University of Arizona Resource Links

Website Resource	Official Link
Software Engineering Website	https://ece.engineering.arizona.edu/
Systems and Industrial Engineering Department Website	https://sie.engineering.arizona.edu/
University of Arizona Scholarships and Financial Aid	https://financialaid.arizona.edu/
University of Arizona Applications	https://go.arizona.edu/it-starts-here/
Arizona Online	https://online.arizona.edu/
University of Arizona Student Engagement and Career Development	https://career.arizona.edu/

Global and Future Software Engineering Research Trends

This section focuses on the worldwide, forward-looking areas of research and development that are driving innovation in software engineering.

Global Research Trend	Key Focus Areas and Research Questions
Artificial Intelligence (AI) and Machine Learning (ML)	**Research:** Creating and optimizing software systems that integrate or are built by AI. **Focus: Generative AI** for code creation and testing; **AI-assisted software development** (Intelligent Code Assistants); **Model Ops (MLOps)** for managing the ML lifecycle; **Human-AI collaboration** in the development process; and using **AI for project management** and bug prediction.
Cybersecurity and DevSecOps	**Research:** Integrating security practices throughout the entire Software Development Lifecycle (SDLC). **Focus: DevSecOps** methodology; **Zero-Trust Architecture** implementation; **AI-**

Global Research Trend	Key Focus Areas and Research Questions
	powered threat intelligence and real-time security analysis; developing **secure software** design patterns; and securing complex systems like IoT and Cloud infrastructure.
Cloud-Native and Distributed Computing	**Research:** Architecting scalable, resilient, and efficient software for cloud and edge environments. **Focus: Microservices Architecture**; **Cloud-native development** (leveraging containers, orchestration, and serverless); **Edge Computing** (bringing computation closer to data sources, often with 5G); and developing tools for **Cloud and Autonomic Computing** (self-managing systems).
Low-Code/No-Code (LCNC) Development	**Research:** Studying the impact, scalability, and security of LCNC platforms. **Focus:** Developing new **LCNC tools** that maintain quality and performance; analyzing the **governance and testing** of LCNC applications; and researching the **democratization of software development** and its effect on professional engineers.
Quantum Computing and Information Theory	**Research:** Developing software, algorithms, and applications for a future quantum internet and quantum-safe cryptography. **Focus: Quantum algorithms** for complex problems (optimization, cryptography); developing **programming languages and compilers** for quantum hardware; and creating **quantum network protocols** and architectures.
Autonomous Systems and Robotics	**Research:** Software for self-governing vehicles, robotics, and complex automated systems. **Focus: Real-time, embedded, and IoT systems**; **Software architecture and testing** for safety-critical systems; **Computer vision** and **sensor fusion**; and robust software for **autonomous decision-making**.

University of Arizona Research Opportunities

This section outlines specific research areas and centers at the University of Arizona that offer software engineering opportunities.

UA Research Area (or Affiliated Center)	Software Engineering Connection and Opportunities
Data Analytics, Informatics, & Machine Learning	Work with faculty on research in **Deep Learning**, **Natural Language Processing (NLP)**, **Probabilistic Modeling**, **Social Network Analysis**, **Data Curation**, and **Data Visualization**. Projects often involve developing complex software for data analysis.

UA Research Area (or Affiliated Center)	Software Engineering Connection and Opportunities
Cyber Operations and Security Computing	Research in **Cybersecurity**, **Cyber Defense**, **Cloud Computing**, and **Intelligent Networking**. Opportunities include software development for **digital forensics**, building **secure software systems**, and developing **cyber DNA** software for threat detection.
Software Engineering and Embedded Systems	Core research areas, often within the Electrical and Computer Engineering (ECE) and Systems & Industrial Engineering (SIE) departments. Focus includes **software architecture and design**, **embedded systems** programming, **DevOps** methodologies, and **continuous integration/continuous deployment (CI/CD)**.
Center to Stream Healthcare In Place (C2SHIP)	Research involves software for health care, including developing **machine learning models** to process data from **wearable sensors**, and creating **mobile diagnostics and testing** applications.
Cloud and Autonomic Computing (CAC) Center	Focuses on research and design of **self-managed information systems** and services. Opportunities in **cloud storage and networking**, **data center design**, and **systems software** for large-scale cloud applications.
Quantum Networks (CQN) Center	A national-scale research center focused on building the quantum internet. Software-related research includes developing **quantum and classical processing** software for network nodes and implementing **quantum network protocols**.
Wireless Networking, Security, and Systems	Research on **5G** and **Next G networks**. Software opportunities include developing **wireless access and application solutions** that are flexible, efficient, reliable, and secure.

Research Opportunities at the University of Arizona Links:

https://ur.arizona.edu/getting-started/first-steps/finding-research-opportunities

https://slhs.arizona.edu/research-opportunities-on-campus