Dr. Konstantin Klemmer

Senior Applied Research Scientist @ Microsoft Research

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Education

Jul 2018 – Jun 2022	**Center for Urban Science + Progress, New York University, Brooklyn, USA** *Visiting PhD Student* • Research emphasis: Novel methods for identification of and learning from spatial patterns in urban data. • Supervision: Professor Daniel B. Neill
Oct 2017 – Jun 2022	**Department of Computer Science, University of Warwick, Coventry, UK** *PhD in Urban Science* • Dissertation: Improving Neural Networks for Geospatial Applications with Geographic Context Embeddings. • Supervision: Professor Stephen A. Jarvis, Professor Daniel B. Neill, Dr. Hongkai Wen
Nov 2020 – Apr 2021	**AI4EO Future Lab, Technical University of Munich & DLR, Munich, Germany** *Beyond Fellow* • Research emphasis: Geospatial machine learning and remote sensing for Earth observation. • Supervision: Professor Xiaoxiang Zhu
Oct 2018 – Sep 2019	**The Alan Turing Institute, London, UK** *Enrichment Student* • Research emphasis: Machine learning for urban analytics.
Oct 2016 – Sep 2017	**Imperial College London & University College London, London, UK** *MSc Transport & Business Management* • Dissertation: Isolating the effect of cycling on local business environments in cities (Grade: 74/100) • Overall Grade: 72/100 (Distinction)
Oct 2012 – Feb 2016	**University of Freiburg, Freiburg, Germany** *BSc Economics* • Dissertation: Exploring the spatio-temporal dynamics of carsharing utilization: A case study from Amsterdam (Grade: 1.0) • Overall Grade: 1.7 (Ranked 4th out of 74 in class)

Work Experience

Dec 2024 – Ongoing	**Microsoft Research, Redmond, USA** *Senior Applied Research Scientist* • Responsibilities: Conceptualizing and executing machine learning research projects for industry-relevant applications. • Manager: Dr. Gayathri Mahalingam
Sep 2022 – Jun 2024	**Microsoft Research New England, Cambridge, USA** *Postdoctoral Researcher* • Responsibilities: Two-year research fellowship as part of the "ML & Stats" postdoc program. • Manager: Dr. Nicolo Fusi

Jan 2022 – Jun 2022	**Department of Computer Science, University of Warwick, Coventry, UK** *EPSRC Mathematical Science Fellow* • Responsibilities: Continuation of research conducted throughout doctoral studies. • Manager: Dr. Hongkai Wen
Nov 2021 – Apr 2022	**Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Bonn, Germany** *Expert Consultant* • Responsibilities: AI expert consultant on the appraisal mission of the "Fair Forward" initiative, providing feedback on a large funding scheme for the use of AI in sustainability and development applications in low-income countries.
May 2016 – Dec 2019	**Geospin GmbH, Freiburg, Germany** *Student Fellow* • Responsibilities: Student fellow in a geospatial data analytics startup. Tasks included data science, social media strategy, market research and business development. • Manager: Dr. Sebastian Wagner (CEO), Dr. Christoph Gebele
May 2014 – Sep 2016	**Chair of Economic Policy and Constitutional Economics, University of Freiburg, Freiburg, Germany** *Student Assistant* • Responsibilities: Research assistance (econometric modelling, data preparation), administration of the Chair's website and e-learning modules, event management. • Manager: Professor Lars P. Feld
Feb 2013 – Apr 2016	**Chair of Information Systems Research , University of Freiburg, Freiburg, Germany** *Student Assistant* • Responsibilities: Research assistance (data preparation and statistical analysis, data visualization), administration of e-learning modules. • Manager: Professor Dirk Neumann
Mar 2014 - May 2014	**Walter Eucken Institute, Freiburg, Germany** *Intern* • Responsibilities: Analysis of scientific articles, data processing, preparation of scientific presentations. • Manager: Professor Lars P. Feld
Sep 2011 – Aug 2012	**EVBZ Care Center for People with Disabilities, Steinhöring, Germany** *Federal Voluntary Service* • Responsibilities: Assistance and care for multiply disabled people, carpool supervision, warehousing

Teaching Experience

Oct 2017 – Sep 2018	**Department of Computer Science, University of Warwick, Coventry, UK** *Teaching Assistant* • Classes: CS118 – Programming for Computer Scientists (Undergraduate), CS909 – Data Mining (postgraduate)
Mar 2013 – Apr 2016	**Chair of Information Systems Research, University of Freiburg, Freiburg, Germany** *Teaching Assistant* • Classes: Introduction to Information Systems (Undergraduate) • Head instructor in the final year.

