Tassilo Klein, Ph.D.

CONTACT INFORMATION

Machine Learning Research
Rosenthaler Str. 30
10178 Berlin
Germany

Phone: +49 (151) 649 365 46
Email: tassilo.klein@sap.com
https://tjklein.github.io

PROFESSIONAL EXPERIENCE

SAP SE, Berlin, Germany
Senior Research Scientist, Innovation Center Network — Apr 2017 – present
Senior Research Scientist, SAP Health — Dec 2015 – Mar 2017

WissEL GmbH, Scientific Instruments, Starnberg, Germany
Software Developer — 1996 – 2007

RESEARCH INTERESTS

Machine Learning: Deep Learning, Unsupervised Learning, Privacy-Preserving Learning

Medical Vision: Multi-modal learning, Computer-aided diagnosis using medical images

Natural Language Processing: Computational Semantics, Vision and Language Integration

EDUCATION

Technische Universität München, Munich, Germany
Ph.D., Computer Science — May 2008 – Dec 2012
Adviser: Prof. Nassir Navab
Thesis: Statistical Image Processing of Medical Ultrasound Radio Frequency Data

Diploma (M. Sc. equivalent), Computer Science — Apr 2004 – Apr 2008
Thesis: Fiducial-Free Registration Procedure for Navigated Bronchoscopy

Concordia University, Montreal, Canada Study abroad coursework in Computer Science Aug 2005 – Dec 2005

Ludwig-Maximilians-Universität München, Munich, Germany
Vordiplom (B. Sc. equivalent), Computer Science — Oct 2001 – Apr 2004

HONORS & AWARDS

Business plan competition winner — 2014
Harvard Healthcare Innovation & Commercialization (HIC), Harvard Medical School

Two-year research scholarship, German Research Foundation (DFG) — 2013

Student Travel Award (MICCAI) — 2012

Business plan competition winner — 2011
Center for Business Creation and Innovation at Technische Universität München

Siemens Excellence Award for outstanding master's thesis — 2008

Study abroad in Quebec tuition waiver scholarship (CREPUQ) — 2005

RESEARCH EXPERIENCE

Brigham and Women's Hospital, Harvard Medical School, Boston, USA
Postdoctoral Research Fellow, Department of Radiology — Sep 2013 – Nov 2015

Massachusetts Institute of Technology (MIT), Cambridge, USA
Research Affiliate, Computer Science & Artificial Intelligence Lab. Oct 2014 – Nov 2015

- Investigating machine learning technologies for ultrasound and multi-modal medical image processing tasks (registration, segmentation, reconstruction)
- Developing distributed deep learning framework with applications in imaging genetics
- Conducting research on large-scale machine learning and optimization technologies for discriminative pattern discovery of genetically driven imaging biomarkers

RESEACH EXPERIENCE (CONTINUED)

Technische Universität München, Munich, Germany

Research Fellow, Chair for Computer Aided Medical Procedures Jul 2012 – May 2008

- Researched statistical image processing methods of ultrasound radio frequency data for advanced imaging and registration tasks
- Created models of ultrasound reconstruction methods, e.g. for improved early detection of Parkinson's disease
- Developed 3D freehand ultrasound reconstruction, calibration and data acquisition software
- Implemented intra-operative neurosurgery monitoring, navigation and visualization user interface
- Conducted research on error propagation, and visualization for head mounted display (HMD) based intra-operative surgery guidance system
- Led international, multi-disciplinary teams as work package leader within European Union research projects (ROBOCAST [link] - featured in TIME magazine [link], ACTIVE [link])

Technische Universität München, Munich, Germany

Graduate Student, Chair for Computer Aided Medical Procedures Apr 2004 – Apr 2008

- Developed an automatic fiducial-free registration procedure for navigated bronchoscopy using electromagnetic tracking and pre-interventional computed tomography (CT) data
- Implemented radiation-free visual servoing based interactive repositioning guidance system for camera augmented mobile medical X-ray imaging device (C-arm)
- Developed a tool for analyzing plant genetic similarity in maize and rice

SKILLS

Languages/Frameworks: C, C#, C++, Caffe, Java, MATLAB, OpenCL, OpenCV, OpenGL, Python, PyTorch, Spark, TensorFlow, Theano

PUBLICATIONS

Berriel, R., Lathuili'ere, S., Nabi, M., **Klein, T**, Oliveira-Santos, T., Sebe, N., & Ricci, E. (2019). Budget-Aware Adapters for Multi-Domain Learning. The IEEE International Conference on Computer Vision (ICCV). (link)

Klein, T., & Nabi, M. (2019, July). Attention is (not) all you need for commonsense reasoning. In *Proceedings of the 57th annual meeting of the association for computational linguistics* (pp. 4831–4836). Florence, Italy: Association for Computational Linguistics (ACL). (link,code)

Ostapenko, O., Puscas, M., **Klein, T.**, Jahnichen, P., & Nabi, M. (2019, June). Learning to remember: A synaptic plasticity driven framework for continual learning. The IEEE Conference on Computer Vision and Pattern Recognition (CVPR). (link,code)

