# Dr. Thomas Lang

*Curriculum Vitae*

## Personal Information

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

## Education

### PhD

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

### Study

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| 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

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| 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

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|---|---|
| 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

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|---|---|
| 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

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|---|---|
| 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

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|---|---|
| German | Native |
| English | Fluent |
| Russian | Fundamental |

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# Experience

## Professional

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

## 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

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

## Project work

01/01/2022 – **QuaST**, *Quantum-enabling Services und Tools für industrielle Anwendungen*
01/01/2022 – **MQV K7**, *Quantum algorithms for application, cloud and industry*
01/01/2022 – **BayQS**, *Research with applications of Quantum Computing*
07/01/2022 – **idROX**, *Creating a toolbox for multimodal data processing*
03/01/2021 – 07/30/2021 **BM18**, *High resolution industrial tomography beamline for large objects*
04/01/2018 – 02/28/2021 **Big Picture**, *de.: Digitalisierung, Verarbeitung und Analyse kultureller und industrieller Objekte: Wertschöpfung aus großen Daten*

# Awards and Certificates

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

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

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 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, T. Sauer, T. Wittenberg, S. Gerth, and N. Uhlmann, "OntoSeg - Segmentation of Large Volumetric Datasets Using Semantic Knowledge," in *2023 IEEE 17th International Conference on Semantic Computing (ICSC)*, (Laguna Hills, CA, USA), pp. 65–72, IEEE, Feb. 2023.

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 12$^{th}$ Int. Conf. on Industrial Computed Tomography (iCT 2023)

2023 Chair of Best Paper Award committee at iCT 2023

2023 Organizer of the Fraunhofer EZRT Workshop on Industrial CT at the ESRF beamline BM18

Münzkirchen, 26. Mai 2023