Ali Reza Ibrahimzada

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Research Interest

My research covers software engineering, artificial intelligence, and LLMs for code, with the goal of modernizing and enhancing the reliability of large-scale software systems. To this end, I leverage program analysis and LLMs to automatically translate and validate repository-level code across different programming languages. So far, my work has focused on evaluating LLMs in code translation and investigating translation bugs [C4], source code decomposition for code translation [C3], and building end-to-end neuro-symbolic repository-level code translation and validation tools [C2].

Beside code translation, I have also enjoyed working on other problems in software engineering [C1, C5] and machine learning for bioinformatics [J6, J7].

Education

08/22 – 07/26	🔖	**Ph.D. Computer Science, University of Illinois Urbana-Champaign, IL, USA** GPA: 4.00 / 4.00 Advisor: Reyhaneh Jabbarvand Thesis: *Neuro-Symbolic Code Translation and Validation using Large Language Models*
08/22 – 12/24	🔖	**M.Sc. Computer Science, University of Illinois Urbana-Champaign, IL, USA** GPA: 4.00 / 4.00 Advisor: Reyhaneh Jabbarvand Thesis: *Bridging the Gap between Testing and Debugging through Explainable Deep Oracles*
09/18 – 07/22	🔖	**B.Sc. Computer Science, Marmara University, Istanbul, Turkey** GPA: 3.98 / 4.00 Advisor: Mehmet Kadir Baran Thesis: *Depth Estimation of Stereo Images using Deep Learning*

Research Publications

Conference Proceedings

[C1] **A. R. Ibrahimzada**, Y. Chen, R. Rong, and R. Jabbarvand, "Challenging bug prediction and repair models with synthetic bugs," in *2025 IEEE International Conference on Source Code Analysis and Manipulation (SCAM)*, 2025. 🔗 URL: https://arxiv.org/abs/2310.02407.

[C2] **A. R. Ibrahimzada**, K. Ke, M. Pawagi, M. S. Abid, R. Pan, S. Sinha, and R. Jabbarvand, "Alphatrans: A neuro-symbolic compositional approach for repository-level code translation and validation," FSE, vol. 2, New York, NY, USA: Association for Computing Machinery, Jun. 2025. 🔗 DOI: 10.1145/3729379.

[C3] **A. R. Ibrahimzada**, "Program decomposition and translation with static analysis," in *Proceedings of the 2024 IEEE/ACM 46th International Conference on Software Engineering: Companion Proceedings*, ser. ICSE-Companion '24, Lisbon, Portugal: Association for Computing Machinery, 2024, pp. 453–455, ISBN: 9798400705021. 🔗 DOI: 10.1145/3639478.3641226.

[C4] R. Pan*, **A. R. Ibrahimzada***, R. Krishna, D. Sankar, L. P. Wassi, M. Merler, B. Sobolev, R. Pavuluri, S. Sinha, and R. Jabbarvand, "Lost in translation: A study of bugs introduced by large language models while translating code," in *Proceedings of the IEEE/ACM 46th International Conference on Software Engineering*, ser. ICSE '24, Lisbon, Portugal: Association for Computing Machinery, 2024, ISBN: 9798400702174. 🔗 DOI: 10.1145/3597503.3639226.

[C5]   **A. R. Ibrahimzada**, Y. Varli, D. Tekinoglu, and R. Jabbarvand, "Perfect is the enemy of test oracle," in *Proceedings of the 30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ser. ESEC/FSE 2022, Singapore, Singapore: Association for Computing Machinery, 2022, pp. 70–81, ISBN: 9781450394130. ⬥ DOI: 10.1145/3540250.3549086.

Journal Articles

[J1]   A. Cakmak, H. Ayaz, S. Arıkan, **A. R. Ibrahimzada**, Ş. Demirkol, D. Sönmez, M. T. Hakan, S. T. Sürmen, C. Horozoğlu, M. B. Doğan, Ö. Küçükhüseyin, C. Cacına, B. Kıran, Ü. Zeybek, M. Baysan, and İ. Yaylım, "Predicting the predisposition to colorectal cancer based on snp profiles of immune phenotypes using supervised learning models," *Medical & Biological Engineering & Computing*, vol. 61, no. 1, pp. 243–258, Jan. 2023, ISSN: 1741-0444. ⬥ DOI: 10.1007/s11517-022-02707-9.

