Aleksandar Anžel

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Born 06.08.1995.

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WORK EXPERIENCE

October 2023 – present

Postdoctoral Researcher

Robert Koch Institute, Center for Artificial Intelligence in Public Health Research (ZKI-PH 5: Visualisation), Berlin

- Contributed to cutting-edge research and development efforts at the intersection of artificial intelligence (AI), machine learning, visualization, and public health. Collaborated with a multidisciplinary team of researchers to design and implement novel techniques for visualizing and explaining AI models in public health applications. Worked on improving existing visualization techniques used in public health AI models through analysis, evaluation, and proposing innovative solutions for enhanced user understanding and trust in AI systems. Conducted research and published findings in reputable scientific journals or presented at relevant international conferences.

July 2022 – February 2023

Technical Lead

eMedicals Healthtech GmbH, Frankfurt am Main

- Mentored and led two teams of 8 people to increase productivity and maximize product quality. Helped with discovering and hiring new team members. Assessed used technologies and advised on SOTA the team could use. Determined potential risks and proposed ways to mitigate them, thus providing GDPR compliant and secure internal platform. Asserted data compliance and ensured its proper adoption. Used Scrum methodology to help the product owner and acted as a Scrum Master. Designed and implemented application-critical parts of the *kidi* platform. Improved the performance of legacy code and decreased loading times by 40%. Reviewed the code of other team members and promoted collaboration and engagement between two teams. Provided architectural and design directions for the company's products and reinforced the company's goals. Guided the development according to multiple software-as-a-medical-product standards and conducted internal audits.

October 2021 – July 2022

Data Scientist

eMedicals Healthtech GmbH, Frankfurt am Main

- Used analytical, statistical, and programming skills to collect, analyze, and interpret large medical and biological data sets. Streamlined algorithm development, machine learning workflows (*i.e.,* NLP and computer vision), and statistical techniques to produce solutions to problems quickly. Initiated automated testing efforts that reduced post production defects by 30%. Closely worked with university partners (*i.e.*, Technische Universität Darmstadt) and research organizations (*i.e.*, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.) to improve, evaluate, and further develop algorithms relevant to the company. Closely monitored SOTA AI and data science methods and technologies to support the evolution of the company's strategy.4

December 2020 – September 2023

Research Associate

Heider Lab, Philipps-Universität Marburg, Marburg

- Developed bioinformatics and ML pipelines for solving various omics and multi-omics problems. Adapted existing and designed and implemented new visualization methods for biological and medical data sets. Organized and facilitated workshops, seminars, and lectures to empower and inspire students to reach their full potential. Mentored multiple undergraduate and graduate students during their studies and while conducting research. Introduced undergraduate and graduate students from various disciplines to good scientific practices and conventions.

MOSLA (*Molekulare Speicher zur Langzeit-Archivierung*), Philipps-Universität Marburg, Marburg

- Designed, implemented, and evaluated automatic workflows for information storage systems based on molecular storage media. Adapted existing and developed new visualization methods and UIs for novel data storage technologies. Systematically reviewed existing DNA storage tools and methods and promoted DNA as a data storage medium. Actively engaged with other domain specialists and supported and steered the research.

EDUCATION

December 2020 – December 2023

Doctoral degree in Computer Science (*Dr. rer. nat.*)

Philipps-Universität Marburg, Faculty of Mathematics and Computer Science

- Anžel, A. (2023). *A Tale of Two Approaches: Comparing Top-Down and Bottom-Up Strategies for Analyzing and Visualizing High-Dimensional Data*. Philipps-Universität Marburg. 10.17192/z2023.0533

August 2021

OxML Summer School

Modules: Representation learning and statistical ML, NLP, ML in healthcare

Machine Learning Summer School, University of Oxford

October 2018 – January 2020

Master's degree in Mathematics

Module: Computer Science and Informatics

University of Belgrade, Faculty of Mathematics

- Average grade: 10.00 (out of 10.00)
- Anžel, A. (2020). *Determining protein N-glycosylation with machine learning methods*. University of Belgrade, Faculty of Mathematics. elibrary.matf.bg.ac.rs

