

Dr. David Knichel

Freelance Secure AI & Solution Architect

Profile

Secure AI architect with a Ph.D. in applied cryptography and hardware security. I help companies design, evaluate, and implement practical AI solutions with a focus on **security, model and tool selection, evaluation, and cost optimization**. My work covers AI-assisted business processes, agentic systems, confidential AI, and integration into existing enterprise environments.

Highlights

2022 **Winner, German IT Security Award** — €100,000 award for research on automated creation of secure cryptographic hardware.

Ph.D. **Dr.-Ing. in Applied Cryptography and Hardware Security**, Ruhr University Bochum, *summa cum laude*.

Expertise Secure AI architecture, AI automation, agentic systems, LLM evaluation, model/tool selection, cost optimization, confidential computing, applied cryptography.

Professional Experience

2026–present **Solution Architect**, *Edgeless Systems*, Bochum, Germany.

- Design and integrate secure AI solutions in enterprise environments.
- Translate business requirements into AI architectures, integrations, and technical solutions.
- Design AI-assisted and agentic workflows for internal and customer use cases.
- Select models, tools, and architectures based on quality, security, latency, and cost.
- Evaluate AI systems and identify options to improve reliability and inference cost.
- Advise customers on confidential AI, secure deployment, and integration.

2024–present **Freelance AI & Security Consultant**.

- Architecture and technical consulting for secure AI and confidential computing.
- Prototypes and technical evaluations for AI, security, and cloud-native systems.
- Research and technical documentation on confidential AI, 5G security, and post-quantum cryptography.
- Translation of complex security and AI topics into practical implementation guidance.

2024 **Enterprise Security Architect**, *Cymotive GmbH*, Wolfsburg, Germany.

- Performed systematic security and risk analyses for automotive systems.
- Defined security architectures and technical controls for OEM and Tier-1 environments.
- Advised engineering teams on secure implementation and regulatory requirements.

2019–2023 **Researcher — Applied Cryptography & Hardware Security**, *Ruhr University Bochum*, Bochum, Germany.

- Developed methods and software for automated security analysis and protection of cryptographic systems.
- Published at leading security and cryptography conferences including ACM CCS, CHES, and ASIACRYPT.
- Acquired and contributed to research projects with budgets above €1 million.
- Supervised researchers and students and presented research internationally.

2015–2017 **Security Engineering — Working Student / Intern**, *NXP Semiconductors*, Hamburg, Germany.
Security verification, automation tooling, measurement-data processing, and security engineering.

Secure AI Capabilities

Architecture LLM applications, agentic systems, RAG, enterprise AI integration, API-based AI services, workflow automation, secure data flows.

Security AI security architecture, confidential computing, trusted execution environments, cryptography, threat analysis, privacy and data-flow analysis.

Evaluation	Model comparison, quality evaluation, LLM/application evaluation, reliability analysis, architecture trade-offs.
Optimization	Model routing, model/tool selection, inference-cost optimization, latency and quality trade-offs, API and infrastructure optimization.
Implementation	Python, C/C++, JavaScript/TypeScript, Rust, cloud-native systems, APIs, prototypes and technical integrations.

Education

- 2019–2023 **Ph.D. / Dr.-Ing. — Applied Cryptography and Hardware Security**, *Ruhr University Bochum*, *summa cum laude*.
 Formal verification and automated masking of cryptographic hardware.
- 2016–2018 **M.Sc. IT Security / Information Technology**, *Ruhr University Bochum*, Grade: 96%.
- 2012–2016 **B.Sc. IT Security / Information Technology**, *Ruhr University Bochum*, Grade: 97%.

Recognition

- 2022 **German IT Security Award**, winner.
- 2016 **G Data Prize**, awarded to the best Bachelor's graduate of the year.
- 2014 **Deutschlandstipendium**.

Research

Author of publications at **ACM CCS, CHES, ASIACRYPT, CARDIS, and IEEE ETS**. [Google Scholar](#)

Languages

German	Native
English	Fluent