Volunteering & Mentoring

Aug 2020 – Ongoing	**Climate Change AI, Pittsburgh, USA** *Chair of the Communications Committee & Member of the Board of Directors (2021-2023)* • Responsibilities: Leadership role in a fast-growing NGO at the intersection of climate change and artificial intelligence. Tasks include organizational oversight, social media, academic outreach and event organization.
Oct 2020 – Jan 2021 Oct 2019 – Jan 2020 Oct 2018 – Jan 2019	**Applied Machine Learning Days, Lausanne, Switzerland** *Co-organizer of the "AI & Cities" track* • Responsibilities: Organising full day conference tracks on the impacts of AI on urban living and governance.
Nov 2016 – Sep 2017	**Imperial College Data Science Society, London, USA** *Team Talent Development* • Responsibilities: Organising and teaching machine learning workshops in R and Python, arranging academic and industry talks, promoting data science and its social impacts.
Sep 2015 – Sep 2016	**Aktionskreis Freiburger Schule, Freiburg, Germany** *Honorary Staff Member* • Responsibilities: Public relations, social media, event management.
Oct 2014 – Mar 2015	**Mentoring Program of the Economics Department, University of Freiburg, Freiburg, Germany** *Mentor* • Responsibilities: Group supervision for first-semester undergraduate students.
Oct 2012 – Sep 2016	**Student's Union of the Economics Department, University of Freiburg, Freiburg, Germany** *Student Representative* • Responsibilities: Elected student representative in various committees such as faculty council or student parliament. Co-president of the Economics Student Union (Oct 2013 – Oct 2015).

Awards & Scholarships

Nov 2020 – Apr 2021	**Technical University of Munich & DLR, Munich, Germany** *Beyond Fellowship* • Value: €6,000, travel expenses
Oct 2018 – Sep 2019	**The Alan Turing Institute, London, UK** *Enrichment Student Scholarship* • Value: £5,000
Oct 2017 – Dec 2021	**Engineering and Physical Sciences Research Council, London, UK** *PhD Scholarship* • Value: Tuition fees
Oct 2017 – Dec 2021	**University of Warwick, Coventry, UK** *PhD Stipend* • Value: £14,553 pa., research allowance

Talks

- GISRUK 2017 – CDRC Data Challenge, Leicester, UK, April 2018 (contributed talk)
- Data Natives 2018, London, UK, April 2018 (contributed talk)
- WPCCS 2018, Coventry, UK, June 2018 (contributed talk)

- UbiComp 2018 – Workshop "Pervasive Urban Applications", Singapore, October 2018 (contributed talk)
- NeurIPS 2018 – Workshop on Modeling and decision-making in the spatiotemporal domain, Montreal, Canada, December 2018 (contributed talk)
- A blueprint for urban analytics research, The Alan Turing Institute, Newcastle, UK, April 2019 (invited talk)
- ML4SEP Seminar, University of Zurich, Switzerland, January 2020 (invited talk)
- ICLR 2020 – Workshop "Machine Learning in Real Life" (ML-IRL), Addis Ababa, Ethiopia, April 2020 (contributed short talk)
- ICLR 2020 – Workshop "Climate Change AI" – Energy Day, Addis Ababa, Ethiopia, April 2020 (invited short talk)
- AI4EO seminar series, Munich, Germany, November 2020 (invited talk)
- AI4EO seminar series, Munich, Germany, July 2021 (invited talk)
- Royal Geographical Society – Annual Conference, London, UK, September 2021 (contributed talk)
- European Broadcasting Union – Green AI Micro-Workshop, virtual, March 2022 (invited talk)
- TUM.ai – Seminar series, Munich, Germany, July 2022 (invited talk)
- Harvard University – AI-Assisted Decision-Making for Conservation, Cambridge, USA, October 2022 (invited talk)
- University of Southern California – Frontiers of ML and AI, Los Angeles, USA, November 2022 (invited talk)
- TU Berlin – Climate Change & AI Berlin Brandenburg Workshop, virtual, November 2022 (invited talk)
- National Renewable Energy Laboratory – ALIS Seminar, virtual, January 2023 (invited talk)
- Massachusetts Institute of Technology – Slack Lunch Seminar (SLS), Cambridge, USA, March 2023 (invited talk)
- New York University – Machine Learning for Good (ML4G) Lab Seminar, New York, USA, May 2023 (invited talk)
- Microsoft Research – MSR Montreal Seminar, Montreal, Canada, August 2023 (invited talk)
- Mila – Seminar Talk with David Rolnick's research group, Montreal, Canada, August 2023 (invited talk)
- The Alan Turing Institute – Seminar Talk, London, UK, November 2023 (invited talk)
- AGU Annual Meeting – Beyond the Black Box—Advancing Geo-ML by Incorporating Context with Specialized Architectures, Benchmark Datasets, and Tailored Notions of Interpretability, San Francisco, USA, December 2023 (invited talk)
- University of Cambridge – Energy and Environment Group, Cambridge, UK, March 2024 (invited talk)
- Harvard University – Evaluating the Science of Geospatial AI Conference, Cambridge, USA, May 2024 (invited talk)
- Cyber2A – Cyber2A and PDG Webinar, June 2024 (invited talk)
- Copenhagen University – SSL4EO Summer School, Copenhagen, Denmark, July 2024 (invited talk)
- Technical University of Munich – AI4EO Symposium, Munich, Germany, July 2024 (invited talk)
- Cohere For AI – Community Webinar, November 2024 (invited talk)

