



AQUILONIS d.o.o.

**SREDNJA EKONOMSKA ŠOLA
IN GIMNAZIJA MARIBOR**

**SVEUČILIŠTE U ZAGREBU
FAKULTET ELEKTROTEHNIKE I RAČUNARSTVA**

**TARTU KUTSEHARIDUSKESKUS
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University of Zagreb

Faculty of Electrical Engineering and Computing

Outline

- ▶ University of Zagreb
- ▶ Faculty of Electrical Engineering and Computing
- ▶ Laboratory for Systems and Signals



University of Zagreb (UnizG)

- ▶ ... is the oldest and biggest university in South-Eastern Europe (1669.)
- ▶ ... offers education and research in all scientific fields
 - ▶ arts, biomedicine, biotechnology, engineering, humanities, natural sciences and social sciences



UniZG in numbers

- ▶ Around 8 000 teachers and 72 000 students
- ▶ 31 Faculties and 3 Art academies
- ▶ UniZG produces:
 - ▶ over 50 percent of the annual research output in Croatia
 - ▶ 80 percent of scientific productivity of all Croatian universities

UniZG faculties

- ▶ Faculty of Agriculture
- ▶ Faculty of Architecture
- ▶ Faculty of Civil Engineering
- ▶ Faculty of Chemical Engineering and Technology
- ▶ Faculty of Economics and Business
- ▶ **Faculty of Electrical Engineering and Computing**
- ▶ Faculty of Geotechnical Engineering
- ▶ Faculty of Humanities and Social Science
- ▶ Faculty of Law
- ▶ Faculty of Mechanical Engineering and Naval Architecture
- ▶ Faculty of Mining, Geology and Petroleum Engineering
- ▶ Faculty of Pharmacy and Biochemistry
- ▶ Faculty of Political Science
- ▶ Faculty of Science
- ▶ School of Dental Medicine
- ▶ School of Medicine
- ▶ ...

Faculty of Electrical engineering and Computing (FER)

- ▶ History:
 - ▶ 1919: Technical College
 - ▶ 1926: College of Engineering
 - ▶ 1956: Faculty of Electrical Engineering
 - ▶ 1995: Faculty of Electrical Engineering and Computing



FER in numbers

- ▶ 600 employees
 - ▶ more than 1/3 are hired at the faculty's own expense, thanks to international funding of the faculty's research
- ▶ 3000 students
- ▶ 12 departments
- ▶ more than 30 research laboratories
- ▶ around 250 active science and research projects
 - ▶ according to European Commission data, FER is one of the leading Croatian institutions in terms of attracting EU projects

FER departments

- ▶ Department of Applied Physics
- ▶ Department of Applied Mathematics
- ▶ Department of Applied Computing
- ▶ Department of Electrical Engineering Fundamentals and Measurements
- ▶ Department of Electric Machines, Drives and Automation
- ▶ Department of Energy and Power Systems
- ▶ Department of Telecommunications
- ▶ **Department of Electronic Systems and Information Processing**
- ▶ Department of Control and Computer Engineering
- ▶ Department of Electroacoustics
- ▶ Department of Electronics, Microelectronics, Computer and Intelligent Systems
- ▶ Department of Communication and Space Technologies

FER research laboratories

- ▶ Auralization Laboratory (AuraLab)
- ▶ Text Analysis and Knowledge Engineering Lab (TakeLab)
- ▶ Laboratory for Bioinformatics and Computational Biology (LBCB)
- ▶ **Laboratory for Systems and Signals (LSS)**
- ▶ Social Networking and Computing Laboratory (socialLAB)
- ▶ Integrated Circuits and Electromagnetic Compatibility Laboratory (IC&EMC Lab)
- ▶ Internet of Things Laboratory (IoT Lab)
- ▶ Micro- & Nano-Electronics Laboratory (MiNEL)
- ▶ Smart Grid Laboratory (SGLab)
- ▶ Laboratory for Nuclear Energy and Safety (LNES)
- ▶ Laboratory for Underwater Systems and Technologies (LABUST)
- ▶ Applied Optics Laboratory (AOLab)
- ▶ Laboratory for Robotics and Intelligent Control Systems (LARICS)
- ▶ Laboratory for Renewable Energy Systems (LARES) ...

Laboratory for Systems and Signals (LSS)

- ▶ LSS was founded in 1986
 - ▶ by prof. Babić, prof. Jeren and prof. Pale
 - ▶ with the intention of developing experts to build the economy on challenging projects

- ▶ LSS:
 - ▶ started with computerized measurement systems,
 - ▶ and with the advent of war the focus was transferred to the construction of the Croatian Internet

LSS – research activities

- ▶ Today, LSS is mostly active in two areas:
 - ▶ Education
 - ▶ Information security
- ▶ In education, LSS:
 - ▶ researches learning and teaching methods
 - ▶ and develops appropriate tools
- ▶ In security, LSS:
 - ▶ researches authentication methods and methods of learning and teaching cybersecurity through authentic virtual environments

LSS – research results

- ▶ AuResS: The Audience Response System
- ▶ Automated diagnostic skill assessment
 - ▶ based on examinee's explication of rules for scenario-based problem solving tasks
- ▶ Knowledge-based authentication using decentralised verifiers
- ▶ Automatic generator for computer forensics assessment problems



...



Example – generating com. for. problems

- ▶ Computer forensics
 - ▶ a graduate level course, 60-80 students
- ▶ Instead of:
 - ▶ manually creating and scoring assessment problems
 - ▶ a program creates unique practical problems for each student
- ▶ The generated problems cover:
 - ▶ file system forensics, digital document forensics, RAMforensics, network forensics, and steganography

LSS – commercial activities

- ▶ Apart from research, for more than 25 years, LSS is also engaged in commercial activities:
 - ▶ Security assessments / penetration testing
 - ▶ Security education, awareness and training
 - ▶ Consulting services for computer networks, data centers, information systems
 - ▶ Project management

Example – security assessment & edu.

- ▶ Capture the Flag (CTF) cybersecurity competition
 - ▶ for high-school students
 - ▶ in collaboration with the Croatian National CERT
 - ▶ digital forensics, web security, exploit development, reverse engineering ...

- ▶ Security assessments:
 - ▶ finding security problems (vulnerabilities) in apps and IT systems
 - ▶ researching and suggesting the best way to fix them
 - ▶ communicating with managers, programmers, administrators

THANKS!

Any questions?

