JOSHUA GARCIA

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Donald Bren School of Information and Computer Sciences
Department of Informatics
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Research Interests

My research interests are in automated software engineering, especially software testing and analysis for autonomous driving systems, software vulnerability management, and the decay of software architectures.

Education

Ph.D., Computer Science, August 2014
University of Southern California
Los Angeles, CA, U.S.A.
Dissertation: A Unified Framework for Studying Architectural Decay of Software Systems

Master of Science, Computer Science, December 2008
University of Southern California
Los Angeles, CA, U.S.A.

Bachelor of Science in Computer Engineering and Computer Science, Minor in Philosophy, May 2006
University of Southern California
Los Angeles, CA, U.S.A.

Employment History

University of California, Irvine, USA		
July 2025–Present	**Associate Professor**	Department of Informatics
University of California, Irvine, USA		
July 2018–June 2025	**Assistant Professor**	Department of Informatics
University of California, Irvine, USA		
July 2015–June 2018	**Postdoctoral Associate**	Institute for Software Research
George Mason University, Fairfax, VA, USA		
July 2014–June 2015	**Postdoctoral Research Fellow**	Software Design and Analysis Laboratory
University of Southern California, Los Angeles, CA, USA		
January 2008–June 2014	**Research Assistant**	Software Architecture Research Group
May 2007–August 2007	**Research Assistant**	Southern California Earthquake Center
May 2005–May 2006	**Research Intern**	Southern California Earthquake Center
NASA Jet Propulsion Laboratory, La Cañada Flintridge, CA, USA		
June 2009–August 2010	**Software Engineer**	
Xerox Special Information Systems, Monrovia, CA, USA		
June 2006–August 2006	**Software Development Intern**	
Threshold Marketing, Los Angeles, CA, USA		
August 2004–April 2005	**Software Development Intern**	
Digital Computing Systems, LLC, Van Nuys, CA, USA		
May 2003–August 2003	**IT Consultant**	
Notre Dame High School, Sherman Oaks, CA, USA		
June 2001–September 2002	**Assistant Network Admin**	
Toy Mandala (Collectible Items Store), Sherman Oaks, CA, USA		
April 2002–August 2002	**Webmaster and Ad Designer**	

Publications

Notation: asterisk (*) – the author is my student; underlined – the author is the PI of the project

Conferences

[C31] Steven Ngo*, Akshay Rohatgi*, and **Joshua Garcia**. Netsiege: A Long-Form, Club-Led King-of-the-Hill Competition for Accessible Cybersecurity Training. *58th ACM Technical Symposium on Computer Science Education (SIGCSE TS 2027)*, Sacramento, California, February 2027. (25.8% acceptance rate; to appear)

[C30] Yuqi Huai*, Yuntianyi Chen*, Ziwen Wan, Qi Alfred Chen, and **Joshua Garcia**. DeFT: Maintaining Determinism and Extracting Unit Tests for Autonomous Driving Planning. *48th IEEE/ACM International Conference on Software Engineering (ICSE 2026)*, Rio de Janeiro, Brazil, April 2026. (24.4% acceptance rate for Cycle 1; accepted after major revision)

[C29] Yirui He*, Yongbo Chen*, Jessy Ayala*, Yecheng Zhou*, Qiran Wang*, and **Joshua Garcia**. Breaking Strong Encapsulation: A Comprehensive Study of Java Module Abuse. *48th IEEE/ACM International Conference on Software Engineering (ICSE 2026)*, Rio de Janeiro, Brazil, April 2026. (9.1% direct acceptance rate for Cycle 1)

[C28] Luca Di Bartolomeo, Philipp Mao, Yu-Jye Tung*, Jessy Ayala*, Samuele Doria, Paolo Celada, Marcel Busch, **Joshua Garcia**, Eleonora Losiouk, and Mathias Payer. Hercules Droidot and the murder on the JNI Express. *34th USENIX Security Symposium*, Seattle, Washington, August 2025. (16.0% acceptance rate for Cycle 2; accepted after major revision)

[C27] Jessy Ayala*, Yu-Jye Tung*, and **Joshua Garcia**. A Mixed-Methods Study of Open-Source Software Maintainers On Vulnerability Management and Platform Security Features. *34th USENIX Security Symposium*, Seattle, Washington, August 2025. (8.21% direct acceptance or accepted after shepherding rate for Cycle 1)

[C26] Yuntianyi Chen*, Yuqi Huai*, Yirui He*, Shilong Li*, Changnam Hong*, Qi Alfred Chen, and **Joshua Garcia**. A Comprehensive Study of Bug-Fix Patterns in Autonomous Driving Systems. *33rd ACM International Conference on the Foundations of Software Engineering (FSE)*, Trondheim, Norway, June 2025. (11.44% direct acceptance rate)

[C25] Jessy Ayala*, Steven Ngo*, and **Joshua Garcia**. A Deep Dive Into How Open-Source Project Maintainers Review and Resolve Bug Bounty Reports. *46th IEEE Symposium on Security and Privacy (Oakland 2025)*, San Francisco, California, May 2025. (14.3% acceptance rate for Cycle 1)

[C24] Yuntianyi Chen*, Yuqi Huai*, Shilong Li*, Changnam Hong*, and **Joshua Garcia**. Misconfiguration Software Testing for Failure Emergence in Autonomous Driving Systems. *32nd ACM International Conference on the Foundations of Software Engineering (FSE)*, Ipojuca (Pernambuco), Brazil, July 2024. (25.5% acceptance rate)

[C23] Yoonha Cha, Isabela Figueira, Jessy Ayala*, Emory James Edwards, **Joshua Garcia**, André van der Hoek, and Stacy Marie Branham. Do You Want Me to Participate or Not?: Investigating the Accessibility of Software Development Meetings for Blind and Low Vision Professionals. *Proceedings of the CHI Conference on Human Factors in Computing Systems (CHI)*, Honolulu, Hawaii, May 2024. (26.4% acceptance rate)

[C22] Esmerald Aliaj, Alberto Krone-Martins, **Joshua Garcia**, and Sang-Woo Jun. FarSlayer: Turnkey Acceleration of Legacy Software on Commodity FPGA Card. *IEEE 34th International Conference on Application-Specific Systems, Architectures and Processors (ASAP)*, Porto, Portugal, July 2023. (31% acceptance rate)

[C21] Yuqi Huai*, Yuntianyi Chen*, Sumaya Almanee*, Tuan Ngo*, Xiang Liao*, Ziwen Wan, Qi Alfred Chen, and **Joshua Garcia**. Doppelgänger Test Generation for Revealing Bugs in Autonomous Driving Software. *2023 IEEE/ACM 45th International Conference on Software Engineering (ICSE)*, Melbourne, Australia, May 2023. (26.6% acceptance rate)

[C20] Ziwen Wan, Junjie Shen, Jalen Chuang, Xin Xia, **Joshua Garcia**, Jiaqi Ma, and Qi Alfred Chen. Too Afraid to Drive: Systematic Discovery of Semantic DoS Vulnerability in Autonomous Driving Planning under Physical-World Attacks. *Network and Distributed Systems Security (NDSS) Symposium*, San Diego, California, April 2022. (16.2% acceptance rate)

[C19] **Joshua Garcia**, Mehdi Mirakhorli, Lu Xiao, Yutong Zhao, Ibrahim Mujhid, Khoi Pham, Ahmet Okutan, Sam Malek, Rick Kazman, Yuanfang Cai and Nenad Medvidović. Constructing a Shared Infrastructure for Software Architecture Analysis and Maintenance. *18th IEEE International Conference on Software Architecture (ICSA 2021)*, Stuttgart, Germany, March 2021. (26.7% acceptance rate)

[C18] Sumaya Almanee*, Arda Unal*, Mathias Payer, and **Joshua Garcia**. Too Quiet in the Library: An Empirical Study of Security Updates in Android Apps' Native Code. *In the 43rd International Conference on Software Engineering (ICSE 2021)*, Madrid, Spain, May 2021. (22.4% acceptance rate)

[C17] **Joshua Garcia**, Yang Feng, Junjie Shen, Sumaya Almanee*, Yuan Xia*, and Qi Alfred Chen. A Comprehensive Study of Autonomous Vehicle Bugs. *In the 42nd International Conference on Software Engineering (ICSE 2020)*, Seoul, South Korea, May 2020. (20.9% acceptance rate)

[C16] Negar Ghorbani*, **Joshua Garcia**, and Sam Malek. Detection and Repair of Architectural Inconsistencies in Java. *In the 41st International Conference on Software Engineering (ICSE 2019)*, Montreal, Canada, May 2019. (21% acceptance rate)