Academic Services

Reviewing
- Journals: Nature, Nature Cities, PLOS ONE, Public Transport – Planning and Operations, Computer Vision and Image Understanding, Environmental Data Science, Environment and Planning B: Urban Analytics and City Science, International Journal of Geographic Information Science, Annals of the American Association of Geographers, Violence against Women, Geo-spatial Information Science, ISPRS Journal of Photogrammetry and Remote Sensing
- Conferences: IEEE ITSC, WI, KDD, AAAI, AISTATS, NeurIPS, CVPR, ICML

Program Committee
- AAAI'23 Conference - "AI for Social Impact" track
- NeurIPS'19 Workshop "Machine Learning for the Developing World"
- ICLR'20 Workshop "Tackling Climate Change with Machine Learning"
- NeurIPS'20 Workshop "Tackling Climate Change with Machine Learning"
- ICLR'21 Workshop "Tackling Climate Change with Machine Learning"
- NeurIPS'21 Workshop "Tackling Climate Change with Machine Learning"
- NeurIPS'22 Workshop "Tackling Climate Change with Machine Learning"
- NeurIPS'23 Workshop "Tackling Climate Change with Machine Learning"
- ICLR'24 Workshop "Tackling Climate Change with Machine Learning"
- ICLR'24 Workshop "Machine Learning for Remote Sensing"

- CVPR'24 Workshop "EarthVision"
- NeurIPS'24 Workshop "Tackling Climate Change with Machine Learning"

Organization
- Applied Machine Learning Days – AI & Cities track, 2019–2021 (Co-organizer)
- ICLR'20 Workshop "Tackling Climate Change with Machine Learning" – Energy day (Co-organizer)
- NeurIPS'20 Workshop "Machine Learning for the Developing World" – Co-organizer and submissions chair
- NeurIPS'21 Workshop "Machine Learning for the Developing World" – Co-organizer and submissions chair
- ICLR'23 Workshop "Tackling Climate Change with Machine Learning" – Lead organizer
- ICLR'25 Workshop "Tackling Climate Change with Machine Learning" – Lead organizer

Mentoring

Undergraduate: Nathan Safir (University of Georgia)
Postgraduate: Gyri Reiersen (Technical University of Munich), David Mikisch (TU Berlin, Mila), Haoran Zhang (Harvard University)

Languages

German (native language), English (fluent), French (advanced), Spanish (basic)

Software

Operating Systems: Windows OS, Linux OS
Statistics, Data Science & Machine Learning: R, Python (PyTorch), SPSS
Other: QGIS, Microsoft Office, LaTeX, PHP, PostgreSQL, HTML, CSS, PostGIS, Git, Docker

Publications

2025

1. **Klemmer, K.**, Rolf, E., Robinson, C., Mackey, L. & Russwurm, M. SatCLIP: Global, General-Purpose Location Embeddings with Satellite Imagery. *Proceedings of the AAAI Conference on Artificial Intelligence* (2025).

2024

2. **Klemmer, K.** & Rolf, E. Satellite images reveal untracked human activity on the oceans. *Nature* (2024).

3. Koshiyama, A. *et al.* Towards algorithm auditing: a survey on managing legal, ethical and technological risks of AI, ML and associated algorithms. *Royal Society Open Science* (2024).

