

# Dr. János Karancsi

AI Engineer · Cloud Backend Developer · PhD Physicist (CERN / CMS)

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· [inspirehep.net/authors/1069992](https://inspirehep.net/authors/1069992) · [scholar.google.com/citations](https://scholar.google.com/citations)

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## SUMMARY

Senior Software Engineer and PhD physicist: a decade at CERN on the CMS Experiment, then five years building AWS-native backend microservices at global scale. Over the past year I have specialised in AI-augmented engineering - designing an agentic knowledge base used across ~50 repositories that lets coding agents plan and execute senior-level work. I pair rare analytical depth (physics PhD, distributed computing at petabyte scale) with production cloud engineering and hands-on LLM/agent systems. Co-contributor to the 2025 Breakthrough Prize in Fundamental Physics. Available for remote-first Senior Engineer, Cloud Architect, and AI Engineering roles with international scope.

## EXPERIENCE

### Senior Software Developer

Jan 2025 - present

RDI Software Hungary (Capgemini Group) · Debrecen, Hungary (remote/hybrid)

- Deliver AWS-native backend microservices for a global client's digital infrastructure within event-driven, CQRS-based distributed systems.
- Pioneered a structured agentic AI development framework across ~50 repositories (AGENTS.md methodology), enabling coding agents to autonomously plan and execute senior-level tasks; estimated 2-3x personal delivery throughput.
- Co-developing a company-wide AI adoption strategy with senior leadership (in progress): LLM tooling standards, prompt-engineering practices, and knowledge-base governance.

### Software Developer (Mid-Level)

Jul 2022 - Mar 2025

RDI Software Hungary (Capgemini Group) · Debrecen, Hungary

- Designed and developed C# .NET backend microservices and AWS Lambda functions for a client digital platform handling millions of customer transactions daily across international markets.
- Integrated DynamoDB, SQS, and Redis into microservice backends supporting low-latency, high-availability access under sustained production traffic.

### Junior Software Developer

Aug 2021 - Jun 2022

RDI Software Hungary (Capgemini Group) · Debrecen, Hungary

- Transitioned from 10+ years of scientific C++/Python into commercial C# .NET, reaching production-ready quality within the first month.

### PhD Research Associate (permanent); Leader, Particle Physics Group

Nov 2019 - Aug 2021

MTA Atomki (Hungarian Academy of Sciences, Institute for Nuclear Research) · Debrecen, Hungary

- Appointed to a permanent, merit-based Research Associate position on PhD completion.
- Appointed Leader of the Particle Physics Group at MTA Atomki (July 2020).

### Research Assistant

Oct 2013 - Nov 2019

MTA Atomki (Hungarian Academy of Sciences, Institute for Nuclear Research) · Debrecen, Hungary

- Level 3 Coordinator of the CMS Pixel Detector Offline Reconstruction & Calibration working group for 4 consecutive years, coordinating physicists across multiple international institutions; declined the L2 offer to finish the PhD. Recognised by the 2012 CMS Achievement Award for pixel-detector performance measurements and calibration.
- Measured the lepton (electron and muon) efficiencies for a single-lepton Supersymmetry search (2012 LHC data) that set world-best exclusion limits at publication.

## EDUCATION

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**PhD, Physics** 2010–2019  
University of Debrecen · Experimental particle physics

**BSc + MSc (integrated), Physics** 2006–2010  
University of Leeds · Physics

## CERTIFICATIONS

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**Big Data and Machine Learning Fundamentals** — Google Cloud 2025  
**Cloud Digital Leader** — Google 2025  
**Test-Driven Development** — LearnQuest 2021

## SKILLS

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<b>LLM &amp; agentic systems</b>	Agentic knowledge-base design (AGENTS.md) · LLM orchestration & multi-agent workflows · Prompt & spec engineering for agents · GitHub Copilot (agentic use) · RAG & vector search · MCP server development
<b>Machine learning &amp; deep learning</b>	PyTorch · Transformer internals · Model training engineering
<b>Backend &amp; cloud</b>	Python · C# and .NET · AWS (Lambda, DynamoDB, SQS, EKS, ElastiCache) · Microservices architecture · CQRS & event-driven architecture · REST API design
<b>DevOps &amp; infrastructure</b>	Kubernetes (EKS, Helm) · Docker & containerization · Terraform (IaC) · CI/CD pipelines (Jenkins)
<b>Data &amp; databases</b>	Statistical analysis · Large-scale data analysis · SQL & databases
<b>Physics &amp; scientific computing</b>	Distributed computing at scale · Scientific computing (ROOT, GEANT4) · C++ · Numerical methods & precision
<b>Leadership &amp; communication</b>	Technical leadership & coordination · Technical communication & presentation · Mentoring

## PUBLICATIONS

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Co-author on 1,000+ peer-reviewed CMS publications; personal contributions in SUSY and Pixel work.  
[inspirehep.net/authors/1069992](https://inspirehep.net/authors/1069992) ↗

### Selected first-hand papers

PhD thesis - beyond the Standard Model with CMS ↗  
Razor + boosted SUSY search (JHEP 2019) ↗  
Single-lepton SUSY search (Phys. Lett. B 2014) ↗

Online CV · [dr-janos-karancsi.pages.dev](https://dr-janos-karancsi.pages.dev)