[C15] Mahmoud Hammad, **Joshua Garcia**, and Sam Malek. SALMA: Self-Protection of Android Systems from Inter-Component Communication Attacks. *In the 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018)*, Montpellier, France, September 2018. (20% acceptance rate)

[C14] Mahmoud Hammad, **Joshua Garcia**, and Sam Malek. A Large-Scale Empirical Study on the Effects of Code Obfuscations on Android Apps and Anti-Malware Products. *In the 40th International Conference on Software Engineering (ICSE)*, Gothenburg, Sweden, May 2018. (21% acceptance rate)

[C13] Jun-Wei Lin, Reyhaneh Jabbarvand, **Joshua Garcia**, and Sam Malek. Nemo: Multi-Criteria Test-Suite Minimization with Integer Nonlinear Programming. *In the 40th International Conference on Software Engineering (ICSE)*, Gothenburg, Sweden, May 2018. (21% acceptance rate)

[C12] **Joshua Garcia**, Mahmoud Hammad, Negar Ghorbani, and Sam Malek. Automatic Generation of Inter-Component Communication Exploits for Android Applications. *In the 11th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Paderborn, Germany, September 2017. (24.4% acceptance rate)

[C11] Nariman Mirzaei, **Joshua Garcia**, Hamid Bagheri, Alireza Sadeghi, and Sam Malek. Reducing Combinatorics in GUI Testing of Android Applications. *In the 38th International Conference on Software Engineering (ICSE)*, Austin, Texas, May 2016. (19% acceptance rate)

[C10] Duc Le, Pooyan Behnamghader, **Joshua Garcia**, Daniel Link, Arman Shahbazian and Nenad Medvidović. An Empirical Study of Architectural Change in Open-Source Software Systems. *In the 12th Working Conference on Mining Software Repositories (MSR)*, Florence, Italy, May 2015. (30% acceptance rate)

[C9] Thibaud Lutellier, Devin Chollack, **Joshua Garcia**, Lin Tan, Derek Rayside, Nenad Medvidović and Robert Kroeger. Comparing Software Architecture Recovery Techniques Using Accurate Dependencies. *In the 37th International Conference on Software Engineering (ICSE), Software Engineering In Practice Track*, Florence, Italy, May 2015. (22.6% acceptance rate)

[C8] **Joshua Garcia**, Igor Ivkovic, and Nenad Medvidović. A Comparative Analysis of Software Architecture Recovery Techniques. *In the Proceedings of the 28th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, Palo Alto, California, November 2013. (18.6% acceptance rate)

[C7] **Joshua Garcia**, Daniel Popescu, Gholamreza Safi, William G.J. Halfond, and Nenad Medvidović. Identifying Message Flow in Distributed Event-Based Systems. *In the Proceedings of the 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE)*, Saint Petersburg, Russia, August 2013. (20.3% acceptance rate)

[C6] **Joshua Garcia**, Ivo Krka, Chris Mattmann, and Nenad Medvidović. Obtaining Ground-Truth Software Architectures. *In the 35th International Conference on Software Engineering (ICSE), Software Engineering In Practice Track*, San Francisco, California, May 2013. (20% acceptance rate)

[C5] Daniel Popescu, **Joshua Garcia**, Kevin Bierhoff, and Nenad Medvidović. Impact Analysis for Distributed Event-Based Systems. *In the Proceedings of the 6th ACM International Conference on Distributed Event-Based Systems (DEBS)*, Berlin, Germany, July 2012. (16.4% acceptance rate)

[C4] Isela Macia Bertrán, **Joshua Garcia**, Daniel Popescu, Alessandro Garcia, Nenad Medvidović and Arndt Von Staa. Are Automatically-Detected Code Anomalies Relevant to Architectural Modularity? An Exploratory Analysis of Evolving Systems. *In the Proceedings of the 11th Annual International Conference on Aspect-oriented Software Development (AOSD)*, Hasso-Plattner-Institut Potsdam, Germany, March 2012. (25% acceptance rate)

[C3] Isela Macia, Alessandro Garcia, Arndt von Staa, **Joshua Garcia**, and Nenad Medvidović. On the Impact of Aspect-Oriented Code Smells on Architecture Modularity: An Exploratory Study. *In the Proceedings of the 5th Brazilian Symposium on Software Components, Architectures and Reuse (SBCARS)*, São Paulo, Brazil, September 2011. (31% acceptance rate)

[C2] Hossein Tajalli, **Joshua Garcia**, George Edwards, and Nenad Medvidović. PLASMA: A Plan-Based Layered Architecture for Software Model-Driven Adaptation. *In the Proceedings of the 25th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, Antwerp, Belgium, September 2010. (17.4% acceptance rate)

[C1] **Joshua Garcia**, Daniel Popescu, George Edwards and Nenad Medvidović. Toward a Catalogue of Architectural Bad Smells. *In the Proceedings of the Fifth International Conference on the Quality of Software Architectures (QOSA)*, East Stroudsburg, Pennsylvania, June 2009. (39% acceptance rate)

Journals

[J14] Negar Ghorbani*, **Joshua Garcia**, and Sam Malek. Bringing Architecture-Based Adaption to the Mainstream. *Information and Software Technology (IST)*, volume 176, December 2024.

[J13] Negar Ghorbani*, Tarandeep Singh, **Joshua Garcia**, and Sam Malek. Darcy: Automatic Architectural Inconsistency Resolution in Java. *IEEE Transactions on Software Engineering (TSE)*, vol. 50, no. 6, pp. 1639–1657, June 2024.

[J12] Yuqi Huai*, Sumaya Almanee*, Yuntianyi Chen*, Xiafa Wu*, Qi Alfred Chen, and **Joshua Garcia**. scenoRITA: Generating Diverse, Fully Mutable, Test Scenarios for Autonomous Vehicle Planning. *IEEE Transactions on Software Engineering (TSE)*, August 2023.

[J11] Negar Ghorbani*, Reyhaneh Jabbarvand, Navid Salehnamadi, **Joshua Garcia**, and Sam Malek. DeltaDroid: Dynamic Delivery Testing in Android. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, May 2023.

[J10] **Joshua Garcia**, Ehsan Kouroshfar, Negar Ghorbani*, and Sam Malek. Forecasting Architectural Decay from Evolutionary History. *IEEE Transactions on Software Engineering (TSE)*, vol. 48, issue 7, July 2022.

[J9] Thibaud Lutellier, Devin Chollak, **Joshua Garcia**, Lin Tan, Derek Rayside, Nenad Medvidovic, and Robert Kroeger. Measuring the Impact of Code Dependencies on Software Architecture Recovery Techniques. *IEEE Transactions on Software Engineering (TSE)*, vol. 44, issue 2, February 2018.

[J8] **Joshua Garcia**, Mahmoud Hammad, and Sam Malek. Lightweight, Obfuscation-Resilient Detection and Family Identification of Android Malware. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, vol. 26, issue 3, no. 11, January 2018.

[J7] Alireza Sadeghi, Hamid Bagheri, **Joshua Garcia**, and Sam Malek. A Taxonomy and Qualitative Comparison of Program Analysis Techniques for Security Assessment of Android Software. *IEEE Transactions on Software Engineering (TSE)*, vol. 43, no. 6, pp. 492–530, June 2017.

[J6] Pooyan Behnamghader, Duc Minh Le, **Joshua Garcia**, Daniel Link, Arman Shahbazian, and Nenad Medvidović. A Large-Scale Study of Architectural Evolution in Open-Source Software Systems. *Empirical Software Engineering (EMSE)*, vol. 22, no. 3, pp. 1146–1193, June 2016.

[J5] Hamid Bagheri, **Joshua Garcia**, Alireza Sadeghi, Sam Malek, Nenad Medvidović. Software Architectural Principles in Contemporary Mobile Software: From Conception to Practice. *Journal of Systems and Software (JSS)*, vol. 119, pp. 31–44, September 2016.

[J4] Hamid Bagheri, Alireza Sadeghi, **Joshua Garcia**, and Sam Malek. COVERT: Compositional Analysis of Android Inter-App Permission Leakage. *IEEE Transactions on Software Engineering (TSE)*, vol. 41, no. 9, pp. 866–886, September 2015.

[J3] Chris A. Mattmann, **Joshua Garcia**, Ivo Krka, Daniel Popescu, and Nenad Medvidović. Revisiting the Anatomy and Physiology of the Grid. *Journal of Grid Computing*, vol. 13, no. 1, pp. 19–34, January 2015

[J2] Nenad Medvidović, Hossein Tajalli, **Joshua Garcia**, Yuriy Brun, Ivo Krka, and George Edwards. Engineering Heterogeneous Robotics Systems: A Software Architecture-Based Approach, *IEEE Computer*, vol. 44, no.5, pp. 62–71, May 2011.

