query for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics*”, ICSME, Madrid, Spain.
- [17] M. Masudur Rahman. 2018, “*NLP2API: Query Reformulation for Code Search using Crowdsourced Knowledge and Extra-Large Data Analytics*” [Artifact], ICSME, Madrid, Spain.
- [18] M. Masudur Rahman and Chanchal K. Roy. 2018, “*Poster: Improving Bug Localization with Report Quality Dynamics and Query Reformulation*”, ICSE, Gothenburg, Sweden.
- [19] M. Masudur Rahman. 2017, “*Improved Query Reformulation for Concept Location using CodeRank and Document Structures*”, ASE, Urbana, IL, USA
- [20] M. Masudur Rahman. 2017, “*Improved Query Reformulation for Concept Location using CodeRank and Document Structures*” [Poster], ResearchFest, University of Saskatchewan.
- [21] M. Masudur Rahman and Chanchal K. Roy. 2017, “*Towards automated supports for code reviews using reviewer recommendation and review quality modelling*”, 56th CREST Open Workshop (COW), **University College London**, UK. [Invited Talk]
- [22] M. Masudur Rahman, Chanchal K. Roy and David Lo. 2017, “*RACK: Code Search in the IDE using Crowdsourced Knowledge*” [Demo], ICSE, Buenos Aires, Argentina .
- [23] M. Masudur Rahman, Chanchal K. Roy and R. G. Kula. 2017, “*Predicting Usefulness of Code Review Comments using Textual Features and Developer Experience*”, MSR, Buenos Aires, Argentina.
- [24] M. Masudur Rahman and Chanchal K. Roy. 2017, “*Impact of Continuous Integration on Code Reviews*”, MSR, Buenos Aires, Argentina.
- [25] M. Masudur Rahman and Chanchal K. Roy. 2017, “*STRICT: Information Retrieval Based Search Term Identification for Concept Location*”, SANER, Klagenfurt, Austria.

- [26] M. Masudur Rahman. 2016, “*CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience*”, ICSE, Austin, TX, USA
- [27] M. Masudur Rahman. 2016, “*CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies*” [Demo+Poster], ASE, Singapore
- [28] M. Masudur Rahman. 2016, “*CORRECT: Code Reviewer Recommendation at GitHub for Vendasta Technologies*” [Demo], Technology Meeting, Vendasta Technologies, Saskatoon, Canada.
- [29] M. Masudur Rahman. 2016, “*QUICKAR: Automatic Query Reformulation for Concept Location Using Crowdsourced Knowledge*”, ASE, Singapore
- [30] M. Masudur Rahman. 2016, “*RACK: Automatic API Recommendation using Crowdsourced Knowledge*”, SANER, Osaka, Japan
- [31] M. Masudur Rahman. 2015, “*Recommending Insightful Comments for Source Code using Crowdsourced Knowledge*”, CSER, Markham, Canada
- [32] M. Masudur Rahman. 2015, “*Recommending Relevant Sections from a Webpage about Programming Errors and Exceptions*”, CASCON, Markham, Canada.
- [33] M. Masudur Rahman and Chanchal K. Roy. 2015, “*Recommending Insightful Comments for Source Code using Crowdsourced Knowledge*”, SCAM, Bremen, Germany.
- [34] M. Masudur Rahman and Chanchal K. Roy. 2015, “*An Insight into the Unresolved Questions at Stack Overflow*”, MSR, Florence, Italy.
- [35] M. Masudur Rahman. 2015, “*CORRECT: Code Reviewer Recommendation in GitHub Based on Cross-Project and Technology Experience*”, Technology Meeting, Vendasta Technologies.
- [36] M. Masudur Rahman. 2015, “*TextRank Based Search Term Identification for Software Change Tasks*”, SANER, Montreal, Canada
- [37] M. Masudur Rahman. 2014, “*SurfClipse: Context-Aware Meta Search in the IDE*” [Demo + Poster], ICSME, Victoria, Canada
- [38] M. Masudur Rahman. 2014, “*On the Use of Context in Recommending Exception Handling Code Examples*”, SCAM, Victoria, Canada
- [39] M. Masudur Rahman and Chanchal K. Roy. 2014, “*Towards a Context-Aware Meta Search Engine for IDE-Based Recommendation about Programming Errors and Exceptions*”, CSMR-WCRE, Antwerp, Belgium.
- [40] M. Masudur Rahman and Chanchal K. Roy. 2014, “*An Insight into the Pull Requests of GitHub*”, MSR, Hyderabad, India.
- [41] M. Masudur Rahman. 2013, “*An IDE-Based Context-Aware Meta Search Engine*”, WCRE, University of Koblenz-Landau, Koblenz, Germany.
- [42] M. Masudur Rahman. 2018, “*Supporting Software Change Tasks using Automated Query Reformulations*”, **Guest Lecture**, CMPT 470/816: Advanced Software Engineering, University of Saskatchewan, Canada.
- [43] M. Masudur Rahman. 2013, “*Semantic Network Based API Usage Pattern Extraction and Learning*”, Graduate Symposium, University of Saskatchewan, Canada.


