ETHAN VILLALOVOZ

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EDUCATION

Washington State University, Honors College August 2021 - May 2025
B.Sc. | Computer Science, Minor Mathematics (GPA: 3.96/4.0) *Pullman, WA*

- Senior Design Project: Retrieval-Augmented Generation (RAG) using Knowledge Graphs and Vector Search.

TECHNICAL SKILLS

Programming Languages	C/C++, Python, HTML/CSS, Haskell, MATLAB, LaTeX, C#, SQL, R
Developer Tools	VS Code, VS Community, Xcode, CLion, PyCharm, RStudio, Weka, Cytoscape, Google Colab
Technologies/Frameworks	Command Line Interface - Windows/Unix, Robot Operating System, Linux, GitHub, Pandas, NumPy, PyTorch, Scikit-learn, TensorFlow, Matplotlib, Seaborn, CUDA

WORK EXPERIENCE

Google May 2023 – August 2023
STEP (Student Training in Engineering Program) Intern | Google Core *Sunnyvale, CA*

- Advisor: Arun Tej Chennadi, Paul Valdez
- Accomplished development of 5 statistics collection jobs for pending queues within the team's internal database using C++ and SQL, optimizing cost expenditures, and providing clients with valuable insights.
- Achieved remarkable efficiency by conducting incremental job sampling, scaling from 1% to 100% of the database in under 4 hours—decreasing anticipated run-time by 66% and enhancing overall process effectiveness.
- Developed dynamic graphs to empower clients with real-time monitoring and analysis of outputs from stats collection jobs, utilizing expertise in HTML and a SQL-like language to enhance data visualization and insights.
- Implemented a real-time statistics feature on the client dashboard, providing clients with up-to-date visibility into pending queue messages, utilizing HTML and a SQL-like language to enhance data presentation and accessibility.
- Participated in enlightening company-hosted leadership speaking events, contributing to insights into professional development and effective leadership strategies.

PUBLICATIONS

Under Review

U2 Shlok Tomar, Aryan Deshwal, **Ethan Villalovoz**, Haipeng Cai, Janardhan Rao Doppa. *Test-Driven Code Generation using LLMs via Bayesian Optimization*. In Proceedings of the 2025 AAAI Conference on Innovative Applications of Artificial Intelligence (IAAI 2025).

U1 Shlok Tomar, Aryan Deshwal, **Ethan Villalovoz**, Mattia Fazzini, Haipeng Cai, Janardhan Rao Doppa. *Sample-Efficient LLM-Driven Program Synthesis: A Novel Bayesian Optimization Approach*. In Proceedings of the 2025 IEEE/ACM International Conference on Software Engineering (ICSE 2025).

Conference Papers

C1 Alexandra Bacula, **Ethan Villalovoz**, Deanna Flynn, Ankur Mehta, Heather Knight. *Social Triangles and Aggressive Lines: Multi-Robot Formations Impact Navigation and Approach*. In Proceedings of the 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023).

Poster Presentations

P5 **Villalovoz, Ethan**; Zhao, Michelle; Admoni, Henny; Simmons, Reid. 2024. *Clarifying Feature Overspecification in Reward Learning from State Corrections via Follow Up Questions*. Robotics Institute Summer Scholars: RISS 2024 Research Showcase, Pittsburgh, PA.

P4 **Villalovoz, Ethan T.**; Cook, Diane J. 2023. *Innovation On Your Wrist: Developing Ambient Smartwatches for Automated Cognitive Health*. Pacific Northwest LSAMP Conference, Portland, OR. Funded by the National Institute of Biomedical Imaging and Bioengineering of the NIH (R25EB027606) through the ESTEEMED MIRA program.

P3 **Villalovoz, Ethan T.**; Cook, Diane J. 2023. *Innovation On Your Wrist: Developing Ambient Smartwatches for Automated Cognitive Health*. Western Regional Honors Council Conference, Missoula, MT. Funded by the National Institute of Biomedical Imaging and Bioengineering of the NIH (R25EB027606) through the ESTEEMED MIRA program.

