[LinkedIn (sylwia-majchrowska)](#) [https://majsylw.netlify.app/](#)

Sylwia Majchrowska

R&D Researcher

Research scientist focused on data mining and modeling using probabilistic and deterministic approaches.
Fun of Python, eager to learn more (and share knowledge with others).

Professional Experience

06.2023 - Present **Postdoctoral fellow**
Center for Artificial Intelligence **AstraZeneca**
- Project titled "Adaptable AI for Echo Analysis using Self Supervised Learning".

10.2021 - 04.2023 **Data Scientist**
Eye for AI Talent Program **AI Sweden**
- 24th Oct '22 - 15th Apr '23 - **AstraZeneca**: *Feature translation for machine to human readable outputs*.
- 11th Apr '22 - 21st Oct '22 - **Zenseact**: *Explainable and interpretable motion prediction approaches of road users in highly interactive scenarios using Argoverse and NuScenes dataset*.
- 4th Oct '21 - 8th Apr '22 - **Sahlgrenska University Hospital**: *Generative modeling of medical data for anonymisation purposes & Explainable AI*
- 4th Oct '21 - 8th Apr '22 - **AI Sweden**: *Federated Learning in the context of skin lesion diseases classification and generation.*

07.2019 - 10.2021 **Deep Learning Researcher**
R&D Team **NeuroSYS Sp. z o.o.**
- Research on computer vision, signal processing, speech enhancement and deep learning
- Designing and developing deep learning algorithms for image processing using neural network models

05.2021 – 8.2021 **Open Software Programmer**
gprMax **Google Summer of Code**
- Develop scripts to model electromagnetic properties of different dispersive media.

10.2018 - 06.2019 **Junior Data Analyst (training)**
CWR & LoA Management Team **Nokia**
- Automation with scripting to support data organization (VBA, mySQL, DAX)
- Creation of user-friendly tools visualizing the financial domain of the benchmarked product or service (Power BI Services - developing new visuals R/Python/TypeScript)

07.2017 - 09.2018 **R&D Researcher**
Numerical Simulation Team **XTPL S.A.**
- Solving problems related to conducting experimental research using techniques based on data analysis
- Developing a numerical model describing the physical phenomena occurring during the formation of ultrathin conductive lines (ANSYS, Python)

Skills

Languages / Frameworks

Python (PyTorch, scikit-learn, python-pcl, python-opencv), Matlab (ODE, FFT, DL tools), C/C++, R, SQL

Tools

GIT, Jupyter notebook, Latex, Matlab, Power BI

Concepts

Computer Vision, CNNs, Domain Adaptation, GANs, Image segmentation, Object detection, Explainable AI, Bias Mitigation, Numerical modeling, Nonlinear fiber optics, Energy conservation

Education

10.2017 - 01.2023 **Doctor of Philosophy**
Wroclaw University of Science and Technology
- Physics, spec. Nonlinear Fiber Optics
- Doctoral thesis: *Numerical investigation of the dynamics of selected nonlinear phenomena in multimode optical fibers*
- Research in topic of modeling nonlinear phenomena in multimode fibers (Matlab, COMSOL)
- Present own research at conferences and in form of reports/articles
- Teaching basics of programming and physics

10.2012 - 07.2017 **Master of Engineering**
Wroclaw University of Science and Technology
- Physics, spec. Nanoengineering
- Master thesis: *Modeling of second harmonic generation in microstructured optical fibers* (5.5/5.5)
- Engineering thesis: *Modeling of all-normal supercontinuum generation in microstructured optical fibers* (5.0/5.5)

10.2012 - 09.2017 **Master of Science**
University of Wroclaw
- Mathematics, spec. Biomathematics
- Intern at Department of Genomic
- Master thesis: *Selforganization of light – mathematical model and simulations* (4.5/5.0)

Languages

Polish: native, English: B2, German: A2

Selected publications

Towards trustworthy multi-modal motion prediction: Holistic evaluation and interpretability of outputs, S. Carrasco, S. Majchrowska, J. Johnander, C. Petersson, , M.l Ángel Sotelo, D. Fernández Llorca, CAAI Transactions on Intelligence Technology, 10.1049/cit2.12244, 2023

The (de) biasing effect of GAN-based augmentation methods on skin lesion images, A. Mikołajczyk, S. Majchrowska, S. Carrasco, MICCAI, 437-447, 2022

Multiple intermodal-vectorial four-wave mixing bands generated by selective excitation of orthogonally polarized LP_{01} and LP_{11} modes in a birefringent fiber, S. Majchrowska, K. Żołnacz, W Urbańczyk, K Tarnowski, Optics Letters 47 (10), 2522-2525, 2022

Self-Normalized Density Map (SNDM) for Counting Microbiological Objects, K. M. Graczyk, J. Pawłowski, S. Majchrowska, T. Golan, Scientific Reports 12 (1), 10583, 2022

