Nicolas Crespo

ncrespo@ucla.edu | github.com/n-crespo | linkedin.com/in/n-crespo | ncrespo.com

Aspiring computer engineer interested in building innovative, impactful solutions to complex technical problems.

Education

University of California, Los Angeles, *B.S. in Computer Engineering* Expected March 2028

- Operating Systems, Computer Architecture and Assembly Language, Machine Learning, Data Structures and Algorithms, Object Oriented Programming, Digital Logic Design, Systems and Signals, Discrete Mathematics, Differential Equations
- Active member of UCLA IEEE and UCLA ACM Cyber

Work Experience

Formal Verification of Autonomous Systems Intern, NASA Langley Research Center June 2025 — Sept 2025

- Designed a domain-specific language embedding to model and test Detect-and-Avoid systems on autonomous aircraft.
- Created and formally verified a novel technique for assuring the safety of safety-critical Unmanned Aircraft Systems (UAS) by evaluating if untrusted or AI/ML generated flight instructions would violate predefined operational boundaries.
- Developed an automated proof strategy for guaranteeing flight safety and correctness, reducing verification time by >90%.

Software Engineer Intern, Thomas Jefferson National Accelerator Facility June 2024 — Aug 2024

- Engineered and integrated lab-wide inventory location tracking with session-persistent cookies into Jefferson Lab's (JLab) data management system to fully automate manual reporting procedures for 200+ lab engineers and improve data quality.
- Developed a unified fuzzy data searching system by consolidating JLab's cross-departmental Oracle SQL relational databases, reducing data retrieval time by >70% and improving search accuracy and efficiency across all lab departments.
- Source code and documentation on GitHub (github.com/n-crespo/jlab-2024).

Computer Science Research Intern, NASA Langley Research Center Dec 2023 — Mar 2024

- Developed a productive conflict avoidance and recovery system for autonomous UAS in crowded airspaces.
- Formally verified the safety of this system as a fallback for untrusted ML/AI based controllers in safety-critical situations.
- Source code and documentation on GitHub (github.com/n-crespo/NASA-2023).

Publications

A Verification Framework for Runtime Assurance of Autonomous UAS, IEEE Nov 2024
2024 AIAA DATC/IEEE Digital Avionics Systems Conference (https://ieeexplore.ieee.org/document/10748654)

A Formal Verification Framework for Runtime Assurance, Springer May 2024
2024 NASA Formal Methods Conference: 16th International Symposium (https://doi.org/10.1007/978-3-031-60698-4_19)

Projects

The Open Dissent, Co-Founder and Software Engineer (github.com/n-crespo/theopendissent) Ongoing

- Building a serverless full-stack social platform using React, TypeScript, and Firebase Cloud Functions (Node.js).
- Created an CI/CD pipeline using GitHub Actions and Vercel to automate production deployments.
- Secured funding through the VOICE Initiative from the UC National Center for Free Speech and Civic Engagement.

VulnEx, Team Lead and Backend Developer (github.com/n-crespo/vulnex) Sept 2025 — Dec 2025

- Optimized parsing of 300k+ CVE records, reducing fetching time by 96% (1hr to 2min) and storage requirements by 97%.
- Created an Express/MongoDB REST API, implementing secure JWT auth middleware and bulk CRUD operations.
- Built GitHub Actions CI/CD pipeline for automated deployment with 30+ E2E and integration tests (Mocha/Playwright).

High-Performance Image Manipulation Algorithms in C, Developer May 2025

- Optimized Gaussian convolution and greyscaling algorithms in C to exploit cache locality and instruction-level parallelism.
- Achieved a 12-15x speedup over sequential baselines with multi-threading using OpenMP pragmas.

Skills

- **Expertise**: Software Engineering | Formal Verification | Digital Logic Design | Circuit Design | Data Analysis
- **Programming Languages**: C/C++ | x86 Assembly/MIPS | Python | Java | JavaScript/TypeScript | SQL | Bash | Typst
- **Technologies**: React | NodeJS | MongoDB | Playwright | ExpressJS | Vim/Neovim | Linux | Git/GitHub