Lukasz Michalski

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Personal Profile

A self-motivated and passionate individual with a strong interest in accelerated heterogeneous computing and applied fast machine learning solutions. Software Engineer at AMD, with MSc in artificial intelligence (BEng in computer engineering) with a palpable desire to research into efficient offloading of modern ML architectures on edge accelerators. Extensive drive and ambition for research further amplified after work at CERN. Experience in applied machine learning, algorithmic optimization, computer architecture in both research and industry settings, as well as presenting at conferences and constructing research papers. Beyond academics, my experience as a national team athlete has shaped a strong work ethic, discipline, and ability to excel in teams toward shared goals.

Professional Experience

Software Engineer, AMD **2025 - Present**
- Performance software engineer working on optimization of rendering pipelines using modern machine learning solutions in FidelityFX: *upscaling, frame generation, ray regeneration, radiance caching*, on proprietary AMD RDNA graphics accelerator architectures.

Machine Learning Engineer Intern, Intel **2023 - 2024**
- Research on solutions targeting visual corruptions detection using video for gameplay for Intel DirectX 3D driver. Focused on applied computer vision and development of accurate heuristics for vision tasks.

Software Development Working Student, Nokia **2021 - 2023**
- Focusing on internal tools for analyzing eNB machine logs and development of an in-house source code management system for SoC hardware solutions within Mobile Networks R&D department.

Research Experience

Technical Student, CERN **2024 - 2025**
- Benchmarking heterogeneous accelerator architectures (AI Engines, FPGAs, GPUs) towards 40 MHz physics analysis. Comparison done using representative $W \rightarrow 3\pi$ decay cut-based algorithm.
- Efficient interface for heterogeneous machine learning inference inside *cmssw* framework enabling direct usage of optimized memory layouts (SoAs) with reduced memory footprint. Solution recognized at various ML/HEP conferences including FastML, ACAT, IML: Michalski, L., Zeh, C. et.al. (2025), *Efficient Data Movement for Machine Learning Inference in Heterogeneous CMS Software.*
- Tau tagging pipeline for L1 scouting system with parallel clustering and direct inference using transformer based model architecture.

Research Student, Wroclaw University of Science and Technology **2023 - 2025**
- Technical leader of a team (3) developing particle swarm optimization algorithm called *Boids* targeting GPUs and CPUs accelerators. Research lead to publication: *Parallel Swarm Intelligence: Efficiency Study with Fast Range Search in Euclidean Space, Michalski et.al, 2024*

Research Student, Samsung R&D Institute & Wroclaw University of Science and Technology **2023**
- Researching NLP techniques to automate machine translation of complex software systems descriptions in the form of technical reports into semantic knowledge-graphs for internal search engines. Outcomes presented at university forum conference.

Conference Publications, Proceedings and Posters

Peer-Reviewed Journal Articles:

- Michalski, L., Sołtysik, A., & Woda, M. (2025). *Efficiency Analysis of Parallel Swarm Intelligence Using Rapid Range Search in Euclidean Space*. International Journal of Electronics and Telecommunications, Vol. 71, No. 1, pp. 31-37.

Conference Papers:

- Michalski, L., Sołtysik, A., & Woda, M. (2024). *Parallel Swarm Intelligence: Efficiency Study with Fast Range Search in Euclidean Space.* 19th International Conference on Dependability of Computer Systems, Brunow, Poland. (**Oral Presentation)**

Conference Presentations / Posters:

- Michalski, L.†, Zeh, C.†, Beltrame, L., Valsecchi, D., Pantaleo, F., & Cano, E. (2025). *Efficient Data Movement for Machine Learning Inference in Heterogeneous CMS Software.* 23rd International Workshop on Advanced Computing and Analysis Techniques in Physics Research, Hamburg, Germany. (**Best Poster Award)**
- Michalski, L.†, Zeh, C.†, Beltrame, L., Valsecchi, D., Pantaleo, F., & Cano, E. (2025). *Efficient Data Movement for Machine Learning Inference in Heterogeneous CMS Software.* Fast Machine Learning for Science Conference, Zurich, Switzerland.
- Michalski, L.†, Zeh, C.†, Beltrame, L., Valsecchi, D., Pantaleo, F., & Cano, E. (2025). *Efficient Data Movement for Machine Learning Inference in Heterogeneous CMS Software.* 7th Inter-Experimental LHC Machine Learning Workshop, Geneva, Switzerland.

