Antonin Sulc PhD

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http://sulcantonin.github.io

RESEARCH INTERESTS Computer Vision (Geometry), Anomaly Detection, Language (NLP, LLM)

Technologies

PyTorch, Streamlit, HuggingFace, High-Performance (Cloud) Computing, R

LANGUAGES

English (C1), German (B2), Czech (native)

EDUCATION

University of Konstanz, Konstanz, Germany

PhD., Artificial Intelligence - Computer Vision, 2015 - 2020

- Grade: Magna Cum Laude (1.0)
- Advisors: Prof. Dr. Bastian Goldluecke
- 434 Citations (Google Scholar)
- Publications on top-tier conferences (CVPR, ICCV, BMVC)
- Contribution to projects outside scope of PhD topic (Dpt. of Collective Behavior)

Czech Technical University, Prague, Czech Republic

Bc.& MSc., Artificial Intelligence, 2008 - 2014

• Nominated as a master thesis of year 2014 in Czech Republic

Work

Founder

April 2022 - ∞

mindling.tech

Consulting Start-up,

Development of tailor made AI solutions for various clients like tailor made multilingual search, digital twins, tracking

Researcher

January 2024 - ∞

Berkeley Lab (LBNL) - UC Berkeley

Development of intelligent algorithms for accelerator controls

Senior Data Scientist

May 2021 - October 2024

Helmholtz Gemeinschaft

Real-time accelerator controls algorithms for anomaly detection

Improvement of corporate FAIR principles.

Visiting Researcher (within PhD.)

March 2020 - Aug 2020

University of Haifa - Marine Imaging Lab,

A short term research stay, help in the lab, development of algorithm for image processing in challenging environments (water)

Supervisor: Dr. Tali Treibitz

Visiting Researcher (within PhD.)

Oct 2018 - March 2019

National Institute of Informatics in Tokyo,

Imari Sato Lab

A short term research stay, help in the lab, development of algorithm for image processing in challenging environments (water)

Software Engineer & Data Scientist

Jan 2014 - Dec 2015

Vendavo Inc., Prague, Czech Republic

Development of recommender systems

Supervisor: Dr. Ludek Kopacek, Eric Bergerson

Journals

- A. Sulc, A. Eichler and T. Wilksen Unsupervised Log Anomaly Detection with Few Unique Tokens *IET Journal Information Security* (in review)
- A. Sulc, A. Eichler and T. Wilsken. A data-driven anomaly detection on SRF cavities at the European XFEL. *Journal of Physics: Conference Series*. Vol. 2420. No. 1. IOP Publishing, 2023.

- A. Sulc, O. Johannsen, B. Goldluecke. Recovery of Geometry, Natural Illumination and BRDF from a Single Light Field Image, In *Journal of the Optical Society of America A*, 2022,
- S. Ishihara, A. Sulc, and I Sato, Depth estimation using spectrally varying defocus blur, In *Journal* of the Optical Society of America A, 2021,

PEER-REVIEWED PUBLICATIONS

- 1. A. Sulc, T. Hellert, R. Kammering, H. Houscher, J. M. St. John, Towards Agentic AI on Particle Accelerators at ML4Physics Workshop at The Conference on Neural Information Processing Systems 2024, New Orleans, USA
- A. Sulc, R. Kammering, A. Eichler, T. Wilksen PACuna: Automated Fine-Tuning of Language Models for Particle Accelerators at ML4Physics Workshop at The Conference on Neural Information Processing Systems 2023, New Orleans, USA
- 3. A. Sulc, I. Sato, B. Goldluecke, T. Treibitz. Towards Monocular Shape from Refraction, In BMVC, 2021, oral (3.3% acceptance)
- 4. S. Ishihara, A. Sulc, I. Sato. Depth from Spectral Defocus Blur. In *Proc. International Conference in Image Processing (ICIP)*, 2019
- 5. M. Zhu, A. Alperovich, O. Johannsen, A. Sulc, B. Goldluecke. An Epipolar Volume Autoencoder with Adversarial Loss for Deep Light Field Super-Resolution. In *Proc. Conference on Computer Vision and Pattern Recognition Workshop (CVPRW)*, 2019.
- A. Sulc, O. Johannsen, B. Goldluecke. Inverse Lightfield Rendering for Shape, Reflection and Natural Illumination. In Proc. 11th International Conference on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR), 2017.
- 7. O. Johannsen, A. Sulc¹, N. Marniok, B. Goldluecke. Layered scene reconstruction from multiple light field camera views. In *Proc. Asian Conference on Computer Vision (ACCV)*, 2016.
- 8. A. Sulc, A. Alperovich, N. Marniok, B. Goldluecke. Reflection Separation in Light Fields based on Sparse Coding and Specular Flow. In *Proc. Vision*, *Modelling and Visualization (VMV)*, 2016.
- 9. O. Johannsen, A. Sulc, B. Goldluecke. Occlusion-aware depth estimation using sparse light field coding. In *Proc. German Conference on Computer Vision (GCPR)*, 2016.
- 10. O. Johannsen, A. Sulc, B. Goldluecke. What Sparse Light Field Coding Reveals About Scene Structure. In *Proc. Conference on Computer Vision and Pattern Recognition (CVPR)*, 2016.
- 11. O. Johannsen, A. Sulc, B. Goldluecke. Variational Separation of Light Field Layers. In *Proc. Vision, Modelling and Visualization (VMV)*, 2015.
- 12. O. Johannsen, A. Sulc, B. Goldluecke. On Linear Structure from Motion for Light Field Cameras. In Proc. International Conference on Computer Vision (ICCV), 2015.

