

Dr. Thomas Lang

Curriculum Vitae

Personal Information

Born **20th April 1993**, *Schärding*
Citizenship **Austria**
Confession **Roman catholic**



Education

PhD

04/01/2018 – 04/14/2021 **University of Passau**, *Computer Science*, Final grade 1.0 (*summa cum laude*)
07/09/2021 Thesis defence

Study

Term 2016/17–Term 2017/18 **University of Passau**, *Master Computer Science*, Final grade 1.1 (with distinction)
Term 2013/14–Term 2016 **University of Passau**, *Bachelor Computer Science*, Final grade 1.8 (good)

School

2012 **Matura**, *Average grade 1.2 (with distinction)*
2007–2012 **Höhere Technische Lehranstalt Innviertel-Nord in Andorf**
2003–2007 **Hauptschule Münzkirchen**
1999–2003 **Volksschule Münzkirchen**

PhD Thesis

Title **AI-Supported Interactive Segmentation of 3D Volumes**
Description Development of novel and general methods for interactive segmentation of very large 3D volumetric data using geometric information.
Download <https://nbn-resolving.org/urn:nbn:de:bvb:739-opus4-9221>

Masters Thesis

Title **Improving the Efficiency of Code Generation Based on Cylindrical Algebraic Decomposition**
Description Implementation and optimization of code generation for arbitrary loop bounds based on a cylindrical algebraic decomposition.
Download <http://www.infosun.fim.uni-passau.de/cl/arbeiten/lang-m.pdf>

Bachelors Thesis

Title **An Intel®Xeon Phi™ Backend for the ExaStencils Code Generator**
Description Extension of the ExaStencils code generator to support the Intel®Xeon Phi™ co-processor.
Download <http://www.infosun.fim.uni-passau.de/cl/arbeiten/lang-b.pdf>

Language Skills

German Native
English Fluent
Russian Fundamental

Presentations

C++ course Presenter of a C++ course at the University of Passau, Winter terms 2018/19 and 2019/20
PhD Several presentations throughout the doctorate
Rigorosum PhD thesis defence presentation, 07/09/2021

Experience

Professional

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| 09/01/2021 – | Post-Doc , <i>Fraunhofer IIS, Division EZRT/CTMT, Passau</i> |
| 04/01/2018 – 08/31/2021 | Researcher , <i>Institute FORWISS, University of Passau</i> |
| 08/01/2016 – 03/31/2018 | Student researcher , <i>Institute FORWISS, University of Passau</i> |
| 2015/2016 | Student researcher , <i>University of Passau, several chairs</i> |
| 07–08 / {2011,2013} | Summer job , <i>GST Global Sports Technologies GmbH</i> |

Additional Qualifications

- Extensive experience with programming in C/C++, Python, Haskell
- Extensive experience with parallel programming (OpenMP, MPI, GPU)
- Extensive experience with \LaTeX
- Extensive experience with machine learning techniques and their usage
- Experience with version control software (git, svn)

Projects

Acquired projects

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| 03/01/2023 – 02/28/2026 | KI4D4E , <i>An AI-based framework for the visualization and evaluation of massive datasets of 4D tomography for end users of beamlines</i> , Budget: 500k/210k/2.5M€ (FhG/UP/Total) |
| 09/01/2021 – 08/31/2022 | OntoSeg , <i>Efficient ontology-based segmentation of large volumes</i> , Budget: 90k€ |

Project work

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| 01/01/2022 – | QuaST , <i>Quantum-enabling Services und Tools für industrielle Anwendungen</i> |
| 01/01/2022 – | QACI , <i>Munich Quantum Valley - Quantum algorithms for application, cloud and industry</i> |
| 01/01/2022 – | BayQS , <i>Research with applications of Quantum Computing</i> |
| 03/01/2021 – 07/30/2021 | BM18 , <i>High resolution industrial tomography beamline for large objects</i> |
| 04/01/2018 – 02/28/2021 | Big Picture , <i>de.: Digitalisierung, Verarbeitung und Analyse kultureller und industrieller Objekte: Wertschöpfung aus großen Daten</i> |

