

Maddie Juarez

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Education

Loyola University Chicago, BS in Computer Science

August 2022 – May 2026

- GPA: 3.98/4.0
- **Awards:** NSF REU, Mulcahy Scholarship, Research Mentoring Fellow, SBP-BRiMS Conference Scholarship
- **Research Interests:** Machine Learning, Natural Language Processing, Human-Computer Interaction, Social Computing, Graph-Based Modeling, AI for Social Good, Robotics, Simulation, Renewable Energy

Experience

Argonne National Laboratory – Lemont, IL

Undergraduate Visiting Student Researcher - Leadership Computing Facility

June 2023 - Aug 2023

- Researched machine learning algorithms and deep learning models, including CNN, RNN, and HAN to develop and analyze cyberbullying detection systems leveraging large-language models.
- Applied Natural Language Processing (NLP) classification techniques such as word2vec, LIWC, and TF-IDF, and implemented models such as Naive Bayesian, Random Forest, and GPT to social media datasets, enhancing cyberbullying detection accuracy using state-of-the-art techniques.

Science Undergraduate Laboratory Internship (SULI) - Center for Transportation Research

June 2024 - Aug 2024

- Developed and deployed custom V2X software for real-time transmission and reception between connected vehicles and roadside units, supporting smart mobility infrastructure and EcoCAR's electric vehicle platform.
- Simulated dynamic driving scenarios using bench-tested radios to enable pre-road testing validation for connected and automated vehicle (CAV) pipelines.
- Built scalable on-road CAV data collection mechanisms to validate energy-efficient, intelligent vehicle behaviors aligned with next-generation mobility and renewable energy initiatives.
- Focused on electric vehicle integration as part of the U.S. Department of Energy's mission to advance sustainable transportation and renewable energy systems.
- Contributed to the DOE-sponsored STEP program, advancing applied research and STEM workforce development in transportation electrification and V2X innovation.

Research Experience

BullyBlocker Laboratory

iOS App to Combat Cyberbullying

May 2022 – August 2023

- Created an iOS app, *ActionPoint*, aimed at reducing cyberbullying by enhancing parent-teen communication; included interactive in-app surveys with real-time feedback to foster awareness and dialogue.
- Used AWS and PHP to implement secure user authentication and support server-side architecture.
- Published and presented work at WF-PST'24 in Washington, DC; Presented at Speak Up, Stand Up, Save a Life event in Phoenix, AZ.

Analyzing the Robustness of Machine Learning Models for Cyberbullying Detection using Adversarial Attacks

August 2023 – May 2025

- Designed and implemented end-to-end machine learning pipelines to evaluate cyberbullying detection models, incorporating text standardization, cross-validation, and baseline benchmarking across traditional ML and deep learning models.
- Conducted black-box adversarial attacks using word-level substitutions and character-level perturbations to assess model vulnerabilities and quantify performance degradation.
- Analyzed limitations of small expert-labeled datasets and restricted metadata access, synthesizing findings to highlight challenges in real-world cyberbullying detection.

Cyberbullying Dataset and Graphical Networks

May 2025 – Present

- Constructed a labeled dataset capturing fine-grained cyberbullying roles between victims and bullies, topic content, and severity levels, supporting high-resolution classification and fairness evaluation.
- Modeled evolving cyberbullying sessions as dynamic directed graphs, capturing user roles and interactions to analyze temporal structure and influence propagation in online abuse networks.

Software and Systems Laboratory

Visuomotor Behavior Cloning with Human Action Reconstruction

Oct 2024 - Present

- Develop large-scale, self-supervised learning systems that enable robots to learn directly from human demonstration in combination with robot actions simultaneously, aiming to overcome embodiment challenges to perform complex tasks in real-world environments.
- Designed and executed structured data collection pipelines for both human video demonstrations and vision-based robot teleoperation, enabling robust training across four manipulation tasks (Pick, Stack, Sort Duck, Sweep) using the XArm robotic platform.
- Conducted joint training using visual and proprioceptive input modalities, applying retargeted 3D hand pose estimation and action mapping techniques to enable robust, sample-efficient robot policies.