Generation of microbial colonies dataset with deep learning style transfer, J. Pawłowski, S. Majchrowska, T. Golan, Scientific Reports 12 (1), 1-12, 2022

Deep learning-based waste detection in natural and urban environments, S. Majchrowska, A. Mikołajczyk, M Ferlin, Z. Klawikowska, M. Plantykow, A. Kwasigroch, Karol M., Waste Management 138, 274-284, 2022

Modeling Arbitrary Complex Dielectric Properties – an automated implementation for gprMax, S. Majchrowska, I. Giannakis, C. Warren, A. Giannopoulos, 2021 11th IWAGPR

Selected projects

Feature translation for machine to human readable outputs
AstraZeneca (10.2022 – Present)
Classification and segmentation of the echocardiograms.
Technologies used: Python, Pytorch

Explainable and interpretable motion prediction
Zenseact (04.2022 – 10.2022)
Research on motion prediction using GNN-based approaches.
Technologies used: Python, Pytorch

Generative modeling of medical data
Sahlgrenska University Hospital (10.2021 – 04.2022)
The main goal of the project is to explore GANs to generate synthetic data and test the performance of DL models.
Technologies used: Python, Pytorch

Decentralized learning for healthcare data
AI Sweden (10.2021 – 04.2022)
Discover how Swedish hospitals can collaborate in a practical sense. Case study: Melanoma Image classification.
Technologies used: Python, Pytorch

HearAI
WAI Poland (06.2021 – 04.2022)
Non-profit educational project from the AI for Good series during which we focus on the problem of sign language recognition with strong emphasis on data annotations.
Technologies used: Python, Pytorch

Modeling materials with complex electromagnetic properties
Google Summer of Code (05.2021 - 08.2021)
The main goal of the project is to enhance a series of scripts, which modeled electromagnetic properties of the variety range of materials in gprMax software.
Technologies used: Python.

Nonlinear phenomena in multimode fibers
Wroclaw University of Technology (09.2019 – 08.2021)
Modeling of nonlinear propagation in multimode fibers - influence of fiber parameter on nonlinear phenomena. Investigation of multimode solitons and frequency conversion.
Technologies used: Matlab, COMSOL Multiphysics.

Detect Waste
WiML&DS (10.2020 – 03.2021)
Non-profit educational project from the AI for Good series during which we focus on the problem of waste in the environment with strong emphasis on plastics. We learn together and work on a model for trash detection from RGB images.
Technologies used: Python, Pytorch

Development of a new method for detection and identifying bacterial colonies using artificial neural networks and machine learning algorithms
NeuroSYS (07.2019 - 07.2020)
In collaboration with microbiologists from University of Wroclaw we developed solutions for detection, classification and counting bacterial colonies grown on agar plates.
Technologies used: Python, PyTorch

Teaching

11.2022 **Visiting Lecturer**
University of Uppsala – Workshops on Trustworthy AI

01.2022 - 06.2022 **Master Thesis Supervisor**
Sahlgrenska University Hospital – Synthetic images Generation

10.2017 - 12.2022 **Academic Teacher**
Wroclaw University of Science and Technology

Spring 2019/20	Physics preparation course for foreigners GNLSE in python - student project
Fall 2019/20	Introduction to programming in python
Spring 2018/19	Computer engineering systems – Comsol Procedural programming in C
Fall 2018/19	Introduction to programming in C
Spring 2017/18	Procedural programming in C
Fall 2017/18	Introduction to programming in C

For physics, optics, quantum engineering students

12.2019 - Present **Volunteer Mentor**
Coder Dojo Foundation

Year 2019/20	Robocycling – game design in Scratch CodeBlocks modeling in TinkerCAD Arduino for beginners (LEDs launch) Code Rocky – labyrinth and person mood/age analyzer (mblock5)

For 6-16 year old kids

07.2017 - 09.2021 **Volunteer Mentor**
PROJEKTOR Foundation

IT4She 2021	IT week - 3D printing for kids *(online)*
IT4She 2020	IT week - computer vision for kids *(online)*
June 2020	Fake news generation using GANs *(online)*
October 2019	Healthy eating workshops - breakfast
IT4She 2019	3D modeling and Code Rocky Dash&Dot workshops
IT4She 2018	BeCreo, Dash&Dot and 3D printer

For 6-16 year old kids

09.2019 - 12.2019 **Mentor in Ada Coders Club**
Girls Code Fun Foundation in cooperation with NOKIA

Fall 2019/20	Introduction to programming in Blockly and Canva

For 8-11 year old girls

✓ *I agree to have my personal data included in my application to be processed for the purposes of the recruitment process. according to rules described in the Privacy Statement for Applicants, as per the Regulation (EU) 2016/679 of the European Parliament and of the*

Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (GDPR).