Martin Sivák



MSc Researcher in Medical AI: Oncology, Genomics & Medical Imaging · FIIT STU

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RESEARCH INTERESTS

Trustworthy AI for precision medicine: **agentic LLM systems** for genomic evidence synthesis and **DNA variant interpretation**; **knowledge graphs** and retrieval-augmented generation over biomedical literature; **computer vision for medical AI**, with most experience in computational pathology (segmentation and quantification in H&E and IHC images) and broad interest in medical imaging across modalities and applications; learning with weak or limited supervision; and human oversight, traceability and reliability of AI used in clinical decision-making.

EDUCATION

MSc (Ing.) Intelligent Software Systems · FIIT, Slovak University of Technology — Sep 2025 – Jun 2027 (exp.)

- **Thesis (in progress):** *Agentic AI workflows for automated DNA variant interpretation and knowledge discovery in large biomedical corpora*. Supervisor: doc. Mgr. Michal Kováč, MSc., PhD.
- Designing specialised AI agents and structured workflows that retrieve, synthesise and interpret heterogeneous genomic evidence (literature, variant databases, guidelines) while keeping every step traceable and reviewable by a human expert.
- Coursework focus: AI/ML, knowledge engineering, intelligent software systems.

Erasmus+ Exchange Semester, Computer Science · University of Eastern Finland, Kuopio — Jan 2026 – Jun 2026

- Courses in software engineering, data analysis and artificial intelligence.

BSc (Bc.) Computer Science, magna cum laude (top 2%) · FIIT, Slovak University of Technology — Sep 2021 – Jun 2025

- **Thesis:** *Histological Image Data Processing Using Methods of Computer Vision and Deep Neural Networks*. Supervisor: prof. Ing. Vanda Benešová, PhD.; reviewer: Ing. Marek Jakab. **Dean's Commendation Letter** for exceptional research.
- Weighted GPA **1.30** (Slovak scale 1–4, where 1.0 = best and 3.0 = lowest pass; ECTS grades A–E); graduated with honours. Programme accredited by the IET (UK).
- Specialisation: artificial intelligence, computer vision and deep neural networks.

PUBLICATIONS

- F. Duvač, P. Farkaš, D.-D. Horvath, D. Ivan, A. Komanek and **M. Sivák**, "Design and Migration of a Bare-Metal Event Gateway to a Scalable Event-Driven Serverless Architecture on AWS with Integrated Foundation Model-Based Automated JSON Analysis," in *Proc. 2026 Information Technology Scientific Research Conference (IIT.SRC)*, Bratislava, Slovakia, Apr. 2026. IEEE. DOI: 10.1109/IIT.SRC67760.2026.11628845

RESEARCH PROJECTS

Weakly supervised lymphocyte segmentation in breast-cancer histopathology · BSc thesis — 2024 – 2025

Thesis PDF · Code · Slovak thesis registry (CRZP)

- Addressed segmentation of tumour-infiltrating lymphocyte nuclei in H&E slides when the large dataset (**TIGER**) offers only bounding-box labels.
- Generated pixel-level pseudo-masks with classical computer vision (Otsu and adaptive thresholding, marker-controlled watershed) and fused them into a second generation via quartile agreement and consensus voting.
- Trained U-Net models; pre-training on pseudo-masked TIGER and fine-tuning on the small fully annotated **TNBC** dataset gave the best Dice / IoU, outperforming training on annotated data alone.

Agentic workflows for DNA variant interpretation · MSc thesis — 2025 – Present

- Exploring how specialised LLM agents, knowledge graphs and RAG can support the analysis and interpretation of complex genomic evidence in precision oncology, with emphasis on reliability and appropriate human oversight.

Serverless event gateway with foundation-model diagnostics · Industry project with Fiserv — 2025 – 2026

Six-person FIIT STU team · published at IEEE IIT.SRC 2026

- Industrial case study: migrated a bare-metal, Kubernetes-based event gateway (a distributed monolith for JSON event validation, transformation and routing) to an event-driven serverless AWS architecture: Kinesis, EventBridge, Lambda, SQS, Step Functions, DynamoDB, S3.
- Integrated an **Amazon Bedrock** foundation-model pipeline, orchestrated via Step Functions, for automated JSON issue analysis alongside rule-based validation, with retries, timeouts and deterministic fallbacks.
- Evaluation showed higher peak throughput, elasticity and diagnostic coverage, traded against greater latency variance from model invocations.

Ki-67 quantification in IHC-stained pathology images · European Healthcare Hackathon, IKEM Prague 2025

- Solved the digital-pathology challenge: automated identification and quantification of Ki-67-positive cells in immunohistochemistry images. Ki-67 is the proliferation index pathologists use in tumour grading, which makes this a direct continuation of my BSc work on lymphocyte segmentation.

Applied clinical AI: MB Trials and Larinta · MediBit Jul 2025 – Present

- Translational research into practice: matching structured and unstructured oncology patient profiles to clinical-trial eligibility criteria, together with a postdoctoral cancer researcher and an oncology resident.
- Coordinate a project with Larinta (formerly Shoelessly) on an AI throat-scanning application for ENT digital diagnostics.

