Elizaveta (Liza) Pertseva

limpa105 | epertsev@ucsd.edu | limpa105.github.io

RESEARCH INTEREST

My research interests lie in the intersection of **Programming Languages** (PL), **Artificial Intelligence** (AI), and **Human-Computer Interaction** (HCI). By leveraging the soundness of PL methods and the scalability of AI techniques, I seek to build program synthesis tools that are easy to use, can generalize from a diverse array of specifications, and can be extended to numerous domains while maintaining robustness.

EDUCATION

University of California, San Diego — 2019 - Present

B.Sc., Mathematics for Computer Science (Major GPA: 3.98/4.0)

Graduate Level Coursework: Program Synthesis, Programming Languages, Probabilistic Reasoning and Learning, Advanced Statistical NLP, Machine Learning, Programmers are People Too, and Topics in Psycholinguistics (7 courses total)

PUBLICATIONS

[1] **Pertseva, Elizaveta**, Mark Barbone, Joey Rudek, and Nadia Polikarpova. 2022. Regex+: synthesizing regular expressions from positive examples. *11TH Workshop on Synthesis (SYNT)*. https://par.nsf.gov/biblio/10336574.

[2] Nikolai Vogler, Kartik Goyal, Kishore PV Reddy, **Elizaveta Pertseva**, Cristopher Warren, Max G'Sell, and Taylor Berg-Kirkpatrick. 2023. Contrastive attention networks for attribution of early modern print. In *The 37th Association for the Advancement of Artificial Intelligence (AAAI)*.

[3] Ruanqianqian (Lisa) Huang, **Elizaveta Pertseva**, Michael Coblenz, and Sorin Lerner. [n. d.] How do haskell programmers debug? *13th Annual Workshop at the Intersection of PL and HCI (PLATEAU)*. (Under Review (single-blind).

AWARDS/HONORS

- San Diego Super Computer REU Scholarship Recipient
- UCSD CSE Nominee for CRA Outstanding Undergraduate Researcher Award 2022 (one of four)
- PLMW Student Scholarship Recipient (POPL 2022)

LANGUAGES

Russian ●●●●●   English ●●●●●   French ●●●●○

MAJOR RESEARCH EXPERIENCE/PROJECTS

Student Researcher, **Neuro-Symbolic Regex+** — June 2021 - Present

Advisor: Nadia Polikarpova and Taylor Berg Kirkpatrick (CSE UCSD)

NSF-funded Summer REU project to investigate if A* and neural pragmatic communication can help scale regular expression inference from *only* positive examples. Designed a DFA-based smart regex example generator, built a neural speaker/listener model with reconstruction loss, and developed a framework to integrate with A* search. Preliminary results accepted to a student competition at **POPL**.

Student Researcher, **Regex+** January 2021 - May 2020

Advisor: Nadia Polikarpova (CSE UCSD)

Developed a novel regular expression synthesizer (Regex +) that can infer correct regular expressions from *only* positive examples. Regex + more than triples the accuracy of existing neural and search-based regex synthesizers, including Github Copilot. Presented results at an international workshop on synthesis **SYNT** co-located with **CAV** at **Technion**.

Student Researcher, **Print and Probability (P&P)** September 2021 - Present

Advisor: Taylor Berg-Kirkpatrick (CSE UCSD) and Max G'Sell (Statistics CMU)

Part of a joint interdisciplinary project between UCSD and CMU with the goal to use NLP and Computer Vision techniques to deanonymize early modern printers by matching uniquely damaged character types across books. Contributed to the model design, Led model interpretation, and developed a novel neuro-symbolic line extraction method. Results were accepted to **AAAI**.

Undergraduate Researcher, **San Diego Supercomputer Center** March 2021 - August 2021

Advisor: Mai Nguyen (SDSC)

Investigated and compared ways to optimize the performance of a Deep Transfer Learning Model for image classification in different ML Frameworks: Keras, TensorFlow and PyTorch. Results were used to teach ML researchers at San Diego Super Computer's Cyberinfrastructure-Enabled Machine Learning (CIML) Summer Institute.

Undergraduate Researcher, **Language Comprehension Lab** September 2019 - March 2020

Advisor: Eva Wittenberg (Linguistics UCSD)

Used eye tracking to explore how semantics and syntax affect the reading comprehension of a referring expression "it". Led the human study and developed the data analysis and statistical testing protocol. Ran the human study and data collection for an experiment studying use of pragmatics with a restricted grammar.

PROFESSIONAL EXPERIENCE

Data Engineer Intern, Amazon June 2022 - Septemeber 2022

Researched, extended, united and automated verification checks done by Data Science, Business Intelligence, and Data Engineering teams for the market metadata optimization campaign. Build a database uniting metadata from 5 different providers, 6 products and 3 marketplaces.

Data Analytics and Engineering Intern, Pacific Life June 2021 - Septemeber 2021

Developed an intelligent robotic automation process for customer discovery for the PRT team. Investigated key text features in Form 5500 pdf files indicating the future sale of contract. Created CPU-parallelized pipeline for web scraping, OCR, and keyword identification. Led seminars on web scraping and OCR.

Machine Learning Research Scientist Intern, Upstart June 2020 - Septemeber 2020

Invited back to investigate the behavior of low-income borrowers. Framed the problem mathematically, ran logistic regression, discovered patterns and presented findings to a cofounder and key stakeholders.

TEACHING EXPERIENCE

Undergraduate Teacher Assistant March 2022 - June 2022

(**Class**: Programming Languages (CSE130), **Instructor**: Nadia Polikarpova)

Helped students master functional programming (Lambda Calculus and Haskell). Held weekly office hours, assisted with assignment setup and answered 100+ student questions on Piazza.

SERVICE

UCSD Sailing Team   September 2019 - Present
  – **Vice President** (June 2021 - June 2022)
  – **Member of Fundraising Committee** (January 2021- June 2021)

As the Vice President, led a team of 56 individuals. Organized practices, facilitated volunteer and fundraising events, and hosted a 400+ participants competition. Guided the women's team to PCCSC Championships.

EDGE Mentor   September 2022 - Present

Mentored high school girls seeking to pursue a degree in STEM. Offered advice and support, provided feedback on college essays and job applications, and helped network.

FLoC Student Volunteer   August 2022

Helped make sure the international multi-conference event ran smoothly by assisting with setup, providing technical support, and helping participants find locations of scheduled talks.

POPL Student Volunteer   January 2023 (Future)