October 2014 – July 2018

Bachelor's degree in Mathematics

Module: Computer Science and Informatics

University of Belgrade, Faculty of Mathematics

- Average grade: 8.66 (out of 10.00)

SKILLS

Languages

Serbian — Native proficiency

English — Bilingual proficiency

- Cambridge English: First (FCE): upper intermediate (B2 in CEFR)

German — Elementary proficiency

Computer Science

Software Development

- Python, C, C++, Java, MATLAB, Shell, Haskell, Assembly IA-64, Assembly ARM-32

Machine Learning

- Keras, Tensorflow, Scikit-learn, PyTorch

Data Management

- SQL, NoSQL, Pandas

Visualization

- Vega-Lite, Altair, Plotly, Matplotlib

Additional skills

Scientific and Cluster Computing, High-Level Visualization, CI/CD, Containerization (Docker), Cloud Development (Microsoft Azure), Agile Development, Scrum, Code Verification and Validation

Document manipulation — LaTeX, Libre Office Suite, Microsoft Office Suite

Soft skills

- Excellent organizational and communication skills utilized to convey complex scientific concepts to diverse audiences
- Outstanding interpersonal skills leveraged to cultivate productive relationships with academic and industry partners
- Thoroughness, with rigorous attention to both detail and quality
- Project management expertise applied in overseeing research endeavors within academic and industry contexts, delivering results with efficiency and excellence
- Strong analytical thinking skills utilized to drive data-driven decision-making in complex scientific projects

PUBLICATIONS

2024

- Weckbecker, M., **Anžel, A.**, Yang, Z., & Hattab, G. (2024). *Interpretable Molecular Encodings and Representations for Machine Learning Tasks*. Computational and Structural Biotechnology Journal, 23, 2326–2336. 10.1016/j.csbj.2024.05.035
- Yang, Z., Dai, X., Yang, W., İlgen, B., **Anžel, A.**, & Hattab, G. (2024). *Kernel-based Learning for Safe Control of Discrete-Time Unknown Systems under Incomplete Observations (Version 1)*. The 43rd Chinese Control Conference (CCC), Kunming, China, July 2024. 10.48550/arXiv.2405.00822

2023

- **Anžel, A.**, Heider, D., & Hattab, G. (2023). *Interactive Polar Diagrams for Model Comparison.* Computer Methods and Programs in Biomedicine, 242, 107843. 10.1016/j.cmpb.2023.107843
- Hattab, G., **Anžel, A.**, Spänig, S., Neumann, N., & Heider, D. (01 2023). *A parametric approach for molecular encodings using multilevel atomic neighborhoods applied to peptide classification.* NAR Genomics and Bioinformatics, 5(1). 10.1093/nargab/lqac103

2022

- **Anžel, A.**, Heider, D., & Hattab, G. (2022). *MOVIS: A multi-omics software solution for multi-modal time-series clustering, embedding, and visualizing tasks.* Computational and Structural Biotechnology Journal, 20, 1044–1055. 10.1016/j.csbj.2022.02.012

2021

- **Anžel, A.**, Heider, D., & Hattab, G. (2021). *The Visual Story of Data Storage: From Storage Properties to User Interfaces.* Computational and Structural Biotechnology Journal, 1(1), 1. 10.1016/j.csbj.2021.08.031

SOFTWARE PROJECTS

Bioinformatics

- *MOVIS: A Multi-Omics Software Solution for Multi-modal Time-Series Clustering, Embedding, and Visualizing Tasks*
- *CMANGOES — Carbon-based Multi-level AtomicNeiGhborhOod EncodingS*
- *Determining protein N-glycosylation with machine learning methods*
- *Modification and analysis of UPGMA algorithm while using different metrics*

Computer Science

- *Interactive Polar Diagrams for Model Comparison*
- *Finding Waldo using various Machine Learning methods*
- *Image modification and correction in Python*
- *Determining integer variable ranges using Abstract Interpretation in C++ (LLVM, Clang)*
- *AVL trees in C programming language*

