

# 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 [C<sub>4</sub>], source code decomposition for code translation [C<sub>3</sub>], and building end-to-end neuro-symbolic repository-level code translation [C<sub>2</sub>] and validation [P<sub>1</sub>] tools.

Beside code translation, I have also enjoyed working on other problems in software engineering [C<sub>1</sub>, C<sub>5</sub>] and machine learning for bioinformatics [J<sub>1</sub>, J<sub>2</sub>].

## Education


- 08/22 – 12/26 📖 **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*

## 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

## Research Publications



### Preprints

- [P1] **A. R. Ibrahimzada**, B. Paulsen, R. Jabbarvand, J. Dodds, and D. Kroening, "Matchfixagent: Language-agnostic autonomous repository-level code translation validation and repair," 2025.  URL: <https://arxiv.org/abs/2509.16187>.

### 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 & Manipulation (SCAM)*, 2025, pp. 133–144.  DOI: [10.1109/SCAM67354.2025.00021](https://doi.org/10.1109/SCAM67354.2025.00021).
- [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](https://doi.org/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](https://doi.org/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](https://doi.org/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](https://doi.org/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. Horozoglu, M. B. Doğan, Ö. Küçük hüseyin, C. Cacina, 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](https://doi.org/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. 2050026, 2020, PMID: 33125294.  DOI: [10.1142/S0219720020500262](https://doi.org/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.

## 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
  - 📌 **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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### **Reyhaneh Jabbarvand**

Assistant Professor

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### **Brandon Paulsen**

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