P2 **Villalovoz, Ethan T.**; Cook, Diane J. 2023. *Innovation On Your Wrist: Developing Ambient Smartwatches for Automated Cognitive Health*. Showcase for Undergraduate Research and Creative Activity, Pullman, WA. Funded by the National Institute of Biomedical Imaging and Bioengineering of the NIH (R25EB027606) through the ESTEEMED MIRA program.

P1 **Villalovoz, Ethan**; Bacula, Alexandra. 2022. *Scary Triangles and Friendly Arcs: Developing Geometric Features for Multi-Robot Expressive Motion*. Research Experiences for Undergraduates: Robots in the Real World, Corvallis, OR.

RESEARCH EXPERIENCE

Undergraduate Research Assistant August 2023 – Present
Doppa Laboratory | Washington State University *Pullman, WA*

- Advisor: Dr. Janardhan Rao (Jana) Doppa, Dr. Haipeng Cai, Aryan Deshwal, Shlok Tomar
- Analyzing security vulnerabilities of programs generated by large language models (LLMs) for code, contributing to enhanced system integrity and cybersecurity, measured by identifying and mitigating potential risks.
- Configured Python scripts for 11 large language models (LLMs) to generate 3 datasets per model using EvalPlus, resulting in precise extraction of accuracy metrics for each prompt in the EvalPlus dataset.
- Implemented a majority voting script where 1 LLM generates code prompts from the EvalPlus dataset above a certain accuracy threshold, while the other 10 LLMs evaluate the generated code for security vulnerabilities.

Robotics Institute Summer Scholars June 2024 – August 2024
HARP (Human And Robot Partners) Laboratory | Carnegie Mellon University *Pittsburgh, PA*

- Advisor: Dr. Henny Admoni, Dr. Reid Simmons, Michelle Zhao
- Conducted implementation of learning from human corrections, enhancing autonomous systems' ability to adapt in real-time by leveraging probabilistic models and Bayesian inference for iterative state corrections.
- Investigated the impact of interactive feedback and proactive dialogue on the alignment of robotic actions with human preferences, formulating precise research questions through comprehensive literature reviews.
- Developed a hierarchical reward learning system that leverages Bayesian inference and large language models (LLMs) to refine a robot's understanding of human preferences through targeted clarification questions.
- Engineered an adaptive reward hypothesis space incorporating multi-level features (e.g., color, material, type) to enhance robot interaction and alignment with user-specific preferences in dynamic environments.

CS Research Mentorship Program Mentee September 2023 – December 2023
Class 2023B | Google *Remote*

- Advisor: Dr. Emil Praun
- Accepted to a three month program that matches students with Google mentors and peers to support their pursuit of computer science research pathways.
- Empowered fellow students by leading group discussions on initiating research pathways, drawing from valuable insights and resources derived from previous research experiences.

Undergraduate Research Assistant August 2022 – May 2023
CASAS (Center for Advanced Studies in Adaptive Systems) Laboratory | Washington State University *Pullman, WA*

- Advisor: Dr. Diane Cook, Dr. Bryan Minor
- Executed comprehensive analysis of sensor data from smart homes, with a focus on identifying pertinent movements for participants with cognitive health disabilities, enhancing data-driven insights.
- Explored and pioneered the potential of ecological momentary assessments (EMA) through in-depth study of smartwatch data, laying the foundation for real-time prediction of emotional and psychological states.

Research Experience for Undergraduates June 2022 – August 2022
Robots in the Real World - CHARISMA Robotics Laboratory | Oregon State University *Corvallis, OR*

- Advisor: Dr. Heather Knight, Alexandra Bacula, Deanna Flynn
- Contributed to the development of geometric features for multi-robot expressive motion, enhancing robot character and intelligence by integrating techniques from the performing arts with graduate researchers.
- Researched the correlation between geometric shapes and people's emotional responses in human-robot interaction through comprehensive literature reviews, enabling the formulation of precise research questions.
- Implemented a Python script with robust functionality, enabling the calculation of geometric formation ending positions based on user inputs, facilitating seamless communication with the Pioneer 3DX robot.
- Designed and created a user-friendly Graphical User Interface (GUI) for the geometry formation script, streamlining input entry and enhancing accessibility, ensuring efficient command-line interaction for users.