SELECTED EVENTS

2024

- *Workshop — Good Scientific Practice: From Data to AI.* Berlin, Germany. (presenter)
- *Serbian Society for Bioinformatics and Computational Biology (BiRBi) Seminar.* Virtual. (presenter)

2023

- *Artificial Intelligence in Public Health Research.* Berlin, Germany. (organizer, attendee)
- *Future Bioinformatics Workshop.* Herborn, Germany. (attendee)

2022

- *Future Bioinformatics Workshop.* Ebsdorfergrund, Germany. (presenter)
- *The 1st International Conference on Data Storage in Molecular Media.* Virtual. (attendee, co-host)

2021
- *IEEE Visualization Conference (VIS).* Virtual. (attendee)
- *Bio+Med+Vis Spring School.* Virtual. (attendee)
- *Symposium on Interdisciplinary Bioinformatics and Biomedical Data Science (IBBMDS).* Marburg, Germany. (presenter)

2020
- *IEEE Visualization Conference (VIS).* Salt Lake City, Utah, USA. (attendee)
- *Eurographics & Eurovis (EGEV).* Norrköpping, Sweden. (attendee)

TEACHING

2022 – 2023
- **Lecture**, *Machine Learning.* Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany. (collaborator, tutor)

2022
- **Guest lecture**, *Molecules as storage media for long-term data storage.* Faculty of Mathematics, University of Belgrade. Belgrade, Serbia. (presenter)

2021 – 2022
- **Group student project (Projektarbeit)**, *DNA Storage Encodings.* Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany. (co-organizer, tutor)

2020 – 2022
- **Lecture**, *Data Visualization.* Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany. (collaborator)
- **Seminar**, *Information Theory Tools for Visual Computing.* Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany. (co-organizer, presenter)

ADVISING & SUPERVISION

January 2024 – present Vincent Schilling, M.Sc., Computer Science (CS). *AI-supported proteomics analysis for an effective antimicrobial therapy decision*. Department of Mathematics and Computer Science, Freie Universität Berlin. Berlin, Germany.

October 2023 – present Andre Jatmiko Wijaya, M.Sc., Computer Science (CS). *Monitoring Antimicrobial Resistance (AMR) Reservoirs and the Evolution of Virulence through AI-supported Next Generation Annotation of Horizontal Gene Transfer*. Department of Mathematics and Computer Science, Freie Universität Berlin. Berlin, Germany.

October 2023 – present Ana Gomes Ferreira, M.Sc., Computer Science (CS). *Unsupervised Learning for Surveillance Indicators*. Department of Mathematics and Computer Science, Freie Universität Berlin. Berlin, Germany.

November 2022 – September 2023 Bianca Thiel, M.Sc., Computer Science (CS). *Interactive Information-Theoretic Visualization for Plot Types*. Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany.

October 2022 – September 2023 Dilekcan Pamir, B.Sc., Computer Science (CS). *Qualitative and Quantitative Visualization of Soft-Tissue Registration Mediated with Isolines*. Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany.

June 2022 – October 2022 Jing Chen, B.Sc., Bioinformatics (BI). *Geospatial Visualization of Lake Microbiomes*. Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany.

October 2021 – November 2022 Fabio Rougier, M.Sc., Computer Science (CS). *Explainable Machine Learning – Visualization of Random Forests*. Department of Mathematics and Computer Science, Philipps-Universität Marburg. Marburg, Germany.

REVIEWING

2022 – present
- BMC Bioinformatics, ISSN: 1471-2105
- Scientific Reports, ISSN: 2045-2322
- BioData Mining, ISSN: 1756-0381
- Bioinformatics Advances, ISSN: 2635-0041
- Frontiers in Cellular and Infection Microbiology, ISSN: 2235-2988

ADDITIONAL INFORMATION

Driving licence	Category B (cars)
Interests	Technology, Research, Computer Science, Bioinformatics, Linux, FOSS, Science Fiction, Fantasy, The Matrix, Video games, Hiking