Resistance of testicular cancer to cisplatin · Biology Olympiad, project section 2019 – 2020

- High-school research project supervised by Dr. Dana Jurkovičová (Slovak Academy of Sciences); **1st place** in the Bratislava regional round and **7th place** in the national round.

SCHOOLS, TRAINING & CERTIFICATES

Oxford Machine Learning Summer School (OxML) · AI for Global Goals Oct 2025
certificate

Nexteria Leadership Academy · Bratislava Sep 2026 – Present

- Selective programme in leadership, communication and entrepreneurship: intensive courses and workshops led by industry professionals, real-world projects for leading companies, and a personal mentor.

Neural Networks and Deep Learning — DeepLearning.AI

Becoming an Effective Leader — Harvard Business School Online Jul 2026

HONOURS & AWARDS

Dean's Commendation Letter — for exceptional research, BSc thesis, FIIT STU 2025

BSc magna cum laude — top 2% of graduates 2025

Rakathon 2026: 3rd place (InterSystems Challenge) & Microsoft Challenge Award · Prague Oct 2026
Czech oncology hackathon with the General Health Insurance Company (VZP) as main partner · project page

- Built **Cesta Pacienta**, a clinical-workflow MVP for Czech Comprehensive Oncology Centres that carries a suspected cancer patient from the GP through the oncology coordinator and the multidisciplinary tumour board, and back to the GP, without information loss.
- An LLM extracts handover data from heterogeneous medical reports, and every value carries a verbatim quote verified against the source and highlighted in the original. Deterministic rules flag missing documents, contradictions and critical lab values.
- Designed for clinical governance: a human confirms every value, tumour-board write-ups are time-correct to the meeting date, the national ID is pseudonymised, and GP receipt is logged in an append-only audit trail. Built on synthetic data.

Startup Weekend Žilina: winners · Žilina Oct 2025

- Joined with two MediBit co-founders and formed an eight-person team around a new idea: an AI tool that estimates employee burnout risk from communication patterns, workload signals and short questionnaires, with recommendations for managers and HR.
- In 56 hours: interviewed about 20 medium and large companies, built a working MVP, mapped competitors and market size, and defined the business model and go-to-market strategy.

Hacknime.to Hackathon: winners · Revúca Feb 2025
project page

- Built a digital fair portal for the City of Revúca that simplifies event administration: online applications, reservations and payments, a vendor app, and QR-code check-in.

Biology Olympiad, category A (project) — 1st place regional round, 7th place national round (see Research Projects) 2020

ACADEMIC SERVICE, TEACHING & MENTORING

Study Programme Board & Disciplinary Committee · FIIT STU 2024 – Present

- Student member of the Study Programme Board for all faculty programmes (2024 – present), representing students in decisions on curricula and programme quality.
- Student member of the Faculty Disciplinary Committee (2024 – 2025).

Private STEM Tutor · meet'n'learn Feb 2021 – Present
tutoring profile

- Over five years of one-to-one tutoring in mathematics, computer science and physics for high-school and university students, young adults and career changers.

Mentor · AjTyvIT May 2026 – Present

- Mentor with a Slovak non-profit (the name means "you too in IT") that motivates, educates and supports girls and women in IT careers, helping close the gender gap in tech.

INDUSTRY EXPERIENCE

Co-Founder & Co-CEO · MediBit — Jul 2025 – Present

AI software for healthcare · *medibit.tech*

- Co-lead a five-person team (engineers, a postdoctoral cancer researcher, an oncology resident) building MB Trials; lead pilot strategy, hospital and partner alignment, and coordinate the Larinta throat-scanning project.

Software Engineer Intern (AI) · Bloomreach — Jul 2025 – Present

- Agentic workflows and applied LLM research for Clarity, an agentic conversational shopping assistant, in a global engineering team.

Web Developer · smartAIm — May 2024 – Oct 2025

- Designed and built client web applications from Figma to production (Vue.js, Nuxt.js, TypeScript).

Junior Software Developer · Zurich Insurance — Mar 2023 – Jun 2025

- Data processing in R (dplyr, purrr) and dynamic HTML/CSS reporting for a business-critical internal tool.

Software Tester · ČSOB Finančná skupina — Aug 2022 – Jan 2023

- Functional and performance testing of mobile and web banking applications.

TECHNICAL SKILLS

Machine learning	Deep learning, computer vision, semantic segmentation (U-Net), weak supervision, transfer learning
LLMs & knowledge	Agentic workflows, RAG, knowledge graphs, LangChain, Google ADK, Amazon Bedrock
Programming & cloud	Python, R, TypeScript / JavaScript, Java, PostgreSQL, Git; AWS serverless (Lambda, Step Functions, EventBridge, Kinesis)
Languages	Slovak (native), English (C1)

REFERENCES

prof. Ing. Vanda Benešová, PhD. – BSc thesis supervisor, FIIT STU · doc. Mgr. Michal Kováč, MSc., PhD. – MSc thesis supervisor, FIIT STU · Dr. Dana Jurkovičová – Slovak Academy of Sciences. Contact details on request.