

# Tassilo J. Klein, Ph.D.

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EXECUTIVE SUMMARY	AI research scientist with strong publication record and background at the cross-section of academia and industry. Many years of experience in applying machine learning in (medical) computer vision and natural language processing.	
RESEARCH INTERESTS	<b>Machine Learning:</b> Deep Learning, Unsupervised Learning, Self-supervised Learning <b>Natural Language Processing:</b> Commonsense Reasoning, Computational Semantics <b>Computer Vision:</b> Medical Imaging, Integration of Vision and Language	
PROFESSIONAL EXPERIENCE	<b>SAP SE</b> , Berlin, Germany <i>Director of Research</i> , SAP AI Research Apr 2020 – present <ul style="list-style-type: none"><li>Established research network with top-tier universities around the world</li><li>Contributed to ~ 1% of the annual company's patent applications</li></ul> <i>Senior Research Scientist</i> , SAP Machine Learning Dec 2015 – Mar 2020 <b>WissEL GmbH, Scientific Instruments</b> , Starnberg, Germany <i>Software Developer</i> 1996 – 2007	
EDUCATION	<b>Massachusetts Institute of Technology (MIT)</b> , Cambridge, USA <i>Research Affiliate</i> , Computer Science & Artificial Intelligence Lab. Oct 2014 – Nov 2015 Adviser: Polina Golland <b>Brigham and Women's Hospital, Harvard Medical School</b> , Boston, USA <i>Postdoctoral Research Fellow</i> , Department of Radiology Sep 2013 – Nov 2015 Adviser: Sandy Wells <b>Technische Universität München</b> , Munich, Germany <i>Ph.D. (summa cum laude)</i> , Computer Science May 2008 – Dec 2012 Adviser: Prof. Nassir Navab Thesis: Statistical Image Processing of Medical Ultrasound Radio Frequency Data <i>Diploma/M.Sc. (summa cum laude)</i> , Computer Science Apr 2004 – Apr 2008 <b>Concordia University</b> , Montreal, Canada Study abroad coursework in Computer Science Aug 2005 – Dec 2005 <b>Ludwig-Maximilians-Universität München</b> , Munich, Germany <i>Vordiplom/B.Sc.</i> , Computer Science Oct 2001 – Apr 2004	
HONORS & AWARDS	SAP Catalyst	2020
	2nd place at the <a href="#">VizWiz Grand Challenge</a> on VQA for Blind People at <a href="#">ECCV</a>	2018
	SAP Catalyst	2017
	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
SKILLS	<b>Programming Languages:</b> Python, C, C#, C++, CUDA, Java, MATLAB <b>Tools/Frameworks:</b> PyTorch, TensorFlow, Spark, OpenCV, OpenGL	

<b>PATENTS</b>	Focal Entropy for Privacy-Preservation US Patent No. 17/147,362 (Filed)	2020
	Privacy-preserving Representation Learning US Patent No. 16/933,584 (Filed)	2020
	Contrastive Self-Supervised Learning for Commonsense Reasoning US Patent No. 16/912,319 (Filed)	2020
	Learning graph-based priors for generalized zero-shot learning US Patent No. 16/950,730 (Filed)	2020
	Multimodal Self-Supervised Learning US Patent No. 17/010,719 (Filed)	2020
	Deep Question Generation US Patent No. 17/010,721 (Filed)	2020
	Weakly Supervised One-Shot Segmentation US Patent No. 17/008,615 (Filed)	2020
	Adversarial Learning for Multimodal Few-shot Learning EU Patent No. 19180590.2 - 1207 (Filed)	2019
	Cross-modal Generation for Fine-grained Recognition EU Patent No. 19180588.6 - 1207 (Filed)	2019
	BERT Attention for Reasoning US Patent No. 16/695,037 (Filed)	2019
	Dynamic Generative Memory for Continual Learning US Patent No. 16/711,134 (Filed)	2018
	Self-paced Adversarial Training for Multimodal Few-shot Learning US Patent No. 16/728,412 (Filed)	2019
	Low-Shot Learning from Imaginary 3D Model US Patent No. 16/728,407 (Filed)	2019
<b>JOURNAL PUBLICATIONS</b>	Ahmadi, S.-A., Bötzel, K., Levin, J., Maiostre, J., <b>Klein, T.</b> , Wein, W., ... Plate, A. (2020). Analyzing the co-localization of substantia nigra hyper-echogenicities and iron accumulation in parkinson's disease: A multi-modal atlas study with transcranial ultrasound and mri. <i>NeuroImage: Clinical</i> , 26, 102185. ( <a href="#">link</a> )	
	Wachinger, C., Reuter, M., & <b>Klein, T.</b> (2018). Deepnat: Deep convolutional neural network for segmenting neuroanatomy. <i>NeuroImage</i> , 170, 434 - 445. ( <a href="#">link</a> , <a href="#">code</a> )	
	Becker, B. G., <b>Klein, T.</b> , Wachinger, C., Initiative, A. D. N., et al. (2018). Gaussian process uncertainty in age estimation as a measure of brain abnormality. <i>NeuroImage</i> , 175, 246–258. ( <a href="#">link</a> )	
	Wachinger, C., Klein, T., & Navab, N. (2012). The 2d analytic signal for envelope detection and feature extraction on ultrasound images. <i>Medical Image Analysis</i> , 16(6), 1073–1084. ( <a href="#">link</a> )	
	Karamalis, A., Wein, W., <b>Klein, T.</b> , & Navab, N. (2012). Ultrasound confidence maps using random walks. <i>Medical Image Analysis</i> , 16(6), 1101 - 1112. ( <a href="#">link</a> )	

