

REBECCA

Reconfigurable Heterogeneous Highly Parallel Processing Platform for safe and secure Al

Challenges and objectives

The REBECCA project develops a RISC-V-based ASIC with integrated AI and security accelerators, for advanced edge-AI systems. Targeted at critical applications like automotive, healthcare, and smart cities, our ASIC connects to an external FPGA with application-specific AI accelerators and I/O, enhancing flexibility for complex, scalable AI tasks. Our solution provides high-levels of security, low-latency and high energy-efficiency while supporting Europe's goals for technological sovereignty.

Technical goals

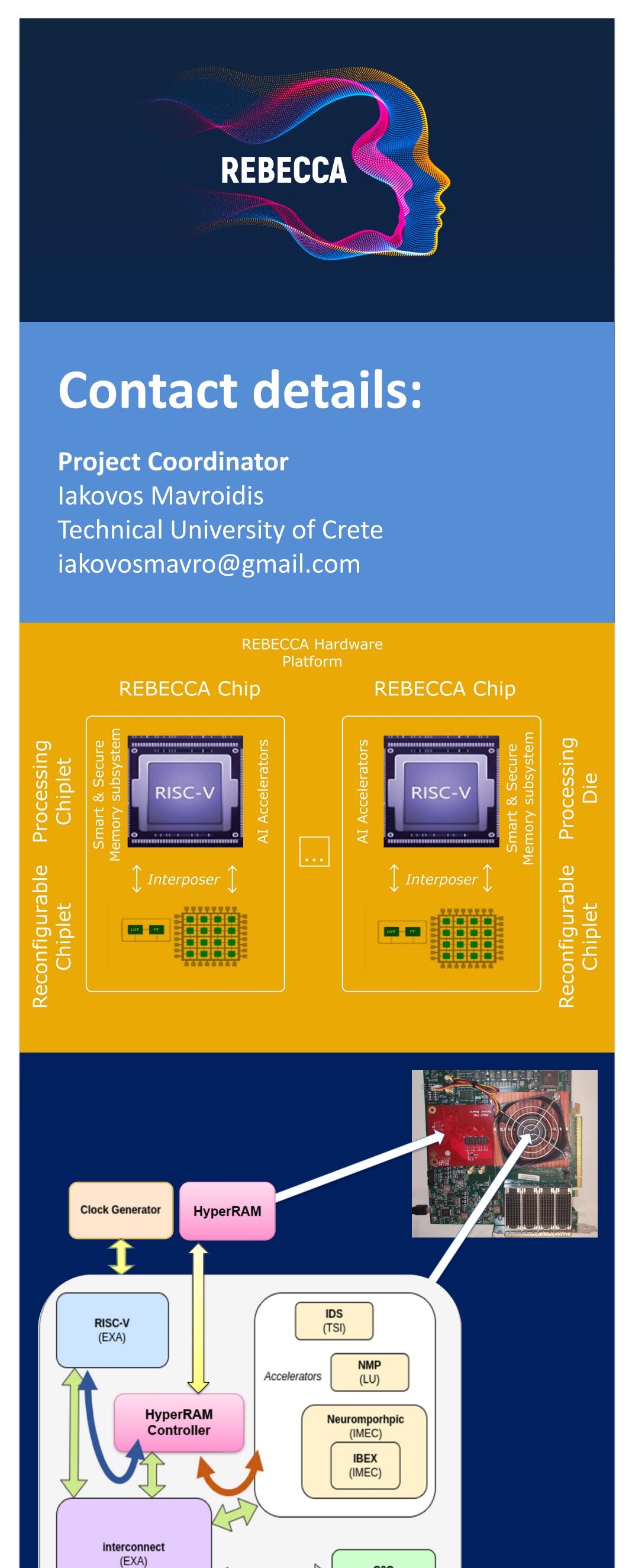
- **RISC-V-based ASIC**: Develop a modular, scalable ASIC with integrated AI and security accelerators.
- External FPGA Integration: Connect the ASIC to an FPGA for additional accelerators and I/O flexibility.
- Near-Memory Processing: Implement NMC for efficient, close-to-storage data processing.
- **Security Features**: Use hardened RISC-V cores to enhance security and privacy.
- Complete Software Stack: Develop a low-power, secure software stack supporting virtualization.
- **Diverse Use Cases**: Validate the platform across multiple real-world applications, including smart appliances, energy, and infrastructure inspection.

These goals aim to build a versatile, high-performance edge-Al platform.

Expected impact

Targeted at edge-AI applications in sectors like smart appliances, energy, and infrastructure inspection, it offers high performance, energy efficiency, security and safety. Our **modular**, **adaptable platform** provides industry and academia with a **versatile open edge-AI solution** for diverse applications. The value creation from this project extends to multiple dimensions:

- Economic Growth: REBECCA fosters Europe's tech autonomy by developing a scalable edge-Al platform, enhancing market opportunities for EU industries.
- **Employment and Expertise:** Supports job creation and skill development in edge-AI hardware and software, increasing demand for skilled professionals.
- Academic Impact: Plans for 20+ peer-reviewed publications and 45+ conference presentations, contributing to edge-AI research.
- **Sustainability and Community Engagement:** Establishing a Sustainability Body to create an ecosystem for long-term adoption and community innovation.



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