[J1] Sam Malek, George Edwards, Yuriy Brun, Hossein Tajalli, **Joshua Garcia**, Ivo Krka, Nenad Medvidović, Marija Mikic-Rakic, and Gaurav Sukhatme. An Architecture-Driven Software Mobility Framework. *Journal of Systems and Software (JSS), Special Issue on Software Architecture and Mobility*, vol. 83, no. 6, pp. 972–989, June 2010.

Workshops and Short Papers

[W16] Jessy Ayala*, Steven Ngo*, and **Joshua Garcia**. Towards Understanding the Underuse of Security Features in Open-source Repositories. *33rd USENIX Security Symposium*, Philadelphia, Pennsylvania, August 2024.

[W15] Jessy Ayala*, Yu-Jye Tung*, and **Joshua Garcia**. A Glimpse of Vulnerability Disclosure Behaviors and Practices Using GitHub Projects. *44th IEEE Symposium on Security and Privacy (S&P)*, San Francisco, California, May 2023.

[W14] **Joshua Garcia**, Mehdi Mirakhorli, Lu Xiao, Sam Malek, Rick Kazman, Yuanfang Cai, and Nenad Medvidović. SAIN: A Community-Wide Software Architecture INfrastructure. *IEEE/ACM 45th International Conference on Software Engineering: Companion Proceedings (ICSE-Companion)*, Melbourne, Australia, May 2023.

[W13] Jessy Ayala* and **Joshua Garcia**. An Empirical Study on Workflows and Security Policies in Popular GitHub Repositories. *IEEE/ACM 1st International Workshop on Software Vulnerability (SVM)*, Melbourne, Australia, May 2023.

[W12] Marcelo Schmitt Laser, Duc Minh Le, **Joshua Garcia**, and Nenad Medvidović. Architectural Archipelagos: Technical Debt in Long-Lived Software Research Platforms. *In the Proceedings of the IEEE/ACM International Conference on Technical Debt (TechDebt)*, May 2021.

[W11] Marcelo Schmitt Laser, Nenad Medvidović, Duc Minh Le, and **Joshua Garcia**. ARCADE: An Extensible Workbench for Architecture Recovery, Change, and Decay Evaluation. *In Proceedings of the 28th ACM Joint*

Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2020), November 2020.

[W10] Reyhaneh Jabbarvand, Alireza Sadeghi, **Joshua Garcia**, Sam Malek, and Paul Ammann. EcoDroid: An Approach for Energy-Based Ranking of Android Apps. *In the 4th International Workshop on Green and Sustainable Software in Conjunction with ICSE*, Florence, Italy, May 2015.

[W9] Youn Kyu Lee, Jae young Bang, **Joshua Garcia**, and Nenad Medvidović. ViVA: A Visualization and Analysis Tool for Distributed Event-Based Systems. *36th International Conference on Software Engineering (ICSE), Formal Demonstrations Track*, Hyderabad, India, June 2014.

[W8] Ran Mo, **Joshua Garcia**, Yuanfang Cai, and Nenad Medvidović. Mapping Architectural Decay Instances into Dependency Models. *In the Proceedings of the Fourth International Workshop on Managing Technical Debt in Conjunction with ICSE*, San Francisco, California, May 2013.

[W7] **Joshua Garcia**, Ivo Krka, Nenad Medvidović, and Chris Douglas. A Framework for Obtaining the Ground-Truth in Architectural Recovery. *In the joint 10th Working IEEE/IFIP Conference on Software Architecture & 6th European Conference on Software Architecture (WICSA/ECSA)*, Helsinki, Finland, August 2012.

[W6] **Joshua Garcia**, Daniel Popescu, Chris Mattmann, Nenad Medvidović, and Yuanfang Cai. Enhancing Architectural Recovery Using Concerns. *In the Proceedings of the 26th IEEE/ACM International Conference on Automated Software Engineering (ASE)*, Lawrence, Kansas, November 2011.

[W5] Ivo Krka, Yuriy Brun, Daniel Popescu, **Joshua Garcia**, Nenad Medvidović. Using Dynamic Execution Traces and Program Invariants to Enhance Behavioral Model Inference. *In the 32nd International Conference on Software Engineering (ICSE), New Ideas and Emerging Results Track*, Cape Town, South Africa, May 2010.

[W4] George Edwards, **Joshua Garcia**, Hossein Tajalli, Daniel Popescu, Nenad Medvidović, Gaurav Sukhatme, and Brad Petrus. Architecture-Driven Self-Adaptation and Self-Management in Robotics Systems. *In the Proceedings of the Workshop on Software Engineering for Adaptive and Self-Managing Systems (SEAMS)*, Vancouver, Canada, May 2009.

[W3] Daniel Popescu, **Joshua Garcia**, and Nenad Medvidović. Enabling More Precise Dependency Analysis in Event-Based Systems. *In the Proceedings of the 17th International Conference on Program Comprehension (ICPC)*, Vancouver, Canada, May 2009.

[W2] **Joshua Garcia**, Daniel Popescu, George Edwards and Nenad Medvidović, Identifying Architectural Bad Smells. *In the Proceedings of the 13th European Conference on Software Maintenance and Reengineering (CSMR)*, Kaiserslautern, Germany, March 2009.

[W1] Chris A. Mattmann, **Joshua Garcia**, Ivo Krka, Daniel Popescu, and Nenad Medvidović. The Anatomy and Physiology of the Grid Revisited. *In the Proceedings of the 8th Working IEEE/IFIP Conference on Software Architecture (WICSA)*, Cambridge, United Kingdom, September 2009.

Book Chapter

[BC1] Sam Malek, Hamid Bagheri, **Joshua Garcia**, Alireza Sadeghi. (2019) Security and Software Engineering. In: Kang, K., Taylor, R., and Cha, S., (eds) *Handbook of Software Engineering*. Springer.

Funding Grants and Awards

[F20] National Science Foundation (NSF)
"CAREER: Enhancing Software Testing and Debugging for Autonomous Driving"
04/2025–03/2030
Joshua Garcia (Sole PI)
$716,851

[F19] Academic Senate Council on Research, Computing and Libraries (CORCL) award initiative
"Towards Automated Bug and Violation Prediction and Repair of Autonomous Driving Systems"
03/25/2025–06/30/2025
Joshua Garcia (Sole PI)
$1,250

[F18] DARPA's Building an Adaptive and Competitive Workforce Track - Tools Competition - Catalyst Award
"Codesafe: Creating a scenario-driven software engineering learning experience"
08/2024–08/2025
Joshua Garcia (Sole PI) with lead Ph.D. student Steven Ngo and Ph.D. student Jessy Ayala
$50,000 (2.61% success rate, 6 out of over 230 submissions for the track; 50 winners from over 1,900 submissions across all tracks)

[F17] National Science Foundation (NSF)
"Planning and Prototyping a Community-Wide Autonomous Driving Software Testing Infrastructure"
07/2024–12/2026
Joshua Garcia (Lead PI) and Qi Alfred Chen
$100,000

[F16] Donald Bren School of Information and Computer Sciences (ICS) Research Award
"Designing and Constructing Next-Generation Hardware Acceleration for Program Analysis"
4/11/2024–6/30/2025
Joshua Garcia (Lead PI), Sang-Woo Jun, Alberto Krone-Martins, Aparna Chandramowlishwaran, and Ian Harris
$75,000

[F15] Donald Bren School of Information and Computer Sciences (ICS) Research Award
"Accessing STEM in Higher Education"
4/11/2024–6/30/2025
Stacy Branham (Lead PI), **Joshua Garcia**, Mohammad Moshirpour, Jennifer Wong-Ma, Veronica Berrocal
$75,000

[F14] Academic Senate Council on Research, Computing and Libraries (CORCL) award initiative
"Balancing Effectiveness and Efficiency of Test Generation for Autonomous Driving Software"
04/14/2023–06/30/2023
Joshua Garcia (Sole PI)
$3,100

[F13] Academic Senate Council on Research, Computing and Libraries (CORCL) award initiative
"Configuration Testing for Emerged Violations in Autonomous Driving Systems"
04/14/2023–06/30/2023
Joshua Garcia (Sole PI)
$1,000

[F12] Interim Covid-19 Research Recovery Program,
Sponsored by the UCI Office of the Provost and Executive Vice Chancellor
"Autonomous Vehicle Software System Testing and Debugging"
03/18/2022–06/30/2022
Joshua Garcia (Sole PI)
$25,000