Awards and Certificates

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| 11/11/2022 | Dissertationspreis der Universität Passau - Dissertation price of the University of Passau |
| 10/01/2019 | iSAQB [®] Certified Professional for Software Architecture - Foundation Level |
| 05/22/2018 | Professional Scrum Master I |
| 01/26/2018 | msg Price for exceptional study work |

Military Service

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| Type | Community Service |
| Institution | Lebenshilfe Münzkirchen |
| Field of Work | Aiding the care of care-dependent persons |
| Duration | 08/01/2012 to 04/30/2013 |

Hobbies and Interests

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| Computer Science | Interest in software development with focus on machine learning, programming languages and image processing |
| Genealogy | Creation of a genealogy of my family |
| Origami | Creation of complex origami figures |
| Calligraphy | Calligraphic writing, mostly in Kurrent |

Publications

- T. Lang, *AI-Supported Interactive Segmentation of 3D Volumes*. PhD thesis, University of Passau, 2021. Available under <https://nbn-resolving.org/urn:nbn:de:bvb:739-opus4-9221>.
- T. Lang and T. Sauer, “AI-Supported Segmentation of Industrial CT Data,” *e-Journal of Nondestructive Testing*, vol. 27, Mar. 2022.
- T. Lang and T. Sauer, “Geometric Active Learning for Segmentation of Large 3D Volumes,” *arXiv*, 2022. doi:10.48550/ARXIV.2210.06885.
- T. Lang and T. Sauer, “Feature-Adaptive Interactive Thresholding of Large 3D Volumes,” *arXiv*, 2022. doi:10.48550/ARXIV.2210.06961.
- T. Lang and T. Sauer, “Feature-Adaptive Interactive Thresholding.” Poster, presented at 31st Rhein-Ruhr-Workshop, Bestwig, 2022.
- T. Lang and T. Sauer, “AI-Supported Segmentation of Industrial CT Data.” Poster, presented at 31st Rhein-Ruhr-Workshop, Bestwig, 2022.
- T. Lang, “Clustering large 3D Volumes: A sampling-based approach,” in *Proc. 59th Annu. Br. Conf. Non-Destr. Test.*, 2022.
- T. Lang, “Achieving Quantum Supremacy in Image Processing: Is it Possible?.” Talk given at the 32nd Rhein-Ruhr-Workshop, Bestwig, 02 2023.
- R. Fischer, E. Hufnagel, T. Lang, J. Claußen, S. Gerth, and T. Sauer, “A Demonstrator for Threat Detection in Volumetric CT Scans,” *e-Journal of Nondestructive Testing*, vol. 28, Mar. 2023.
- T. Lang and A. M. Stock, “Interactive Denoising of 3D Volumes Using Wavelets,” *e-Journal of Nondestructive Testing*, vol. 28, Mar. 2023.
- T. Lang, N. Saeidnezhad, K. Dremel, D. Weller, M. Diez, A. M. Stock, T. Sauer, F. Cianciosi, C. Jarnias, P. Tafforeau, and S. Zabler, “Multiscale Phase-Contrast Tomography at BM18,” *e-Journal of Nondestructive Testing*, vol. 28, Mar. 2023.
- S. Semmler, K. Dremel, D. Suth, T. Lang, M. Basting, M. Firsching, T. Fuchs, S. Kasperl, D. Prjamkov, M. Weule, and R. Schielein, “N-Dimensional Image Encoding on Quantum Computers,” *e-Journal of Nondestructive Testing*, vol. 28, Mar. 2023.

Scientific Activities

- 2023 Co-conference chair of the 12th Int. Conf. on Industrial Computed Tomography (iCT 2023)
- 2023 Chair of Best Paper Award committee at iCT 2023