Other Non-Published Research

- Lopuszynski, S.†, Michalski, L.†, Rymer W.† (2025), *Ver2Vision: Verbal Data to Vision Synthesis with Latent Diffusion Models.*
- Michalski, L. (2025), *Real Time Computer Vision System for Cone Detection.*
- Michalski, L. (2024), *Benchmarking SLAM Algorithms for Autonomous Formula Student Vehicle.*
- Michalski, L. (2024), *Dense Graph Network based Path Planning Algorithm with Geometric Raceline Optimization.*

Relevant Research Skills

- Advanced programming knowledge in C++, Python.
- Deep understanding of modern GPUs architecture and heterogeneous computing principles.
- Meticulous and thorough when approaching software, hardware or firmware problems.
- Applied machine learning, algorithmic optimization, and hardware–software co-design knowledge demonstrated by delivering camera/LiDAR-based perception, SLAM, motion planning solutions for real-time high-performance electric formula-style autonomous vehicles.
- Tenacity and diligence for developing research projects.

Achievements and Rewards

- Best Poster Award, 23rd International Workshop on Advanced Computing and Analysis Techniques in Physics Research, 2025
- Best Oral Presentation & Paper Selected for Post-Conference Proceedings, 19th International Conference on Dependability of Computer Systems, 2024
- 1st Overall Classification Formula Student Easter 2025
- Scrutineering Star, Formula Student Czech Republic 2024
- European championship U19 participant, member of Polish national U19 cycling team, 2018
- Polish National Champion, Men's U19 Road Race, 2018
- Polish National Champion, Men's Elite Team Pursuit, 2019
- Polish Vice-Champion, Men's U23 Team Pursuit, 2019
- Dean's Scholarship for outstanding students from the beginning of BEng, continued during MSc
- "Piastek" Prize for Best Graduating Student High-School Award, 2019

Education

Wroclaw University of Science and Technology: MSc, Artificial Intelligence **2024 - 2026**

- Grade: First-Class Honours
  Thesis: *Real-time and Quasi-Real-Time Data Acquisition and Physics Analysis Algorithms for the Level 1 Trigger System*

  Relevant Modules: *Machine Learning, Deep Neural Networks, Representation Learning, Spatial Data Processing, Large Scale Data Processing.*
  Research Group: PWR Racing Team, Autonomous System Engineer, Projects: *RT14e / RT15e / RT16e*
  - *Senior member responsible for software implementations of perception (camera + LiDAR), SLAM, motion planning solutions and efficient integration on end devices (NVIDIA Jetson Orin).*

Wroclaw University of Science and Technology: BEng, Computer Engineering **2020 – 2024**

- Grade: First-Class Honours (Speciality: *Computer Vision & Graphics*)
  Thesis: *Real-Time GraphNet Path Planning Algorithm for an Autonomous Formula Student Vehicle*

  Relevant Modules: *Computer Architecture, Logit of Digital Circuits, Foundations of Microprocessor Techniques, Embedded Systems, Acceleration of Calculations in Data Processing.*
  Research Group: PWR Racing Team, Path Planning Engineer, Project: *RT13e*
  - *Research focused on path planning problems within real-time contexts focused on geometry constraints, convex optimization, pattern recognition, reinforcement learning, RRT, Delaunay triangulation, GNNs.*

Activities

Student Research Group, PWR Racing Team **2021 - 2026**

- Projects: *RT13e, RT14e, RT15e, RT16e*

  Member of student research group working on development of electric formula student race cars with autonomous capabilities. Senior technical staff member of the Software/Hardware department.

  Autonomous System Engineer - senior member responsible for software implementations of perception (camera + LiDAR), SLAM, motion planning solutions and efficient integration on end devices (NVIDIA Jetson Orin).

  Path Planning Engineer - *Focused on path planning problems within real-time contexts focused on geometry constraints, convex optimization, pattern recognition, reinforcement learning, RRT, Delaunay triangulation, GNNs.*

References

- PhD Giovanni Petrucciani, Research Staff, CERN
- PhD Davide Valsecchi, Postdoctoral Researcher, ETH Zurich
- Kacper Dominiak, GPU Software Development Leader, Intel
- Przemyslaw Lapko, Senior Software Process Improvement Specialist, Samsung Electronics R&D Institute
- PhD Marek Woda, Wroclaw University of Science and Technology
- PhD Dominik Zelazny, Wroclaw University of Science and Technology