Research Tools & Technology Experience

- [1] **Software Development & Maintenance:** Eclipse, PyCharm, IntelliJ, Visual Studio, ArgoUML, Doxygen, JUnit, Espresso framework, UI Automator, Android framework, JavaParser, Jsoup, PMD, FindBugs, SonarLint, CheckStyle, Maven, Gradle, and Continuous Integration.
- [2] **Software Version Control:** Git, GitHub, GitLab, and BitBucket.
- [3] **Code Reviews & Continuous Integration:** Gerrit, Travis CI, and GitHub Pull Request.
- [4] **Big Data Technologies:** Apache Spark 2.2, Hadoop 2.7, and Yarn cluster.
- [5] **Machine Learning & Data Mining:** Gensim, FastText, Word2Vec, WEKA, R, MATLAB, Decision Trees, RandomForest, CART, Logistic Regression, Naive Bayes, Bayes Net, Linear Regression, Resampling, Bagging, Boosting, Stacking, Ensemble Learning, and SHAP framework.
- [6] **Deep Learning:** PyTorch, Keras, TensorFlow, LSTM, CNN, GNN, Siamese, BERT, Encoder-Decoder, Autoencoder, Transformers, T5, GAN, and Stable baselines.
- [7] **Code Search & Information Retrieval:** Lucene, Indri, Lemur, PageRank, and K-Core.
- [8] **Natural Language Processing:** Stanford CoreNLP, Mallet, POS tagging, Sentiment analysis, Term weighting, Text summarization, and Semantic similarity analysis.
- [9] **Statistics & Data Modelling:** Probability distributions, Random sampling, Confidence interval, Central tendency, Data centrality, and Statistical tests.
- [10] **Reporting & Prototyping:** LaTeX, and Pencil.
- [11] **Programming Languages:** Java (standard + android), C#, Python, and C/C++.
- [12] **Research Collaboration:** Overleaf, Slack, and GitHub Issues.

TEACHING EXPERIENCE

[Dalhousie University]

- [1] **Winter 2023/CSCI 3130 - Software Engineering:** Enrollment 143, SLEQ: **3.93/5.00**.
- [2] **Winter 2023/CSCI 6308 - Software Maintenance & Evolution:** Enrollment 11, SLEQ: ***4.57/5.00**
- [3] **Fall 2022/CSCI 3130 - Software Engineering:** Enrollment 131, SLEQ: **4.03/5.00**.
- [4] **Winter 2022/CSCI 3130 - Software Engineering:** Enrollment 103, SLEQ: **4.30/5.00**.
- [5] **Winter 2022/CSCI 6308 - Software Maintenance & Evolution:** Enrollment 23, SLEQ: ***4.51/5.00**
- [6] **Fall 2021/CSCI 3130 - Software Engineering:** Enrollment 103, SRI: 4.05/5.00
- [7] **Winter 2021/CSCI 3130 - Software Engineering:** Enrollment 130, SRI: ***4.54/5.00**
- [8] **Fall 2020/CSCI 3130 - Software Engineering:** Enrollment 107, SRI: 3.42/5.00

Please check my *teaching page*  for updated syllabus and detailed evaluations from students.

