

Shushan Arakelyan

PhD candidate at the University of Southern California

arakelyan.shushan@gmail.com, shushana@usc.edu

My research centers on machine learning and large language models. I have explored the generalization challenges that language models exhibit when applied to code processing, including compositional generalization, out-of-domain generalization, and adaptation to new or low-resource programming languages. I am interested in research scientist and postdoctoral positions in industry.

Education

- 2017 - 2020, **UNIVERSITY OF SOUTHERN CALIFORNIA**
2021 - present PhD in Computer Science
Areas of interest: Large language models and their generalization, in particular in applications for code
- 2015 - 2016 **UNIVERSITY OF CAMBRIDGE**
MPhil in Advanced Computer Science, distinction
Dissertation: Predicting word difficulty level for lexical acquisition (pdf: <https://goo.gl/Xwf41A>)
- 2010 - 2014 **RUSSIAN-ARMENIAN (SLAVONIC) UNIVERSITY**
BSc in Applied Mathematics and Informatics, cum laude
Dissertation: Probabilistic spell-checking for Armenian language.
ACM-ICPC semifinalist

Publications

- “Exploring Distributional Shifts in Large Language Models for Code Analysis”, *EMNLP 2023 (main conference)* **Arakelyan, S.**, Das, R.J., Mao, Y. & Ren, X.
- “Leader: Defense Against Exploit-Based Denial-of-Service Attacks on Web Applications”, *In the 26th International Symposium on Research in Attacks, Intrusions, and Defenses (RAID) 2023*, Tandon, R., Wang, H., Weideman, N., **Arakelyan, S.**, Bartlett, G., Hauser, C. & Mirkovic, J.
- “NS3: Neuro-Symbolic Semantic Code Search”, *In Advances in Neural Information Processing Systems 35 (NeurIPS)*, 2022, **Arakelyan, S.**, Hakhverdyan, A., Allamanis, M., Hauser, C., Garcia, L. & Ren, X.
- “Bin2vec: Learning Representations of Binary Executable Programs for Security Tasks” *In the Cybersecurity Journal, Springer Nature*, 2021. **Arakelyan, S.**, Arasteh, S., Hauser, C., Kline, E. & Galstyan, A.
- “Transparent, Scrutable and Explainable User Models for Personalized Recommendation” *In the 42nd International ACM Conference on Research & Development in Information Retrieval (SIGIR)*, ACM, 2019. Balog, K., Radlinski, F., & **Arakelyan, S.**
- “Mining and forecasting career trajectories of music artists” *In Proceedings of the 29th ACM International Conference on Hypertext and Social Media*, ACM, 2018. **Arakelyan, S.**, Morstatter, F., Martin, M., Ferrara, E. & Galstyan, A.

Community service and volunteering

- ORGANIZER** KDD Deep Learning Day 2021, Machine Learning for Program Analysis (MLPA) 2020 Workshop
- REVIEWER and PC** ACL 2023, NeurIPS 2023, 2022, 2021, ICML 2022, 2023, 2021, 2020 (top reviewer), MSR 2021, ICLR 2021, KDD 2019, ASONAM 2019, WiML workshop 2019
- VOLUNTEER** ICML 2019, Graduate Women in Engineering at USC 2021

Shushan Arakelyan

PhD candidate at the University of Southern California

arakelyan.shushan@gmail.com, shushana@usc.edu

Professional experience

09/2022 - 03/2023	MICROSOFT RESEARCH , Seattle, WA, USA (Remote) Student Researcher Studied out-of-distribution generalization of large language models for code applications, i.e. CodeT5, Codex and ChatGPT, work accepted to EMNLP'23
05/2018 - 08/2018	GOOGLE , London, UK Software Engineering Intern Developed methods for transparent recommendation systems based on user profile descriptions, published at SIGIR'19
10/2016 - 08/2017	QUBE , Yerevan, Armenia Research Engineer Researching and prototyping advanced algorithms for computer graphics, image processing, 3D optimization, and RGB-driven face reenactment (deepfake)
06/2015 - 09/2015	GOOGLE , New York, NY, USA Software Engineering Intern Modified Cloud Logging Infrastructure from MapReduce to FlumeC++.
04/2013 - 05/2015	ONE MARKET DATA , Yerevan, Armenia Software Engineer Enhanced company's OneTick line: extended C++ and Java APIs, added web API for tick data, and designed cross-platform matrix event processors.
08/2012 - 03/2013	QUESTRADE , Yerevan, Armenia Junior C++ Engineer Worked on the front-end of the trading platform for transaction processing.

Awards and scholarships

2019	ACSAC CONFERENCESHIP student travel grant
2015-2016	CAMBRIDGE TRUST ASSESSMENT SCHOLARSHIP for exceptional academic performance
2015-2016	LUYS FOUNDATION SCHOLARSHIP for exceptional academic performance
2015	ARMENIAN INTERNATIONAL WOMEN ASSOCIATION SCHOLARSHIP for public service and academic performance
2014	GOOGLE ANITA BORG MEMORIAL SCHOLARSHIP for exceptional academic performance and leadership
2012	REPUBLIC OF ARMENIA PRESIDENT'S EDUCATIONAL AWARD IN IT for excellent achievements in study and research