4. Rolf, E., **Klemmer, K.**, Robinson, C. & Kerner, H. Mission Critical - Satellite Data is a Distinct Modality in Machine Learning. *Proceedings of the International Conference on Machine Learning (ICML) (Spotlight)* (2024).

5. Russwurm, M., **Klemmer, K.**, Rolf, E., Zbinden, R. & Tuia, D. Geographic Location Encoding with Spherical Harmonics and Sinusoidal Representation Networks. *Proceedings of the International Conference on Learning Representations (ICLR) (Spotlight)* (2024).

2023

6. **Klemmer, K.** & Neill, D. B. Benchmarks and best practices for geospatial predictive modeling with graph neural networks. *submitted* (2023).

7. **Klemmer, K.**, Safir, N. & Neill, D. B. Positional Encoder Graph Neural Networks for Geographic Data. *Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS)* (2023).

8. Weiss, M. *et al.* An Investigation of General-Purpose Neural Models for Low-Shot Adaptation in Geospatial Applications. *submitted* (2023).

9. Xu, L. *et al. Reflections from the Workshop on AI-Assisted Decision Making for Conservation* 2023.

2022

10. Cunningham[*], T., **Klemmer**[*], **K.**, Wen, H. & Ferhatosmanoglu, H. GeoPointGAN: Synthetic Spatial Data with Local Label Differential Privacy. *submitted* (2022).

11. **Klemmer**[*], **K.**, Xu[*], T., Acciaio, B. & Neill, D. B. SPATE-GAN: Improved Generative Modeling of Dynamic Spatio-Temporal Patterns with an Autoregressive Embedding Loss. *Proceedings of the AAAI Conference on Artificial Intelligence* (2022).

12. Reiersen, G. *et al.* ReforesTree: A Dataset for Estimating Tropical Forest Carbon Stock with Deep Learning and Aerial Imagery. *Proceedings of the AAAI Conference on Artificial Intelligence* (2022).

2021

13. **Klemmer, K.** & Neill, D. B. Auxiliary-task learning for geographic data with autoregressive embeddings. *Proceedings of the ACM International Symposium on Advances in Geographic Information Systems (SIGSPATIAL)* (2021).

14. **Klemmer, K.**, Neill, D. B. & Jarvis, S. A. Understanding spatial patterns in rape reporting delays. *Royal Society Open Science* (2021).

15. **Klemmer, K.**, Saha, S., Kahl, M., Xu, T. & Zhu, X. X. Generative modeling of spatio-temporal weather patterns with extreme event conditioning. *AI: Modeling Oceans and Climate Change (AIMOCC) Workshop, International Conference on Learning Representations (ICLR)* (2021).

16. Luo, M., Du, B., **Klemmer, K.**, Zhu, H. & Wen, H. Deployment Optimization for Shared e-Mobility Systems With Multi-Agent Deep Neural Search. *IEEE Transactions on Intelligent Transportation Systems* (2021).

2020

17. **Klemmer, K.**, Yeboah, G., de Albuquerque, J. P. & Jarvis, S. A. Population Mapping in Informal Settlements with High-Resolution Satellite Imagery and Equitable Ground-Truth. *Machine Learning in Real Life (ML-IRL) Workshop, International Conference on Learning Representations (ICLR)* (2020).

18. Luo, M. *et al.* D3P: Data-driven Demand Prediction for Fast Expanding Electric Vehicle Sharing Systems. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (2020).

2019 19. **Klemmer, K.**, Koshiyama, A. & Flennerhag, S. Augmenting correlation structures in spatial data using deep generative models. *arXiv Preprint* (2019).

2018 20. **Klemmer, K.**, Brandt, T. & Jarvis, S. Isolating the effect of cycling on local business environments in London. *PLOS ONE* (2018).

21. Munoz-Mendez, F., Han, K., **Klemmer, K.** & Jarvis, S. Community Structures, Interactions and Dynamics in London's Bicycle Sharing Network. *Proceedings of the 2018 ACM International Joint Conference and 2018 International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers (UbiComp)* (2018).

2017 22. Willing, C., **Klemmer, K.**, Brandt, T. & Neumann, D. Moving in time and space – Location intelligence for carsharing decision support. *Decision Support Systems* (2017).

2016 23. **Klemmer, K.**, Willing, C., Wagner, S. & Brandt, T. Explaining Spatio-Temporal Dynamics in Carsharing: A Case Study of Amsterdam. *AMCIS 2016 Proceedings* (2016).

* denotes equal contribution.