Antoni Dudij

Student

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Professional summary

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.

Websites, Portfolios, Profiles

- https://github.com/sheydHD
- https://www.linkedin.com/in/antoni-dudij
- https://kusch-innovation-consulting.de/
- https://doi.org/10.1016/j.memsci.2025.124205

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

Work history

HIWI, 07/2025 - Current

RWTH Aachen, Lehr- Und Forschungsgebiet Kontinuumsmechanik – Aachen, Germany

- Adjusted ***Deep Symbolic Optimization (DSO)*** code (2022) to modern standards using **Python 3.11** and **TensorFlow 2.x.**
- Increased code functionality extending the framework from **MISO (Multiple Input Single Output)** to **MIMO (Multiple Input Multiple Output)**.
- Documented codebase and adapted software for compatibility across diverse operating systems.

Working Student, 11/2024 - Current

Deutsches Zentrum für Luft- und Raumfahrt (DLR) – Köln, Germany

- Designed and deployed **DLR-AutoMat**, a full-stack web app (Python/FastAPI backend, React frontend) for automated generation of material cards for LS-Dyna simulations.
- Integrated a **MongoDB-based metadata search engine** to enable fast and efficient retrieval of experimental and simulation data.
- Deployed **Chemotion ELN** with PostgreSQL on company servers and ensured seamless interoperability with DLR-AutoMat and MongoDB.
- Connected all systems to the company's **cloud infrastructure**, ensuring scalability, reliability, and maintainability through Docker and Git-based DevOps workflows.

Bachelor Thesis, 06/2024 - 09/2024

Mercedes-Benz Group AG – Sindelfingen, Germany

- **Bachelor thesis topic:** "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 during a vehicle design.
- Conducted **interviews with field experts** and further evaluated in-depth performance with applied statistical metric like **MCC**.
- Improved segmentation quality by identifying model weaknesses and refining feature engineering methods in **MATLAB**.

Internship, 10/2023 - 04/2024

Mercedes-Benz Group AG – Sindelfingen, Germany

- Contributed to **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 methods** in **MATLAB**.
- Retrained and optimized models for detecting corrosion protection layers (e.g., PVC, adhesives), **evaluated using MCC** and custom visualizations.
- Developed and integrated algorithms for detection of crucial car structural elements (e.g. hem flange)

HIWI, 10/2021 - 10/2023

RWTH Aachen, Verfahrenstechnik – Aachen, Germany

TriggerInk Project – Surgical Robotic Arm Prototype

- **Programmed robotic arm movement** for a knee surgery simulation using **RoboDK** and **Python**.
- Connected the robotic arm and an extruder 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 fibers 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)

English (professional proficiency)

Russian (Basic proficiency)

German (professional proficiency)

Spanish (Advanced proficiency)

Education

Bachelor of Science: Computational Engineering Science, 08/2025
RWTH - Aachen, Germany
Expected graduation date in September 2025

High School Diploma: 07/2020
I Liceum Ogólnokształcące Im. Mikołaja Kopernika - Gdańsk, Poland
High School Diploma (Matura-Abitur) with extended courses in Mathematics, Physics, and German

Interests

Coding

Traveling

Light athletics, volleyball, sailing

Furniture crafting

Cocktail making and organizing large-scale events

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

Personal Projects

- Kusch-innovation-consulting.de
- Object Detection System
- Time Tracker Application
- AI Trading-Bot

- AI Family Tree App