Undergraduate Research Assistant February 2022 – August 2022
Driskell Laboratory | Washington State University *Pullman, WA*

- Advisor: Dr. Ryan Driskell
- Utilized HTML/CSS to develop a dynamic website for the lab group, facilitating effective communication and information sharing among researchers.

Undergraduate Research Assistant August 2021 – February 2022
Brozik Laboratory | Washington State University *Pullman, WA*

- Advisor: Dr. James Brozik, Michael Martinez
- Worked with graduate researchers to learn various instrumentation techniques, including absorption and luminescence spectroscopy.

TEACHING EXPERIENCE

Math Learning Center Tutor September 2023 – December 2023
Department of Mathematics and Statistics | Washington State University *Pullman, WA*

- Faculty: Dr. Daniel Reiss
- Empowered students by providing personalized one-on-one and group tutoring sessions for mathematics coursework, homework, and complex concepts, effectively catering instruction to diverse learning styles.
- Enhanced student performance by assessing and tracking progress over time. Collaborated with students to set measurable goals and action plans for continuous improvement, contributing to their academic success.
- Maintained regular communication with students and staff and stayed abreast of evolving educational practices and curriculum, enhancing the overall learning environment and facilitating ongoing improvement.

Undergraduate Teaching Assistant August 2023 – December 2023
CPT_S 355 Programming Language Design (Fall 2023) | Washington State University *Pullman, WA*

- Faculty: Dr. Sakire Arslan Ay
- Guided 86 students in learning introductory to basic concepts in the design of programming languages through leading weekly effective office hours, nurturing their foundational understanding.

- Enhanced student mastery of programming languages by offering comprehensive feedback and evaluation on assignments, projects, and coursework, elevating their learning outcomes.
- Delivered clear instruction on programming languages, leveraging expertise in Haskell, Python, Postscript, and Java, and utilizing development environments like Visual Studio Code and PyCharm.

Undergraduate Teaching Assistant August 2022 – December 2022
CPT_S 121 Program Design and Development C/C++ (Fall 2022) | Washington State University *Pullman, WA*

- Faculty: Professor Andrew O'Fallon
- Guided 17 students in learning introductory programming and computer science concepts through leading weekly lab sessions and providing effective office hours support, nurturing their foundational understanding.
- Enhanced student mastery of programming principles by offering comprehensive feedback and evaluation on assignments, projects, and coursework, elevating their learning outcomes.
- Delivered clear instruction on programming languages, leveraging expertise in C/C++, and utilizing development environments like Visual Studio (Windows), Xcode, and CLion, ensuring a robust learning experience.

Honors Facilitator February 2022 – December 2022
HONORS 198 Honors First-Year Experience (Fall 2022) | Washington State University *Pullman, WA*

- Faculty: Dr. Robin Bond
- Fostered a sense of community and facilitated engagement with the Honors curriculum, guiding 12 incoming students through their transition to college life, nurturing a supportive learning environment.
- Provided expert academic advising and support in schedule planning, ensuring a seamless transition for students as they navigated college resources and academic requirements.
- Designed and implemented interactive activities and discussions, promoting critical thinking and engagement within the Honors community to foster a collaborative learning atmosphere.

LICENSES & CERTIFICATIONS

Machine Learning Foundations | Cornell University July 2024
Exploring the role that machine learning plays in the industry for decision making and its impact on your role. The characteristics of a particular problem, the data you have to work with, and the questions you want to answer will dictate what type of ML approach, method, and algorithm needs to be used.

Machine Learning | Stanford University & DeepLearning.AI on Coursera January 2024
Broad introduction to modern machine learning, including supervised learning (multiple linear regression, logistic regression, neural networks, and decision trees), unsupervised learning (clustering, dimensionality reduction, recommender systems).

