Vincent **Bürgin**

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⚙ Vuenc   in linkedin.com/in/vincent-buergin

Education

M.Sc. Informatics
Technical University of Munich (TUM)

Grade: 1,0 / *passed with high distinction*   October 2020 – March 2024

- Master's program in Computer Science with focus on research projects (*Data Innovation Lab, Guided Research*)
- Area of Specialization: *Machine Learning and Analytics* (20 + 8* ECTS)
- Supplemental Areas (≥ 8 ECTS): *Algorithms, Computer Graphics and Vision, Scientific Computing and HPC*
- Master's Thesis: *Topology-Aware 3D Medical Image Segmentation via Persistent Homology* (Grade: 1,0).
  Supervision: Prof. Daniel Rückert, Prof. Ulrich Bauer, Dr. Johannes Paetzold, Nico Stucki

* Voluntary additional credits

B.Sc. Computer Science
University of Passau

Grade: 1,0 / *mit Auszeichnung ("with distinction")*   October 2016 – September 2020

- Bachelor's Thesis: *Distribution-Valued Games: Overview, Analysis, and a Segmentation-Based Approach* (Grade: 1,0).
  Supervision: Prof. Fabian Wirth, Prof. Hermann de Meer
- Semester abroad at Waterford Institute of Technology, Ireland (September 2018 – December 2018)

B.Sc. Mathematics
University of Passau

Grade: 1,0 / *mit Auszeichnung ("with distinction")*   April 2019 – September 2020

- Studied jointly with B.Sc. Computer Science, joint Bachelor's Thesis

Abitur *(general university entrance qualification)*
Goethe-Gymnasium Regensburg

Grade: 1,0   September 2008 – June 2016

Work Experience

Research Internship
ImFusion GmbH, Munich

November 2022 – April 2023

- Researching applications of graph neural networks (GNNs) for vertebra identification task on CT scans
- Training GNNs processing the output of a vertebra keypoint localisation CNN *(Python, PyTorch, PyTorch Geometric)*
- Integrating GNN inference into ImFusion Suite *(C++)*
- Research resulted in publication at MICCAI conference (*Robust vertebra identification using simultaneous node and edge predicting Graph Neural Networks*, MICCAI 2023).

Student assistant
Chair of Computer Networks, University of Passau

March 2019 – December 2019

- Integrating the *ns-3* network simulator with the mosaik smart power grid co-simulation framework *(Python)*

Internship/vacation jobs in Software Engineering
Vector Informatik GmbH, Regensburg

July 2013; April 2014, April 2015, August 2015, August 2016

- A one-week highschool student intership and several two-week vacation jobs *(C# & WPF, Java)*

Volunteering

EnHands
October 2022 – present

Accredited student initiative at TUM developing hand prosthesis prototypes for low-income countries

- Founding member, leading marketing/student outreach and event organization (*HANDSFORUM*), and contributing to funding applications and organizational tasks
- Treasurer of EnHands e.V. (registered association)

Academic Publications

1. **Remarks on the tail order on moment sequences.**
   V. Bürgin, J. Epperlein, and F. Wirth (2022). Journal of Mathematical Analysis and Applications, Vol. 512 (1). ☺ ✗

2. **Robust vertebra identification using simultaneous node and edge predicting Graph Neural Networks.**
   V. Bürgin, R. Prevost, and M. F. Stollenga (2023). Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023. ☺ ✗

3. **S3M: Scalable Statistical Shape Modeling through Unsupervised Correspondences.**
   L. Bastian*, A. Baumann*, E. Hoppe, V. Bürgin, H. Y. Kim, M. Saleh, B. Busam, and N. Navab (2023). Medical Image Computing and Computer Assisted Intervention (MICCAI) 2023. ☺ ✗

4. **On the Localization of Ultrasound Image Slices within Point Distribution Models.**
   L. Bastian*, V. Bürgin*, H. Y. Kim*, A. Baumann, B. Busam, M. Saleh, and N. Navab (2023). International Workshop on Shape in Medical Imaging (ShapeMI), 2023. ☺ ✗

5. **Topologically faithful multi-class segmentation in medical images.**
   A. Berger, N. Stucki, L. Lux, V. Bürgin, S. Shit, A. Banaszak, D. Rückert, U. Bauer, and Johannes C. Paetzold (2024). Medical Image Computing and Computer Assisted Intervention (MICCAI), 2024. ☺ ✗

6. **Efficient Betti Matching Enables Topology-Aware 3D Segmentation via Persistent Homology.**
   N. Stucki, V. Bürgin, Johannes C. Paetzold, and U. Bauer (2024). Preprint, arXiv:2407.04683. ✗

   Denotes equal contributions

Scholarships and Achievements

relAI: Konrad Zuse School of Excellence in Reliable AI — October 2022 – September 2024
Scholarship and program for Master's and Ph.D. students focusing on reliable AI

best.in.tum, Technical University of Munich — April 2022
Award for top 2% students of the TUM Department of Informatics

Faculty Prize, University of Passau — May 2022
Award for the two highest-scoring graduates per degree program / received for both my B.Sc. degrees

Max Weber-Programm — 2016 – 2022
Scholarship for talented students (awarded after highschool and confirmed after two years of studies)

Bundeswettbewerb Informatik/Bundeswettbewerb Mathematik — 2013 – 2016
National highschool student computer science/mathematics competitions

- *Bundeswettbewerb Informatik*: participated three times (2013/14, 2014/15, 2015/16), final round participant in 2016
- *Bundeswettbewerb Mathematik*: participated two times (2014/15, 2015/16), second prize in second round 2016

Skills

Language Skills

- **German**: Native speaker
- **English**: Fluent and experienced speaker (C1–C2) / TOEFL score 118/120 (June 2020)
- **Spanish**: Basic to advanced knowledge (B1–B2) / university courses until B2.1 level
- **French**: Basic knowledge

Programming Languages and Software

- **Python**: Extensive experience through research projects, research internship, university projects and personal projects. Libraries used include *Numpy, SciPy, PyTorch, PyTorch Geometric.*
- **C++**: Experience through research internship and Master's thesis project.
- **Rust**: Experience through personal projects. Technologies used include *Tokio*, Rust with Wasm, *SixtyFPS* (now *Slint*).
- **JavaScript/NodeJS**: Experience through university projects (full-stack web development) and personal projects (interactive visualizations and algorithmic art). Libraries used include *VueJS, Express, p5.js.*
- **C#**: Experience through personal projects (2010 – 2016, including *Bundeswettbewerb Informatik* projects, XNA/Windows Phone games, puzzle solvers etc.) and highschool student jobs.

Other technologies: *Git / Java, C, Haskell, Julia / LaTeX, Typst / AWS / SageMath, Mathematica, MATLAB, R.*