Becker, B. G., **Klein, T.**, Wachinger, C., Initiative, A. D. N., et al. (2018). Gaussian process uncertainty in age estimation as a measure of brain abnormality. *NeuroImage*, *175*, 246–258. (link)

Pahde, F., Puscas, M. M., Wolff, J., **Klein, T.**, Sebe, N., & Nabi, M. (2019). Low-shot learning from imaginary 3d model. In *IEEE winter conference on applications of computer vision, WACV 2019, waikoloa village, hi, usa, january 7-11, 2019* (pp. 978–985). (link)

Pahde, F., Ostapenko, O., Jähnichen, P., **Klein, T.**, & Nabi, M. (2018). Self-paced adversarial training for multimodal few-shot learning. *2019 IEEE Winter Conference on Applications of Computer Vision (WACV)*, 218-226. (link)

Pahde, F., Nabi, M., **Klein, T.**, & Jahnichen, P. (2018, Oct). Discriminative hallucination for multi-modal few-shot learning. In *2018 25th ieee international conference on image processing (icip)* (p. 156-160). (link)

PUBLICATIONS CONTINUED

Pahde, F., Jähnichen, P., **Klein, T.**, & Nabi, M. (2018). Cross-modal hallucination for few-shot fine-grained recognition. *arXiv preprint arXiv:1806.05147*. (link)

Wachinger, C., Reuter, M., & **Klein, T.** (2018). Deepnat: Deep convolutional neural network for segmenting neuroanatomy. *NeuroImage*, *170*, 434 - 445. (link, code)

Becker, B. G., **Klein, T.**, & Wachinger, C. (2018). Gaussian process uncertainty in age estimation as a measure of brain abnormality. *NeuroImage*, *175*, 246 - 258. doi: https://doi.org/10.1016/j.neuroimage.2018.03.075 (link)

Geyer, R. C., **Klein, T.**, & Nabi, M. (2017, December). Differentially Private Federated Learning: A Client Level Perspective. *Conference on Neural Information Processing Systems (NIPS 2017), Workshop on Machine Learning on the Phone and other Consumer Devices*. (Spotlight) (link,code)

Gutiérrez, B., Peter, L., **Klein, T.**, & Wachinger, C. (2017). A multi-armed bandit to smartly select a training set from big medical data. In (pp. 38–45). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Klein, T., & Wells, W. M. (2015). Rf ultrasound distribution-based confidence maps. In (pp. 595–602). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Klein, T., Hansson, M., & Navab, N. (2012). Modeling of multi-view 3d freehand radio frequency ultrasound. In (pp. 422–429). International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI). (link)

Wachinger, C., Klein, T., & Navab, N. (2012). The 2d analytic signal for envelope detection and feature extraction on ultrasound images. *Medical Image Analysis*, *16*(6), 1073–1084. (link)

Wachinger, C., **Klein, T.**, & Navab, N. (2012). Locally adaptive nakagami-based ultrasound similarity measures. *Ultrasonics*, *52*(4), 547–554. (link)

Karamalis, A., Wein, W., **Klein, T.**, & Navab, N. (2012). Ultrasound confidence maps using random walks. *Medical Image Analysis*, *16*(6), 1101 - 1112. (link)

Plate, A., Ahmadi, S.-A., Pauly, O., **Klein, T.**, Navab, N., & Bötzel, K. (2012). Three-dimensional sonographic examination of the midbrain for computer-aided diagnosis of movement disorders. *Ultrasound in medicine & biology*, *38*(12), 2041–2050. (link)

Wachinger, C., **Klein, T.**, & Navab, N. (2011). The 2d analytic signal on rf and b-mode ultrasound images. In (pp. 359–370). Biennial International Conference on Information Processing in Medical Imaging (MICCAI). (link)

Klein, T., Hansson, M., & Navab, N. (2011). Spatial statistics based feature descriptor for rf ultrasound data. In (pp. 33–36). 2011 IEEE International Symposium on Biomedical Imaging: From Nano to Macro (ISBI). (link)

Ahmadi, S.-A., Baust, M., Karamalis, A., Plate, A., Boetzel, K., **Klein, T.**, & Navab, N. (2011). Midbrain segmentation in transcranial 3d ultrasound for parkinson diagnosis. In G. Fichtinger, A. Martel, & T. Peters (Eds.), (pp. 362–369). Berlin, Heidelberg: Medical Image Computing and Computer-Assisted Intervention – MICCAI 2011. (link)

Ahmadi, S.-A., **Klein, T.**, Navab, N., Roth, R., Shamir, R. R., Joskowicz, L., … Foroni, R. I. (2009). Advanced planning and intra-operative validation for robot-assisted keyhole neurosurgery in robocast. In (pp. 1–7). 2009 International Conference on Advanced Robotics (ICRA). (link)

Klein, T., Traub, J., Hautmann, H., Ahmadian, A., & Navab, N. (2007). Fiducial-free registration procedure for navigated bronchoscopy. In N. Ayache, S. Ourselin, & A. Maeder (Eds.), (pp. 475–482). Berlin, Heidelberg: Medical Image Computing and Computer-Assisted Intervention – MICCAI 2007. (link)