Fundamentals of Data Science in Precision Medicine and Cloud Computing | Stanford University School of Medicine January 2024
Precision medicine educational platform that teaches people of all experience levels how to process and analyze biomedical data, such as wearable data, proteomic data, and microbiome data.

HONORS & AWARDS

Scholarships & Academic Awards

Overall Junior of the Year Voiland College of Engineering & Architecture (Local) Spring 2024
This award is based on nominations from faculty and staff and recognizes academic achievement, leadership, and contributions to the Voiland College of Engineering & Architecture.

Outstanding Junior Student in Computer Science (BS) School of Electrical Engineering and Computer Science (Local) Spring 2024
This award is based on nominations from faculty and staff and recognizes academic achievement, leadership, and contributions to the Voiland College of Engineering & Architecture.

Chancellor's Award for Leadership: Distinguished Leader Award (Local) Spring 2024
Recognizes individuals who demonstrate exceptional leadership and service to the WSU Pullman and surrounding community, as well as those who support leadership development in WSU Pullman students.

Wayne Asmussen Honors College Scholarship Fund Recipient (Local) Fall 2023
Awarded to members of the Honors College to recognize academic performance and achievement.

CS Research Mentorship Program Scholar (International) Fall 2023
Accepted to a three-month program that matches students with Google mentors and peers to support their pursuit of computer science research pathways.

John W. and Anna M. Scott Fund for Academic Excellence Scholarship Recipient (Local) Fall 2023, 2024
Established by generous donors who recognize the increasing costs of pursuing higher education and have specifically directed their contributions towards assisting students of exceptional caliber.

Generation Google Scholarship Recipient (International) Summer 2023
Awarded based on the strength of each candidate's commitment to diversity, equity, and inclusion, demonstrated leadership, and academic performance.

Outstanding Sophomore Student in Computer Science (BS) School of Electrical Engineering and Computer Science (Local) Spring 2023
This award is based on nominations from faculty and staff and recognizes academic achievement, leadership, and contributions to the Voiland College of Engineering & Architecture.

EECS General Scholarship Fund Recipient (Local) Fall 2022
Established by generous donors who recognize the increasing costs of pursuing higher education and have specifically directed their contributions towards assisting students of exceptional caliber.

Hispanic Scholarship Fund Scholar (National) Summer 2022, 2023
Empowers students and parents with the knowledge and resources to successfully complete a higher education.

President Honor Roll (Local) Fall 2021 - Spring 2024
By achieving a cumulative grade point average of 3.50 based on at least 15 cumulative hours of graded work at Washington State University, provided that the semester GPA is 3.0 or better.

Voiland College of Engineering & Architecture Dean's Scholarship Recipient (Local) Summer 2021
Freshman with high academic achievement (high school grade point average and pre-college test scores).

Society of American Military Engineers (SAME) Scholarship Recipient (Regional) Spring 2021, 2022, 2023, 2024
Encourage and support talented students in their pursuit of careers in engineering and the physical sciences.

Top Scholar (Local) Spring 2021
Awarded to first-year students whose academic achievements placed them in the top 10 percent of the admitted 2021 class of Washington State University.

Research Awards

Auvil Undergraduate Research Fellowship (Local) Spring 2024
Awarded to support research, scholarship, and creative activity for undergraduate students in all majors, all campuses, and at all levels of undergraduate education.

MARC (Maximizing Access to Research Careers) - WSU Program (Local) Summer 2023 - Spring 2025
NIH-funded unique opportunity for undergraduate students from underrepresented backgrounds to embark on a two-year program of scientific research, leadership development, and graduate-school preparation.

Early Career Award Research Proposal - WSU SURCA (Local) Spring 2023
This level is for first-year students and sophomores who receive excellent scores from the judges.

ESTEEMED (Enhancing Science, Technology, EnginEering, and Math Educational Diversity) MIRA (Motivating Innovation and Research Achievement) Program (Local) Summer 2021 - Spring 2023

NIH-funded unique opportunity for undergraduate students from underrepresented groups planning to major in biomedical science and engineering fields.