AI for Social Good Projects

Dost: Culturally Responsive Support for Central and South Asian Newcomers Using AI

June 2024 - Dec 2024

- Built an interactive web-based platform for Afghan refugees to access support resources aimed to reduce stress and enhance integration, including a fine-tuned GPT model offering real-time support.

Heyfriend: Wellness and Resource-Driven Support for Low-Income Chicagoans

July 2025 - Present

- Built an interactive web-based platform for low-income individuals to access support resources aimed to reduce stress and enhance integration, including a fine-tuned GPT model offering real-time support.
- Built a custom resume-rendering tool using rendercv and HTML interface to allow users to create a customized, downloadable, formatted resumé.
- Integrated real-time logging using javascript to record aggregated user interactions among site

Publications

Conference Papers

1. **Maddie Juarez**, Natali Barragan, Deborah Hall, Yasin Silva, George Thiruvathukal. *ActionPoint: An App to Combat Cyberbullying by Strengthening Parent-Teen Relationships*. The 2024 World Forum on Public Safety Technology (WF-PST). 10.1109/WFPST58552.2024.00008
2. **Maddie Juarez**, Eldor Abdukhamidov, Manuel Sandoval, Mujtaba Nazari, Deborah Hall, George Thiruvathukal, Tamer Abuhmed, Yasin Silva, Mohammed Abuhamad. *Analyzing Adversarial Strategies and Countermeasures for Cyberbullying Detection*. The 2025 Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMS).
3. Abha Rai, Maria Vidal de Haymes, Ali Tarokh, Shakila Fro, Farzana Farzam, Elisa Leyva Cea, Alix Sanchez-Gomez, **Maddie Juarez**, George Thiruvathukal, Paula Tallman. *AER for Stronger Communities: A Culturally Responsive Intervention for Newcomers*. Families in Society: The Journal of Contemporary Social Services 2026.
4. Manuel Sandoval, Muhammad Arslan, **Maddie Juarez**, Satyaki Sikdar, Mohammed Abuhamad, Daniel Moreira, Deborah L. Hall, Yasin N. Silva. *Insta-CTSR: Cyberbullying, Topics, Severity and Roles for Instagram*. Under Submission.
5. Satyaki Sikdar, Manuel Sandoval, Taylor Hales, Chloe Kilroy, **Maddie Juarez**, Tyler Rosario, Juan J. Rosendo, Deborah L. Hall, Yasin N. Silva. *Network Analysis of Cyberbullying Interactions on Instagram*. Under Submission.

Posters

1. Abha Rai, Alix Sanchez Gomez, Elisa Levy Cea, Mary Held, Maria Vidal de Haymes, Shakila Fro, George K. Thiruvathukal, **Maddie Juarez**, Farzana Farzam, Ali Tarokh, Paula Tallman. *Centering Voices: Culturally Responsive Support for Central and South Asian Newcomers using AI and Fitness Trackers*. The 2026 Conference on Society for Social Work and Research (**SSWR**).
2. Abha Rai, Maria Vidal de Haymes, **Maddie Juarez**, George K. Thiruvathukal, Kristen E. Ravi, Ali Tarokh, Shakila Fro, Farzana Farzam, Paula Tallman, Danny Olweean. *Development and Testing of an Intervention for Newly Arriving Communities*. Oral Presentation. 23rd Annual Hawaii International Summit: Institute on Violence, Abuse, and Trauma Conference 2026.

Technologies

Languages: Python, Java, C++, C, Java, C#, SQL, JavaScript, Swift, R, SAS, HTML/CSS, PHP

Technologies: Microsoft SQL Server, XCode, Linux, LaTeX, AWS, GitHub, Jupyter, Django