[F11] Academic Senate Council on Research, Computing and Libraries (CORCL) Award Initiative
"Automated Repair of Configuration-Related Bugs for Autonomous Vehicle Systems"
03/18/2022–06/30/2022
Joshua Garcia (Sole PI)
$2,800

[F10] Academic Senate Council on Research, Computing and Libraries (CORCL) Award Initiative
"Multi-Agent Search-Based Autonomous Vehicle Testing Framework"
03/18/2022–06/30/2022
Joshua Garcia (Sole PI)
$2,500

[F9] UCI Institute for Software Research (ISR) Affiliate Learning Program
"Learning Program for Untouched Code Analysis"
1/01/2022–03/31/2022
Joshua Garcia (Sole PI)
$11,000

[F8] Donald Bren School of Information and Computer Sciences (ICS) Research Award
"SAHARA: Software Analysis for Hardware Acceleration with Reconfigurable Architectures"
4/21/2021–6/30/2022
Joshua Garcia (Lead PI), Sang-Woo Jun, Alberto Krone-Martins, Aparna Chandramowlishwaran, Sam Malek, Cristina Videira Lopes, and James S. Bullock
$75,000

[F7] Donald Bren School of Information and Computer Sciences (ICS) Research Award
"Acquisition of a Production Autonomous Driving Development Kit for ICS Research and Education Competence in Autonomous System"
4/21/2021–6/30/2022
Qi Alfred Chen (Lead PI), **Joshua Garcia**, Sang-Woo Jun, Roy Fox, Marco Levorato, Amelia Regan, Ian Harris, and Gene Tsudik
$75,000

[F6] Academic Senate Council on Research, Computing and Libraries (CORCL) Award Initiative
"Detecting and Mitigating Timing Side-Channel Vulnerabilities in Software Systems"
4/22/2020–6/01/2022
Joshua Garcia (Lead PI) and Sang-Woo Jun
$3,500

[F5] Academic Senate Council on Research, Computing and Libraries (CORCL) Award Initiative
"NativeBomb: Automatic Exploit Generation of Native Vulnerabilities in Android Apps"
4/22/2020–6/01/2022
Joshua Garcia (Sole PI)
$2,000

[F4] Donald Bren School of Information and Computer Sciences (ICS) Research Award
"Towards Robust and Secure Autonomy"
4/03/2020–12/31/2021
Qi Alfred Chen (Lead PI) and **Joshua Garcia**
$75,000

[F3] National Science Foundation (NSF)
"Research Experiences for Undergraduates (REU) Supplement for Constructing a Community-Wide Software Architecture Infrastructure"
06/2021–08/2022
Sam Malek (PI at University of California, Irvine) and **Joshua Garcia** (Co-PI at University of California, Irvine)
$17,400

[F2] National Science Foundation (NSF)
"Constructing a Community-Wide Software Architecture Infrastructure"
7/1/2018–8/31/2021
Sam Malek (PI at University of California, Irvine), **Joshua Garcia** (Co-PI at University of California, Irvine), Nenad Medvidović (Lead PI at University of Southern California), Mehdi Mirakhorli (PI at Rochester Institute of Technology), Rick Kazman (PI at University of Hawai'i at Mānoa), Yuanfang Cai (PI at Drexel University), and Lu Xiao (PI at Stevens Institute of Technology)
$1,660,000

[F1] National Science Foundation (NSF)
"Planning and Prototyping a Community-Wide Software Architecture Instrument"
8/8/2016–7/31/2018
Sam Malek (PI at UCI), **Joshua Garcia** (Co-PI at UCI), Nenad Medvidović (Lead PI at University of Southern California), and Mehdi Mirakhorli (PI at Rochester Institute of Technology)
$130,000

Compute Allocations

- NSF ACCESS Discover allocation CIS261921, "Simulation-Based Testing and Debugging of Autonomous Driving Systems," **Joshua Garcia (PI)**, 750,000 ACCESS Credits, 09/2026–.
- NSF ACCESS Explore allocation CIS261768, "CADRI: A Cloud-Based Research Infrastructure for Autonomous Driving Software Testing," **Joshua Garcia (PI)**, 200,000 ACCESS Credits, 09/2026–.

Formal Presentations

[P43] *Breaking Strong Encapsulation: A Comprehensive Study of Java Module Abuse*. In the 48th IEEE/ACM International Conference on Software Engineering (ICSE 2026), Rio de Janeiro, Brazil, April 2026.

[P42] *Buggy Rides: Uncovering Software Defects in Autonomous Driving Systems*. In the Informatics Seminar Series, University of California, Irvine, December 2024.

[P41] *A Community-Wide Software Architecture INfrastructure*. In the IEEE/ACM 45th International Conference on Software Engineering, Melbourne, Australia, May 2023.

[P40] Keynote, *Analyzing Android Native Code: Where Are We? Where Should We Go?*, The 5th International Workshop on Advances in Mobile App Analysis, held in conjunction with the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE 2022), Ann Arbor, Michigan, October 2022.

[P39] *From Managed to Native Code: Android Application Vulnerabilities and Exploits*, NortonLifeLock, Culver City, CA, July 2022.

[P38] *Mobile Application Security: Exploits, Malware, and Updates*, Amazon, Online, July 2021.

[P37] *Android Malware Detection: From Obfuscation Susceptibility to Obfuscation Resilience*, NortonLifeLock, Culver City, CA, March 2020.

[P36] *Detection and Repair of Architectural Inconsistencies in Java*. In the 41st International Conference on Software Engineering (ICSE), Montreal, Canada, May 2019.

[P35] *Panel Post-Ph.D. career: What are the tradeoffs between a research career in industry, academia (research track, teaching track), and government?* In the Student Mentoring Workshop (SMeW) at the 41st International Conference on Software Engineering (ICSE), Montreal, Canada, May 2019.

[P34] *Lightweight, Obfuscation-Resilient Detection and Family Identification of Android Malware*. In the 40th International Conference on Software Engineering (ICSE), Gothenburg, Sweden, May 2018.

[P33] *A Large-Scale Empirical Study on the Effects of Code Obfuscations on Android Apps and Anti-Malware Products*. In the 40th International Conference on Software Engineering (ICSE), Gothenburg, Sweden, May 2018.

[P32] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. McGill University, Montreal, Quebec, Canada, April 2018.

[P31] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. Arizona State University, Tempe, Arizona, April 2018.

[P30] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Texas at Dallas, Richardson, Texas, March 2018.

[P29] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. Northeastern University, Boston, Massachusetts, March 2018.

[P28] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Victoria, Victoria, British Columbia, Canada, March 2018.

[P27] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Waterloo, Waterloo, Ontario, Canada, March 2018.

[P26] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of California, Irvine, February 2018.

[P25] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Utah, Salt Lake City, Utah, February 2018.

[P24] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Maryland, College Park, February 2018.

[P23] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Notre Dame, South Bend, Indiana, February 2018.

[P22] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of California, Davis, January 2018.

[P21] *Automated Android Security Assessment: Malware, Vulnerabilities, and Exploits*. University of Southern California, Los Angeles, CA, January 2018.

[P20] *Automatic Generation of Inter-Component Communication Exploits for Android Applications*. Intelligence Community (IC) Academic Research Symposium, Washington, D.C., September 2017.

[P19] *Automatic Generation of Inter-Component Communication Exploits for Android Applications*. 11th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE), Paderborn, Germany, September 2017.

[P18] *Automatic Generation of Inter-Component Communication Exploits for Android Applications*. Institute for Software Research (ISR) Research Forum, University of California, Irvine, June 2017.

[P17] *A Taxonomy and Qualitative Comparison of Program Analysis Techniques for Security Assessment of Android Software*. 39th International Conference on Software Engineering, Buenos Aires, Argentina, May 2017.

[P16] *Lightweight, Obfuscation-Resilient Detection and Family Identification of Android Malware*. IEEE Orange County CyberSecurity Monthly Technical Talk, Tustin, California, September 2016.

[P15] *Effective, Lightweight Analysis of Android Apps: A Security and Testing Perspective*. Aerospace Corporation, El Segundo, California, July 2016.

[P14] *Reducing Combinatorics in GUI Testing of Android Applications*. 38th International Conference on Software Engineering (ICSE), Austin, Texas, May 2016.

[P13] *A Comparative Analysis of Software Architecture Recovery Techniques*. 28th IEEE/ACM International Conference on Automated Software Engineering (ASE), Palo Alto, California, November 2013.

[P12] *Identifying Message Flow in Distributed Event-Based Systems*. 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE), Saint Petersburg, Russia, August 2013.

[P11] *Obtaining Ground-Truth Software Architectures*. *Software Engineering In Practice Track of the 35th International Conference on Software Engineering (ICSE)*, San Francisco, California, May 2013.