[University of Saskatchewan]

- [9] **Fall 2017/CMPT 370 - Software Engineering:** Enrollment 100

[Khulna University]

- [10] Software Engineering (CSE 3101)
- [11] Information System Analysis and Design (CSE 3203)
- [12] Microprocessor and Interfacing (CSE 3111)
- [13] Object-Oriented Programming (CSE 1201)

COURSE CURRICULUM DESIGN

[1] CSCI 6308: Software Maintenance & Evolution

Overview Developed software products often need to be modified to address concerns from their customers, testers, and users (e.g., software bugs, feature requests, performance regression). Activities addressing these concerns are called software maintenance and evolution. The maintenance and evolution involve various challenging activities such as bug resolution, feature enhancement, reverse engineering, traceability link recovery, code reuse, mining software repositories, and the quality control mechanisms such as code review and refactoring. This course will not only discuss these important concepts but also introduce the students to the state-of-the-art tools and technologies supporting these activities.

Role Development

Syllabus Please check here 

[2] CSCI 3130: Software Engineering

Overview The course examines the process of software development, from initial planning through implementation and maintenance. A brief survey of available tools and techniques will be presented covering the topics of analysis, planning, estimating, project management, design, testing, and evaluation. Particular emphasis will be given to organizing and planning, team participation and management, top-down design and structure charts, system and information flow diagrams, walk-throughs and peer review, and testing and quality control.

Role Redesign

Syllabus Please check here 

INDUSTRY EXPERIENCE

Programming, Software, and Technologies

- **Web Application Programming:** ASP.net, AJAX, MVC, PHP, Coolite, Ext.NET, Javascript, CSS, JQuery, JQueryUI, XHTML, XML.
- **Database Programming:** PL/SQL, Microsoft SQL Server, Oracle 9, MySQL, MS Access, JDBC, ODBC
- **Technical Software Skills:** MS Visual Studio.NET, Net Beans, Pencil, JCreator, FileZilla, BugZilla, TortoiseHg, Crystal Report, ULead Studio, PhotoShop, Dreamweaver, WordPress, NotePad++, Dot-NetNuke, Joomla, and Plesk.
- **Professional Working experience:** JCarousel, Lightbox, JQuery Map, Google Map, Fusion Map, Google Data API, Payment Integration (Paypal), Finance API Integration (Yahoo!), DirectXCapture,

Social Web Integration, Email Marketing, SpryAsset, Zoom Map, E-Commerce development and Management, and HTML Scraping

Professional Projects

- [1] **[2012] PicIssu:** A web-based software issue tracking system that automatically collects screenshots of issue locations from the UI. It provides a flexible dashboard with various features for issue management and empowers both the clients and the maintenance developers. *Technology:* ASP.net C#, Javascript, JQuery, CSS, DirectXCapture, and MSSQL Server.
- [2] **[2011] MarketLinkBD:** An accounting software system that manages and automates several tasks of multi-level marketing in Bangladesh. *Technology:* C#, MSSQL, Javascript, Multi-level marketing algorithm.
- [3] **[2010] BizWhack:** An e-commerce application for buying and selling of businesses, real estates and franchises online. It allows a seller to create advertisements for his/her items using site-provided tools. BizWhack also allows the buyers to look for their desired businesses or franchises through an efficient search mechanism. As a full-featured e-commerce application, it supports online payment using Paypal. *Technology:* ASP.net C#, Javascript, JQuery, CSS, Paypal API integration, Google Data APIs, and MSSQL Server.
- [4] **[2011] CrabTree Screener:** A desktop application that scraps Yahoo! finance pages, and mines stock quote information (e.g., Keyword Statistics, Cash Flow and Analyst Estimates) for hundreds of stocks. *Technology:* C#, Socket, JSoup, XML, Finance API, and Excel API.
- [5] **[2010] Interactive Golf Course:** An interactive map application for exploring golf courses at Arizona, USA. It visualizes each par and hole of the field and helps the golfers in advanced game planning. *Technology:* ASP .net C#, CSS, Javascript, JQuery and XML.

