

MICHAŁ ŁUKOMSKI

COMPUTATIONAL NEUROSCIENCE MASTER STUDENT
BACHELOR OF SCIENCE IN QUANTUM ENGINEERING

CONTACT

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SKILLS

- Spiking Neural Networks - Brian 2
- Programming languages: Julia, Python, MATLAB, C, C++, Fortran, Scala, R
- Machine Learning libraries: PyTorch, gym, Stable Baselines 3, Tensorflow/Keras, sklearn, Flux
- Quantum computing - Qiskit, PennyLane
- Git source control
- Design experiments with LabView
- Ab initio calculations
- Monte Carlo simulations
- Finite element analysis (COMSOL)
- Usage of laboratory equipment, esp in the field of photonics

ACTIVITIES

- **Board Member in Eviva L'arte association (2019--2023)**

Organizing the Račlacamp festival in my hometown (Skarżysko-Kamienna)

LANGUAGES

- **Polish** - native
- **English** - advanced (C1) (IELTS academic band 8)
- **German** - pre-intermediate (B1)
- **Russian** - beginner (A1)

EDUCATION

2023-10 -- present

MSc Computational Neuroscience, student

*Bernstein Center for Computational Neuroscience Berlin
Humboldt-Universität zu Berlin & Technische Universität Berlin*

Highlighted courses:

- Acquisition and Analysis of Neural Data
- Models of Higher Brain Functions
- Winter School "Ethics of Neuroscience and AI" 2024
- Models of Neural Systems
- The Virtual Brain in Clinical Research: An Introduction

During my first lab rotation I was developing multimodal foundation model for EEG and fMRI data in Prof. Ritter's lab.

2023-02 -- 2023-06

one semester towards MSc Big Data Analytics

*Wrocław University of Science and Technology
Faculty of Fundamental Problems of Technology*

I completed 29 ECTS before being accepted into the Computational Neuroscience Master's program. Highlighted courses:

- Advanced Topics in Algebra
- Statistical Physics for Complex Systems
- Stream Programming

2019-10 -- 2023-02

BSc Quantum Engineering

*Wrocław University of Science and Technology
Faculty of Fundamental Problems of Technology*

- 210 ECTS (7 semesters)
- Recipient of the Rector's Scholarship for the best student in all semesters
- The dean's reward for very good academic results (2020).
- Bachelor thesis: "*Machine Learning-driven improvement of ground state configuration*" - I used **deep reinforcement learning** for finding ground states of lattice systems. Thesis grade: excellent (5.5).
- GPA: 5.069 / 5.5 ("very good")
- additionally i completed 76 ECTS (2.5 semesters) worth of courses towards **BSc Algorithmic Computer Science** degree

PUBLICATIONS

2024-05

Waveguide-Coupled Light Photodetector Based on Two-Dimensional Molybdenum Disulfide

D. Hlushchenko, J. Olszewski, T. Martynkien, **M. Łukomski**, K. Gemza, P. Karasiński, M. Zięba, T. Baraniecki, Ł. Duda, A. Bachmatiuk, M. Guzik, and R. Kudrawiec

ACS Applied Materials & Interfaces 2024 16 (22), 28874-28885

EXPERIENCE

2025-06 -- present

Student Assistant in the PREACT research unit

Together with people from Division of Clinical Psychological Intervention, headed by Prof. Dr. Christine Knaevelsrud, we investigate Digital Phenotyping of emotion (dys-)regulation as transdiagnostic process and proxy for clinical and neurobiological markers of treatment (non-)response.

(forschungsguppe5187.de/de/projekte/sp6)

2025-07 -- present

Student Assistant in Prof. Kerstin Ritter's Lab

I continue investigating the pretraining of **EEG** and **fMRI** foundation deep learning models, which I started during my lab rotation earlier this year.

2025-01 -- 2025-04

BCCN Lab Rotation - Prof. Kerstin Ritter's Lab

Under the supervision of Sam Gijzen I was working to develop a multimodal foundation model that integrates **EEG** and **fMRI** data. Our model leverages the transformer architecture and employs self-supervised pre-training. The GitHub repository for this project is currently private and will be made public at a later stage.

2022-02 -- 2023-09

Student team member in HYPHa Research Team

Department of Optics and Photonics, Wrocław University of Science and Technology

Designing and studying hybrid sensor platforms of integrated photonic systems based on ceramic and polymer materials.

- Co-author in: "[Waveguide-Coupled Light Photodetector Based on Two-Dimensional Molybdenum Disulfide](#)" *ACS Applied Materials & Interfaces* 2024 16 (22), 28874-28885 (mentioned above)
- Studying waveguides properties with finite element analysis (COMSOL, MATLAB)
- Designing lithography layouts of integrated photonic systems (KLayout, Nazca design)
- Measuring properties of created photonic systems and single-layered materials by performing experiments

2021-06 -- 2021-08

Google Summer of Code - MuZero implementation

Implementation of MuZero - a reinforcement learning algorithm in Julia language.

summerofcode.withgoogle.com/archive/2021/projects/5675675435925504

2020 -- 2023

QUBIT - Quantum Computing Science Club

Active engagement in club projects such as

- investigating "Entropy entanglement in quantum reinforcement learning" presented at the 5th FOKA conference (github.com/qubit-science-club/quantum_reinforcement_learning)
- explaining quantum computing and quantum cryptography to the public

ACHIEVEMENTS

2022-05

1st place in the Q-munity Hack-Q-Thon

Our winning project: a Quantum version of the "Gwent" card game that allows learning quantum computing fundamentals.

(devpost.com/software/qwent)

2021-02

Credits in the QHack hackathon

Quantum Machine Learning hackathon organized by Xanadu.

2021, 2020, 2019

Medals in the Internet Mathematical (Team) Olympiad

A mathematical competition organized by Ariel University.

- 2021 (*team*) **Bronze** medal in the *Blitz* category
- 2020 (*individual*) **Gold** medal in the *Blitz* category
- 2019 (*team*) **Silver** medal in the *Championship* category, and **Bronze** medal in the *Blitz* category

TRAININGS

2024-07

Neuromatch Academy NeuroAI course

Two-week NeuroAI summer course.

For the final group project, we investigated biologically-plausible learning rules, such as Feedback Alignment, Predictive Coding and others.

(neuromatch.io/neuroai-course/)

2022-07

Neuromatch Academy Computational Neuroscience course

A three-week computational neuroscience summer course.

Finished with the group project titled "*Neural habituation and sensitization for novel and familiar visual stimuli in V1*".

(neuromatch.io/computational-neuroscience-course/)

2020-08

QuBes Camp

A two-week online camp introducing students to quantum computing.

Our group project explored quantum support vector machines (QSVM) and compared its accuracy with classical machine-learning models.

CONFERENCE PRESENTATIONS

2021-04

Future of Wireless Systems

Presentation - "*Introduction to quantum teleportation and quantum network*" (presented in Polish).

2020-10

5th National Student Physics and Optics Conference (FOKA)

Presentation - "*Quantum entanglement in quantum reinforcement learning*" (presented in Polish).

2020-02

Winter Kindergarten of Theoretical Physics

Presentation - "*Hourglass Weyl loops in nonsymmorphic monolayer GaTe*" (presented in English).

2019-12

4th National Student Physics and Optics Conference (FOKA)

Presentation - "*Where and when does our journey end? - a world of inverted values*" (presented in Polish).