[P10] *A Framework for Obtaining the Ground-Truth in Architectural Recovery*. 10th joint Working IEEE/IFIP Conference on Software Architecture & 6th European Conference on Software Architecture (WICSA/ECSA), Helsinki, Finland, August 2012.

[P9] *Architectural Recovery to Aid Detection of Architectural Degradation*. USC Center for Software and Systems Engineering Annual Research Review, Los Angeles, California, March 2012.

[P8] *Enhancing Architectural Recovery Using Concerns.* 26th IEEE/ACM International Conference on Automated Software Engineering (ASE), Lawrence, Kansas, November 2011.

[P7] *Cataloging and Detecting Architectural Smells*. USC Center for Software and Systems Engineering Annual Research Review, Los Angeles, California, March 2011.

[P6] *Cataloging and Detecting Architectural Smells*. Ground Systems Architecture Workshop (GSAW), Architecture-Centric Evolution (ACE) Working Group, Los Angeles, California, March 2011.

[P5] *Model- and Plan-Based Software Architecture Adaptation*. USC Center for Software and Systems Engineering Annual Research Review, Los Angeles, California, March 2010.

[P4] *The Anatomy and Physiology of the Grid Revisited*. 8th Working IEEE/IFIP Conference on Software Architecture (WICSA), Cambridge, United Kingdom, September 2009.

[P3] *Toward a Catalogue of Architectural Bad Smells*. 5th International Conference on the Quality of Software Architectures (QOSA), East Stroudsburg, Pennsylvania, June 2009.

[P2] *Architecture-Driven Self-Adaptation and Self-Management in Robotics Systems*. USC Center for Software and Systems Engineering Annual Research Review, Los Angeles, California, March 2009.

[P1] *An Architectural Approach to Robotics Software Design, Implementation, and Deployment*. USC Center for Software and Systems Engineering Annual Research Review, Los Angeles, California, March 2008.

Service Activities

Editorial Board

- Associate Editor, IEEE Transactions on Software Engineering, July 2024–Present.

Organization

- Lead Program Chair and Lead Organizer, 2nd International Workshop on Software Engineering for Autonomous Driving Systems (SE4ADS 2026), co-located with the ACM International Conference on the Foundations of Software Engineering (FSE 2026); proposal accepted November 2025; cancelled March 2026 for too few submissions.
- Lead Program Chair and Lead Organizer, 1st International Workshop on Software Engineering for Autonomous Driving Systems (SE4ADS 2025), co-located with the 47th IEEE/ACM International Conference on Software Engineering (ICSE 2025), Ottawa, Ontario, Canada, April 2025.
- Organizer and Host, CADRI Community Workshop on Autonomous Driving Software Testing Infrastructure, UC Irvine, March 26–27, 2025.
- Co-Chair, Demonstrations Track for the 21st International Conference on Software Architecture (ICSA 2024).
- Co-Chair, Artifact Evaluation Track for the 21st International Conference on Software Architecture (ICSA 2024).
- Co-Chair, Diversity, Equity, and Inclusion at the IEEE/ACM International Conference on Software Engineering (ICSE 2023).
- Co-Chair, Journal-First Track for the 20th International Conference on Software Architecture (ICSA 2023).

- Co-Chair, ACM Student Research Competition at the 44th IEEE/ACM International Conference on Software Engineering (ICSE SRC 2022).
- Co-Organizer, The Celebration of Automated Software Engineering at the 34th IEEE/ACM International Conference on Automated Software Engineering (ASE 2019).
- Co-Chair, Early Career Researchers Forum at the 17th IEEE International Conference on Software Architecture (ICSA ECRF 2020).
- Program Co-Chair, International Workshop on Establishing the Community-Wide Infrastructure for Architecture-Based Software Engineering (ECASE 2019), Montreal, Canada, May 2019.
- Co-Organizer, NSF Sponsored Workshop on Infrastructures and Instruments for Software Architecture (REINFORCE), co-located with the International Conference on Automated Software Engineering, Urbana-Champaign, Illinois, October 2017.
- Program Co-Chair, International Workshop on Establishing the Community-Wide Infrastructure for Architecture-Based Software Engineering (ECASE 2017), Buenos Aires, Argentina, May 2017.
- Co-Organizer, NSF Sponsored Workshop on Infrastructures and Instruments for Software Architecture (REINFORCE), Los Angeles, California, January 2017.

Open-Source Community

- Lead, UC Irvine Autoware Center of Excellence (Autoware Foundation university partner), 2023–Present; Member, Autoware Centers of Excellence Steering Committee.

Program Committee

- USENIX Security Symposium, 2027.
- Journal Ahead Workshop (JAWs), IEEE/ACM International Conference on Software Engineering (ICSE), 2026.
- IEEE/ACM International Conference on Software Engineering (ICSE), Research Track, 2027.
- IEEE/ACM International Conference on Software Engineering (ICSE), Research Track, 2026.
- ACM International Conference on the Foundations of Software Engineering (FSE), Research Papers, 2026.
- IEEE/ACM International Conference on Software Engineering (ICSE), Research Track, 2025.
- ACM International Conference on the Foundations of Software Engineering (FSE), Research Papers, 2025.
- ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), Technical Papers, 2024.
- ACM International Conference on the Foundations of Software Engineering (FSE), Research Papers, 2024.
- The IEEE/ACM International Conference on Software Engineering (ICSE 2024), Doctoral Symposium, 2024.
- The IEEE/ACM International Conference on Software Engineering (ICSE), Technical Track, 2021–2023.
- The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), Research Track, 2020.
- The IEEE/ACM International Conference on Automated Software Engineering (ASE), Technical Track, 2019–2020.
- The IEEE International Conference on Software Architecture (ICSA), Research Papers / Technical Track, 2020–2024.
- The European Conference on Software Architecture (ECSA), Research Papers, 2021–2022.
- The ACM/IEEE International Conference on Software Engineering (ICSE), Poster Track, 2020.
- IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER), Tool Demo Track, 2019.
- The ACM/IEEE International Conference on Software Engineering (ICSE), Artifact Evaluation, 2019.
- The ACM/IEEE International Conference on Software Engineering (ICSE), Demonstrations Track, 2016.
- ACM Innovations in Software Engineering Conference (ISEC), 2017–2019.

Reviewer

- IEEE Transactions on Software Engineering (TSE), 2013–2026.
- ACM Transactions on Software Engineering and Methodology (TOSEM), 2014–2026.
- IEEE Transactions on Software Engineering (TSE) Review Board, 2018–2020.
- IEEE Transactions on Intelligent Transportation Systems (T-ITS), 2026.
- Empirical Software Engineering Journal, 2017–2020, 2022–2024.
- Journal of Systems and Software (JSS), 2015–2018, 2022.
- IEEE Software, 2017–2018, 2020–2021, 2023–2024.
- Communications of the ACM (CACM), 2022.

- Automated Software Engineering Journal, 2019.
- IEEE International Conference on Robotics and Automation (ICRA), 2024, 2026.
- IEEE Security and Privacy, 2023.
- International Conference on Learning Representations (ICLR 2019).
- IEEE Transactions on Mobile Computing (TMC), 2018.
- IEEE Transactions on Dependable and Secure Computing (TDSC), 2018.
- ACM Transactions on Autonomous and Adaptive Systems (TAAS), 2018.
- Information and Software Technology (IST), 2015–2016.
- Science of Computer Programming, Special Issue: CompArch 2012.
- Computing, 2017–2018.
- CIT. Journal of Computing and Information Technology, 2018–2019.

Student Mentor

- Panelist, Student Mentoring Workshop (SMeW) at the IEEE/ACM International Conference on Software Engineering (ICSE), 2026.
- Student Mentor, Student Mentoring Workshop (SMeW) at the IEEE/ACM International Conference on Software Engineering (ICSE), 2022.
- Student Mentor on Program Analysis, the IEEE/ACM International Conference on Software Engineering (ICSE), 2021.
- Panelist, the 1st Student Mentoring Workshop at the International Conference on Software Engineering (ICSE), 2019.

External Reviewer

- The European Conference on Software Architecture (ECSA), 2013–2018.
- IEEE/ACM International Conference on Automated Software Engineering (ASE), 2013.
- The Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE), 2013.
- The ACM International Conference on Distributed Event-Based Systems (DEBS), 2013.
- The International ACM SIGSOFT Symposium on Component-Based Software Engineering (CBSE), 2013.
- The International ACM SIGSOFT Symposium on Architecting Critical Systems (ISARCS), 2013.
- The International Conference on Distributed Event-Based Systems (DEBS), 2012.
- The International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), 2012.
- The International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), 2011.
- The Workshop on Software Engineering for Adaptive and Self-Managing Systems (SEAMS 2010), May 2010.
- The First International Workshop on Quantitative Stochastic Models in the Verification and Design of Software Systems (QUOVADIS), May 2010.
- The IEEE/ACM International Conference on Automated Software Engineering (ASE), 2009.
- The DSN 2009 Workshop on Architecting Dependable Systems (WADS), June 29, 2009.
- The International Conference on Autonomic Computing and Communications (ICAC 2009), June 2009.
- The International Workshop on the Foundations of Coordination Languages and Software Architectures (FOCLASA), 2008.