UNDERGRADUATE COURSEWORK

CPT_S 302 Professional Skills in Computing and Engineering, Fall 2024. Instructor: Dr. Jeremy E. Thompson

CPT_S 321 Object-Oriented Software Principles (C#), Fall 2024. Instructor: Dr. Venera Arnaoudova

CPT_S 327 Cyber Security & Cryptography, Fall 2024. Instructor: Dr. Ananth Jillepalli

CPT_S 421 Software Design Project I (Python), Fall 2024. Instructor: Dr. Parteek Kumar

CPT_S 437 - Introduction to Machine Learning (Python), Fall 2024. Instructor: Dr. Nghia Hoang

CPT_S 315 - Introduction to Data Mining (Python), Spring 2024. Instructor: Dr. Honghao Wei

CPT_S 360 - Systems Programming C/C++, Spring 2024. Instructor: Dr. Monowar Hasan

MATH/CPT_S 453 - Graph Theory, Spring 2024. Instructor: Dr. Abigail Cortez

STAT 360 - Probability and Statistics, Spring 2024. Instructor: Professor Xiaoming Wen

MBIOS 478 - Bioinformatics (Python, SQL, R), Fall 2023. Instructor: Dr. John Wyrick

CPT_S 350 - Design and Analysis of Algorithms (Python), Fall 2023. Instructor: Dr. Zhe Dang

CPT_S 317 - Automata and Formal Languages, Spring 2023. Instructor: Dr. Assefaw Gebremedhin

CPT_S 322 - Software Engineering I (C#), Spring 2023. Instructor: Dr. Haipeng Cai

CPT_S 355 - Programming Language Design (Haskell, Python, Java), Spring 2023. Instructor: Dr. Sakire Arslan Ay

MATH 364 - Principles of Optimization (MATLAB), Spring 2023. Instructor: Dr. Thomas Asaki

CPT_S 260 - Intro to Computer Architecture (MIPS Assembly), Fall 2022. Instructor: Dr. Ganapati Bhat

MATH 220 - Introductory Linear Algebra, Fall 2022. Instructor: Ryan Peffer

MATH 273 - Calculus III, Fall 2022. Instructor: Dr. Eric Remaley

CPT_S 223 - Advanced Data Structures C/C++, Fall 2022. Instructor: Dr. Yan Yan

CPT_S 122 - Data Structures C/C++, Spring 2022. Instructor: Professor Andrew O'Fallon

MATH 216 - Discrete Structures, Spring 2022. Instructor: Dr. Alexander Panchenko

CPT_S 121 - Program Design and Development C/C++, Fall 2021. Instructor: Professor Andrew O'Fallon

LEADERSHIP & STUDENT INVOLVEMENT

Washington State University VCEA Voiland College Ambassador April 2022 – December 2024
Represented and connected Voiland College with industry, alumni, and prospective students, sharing unique experiences and perspectives to promote the college's mission and transformative impact.

Carnegie Mellon University RISS RoboLaunch Website Coordinator June 2024 – August 2024
An initiative to explore the world of robotics through a series of talks and interactive workshops. Responsible for updating the website to ensure accessibility and provide up-to-date information.

Housing and Residence Life Resident Advisor August 2022 – May 2023
Worked and resided in diverse residential communities, fostering safe and engaged environments, addressing conflicts, organizing programs, and building relationships with residents.

Responsibility Opportunity Advocacy Respect (ROAR) Peer Ally September 2021 – May 2023
Collaborated with WSU ROAR students by providing support in attending classes, facilitating social integration, participating in university events, and fostering inclusive experiences for mutual learning and personal growth.

Peer Notetaker August 2022 – December 2022
Uploaded notes to provide equal access for students with various disabilities as an additional study tool.

Sigma Chi Fraternity: Beta Upsilon Chapter September 2021 - December 2021
Mission is to foster a brotherhood of transformational leaders who are committed to friendship, justice and learning.

Student Involvement August 2021
Assisted with Move-In 2021 by assisting first year students move into campus dormitories.