More details about these completed projects can be found in the company's **portfolio page**.



LEADERSHIPS & SERVICES

[Dalhousie University]

- [1] (2023) Chair: MSc thesis defence of Emeka Nwagu, Computer Science, Dalhousie University.
- [2] (2023) Reviewer: Mitacs Business Strategy Internship.
- [3] (2023) Member: Open search committee, Faculty of Computer Science, Dalhousie University.
- [4] (2023) Member: Course curriculum committee, Faculty of Computer Science, Dalhousie University.
- [5] (2023) Member: PhD RAD defence of Sheida Majouni, Computer Science, Dalhousie University.
- [6] (2022) Chair: MSc thesis defence of Ronit Desai, Computer Science, Dalhousie University.
- [7] (2022) ECR Panelist: NSERC Discovery Grant Session 2022, Dalhousie University.
- [8] (2022) Presenter: HereWeCode: FCS research showcase, Dalhousie University.
- [9] (2022) Reviewer: Mitacs Accelerate program (Entrepreneur).
- [10] (2022) External Member: PhD Proposal defence of Md Rashadul Hasan Rakib, Computer Science, Dalhousie University.
- [11] (2022) External Member: PhD RAD defence of Jaber Rad, Computer Science, Dalhousie University.
- [12] (2022) Chair: MSc thesis defence of Mohamed Muzamil, Computer Science, Dalhousie University.
- [13] (2022) Chair: MSc thesis defence of Sayeh Sarkarhosseini, Computer Science, Dalhousie University.

- [14] (2021) Member: Course curriculum committee, Faculty of Computer Science, Dalhousie University.
- [15] (2021) Member: Faculty search committee (Instructor of Professional Practice), Faculty of Computer Science, Dalhousie University.
- [16] (2021) Member: Dean's Award of Excellence committee, Computer Science, Dalhousie University.
- [17] (2021) Chair: MSc thesis defence of Jiarong Cui, Computer Science, Dalhousie University.
- [18] (2021) Chair: MSc thesis defence of Fatemeh Rahimi, Computer Science, Dalhousie University.
- [19] (2021) Chair: MSc thesis defence of Rakshit Varu, Computer Science, Dalhousie University.
- [20] (2021) External Reviewer: Scholarships and Killam Fellowships, Dalhousie University.
- [21] (2020) Member: Course curriculum committee, Faculty of Computer Science, Dalhousie University.
- [22] (2020) Member: Open search committee, Faculty of Computer Science, Dalhousie University.

[Earlier Services & Leaderships]

- [23] (2018 – 2019) Webmaster, IEEE Canada North Saskatchewan Chapter.
- [24] (2014 – 2016) Vice President Internal, Computer Science Graduate Course Council, U of S.
- [25] (2010–2012) Student Contest Organizer & Mentor, Khulna University.
- [26] (2010–2012) Lead Application System Engineer, NOCHALLENGE TECHNOLOGY LLC.
- [27] (2005–2006) Publication Secretary, CLUSTER, Khulna University.
- [28] (2002–2003) House Cultural Prefect, Jhenidah Cadet College.
- [29] (2004) Leadership Contest Winner, ISSB, Bangladesh Army.
- [30] (2000) Television Debate Winner.

[Professional Membership]

- IEEE Professional Membership
- ACM SIGSOFT Membership



PROFESSIONAL REFERENCES

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