

Highlights of the Talks at CIRCUS Workshop

Why do we need to verify software, and what can we achieve?

By Bertrand Meyer

This talk emphasized the critical importance of software verification in ensuring that software systems are correct, robust, and secure. Bertrand Meyer introduced various techniques used in software verification, both static and dynamic, and discussed their respective benefits and limitations.

Software verification in practice: combining proofs and tests

By Li Huang

Li Huang demonstrated an innovative approach to combining tests and proofs in software verification. The presentation highlighted how generating useful test data from failed proofs and using proofs to enhance the quality of test data can significantly improve software reliability.

Can the computer correct our mistakes?

By Viktoriya Kananchuk

This presentation explored the potential of computers to automatically detect and correct bugs in code. Viktoriya Kananchuk shared insights from analyzing real project bugs and creating patterns for their automatic detection and correction.

What is a class invariant and why do we need it?

By Ilgiz Mustafin and Alessandro Skena

Ilgiz Mustafin and Alessandro Skena clarified misconceptions about class invariants and demonstrated their importance in modeling consistency rules for OOP programs. Practical examples illustrated how to write effective class invariants.

Quantum: from Computing to Software Engineering

By Manuel Oriol

Manuel Oriol introduced the audience to the transformative potential and challenges of quantum computing. The presentation showcased efforts by the Chair of Quantum Software Engineering to develop accessible software engineering practices for quantum computing.

Virtual Teaching Assistant for Capstone Project Course

By Julia Kotovich

Julia Kotovich discussed the increasing prevalence of Virtual Teaching Assistants (TAs) in various aspects of education, particularly in Computer Science. She highlighted the benefits of using virtual assistants, such as Chatbots, to improve the quality of teaching and learning environments for both online and offline courses. The presentation included a demonstration of a Chatbot designed to assist students with their Capstone projects, showcasing its potential to respond to a range of student inquiries and support their learning process.

C4Q: A Chatbot for Quantum

By Yaiza Aragonés-Soria

Yaiza Aragonés-Soria presented C4Q, a specialized chatbot aimed at making quantum computing more accessible to non-experts. Given the complexity of quantum computing concepts and the challenges in learning how to code in this field, C4Q serves as an educational tool that accurately answers basic questions and guides users in quantum programming. Unlike other conversational agents, C4Q leverages a pre-trained large language model to classify user requests and then

generates precise answers through a dedicated engine, ensuring the reliability of its responses. This innovative approach promises to democratize access to quantum computing by providing a robust support tool for beginners.

Niel's Chess: A Quantum Game for Schools and the General Public

By Tamás Varga

Tamás Varga introduced a quantum variant of chess that combines conventional chess rules with key quantum-physical effects like superposition and entanglement. Niel's Chess aims to educate and engage the public about quantum computing concepts through an accessible and enjoyable game.

Assessing the quality of smart cities

By Mauro Pezzè

Mauro Pezzè discussed the characteristics and challenges of assessing the quality of smart ecosystems to prevent failures that could disrupt human life. The talk highlighted the need for robust evaluation methods for smart city infrastructures.

Testing Human Centric Systems

By Alind Xhyra and Noura El Moussa

This talk emphasized the importance of considering humans as integral parts of smart cities rather than mere users. Alind Xhyra and Noura El Moussa explored how to infer models of human behavior to thoroughly test smart cities and ecosystems.

Smart monitoring complex ecosystems

By Ketai Qiu and Francesco Lomio

Ketai Qiu and Francesco Lomio addressed the challenges of monitoring evolving smart ecosystems. They presented methods for defining smart monitors that can predict and prevent major issues within dynamic cloud-based systems.

Smart Ecosystem Health

By Matteo Ciniselli, Davide Molinelli, Niccolò Puccinelli

This presentation introduced the concept of system health to capture the expectations of smart ecosystems. The speakers discussed how correct but conflicting behaviors of systems and humans can lead to failures and how to monitor these dynamics.

Autonomic Testing

By Luca di Grazia, Davide Molinelli, Ketai Qiu

The talk showcased an approach to automatically generating test cases for smart ecosystems using Large Language Models (LLMs). This method helps detect unexplored dangerous scenarios and enhances the quality of testing in production environments.

Digital Mirrors

By Francesco Lomio, Davide Molinelli, Luca di Grazia, Ketai Qiu

This presentation introduced digital mirrors as a cost-effective and focused way to test smart cities and ecosystems without the need for full simulators. The speakers outlined how digital mirrors capture essential aspects for sustainable testing.

The Second Quantum Revolution

By Wolfgang Tittel

Wolfgang Tittel provided a simple introduction to the exciting developments of the second quantum revolution. He explained how phenomena like single-photon communication and quantum entanglement are poised to revolutionize technology and solve complex problems.