University Service

- Member, Council on Academic Freedom (CAF), UCI Academic Senate, 2026–2027.
- Member, Graduate Fellowship Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2026–2027.
- Chair, Software Engineering Ph.D. Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2025–2026.
- Department of Informatics Representative (with Steven Ngo), Cal-Bridge PhD Open House (part of the Cal-Bridge Fall Conference), UC Irvine, 2025–2026.
- Co-Coach (with Qi Alfred Chen), UCI Collegiate Cyber Defense Competition (CCDC) Team, Donald Bren School of Information and Computer Sciences, 2024–Present.

- Co-Faculty Advisor (with Qi Alfred Chen), Cyber@UCI, Donald Bren School of Information and Computer Sciences, 2024–Present.
- UCI Faculty and Department Intermediary (with Steven Ngo) for hosting the 2027 Western Regional Collegiate Cyber Defense Competition (WRCCDC) at the UCI Event Center, Donald Bren School of Information and Computer Sciences, 2026–Present.
- Panelist, Professor and Student Panel on Research at ICS, ICS Student Council, Donald Bren School of Information and Computer Sciences, 2025.
- Member, Community Care (CARE) Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2024–2025.
- Member, Community Care (CARE) Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2023–2024.
- Member, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2023–2024.
- Member, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2022–2023.
- Chair, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2021–2022.
- Member, Software Engineering Steering Committee (Curricular Oversight Service), Department of Informatics, Donald Bren School of Information and Computer Sciences, 2021–2024.
- Member, MSWE Steering/Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2021–2024.
- Member, Software Engineering Steering Committee (Curricular Oversight Service), Department of Informatics, Donald Bren School of Information and Computer Sciences, 2020–2021.
- Chair, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2020–2021.
- Member, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2019–2020.
- Session Chair, Faculty Presentations 2, Southern California Software Engineering Symposium, Institute for Software Research, 2019.
- Panel Member, ICS Grad School Faculty Panel, Donald Bren School of Information and Computer Sciences, 2019.
- Member, Graduate Fellowship Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2018–2019.
- Chair, Software Engineering Graduate Admissions Committee, Department of Informatics, Donald Bren School of Information and Computer Sciences, 2018–2019.
- Panel Member, Improving Your Graduate School Application, Donald Bren School of Information and Computer Sciences, 2018.

Webmaster

- The International ACM SIGSOFT Symposium on Component Based Software Engineering (CBSE), 2011.

Teaching Experience

Lecturer

- University of California, Irvine, ICS 33, **Intermediate Programming**, Summer 2026
- University of California, Irvine, SWE 295, **Software Testing and Debugging for Autonomous Driving**, Spring 2026
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2026
- University of California, Irvine, SWE 214, **Program Analysis**, Fall 2025
- University of California, Irvine, INF 113, **Requirements Analysis and Engineering**, Fall 2025
- University of California, Irvine, ICS 33, **Intermediate Programming**, Summer 2025
- University of California, Irvine, INF 113, **Requirements Analysis and Engineering**, Summer 2025
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2025
- University of California, Irvine, SWE 214, **Program Analysis**, Spring 2025
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2025

- University of California, Irvine, INF 113, **Requirements Analysis and Engineering**, Winter 2025
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2024
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2024
- University of California, Irvine, SWE 214, **Program Analysis**, Fall 2023
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2023
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2023
- University of California, Irvine, SWE 214, **Program Analysis**, Fall 2022
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2022
- University of California, Irvine, SWE 214, **Program Analysis**, Fall 2021
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2021
- University of California, Irvine, SWE 221, **Software Architecture**, Winter 2021
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2021
- University of California, Irvine, SWE 266P, **Software Security and Dependability**, Spring 2020
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2020
- University of California, Irvine, INF 295, **Program Analysis**, Spring 2019
- University of California, Irvine, INF 295, **Program Analysis**, Fall 2019
- University of California, Irvine, INF 122, **Software Design II: Structure and Implementation**, Winter 2019
- University of California, Irvine, INF 219, **Software Environments**, Spring 2016

Guest Lecturer

- University of California, Irvine, CS 205, **Computer and Network Security**, Spring 2024
- University of California, Irvine, CS 205, **Computer and Network Security**, Spring 2023
- University of California, Irvine, CS 205, **Computer and Network Security**, Spring 2022
- University of Limerick, CS 573, **Software Quality**, Winter 2022
- University of Illinois Urbana-Champaign, CS 247, **Software Engineering**, Fall 2021
- University of California, Irvine, CS 205, **Computer and Systems Security**, Spring 2021
- University of California, Irvine, CS 295, **Advanced Computer and Network Security**, Spring 2020
- University of California, Irvine, CS 295, **Advanced Computer and Network Security**, Spring 2019
- University of California, Irvine, INF 133, **User Interaction Software**, Fall 2019
- University of California, Irvine, ICS 90, **New Student Seminar**, Fall 2018
- University of California, Irvine, INF 211, **Software Engineering**, Fall 2018
- University of California, Irvine, INF 221, **Software Architecture**, Fall 2017
- University of California, Irvine, INF 221, **Software Architecture**, Fall 2016
- University of Southern California, CSCI 578, **Software Architecture**, Spring 2011
- University of Southern California, CSCI 588, **Specification and Design of User Interface Software**, Fall 2010

Teaching Assistantships

- University of Southern California, CSCI578, **Software Architecture**, Spring 2011
- University of Southern California, CSCI499, **Introduction to Programming for Computer Scientists**, Fall 2010
- University of Southern California, CSCI588, **Specification and Design of User Interface Software**, Fall 2010
- University of Southern California, CSCI578, **Software Architecture**, Spring 2008
- University of Southern California, CSCI101, **Fundamentals of Computer Programming**, Fall 2007

Supervised or Mentored Students and Researchers

Doctoral Dissertation Committee Chair

- Steven Ngo (as Ph.D. advisor),
  Status: Started Fall 2023
- Jessy Ayala (as Ph.D. advisor),
  Status: Dissertation Topic Proposal Defense passed, June 12, 2026
- Yuntianyi Chen (as Ph.D. advisor),
  Status: Candidacy Exam passed, February 5, 2024
- Yuqi Huai (as Ph.D. advisor),
  Status: Graduated, September 2026

First Position Post-Ph.D.: Offer from Google
- Arda Unal (as Ph.D. advisor),
  Status: Graduated, January 2023
  First Position Post-Ph.D.: Meta Research Scientist
- Negar Ghorbani (as Ph.D. co-advisor, co-advised with Sam Malek),
  Status: Graduated, August 2022
  First Position Post-Ph.D.: Meta Research Scientist
- Sumaya Almanee (as Ph.D. advisor),
  Status: Graduated, August 2022
  First Position Post-Ph.D.: Software Engineer II - Azure Purview at Microsoft

Doctoral Dissertation Committee Member

- Nicholas Baron, Advisor: Michael Franz, UCI, 2025 (Advanced to Candidacy)
- Xiafa Wu, Advisor: Brian Demsky, UCI, 2024–
- Tian (Tianjiao) Huang, Advisor: Michael Franz, UCI, 2024–2026 (Graduated)
- Yu Lu, Advisor: André van der Hoek, UCI, 2023–
- Samyak Jhaveri, Advisor: Crista Lopes, UCI, 2023 (Advancement Committee)
- Shanshan Han, Advisor: Sharad Mehrotra, UCI, 2023 (Advancement Committee)
- Ziwen Wan, Advisor: Qi Alfred Chen, UCI, 2022–2025 (Graduated)
- Elahe Paikari, Advisor: André van der Hoek, UCI, 2022–2023 (Graduated)
- Abdulaziz Alshayban, Advisor: Sam Malek, UCI, 2022–2023 (Graduated)
- Kush Krishnakumar Dave, Advisor: Ian Harris, UCI, 2022 (Advancement Committee)
- Vanessa Klotzman, Advisor: Crista Lopes, UCI, 2022–2025 (Graduated)
- Vikram Narayanan, Advisor: Anton Burtsev, UCI, 2021 (Advancement Committee)
- Caio Batista de Melo, Advisor: Nikil Dutt, UCI, 2021 (Advancement Committee)
- Matthew Dees, Advisor: Michael Franz, UCI, 2021 (Advancement Committee)
- Min-Yih Hsu, Advisor: Michael Franz, UCI, 2020 (Advancement Committee)
- Hsin-Wei Hung, Advisor: Ardalan Amiri Sani, UCI, 2020–2023 (Graduated)
- Alexios Voulimeneas, Advisor: Michael Franz, UCI, 2020 (Graduated)
- Junjie Shen, Advisor: Qi Alfred Chen, UCI, 2020–2022 (Graduated)
- Seyed Mohammadjavad Seyed Talebi, Advisor: Ardalan Amiri Sani, UCI, 2019 (Advancement Committee)
- Yingtong Liu, Advisor: Ardalan Amiri Sani, UCI, 2019 (Advancement Committee)
- Dalal Alharthi, Advisor: Amelia Regan, UCI, 2019–2021 (Graduated)
- Milad Asgari, Advisor: Athina Markopoulou, UCI, 2019 (Advancement Committee)
- Luke Fredericks, Advisor: Nathan Kaplan, UCI, 2018 (Advancement Committee)