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](#))

- Taleb, A., Lippert, C., **Klein, T.**, & Nabi, M. (2021). Multimodal self-supervised learning for medical image analysis. The 27th international conference on Information Processing in Medical Imaging (IPMI). (to appear)
- Klein, T.**, & Nabi, M. (2020a). Contrastive self-supervised learning for commonsense reasoning. In *Proceedings of the 58th annual meeting of the association for computational linguistics*. Association for Computational Linguistics (ACL).
- Berriel, R., Lathuilière, 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. (2019a, 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](#))
- 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](#))
- Pahde, F., Jähnichen, P., **Klein, T.**, & Nabi, M. (2018). Cross-modal hallucination for few-shot fine-grained recognition. *arXiv preprint arXiv:1806.05147*. ([link](#))
- 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. (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](#))

**WORKSHOP  
PUBLICATIONS**

- Taleb, A., Lippert, C., Nabi, M., & **Klein, T.** (2019, December). Multimodal self-supervised learning for medical image analysis. *Conference on Neural Information Processing Systems (NeuIPS 2019), Workshop on Medical Imaging meets NeurIPS*. (**Spotlight**) ([link](#))
- Raza, H., Ravanbakhsh, M., **Klein, T.**, Tassilo, & Nabi, M. (2019, Oct). Weakly supervised one shot segmentation. In *The IEEE International Conference on Computer Vision (ICCV) workshops*. (**Spotlight**) ([link](#))
- Ostapenko, O., Puscas, M., **Klein, T.**, Jahnichen, P., & Nabi, M. (2018). Learning to remember what to remember: A synaptic plasticity driven framework. *Conference on Neural Information Processing Systems (NeuIPS 2018), Workshop on Continual Learning*. ([link](#))
- Salama, A., Ostapenko, O., Nabi, M., & **Klein, T.** (2018). Pruning at a glance: A structured class-blind pruning technique for model compression. *Conference on Neural Information Processing Systems (NeuIPS 2018), Workshop on Compact Deep Neural Networks with industrial applications*. (**Spotlight**) ([link](#))
- Dushi, D., Pezzelle, S., **Klein, T.**, & Nabi, M. (2018). *When the distribution is the answer: An analysis of the responses in vizwiz*.
- 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](#))

**PRE-PRINTS  
REPORTS**

- Klein, T.**, & Nabi, M. (n.d.-b). *Meta-contrastive learning for commonsense reasoning*. Association for Computational Linguistics (ACL). (**under review**)
- Klein, T.**, & Nabi, M. (n.d.-c). *Multitask self-supervised learning for winograd schema challenge*. Association for Computational Linguistics (ACL). (**under review**)
- Klein, T.**, & Nabi, M. (n.d.-a). *Learning private representations with focal-entropy*. International Conference for Machine Learning (ICML). (**under review**)
- Klein, T.**, & Nabi, M. (2020b). *Privacy-preserving representation learning by disentanglement*. ([link](#))
- Klein, T.**, & Nabi, M. (2019b). *Learning to answer by learning to ask: Getting the best of gpt-2 and bert worlds*. ([link](#))