[J2]   G. N. Sohsah, **A. R. Ibrahimzada**, H. Ayaz, and A. Cakmak, "Scalable classification of organisms into a taxonomy using hierarchical supervised learners," *Journal of Bioinformatics and Computational Biology*, vol. 18, no. 05, p. 2 050 026, 2020, PMID: 33125294. ⬥ DOI: 10.1142/S0219720020500262. eprint: https://doi.org/10.1142/S0219720020500262.

Thesis

[T1]   **A. R. Ibrahimzada**, *Bridging the gap between testing and debugging through explainable deep oracles*, 2024.

Professional Experience

08/22 – Present	**Research Assistant,** University of Illinois Urbana-Champaign, IL, USA Advised by: Reyhaneh Jabbarvand Topic: Code LLMs for Source Code Generation, Understanding and Translation
05/25 – 08/25	**Applied Scientist Intern,** Amazon Web Services, VA, USA Hosted by: Brandon Paulsen and Joey Dodds Topic: LLM Agents for Autonomous Translation Validation and Repair
05/24 – 08/24	**Research Intern,** IBM Research, NY, USA Hosted by: Saurabh Sinha and Raju Pavuluri Topic: End-to-end Repository-level Code Translation and Validation
05/23 – 08/23	**Research Intern,** IBM Research, NY, USA Hosted by: Saurabh Sinha and Raju Pavuluri Topic: Evaluating LLMs in Code Translation and Bug Analysis
05/21 – 08/22	**Research Intern,** University of Illinois Urbana-Champaign, IL, USA Hosted by: Reyhaneh Jabbarvand Topic: Neural and Interpretable Test Oracles using Deep Learning
06/19 – 02/22	**Research Intern,** Istanbul Technical University, Istanbul, Turkey Hosted by: Ali Cakmak Topic: Machine Learning for Bioinformatics

Awards

2024	**Nomination for the Two Sigma PhD Fellowship**, University of Illinois Urbana-Champaign
	3rd in Student Research Competition @ ICSE'24, ACM
	Travel Grant to attend ICSE'24 in Lisbon, Portugal, NSF
2022	**Travel Grant to attend ESEC/FSE'22 in Singapore, Singapore**, ACM
	Valedictorian of Class of 2022, Marmara University
	Ray Ozzie Computer Science Fellowship, University of Illinois Urbana-Champaign

Awards (continued)

	Best Senior Graduation Project of the Year, Marmara University
2019	**Academic Achievement Scholarship**, Marmara University
2017	**Valedictorian of High School**, KEN
2015	**Travel Grant to attend QUEST'15 in Lucknow, India**, KEN

Talks

SCAM'25	Challenging Bug Prediction and Repair Models with Synthetic Bugs, Auckland, New Zealand
FSE'25	AlphaTrans: A Neuro-Symbolic Compositional Approach for Repository-Level Code Translation and Validation, Trondheim, Norway
ICSE'24	Lost in Translation: A Study of Bugs Introduced by Large Language Models while Translating Code, Lisbon, Portugal
FSE'22	Perfect Is the Enemy of Test Oracle, Singapore, Singapore

Skill Stack

Programming Languages	Python, Java, JavaScript, Rust, C, OCaml
Common	Docker, Vim, Git, SQL
Machine Learning	PyTorch, TensorFlow, vLLM, Codex, Claude Code

Service

Program Committee	ICLR'26, ICLR'25, MSR'25, MSR'24
Artifact Evaluation	ICSE'25
Organizing	ReCode@ICSE'26

Teaching Experience

| Fall 2025 | CS 421 - Programming Languages and Compilers |
| Spring 2025 | CS 447 - Natural Language Processing |

References

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