Master's Thesis Students Supervised

- Xiang Liao, Master's thesis defense chair, UCI, 2025–2026 (Graduated)
  First position post-Master's: Software Engineer at Alibaba
- Qiran Wang, Master's thesis defense chair, UCI, 2024–2025 (Graduated)
- Hameed Sahib, Master's thesis defense chair, UCI, 2024–2026 (Graduated)
- Yang Liu, Advisor: Iftekhar Ahmed, UCI, 2024 (Graduated)
- Yicheng Zhang, Advisor: Jim Jones, UCI, 2024 (Graduated)
- Xinyu Zhang, Advisor: David Redmiles, UCI, 2024 (Graduated)
- Sarnesh Arulnathan, Advisor: Joshua Garcia, UCI, 2023–2025 (Graduated) First position post-Master's: Software Engineer at Visa
- Changnam Hong, Advisor: Joshua Garcia, UCI, 2022–2024 (Graduated)
  First position post-Master's: Software Engineer at Apple
- Shilong Li, Advisor: Joshua Garcia, UCI, 2022–2024 (Graduated)
  First position post-Master's: Research and Development Analyst at GEICO
- Yongbo Chen, Advisor: Joshua Garcia, UCI, 2022–2024 (Graduated)
  First position post-Master's: Ph.D. student at Tulane University
- Yu Lu, Advisor: André van der Hoek, UCI, 2022 (Graduated)
- Canyang Shi, Advisor: Joshua Garcia, UCI, 2021–2022 (Graduated)
  First position post-Master's: Software Engineer at ByteDance

- Aaron Preston Matthews, Advisor: Joshua Garcia, UCI, 2020–2021 (Graduated)
- Saumitra Kadge, Advisor: Crista Lopes, UCI, 2020 (Graduated)
- Faraz Yazdani, Advisor: Sam Malek, UCI, 2020 (Graduated)
- Pritha Dawn, Advisor: Crista Lopes, UCI, 2020 (Graduated)
- Jun Yeon Won, Advisor: Qi Alfred Chen, UCI, 2019 (Graduated)

MSWE Graduate Students Supervised

- Sylvia Chao, UCI, Summer Research (MSWE), 2025
- Keyi Feng, UCI, Summer Research (MSWE), 2025
- Keyan Miao, UCI, Summer Research (MSWE), 2025

Undergraduate Students Supervised as Professor

- Kian Dadban, UCI, Individual Study, 2026–
- Dante Luong, UCI, ICS Honors Program Thesis (H198), 2026–
- Ryan Yu, UCI, Individual Study and Campuswide Honors Collegium Thesis (H198), 2026–
- Partha Khundrakpam, UCI, Individual Study, 2026–
- Jhih-Jhong (Johnny) Lin, National Taiwan University, UCInspire, 2026
- Nathan Nguyen, UCI, Individual Study, 2025–2026
- Akshay Rohatgi, UCI, Individual Study (Cyber@UCI), 2025–2026
- Ruoqi Li, Wuhan University, UCInspire, 2025
  First position post-undergrad: Ph.D. student at Tufts University
- Anzhi (Andy) Zhang, University of Leeds, UCInspire, 2025
  First position post-undergrad: Master's student at Imperial College London
- Jinghan (Bella) Yang, Northeastern University (China), UCInspire, 2025
  First position post-undergrad: Master's student at Georgia Institute of Technology
- Jacob Lee, UCI, Individual Study (Cyber@UCI), 2025
- Drew Levy, UCI, Individual Study (Cyber@UCI), 2025
- Dhruv Kandula, UCI, Individual Study (Cyber@UCI), 2025
- Ruixiang Jiang, Southern University of Science and Technology, UCInspire, 2024; continued research collaboration, 2024–2025
- Geng Li, Northeastern University (China), UCInspire, 2024; UCI Individual Study (3+2 Program), 2024–2025
- Yecheng Zhou, UCI, Individual Study, 2023–2024
  First position post-undergrad: Master's student at the University of Southern California
- Huaihao Mo, UCI, Individual Study, 2023–2024
  First position post-undergrad: Master's student at NYU
- Xiang Liao, UCInspire and Undergraduate Student Researcher, 2022–2024
  First position post-undergrad: UCI Master's in Software Engineering (MSSE) Program
- Dazhi Feng, UCInspire, 2023
  First position post-undergrad: Ph.D. student at UCR under the advisement of Trent Jaeger and Zhiyun Qian
- Hewen Zhang, UCInspire, 2023
- Xingyu Chen, UCInspire and Undergraduate Student Researcher, 2022–2023
  First position post-undergrad: Master's student at CMU Silicon Valley
- Yirui He, UCInspire and Undergraduate Student Researcher, 2021–2022
  First position post-undergrad: Ph.D. under my advisement at UCI
- Zhengyuan Zhang, UCInspire, 2021
- Xiafa Wu, UCI ICS Honors Program and Undergraduate Student Researcher, 2019–2021
  First position post-undergrad: Ph.D. student at UCI ICS Computer Science under the advisement of Brian Demsky
- Hongyu Chen, UCI, Undergraduate Student Researcher, 2020–2021
  First position post-undergrad: Ph.D. student at UCI ICS Computer Science under the advisement of Michael Franz
- Muxi Chen, UCInspire and Undergraduate Student Researcher, 2020–2021
  First position post-undergrad: Ph.D. student at the Chinese University of Hong Kong under the advisement of Qiang Xu
- Yuxiang He, UCInspire, 2020

- Yi Wu, UCInspire, 2020
  First position post-undergrad: Ph.D. student at Purdue University under the advisement of Lin Tan
- Siyun Ji, UCI, Undergraduate Student Researcher, 2020
  First position post-undergrad: Software Engineer at Alibaba Group
- Mohammed Syam Haque, UCI, Individual Study, 2019
  First position post-undergrad: Master of Science, Electrical and Computer Engineering, University of California, Davis
- Zhaoxu Zhang, UCInspire, 2019
  First position post-undergrad: Ph.D. student at the Computer Science Department, University of Southern California under the advisement of William G.J. Halfond
- Yuan Xia, UCI ICS Honors Program, 2019
  First position post-undergrad: Ph.D. student at the Computer Science Department, University of Southern California under the advisement of Jyotirmoy Deshmukh
- Shubham Mahajan, UCI ICS Honors Program, 2019
  First position post-undergrad: Associate Software Engineer at Veeva Systems
- Agnes Jang, UCI ICS Honors Program, 2019
  First position post-undergrad: Flutter Developer at Ripplink
- Liangze Yu, UCI ICS Honors Program, 2019

Students Supervised as a Postdoc (2014–2018)

- Mahmoud Hammad (Ph.D., UCI)
- Alireza Sadeghi (Ph.D., UCI)
- Reyhaneh Jabbarvand (Ph.D., UCI)
- Negar Ghorbani (Ph.D., UCI)
- Jun-Wei Lin (Ph.D., UCI)
- Nariman Mirzaei (Ph.D., GMU)
- Ehsan Kouroshfar (Ph.D., GMU)
- Riyadh Mahmoud (Ph.D., GMU)

Students Mentored at USC as a Ph.D. Student (2008–2014)

- Youn Kyu Lee (Ph.D.)
- Gholamreza Safi (Ph.D.)
- Duc Le (Ph.D.)
- Arman Shahbazian (Ph.D.)
- Pooyan Behnamghader (Ph.D.)
- Bassel Haddad (Masters)
- Anita Singh (Undergraduate)