PUBLICATIONS

- A. Sulc, P. Connor ChatQCD: Let Large Language Models Explore QCD , 42nd International Conference on High Energy Physics
- P. Connor, A. Sulc Revealing Connections in QCD with Machine Learning , 42nd International Conference on High Energy Physics
- A. Sulc, A. Eichler, T. Wilksen, Automated Anomaly Detection on European XFEL Klystrons at *International Conference in Particle Accelerators* 2024, Nashville, USA
- A. Sulc, A. Eichler, G. Hartmann, T. Wilksen, J. St. John, F. Mayet, J. Maldonado, D. Ratner, J. Kaiser, V. Kain, T. Hellert, H. Hoschouer, Towards Unlocking Insights from Logbooks Using AI at International Conference in Particle Accelerators 2024, Nashville, USA
- A. Sulc, A. Eichler, T. Wilksen, Log Anomaly Detection on EuXFEL Nodes at *The 19th Biennial International Conference on Accelerator and Large Experimental Physics Control Systems*, Cape Town, South Africa, <u>oral</u>

¹Equal Contribution

- A. Sulc, A. Eichler, T. Wilksen Textual Analysis of ICALEPCS and IPAC Conference Proceedings: Revealing Research Trends, Topics, and Collaborations for Future Insights and Advanced Search at The 19th Biennial International Conference on Accelerator and Large Experimental Physics Control Systems, Cape Town, South Africa, oral
- A. Sulc, O. R. Kammering, T. Wilksen. A Data-Driven Beam Trajectory Monitoring at the European XFEL at *International Conference in Particle Accelerators 2022*, Bangkok, Thailand

Talks and Tutorials

- 1. Language Processing for Matter and Technology, 10th Annual MT Meeting
- 2. Exploring the Strong Coupling Through Natural Language Processing at 1st Large Language Models in Physics Symposium (LIPS)
- 3. Illuminating the Dark: Discovering in Dark Matter Research through Natural Language Processing at 1st Large Language Models in Physics Symposium (LIPS)
- 4. Unlocking Insights from Logbooks using AI at DESY and BESSY at 9th Low Emittance Rings Workshop 2024
- 5. Towards Unlocking Insights from Logbooks using AI at DESY and BESSY at 4th ICFA Beam Dynamics Mini-Workshop on Machine Learning for Particle Accelerators
- 6. A Potential of Use of Language Processing in Accelerator Control Systems at International Conference on Accelerator and Large Experimental Physics Control Systems 2023 in Cape Town, South Africa
- 7. Machine Learning for Accelerator(s) R&D at Any Light Particle Search Workshop at DESY in Hamburg, Germany
- 8. Tutorial on Anomaly Detection at ICFA Beam Dynamics Workshop in Chicago, IL, USA
- 9. Current Development of Automated Accelerator Controls at DESY 8th Matter and Technologies Annual Meeting in Hamburg, Germany
- 10. Machine Learning for Anomaly Detection at MLE-Summer School at TUHH in Hamburg, Germany
- 11. Data-Driven Diagnosis at European XFEL at CDCS Opening Symposium in Hamburg, GErmany
- 12. Light Field Analysis for non-Lambertian Scenes at PixelClub Technion in Haifa, Israel
- 13. Multiobject Tracking Repetitive Patterns with Autoencoder at Machine learning in the behavioral sciences Workshop at ASAB Summer School 2019 in Konstanz, Germany
- 14. Lightfield Analysis for non-Lambertian Scenes at The 11th Intelligent Machine Perception Seminar in Prague, Czech Republic
- 15. Light-fields: Beyond the Lambertian at The 38th Pattern Recognition and Computer Vision Colloquium in Prague, Czech Republic
- 16. State-of-The-Art Computational Design and Fabrication

OTHER

- Scientific Chair of 5th ICFA Beam Dynamics Mini-Workshop on Machine Learning for Particle Accelerators.
- Reviewer of CVPR, NeuralIPS
- B-driver license.