Contact

Phone
+48 537 038 462

Email
antoni.dudij@rwth-aachen.de
antonidudij@gmail.com

Address
Rosstraße 7, Aachen, Germany

LinkedIn
antoni-dudij

GitHub
https://github.com/sheydHD

Technical Skills

Languages & Programming:
- Python (Expert)
- MATLAB (Expert)
- C++ (Advanced)
- JavaScript
- Bash

AI & Data Tools:
- TensorFlow
- PyTorch
- Graph Neural Networks
- MongoDB, PostgreSQL, SQLite

Simulation & Engineering:
- MS Office
- LaTeX
- Autodesk Inventor
- RoboDK

DevOps & Workflow:
- Linux
- Docker
- GitHub
- CI/CD pipelines
- VS code / Cursor

ML & AI Focus:
- Advanced prompt engineering
- Code, text & image generation
- AI agents creation and automation workflows

Antoni Dudij

RWTH Student

I am a student of Computational Engineering Science (CES) at RWTH Aachen University, with a strong focus on full-stack development, artificial intelligence, and automation. Passionate about building scalable web and mobile applications, I thrive in fast-paced environments and enjoy leveraging cutting-edge AI tools to accelerate development and learning.

Experience

November 2024 - Present

Working Student at Deutsches Zentrum für Luft- und Raumfahrt (DLR), Köln, Germany

Development of DLR-AutoMat – Full-Stack System for Material Card Automation

- Designed and deployed a **full-stack web app** (**React + Python/FastAPI**) to automate the generation of material cards for LS-Dyna simulations.
- Integrated Chemotion's **PostgreSQL** and a **MongoDB**-backed metadata search engine, enabling fast **AI-based data retrieval** from lab instruments.
- Ensured scalability and reliability through **Docker**-based deployment, **Git** version control, and adherence to modern backend and **DevOps** standards.

June 2024 - September 2024

Bachelor Thesis at Mercedes-Benz Group AG, Sindelfingen, Germany

"Evaluation of ML-based models for the detection of corrosion-prone areas during the vehicle development process"

- Created and structured datasets to **train** and **evaluate ML** models for identifying corrosion-prone areas in vehicle design.
- Conducted **expert interviews** and applied statistical metrics (e.g. **MCC**) for in-depth performance evaluation.
- Improved **segmentation** quality by identifying model weaknesses and refining feature engineering methods in **MATLAB**.

October 2023 - April 2024

6-month Internship at Mercedes-Benz Group AG, Sindelfingen, Germany

Development of ML-based models for the detection of corrosion-prone areas during vehicle development

- Improved segmentation of door components by enhancing **neural network training datasets** and applying advanced **feature engineering** in **MATLAB**.
- Retrained and optimized models for detecting corrosion protection layers (e.g., PVC, adhesives), evaluated using **MCC** and custom **visualizations**.
- Developed algorithms for automated detection of structural elements and contributed to the concept of a central experimental data repository.

October 2021 - October 2023

HIWI - RWTH Aachen Verfahrenstechnik, Germany

TriggerInk Project – Surgical Robotics Prototype

- Programmed **robotic arm** movements for knee surgery simulation using **RoboDK** and **Python**.
- Integrated the arm with an external pump system for precise cartilage extrusion control.

Flow, Fouling, and Backwashing with Membrane Filter Modules

- Designed and conducted experiments on various membrane modules, including AVT-developed hollow fibres and clinical blood filters.
- Operated **MRI** equipment to generate high-resolution images of membrane structures; enhanced image clarity with custom **MATLAB** scripts.
- Contributed to a peer-reviewed publication in Journal of Membrane Science: **https://doi.org/10.1016/j.memsci.2025.124205**

Languages

- Polish (Native)
- German (professional proficiency)
- Englisch (professional proficiency)
- Spanish (Advanced proficiency)
- Russian (Basic proficiency)

Personal Projects

- kusch-innovation-consulting.de
- Object Detection System
- Time Tracker Application
- AI Trading-Bot
- AI Family Tree App

Interests

- Coding
- Traveling
- Light athletics, volleyball, sailing
- Furniture crafting
- Cocktail making and organizing large-scale events

Education

October 2020 - Present

B.Sc. in Computational Engineering Science, RWTH Aachen, Germany

- Expected graduation date in September 2025

September 2017 - July 2020

High school graduate from I Liceum Ogólnokształcące im. Mikołaja Kopernika, Gdańsk, Poland

- High School Diploma (Matura-Abitur) with extended courses in Mathematics, Physics, and German

Publications

- Wypysek, D., Wennemaring, S., **Dudij, A.**, Wessling, M. (2025). Flow and fouling visualization in modules having multiple multichannel membranes. Journal of Membrane Science
- **DOI:** https://doi.org/10.1016/j.memsci.2025.124205

Projects

November 2024 - February 2025

CES Project - 'Computational Intelligence in Engineering', RWTH Aachen, Germany

Surrogate Model for FEM Porous Media Displacement Prediction

- Preprocessed **FEM** mesh data and converted simulation outputs for training via **ParaView** and custom scripts.
- Built and trained a **physics-informed Graph Neural Network** to predict nodal displacements on car seat and foam cushion meshes.
- **Tuned hyperparameters on** RWTH's CLAIX **cluster** and validated accuracy (**MAE, R^2**) against FEM benchmarks.
- Documented results with a focus on simulation speed-up and model generalizability.

May 2023 - October 2023

CES Project - '3D Printer Development', RWTH Aachen, Germany

Development of a Multi-Color 3D Delta Printer

- **Co-led a team** of four to design and build a custom **3D Delta Printer** capable of extruding three filaments through a single nozzle.
- Managed the full project lifecycle, from **CAD** modelling in Inventor to final assembly and calibration.
- Implemented **Marlin** firmware and **G-Code** for precise multi-material print control.

April 2022 - November 2022

CES Project - 'Simulation Software Development', RWTH Aachen, Germany

Validation and Comparison of Evaporation Models in a Lagrangian Particle Formulation

- Implemented Lagrangian Particle Model in **C++** with modular energy models and post-processing tools at AIA RWTH Aachen.
- Designed simulation architecture, developed test cases, and validated performance across various setups.
- Delivered full project documentation and user instructions for compilation and execution.