High-School Students Supervised at UCI

- Elliot Frields, Valencia High School, Val Tech Intern 2024
- Ryan Sweezey, Valencia High School, Val Tech Intern 2024
- Rini Dagli, Valencia High School, Val Tech Intern 2023
- Arjun Batra, Woodbridge High School, Summer Intern 2023
- Kevin Torres Dominguez, Valencia High School, Val Tech Intern 2023
- Aditya Shah, Arnold O. Beckman High School, Summer Intern 2023
- Emiliano Berber, Valencia High School, Val Tech Intern 2023
- Garett Reynolds, Valencia High School, Val Tech Intern 2023
- Erel Ozen, Arnold O. Beckman High School, Summer Intern 2022
- Purav Patel, Arnold O. Beckman High School, Summer Intern 2022
- Alex Kim, Valencia High School, Val Tech Intern 2022
- Kerry Wang, Valencia High School, Val Tech Intern 2022
- Jason Aviles, Valencia High School, Val Tech Intern 2021
- Khushi Kaushik, Valencia High School, Val Tech Intern 2021
- Janav Shah, Valencia High School, Val Tech Intern 2021
- William Shin, Valencia High School, Val Tech Intern 2021
- Jagdeep Sidhu, Valencia High School, Val Tech Intern 2021

Publicly Available Software and Datasets

- DeFT Dataset and artifact for maintaining determinism and extracting unit tests for autonomous driving planning (from [C30]):
  - Available at: https://zenodo.org/records/21985800
  - Code repository: https://github.com/YuqiHuai/DeFT/
- **Conf**iguration **V**iolation **E**merger (ConfVE) is the first automated configuration testing framework for autonomous driving systems (ADSes). ConfVE's design focuses on the emergence of violations through rerunning scenarios generated by different ADS testing approaches under different configurations, leveraging 9 test oracles. https://zenodo.org/records/11406940 (source and data) and https://zenodo.org/records/11051748 (videos) (from [C24])
- ADS bug-fix pattern benchmark from *A Comprehensive Study of Bug-Fix Patterns in Autonomous Driving Systems*, containing 1,331 ADS bug-fix instances from Apollo and Autoware. https://zenodo.org/records/14807539 (from [C26])
- Artifact for *A Mixed-Methods Study of Open-Source Software Maintainers On Vulnerability Management and Platform Security Features*. https://zenodo.org/records/14721125 (from [C27])
- scenoRITA (**scen**ari**o** Gene**R**at**I**on **T**esting for **A**Vs) is a test generation framework which aims to find safety and motion sickness-inducing violations in the presence of an evolving traffic environment. scenoRITA combines both (i) AV software domain knowledge and (ii) search-based testing that, through a novel gene representation, overcomes the following limitations of previous work: (i) manual setup and a limited number of scenario types; (ii) a small fixed number of obstacles per scenario; and (iii) obstacles with fixed trajectories and limited maneuvers which require manual specification. https://zenodo.org/records/8231346 (from [J12])
- DoppelTest is a novel test-generation approach for AV software testing that (1) utilizes smart obstacles and (2) ensures the ADS is responsible when violations occur by running multiple ADSes in the same scenario, where each ADS controls a different AV. https://github.com/Software-Aurora-Lab/DoppelTest and https://doi.org/10.5281/zenodo.7575582 (from [C21])
- DeltaDroid, a tool for test generation to support dynamic delivery in Android apps, and its dataset. https://sites.google.com/view/deltadroid/home (from [J11])
- Architectural decay prediction scripts and data. https://github.com/jgarci40/arch-prediction-tools (from [C10])
- **S**oftware **A**rchitecture **IN**strument (SAIN), a first-of-its-kind integration framework for assembling architecture-related techniques and tools with the goal of enabling empirical research in the context of software maintenance. http://sain.usc.edu (from [C19])
- Librarian: a tool designed to identify native libraries and their versions as found in Android apps, input data, and extended evaluation results. https://github.com/salmanee/Librarian (from [C18])
- Dataset from A Comprehensive Study of Autonomous Vehicle bugs. https://sites.google.com/view/av-bug-study/home (from [C17])
- Darcy: a tool that detects and repairs architectural inconsistencies in the Java Platform Module System. https://sites.google.com/view/darcy-project/home (from [C16])
- RevealDroid: a tool suite for detection of malicious Android apps and identification of a malicious app's family. Users include FBI; Department of Homeland Security; and Zimperium, a mobile threat defense company. http://seal.ics.uci.edu/projects/revealdroid/index.html (from [J8])
- LetterBomb: a framework for automatic generation of inter-component communication exploits for Android apps. Users include FBI and IBM. http://seal.ics.uci.edu/projects/letterbomb/index.html (from [C12])
- SALMA: Self-Protection of Android Systems from Inter-Component Communication Attacks [C15] http://seal.ics.uci.edu/projects/salma/index.html
- Classification of Android security analysis papers from [C7] http://seal.ics.uci.edu/projects/droid-sec-taxonomy/index.html
- Obfuscation framework and datasets from [C14] http://seal.ics.uci.edu/projects/obfuscation/index.html
- COVERT: an approach for identifying collections of Android apps that together combine their permissions to escalate privileges. (from [J4]) http://seal.ics.uci.edu/projects/covert/index.html

- Architectural Recovery using Concerns (ARC): an approach for recovery of the components of a software systems architecture that leverages topic models. Users include Huawei, Northrup Grumman, and Boeing. (from [C6], [C8], [C10], [J6]) https://softarch.usc.edu/wiki/doku.php?id=arcade:start
- Architecture Recovery, Change, And Decay Evaluator (ARCADE): a software workbench that employs a suite of architecture-recovery techniques and a set of metrics for measuring different aspects of architectural change. Users include Huawei, Northrup Grumman, and Boeing. (from [C10] and [J6]) https://softarch.usc.edu/wiki/doku.php?id=arcade:start
- Eos: a tool for identifying messages, inter-component dependencies based on messages, intra-component dependencies based on messages, and attributes of a message in a distributed event-based system. (from [C7])
  https://softarch.usc.edu/projects/automated-recovery-of-software-system-designs/
  https://softarch.usc.edu/wiki/doku.php?id=mfa:start
- Ground-Truth Software Architectures: architectures recovered with the aid of a software system's architect or long-time architecturally aware developer.
  - Includes Apache Hadoop, Bash (Bourne Again Shell), Apache OODT, and ArchStudio. (from [C6]) https://softarch.usc.edu/wiki/doku.php?id=recoveries:start
  - Includes Google Chromium. (from [C9] and [J9]) http://asset.uwaterloo.ca/ArchRecovery/
- Apache Object Oriented Data Technology (OODT) (as an Apache Committer): a framework for large-scale distributed data management and processing. Users include NASA, DARPA, and National Cancer Institute. https://oodt.apache.org/

Honors, Awards, and Selected Statistics

- Google Scholar (September 2026): 4,575 citations; h-index 32
- Author of 4 of the most-cited software engineering papers published 2013–2023, per an independent bibliometric study using CrossRef and Semantic Scholar citation data across the field's top venues (Monperrus, *Most Cited Papers in Software Engineering 2013–2023*, KTH Royal Institute of Technology, 2025): [C8], [J4], [J6], [J8]
- Award, National Science Foundation (NSF) CAREER Award, 2025
- Award, ICSE 2025 Distinguished Reviewer
- Award, FSE 2025 Distinguished Reviewer
- Award, FSE 2024 Distinguished Reviewer
- Award, ESEC/FSE 2020 Distinguished Reviewer
- Intelligence Community (IC) Postdoctoral Research Fellow, 2014–2017
- Award, Best Research Assistant Award, USC Computer Science Department, 2014
- Award, USC School of Engineering Doctoral Fellowship, 2006–2010
- Award, International Conference in Program Comprehension 2009, Best Poster Award
- Award, First Place, Special Interdisciplinary Award, USC Undergraduate Symposium for Scholarly and Creative Work, 2006
- Award, NSF Travel Grant for ICSE 2018
- Award, NSF Travel Grant for ICSE 2017
- Award, SIGSOFT CAPS Travel Grant for ICSE 2013
- Award, SIGSOFT CAPS Travel Grant for ICSE 2009
- Member, Association for Computing Machinery (ACM)
- Member, ACM Special Interest Group on Software Engineering (SIGSOFT)
- Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, IEEE Young Professionals
- Member, IEEE Computer Society
- Member, IEEE Computer Society Technical Community on Software Engineering (TCSE)
- Member, IEEE Intelligent Transportation Systems Society
- Member, IEEE Vehicular Technology Society
- Educational Member, USENIX Association, 2025–2026
- Member, Golden Key International Honors Society
- USC Renaissance Scholar

Consulting

- Quandary Peak Research, 2024–2025