

Dr. Konstantin Klemmer

Postdoctoral Researcher

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Education

Jul 2018 – Jun 2022	Center for Urban Science + Progress, New York University, Brooklyn, USA <i>Visiting PhD Student</i> <ul style="list-style-type: none">• 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 <i>PhD in Urban Science</i> <ul style="list-style-type: none">• 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 <i>Beyond Fellow</i> <ul style="list-style-type: none">• 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 <i>Enrichment Student</i> <ul style="list-style-type: none">• Research emphasis: Machine learning for urban analytics.
Oct 2016 – Sep 2017	Imperial College London & University College London, London, UK <i>MSc Transport & Business Management</i> <ul style="list-style-type: none">• 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 <i>BSc Economics</i> <ul style="list-style-type: none">• 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

Sep 2022 – Ongoing	Microsoft Research New England, Cambridge, USA <i>Postdoctoral Researcher</i> <ul style="list-style-type: none">• 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 <i>EPSRC Mathematical Science Fellow</i> <ul style="list-style-type: none">• Responsibilities: Continuation of research conducted throughout doctoral studies.• Manager: Dr. Hongkai Wen

Nov 2021 – Apr 2022	<p>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Bonn, Germany <i>Expert Consultant</i></p> <ul style="list-style-type: none"> 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	<p>Geospin GmbH, Freiburg, Germany <i>Student Fellow</i></p> <ul style="list-style-type: none"> 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	<p>Chair of Economic Policy and Constitutional Economics, University of Freiburg, Freiburg, Germany <i>Student Assistant</i></p> <ul style="list-style-type: none"> 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	<p>Chair of Information Systems Research , University of Freiburg, Freiburg, Germany <i>Student Assistant</i></p> <ul style="list-style-type: none"> Responsibilities: Research assistance (data preparation and statistical analysis, data visualization), administration of e-learning modules. Manager: Professor Dirk Neumann
Mar 2014 - May 2014	<p>Walter Eucken Institute, Freiburg, Germany <i>Intern</i></p> <ul style="list-style-type: none"> Responsibilities: Analysis of scientific articles, data processing, preparation of scientific presentations. Manager: Professor Lars P. Feld
Sep 2011 – Aug 2012	<p>EVVZ Care Center for People with Disabilities, Steinhöring, Germany <i>Federal Voluntary Service</i></p> <ul style="list-style-type: none"> Responsibilities: Assistance and care for multiply disabled people, carpool supervision, warehousing

Teaching Experience

Oct 2017 – Sep 2018	<p>Department of Computer Science, University of Warwick, Coventry, UK <i>Teaching Assistant</i></p> <ul style="list-style-type: none"> Classes: CS1118 – Programming for Computer Scientists (Undergraduate), CS909 – Data Mining (postgraduate)
Mar 2013 – Apr 2016	<p>Chair of Information Systems Research, University of Freiburg, Freiburg, Germany <i>Teaching Assistant</i></p> <ul style="list-style-type: none"> Classes: Introduction to Information Systems (Undergraduate) Head instructor in the final year.

Volunteering & Mentoring

Aug 2020 – Ongoing	Climate Change AI, Pittsburgh, USA <i>Chair of the Communications Committee & Member of the Board of Directors (2021-2023)</i> <ul style="list-style-type: none">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 <i>Co-organizer of the "AI & Cities" track</i> <ul style="list-style-type: none">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 <i>Team Talent Development</i> <ul style="list-style-type: none">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 <i>Honorary Staff Member</i> <ul style="list-style-type: none">Responsibilities: Public relations, social media, event management.
Oct 2014 – Mar 2015	Mentoring Program of the Economics Department, University of Freiburg, Freiburg, Germany <i>Mentor</i> <ul style="list-style-type: none">Responsibilities: Group supervision for first-semester undergraduate students.
Oct 2012 – Sep 2016	Student's Union of the Economics Department, University of Freiburg, Freiburg, Germany <i>Student Representative</i> <ul style="list-style-type: none">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 <i>Beyond Fellowship</i> <ul style="list-style-type: none">Value: €6,000, travel expenses
Oct 2018 – Sep 2019	The Alan Turing Institute, London, UK <i>Enrichment Student Scholarship</i> <ul style="list-style-type: none">Value: £5,000
Oct 2017 – Dec 2021	Engineering and Physical Sciences Research Council, London, UK <i>PhD Scholarship</i> <ul style="list-style-type: none">Value: Tuition fees
Oct 2017 – Dec 2021	University of Warwick, Coventry, UK <i>PhD Stipend</i> <ul style="list-style-type: none">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)

Academic Services

Reviewing

- Journals: Nature, 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
- Conferences: IEEE ITSC, WI, KDD, AAAI, AISTATS, NeurIPS, CVPR

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”

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

Mentoring

Undergraduate: Nathan Safir (University of Georgia)

Postgraduate: Gyri Reiersen (Technical University of Munich)

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

- 2024 | 1. **Klemmer, K.** & Rolf, E. Satellite images reveal untracked human activity on the oceans. *Nature* (2024).
2. 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 | 3. **Klemmer, K.** & Neill, D. B. Benchmarks and best practices for geospatial predictive modeling with graph neural networks. *submitted* (2023).
4. **Klemmer, K.**, Rolf, E., Robinson, C., Mackey, L. & Russwurm, M. SatCLIP: Global, General-Purpose Location Embeddings with Satellite Imagery. *submitted* (2023).
5. **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).
6. Weiss, M. *et al.* An Investigation of General-Purpose Neural Models for Low-Shot Adaptation in Geospatial Applications. *submitted* (2023).
7. Xu, L. *et al.* *Reflections from the Workshop on AI-Assisted Decision Making for Conservation* 2023.
- 2022 | 8. Cunningham*, T., **Klemmer***, K., Wen, H. & Ferhatosmanoglu, H. GeoPointGAN: Synthetic Spatial Data with Local Label Differential Privacy. *submitted* (2022).
9. **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).
10. Reiersen, G. *et al.* ReforestTree: A Dataset for Estimating Tropical Forest Carbon Stock with Deep Learning and Aerial Imagery. *Proceedings of the AAAI Conference on Artificial Intelligence* (2022).
- 2021 | 11. **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).
12. **Klemmer, K.**, Neill, D. B. & Jarvis, S. A. Understanding spatial patterns in rape reporting delays. *Royal Society Open Science* (2021).
13. **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).
14. Koshiyama, A. *et al.* Towards algorithm auditing: a survey on managing legal, ethical and technological risks of AI, ML and associated algorithms. *submitted* (2021).
15. 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 | 16. **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).
17. 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 | 18. **Klemmer, K.**, Koshiyama, A. & Flennerhag, S. Augmenting correlation structures in spatial data using deep generative models. *arXiv Preprint* (2019).

- 2018 | 19. **Klemmer, K.**, Brandt, T. & Jarvis, S. Isolating the effect of cycling on local business environments in London. *PLOS ONE* (2018).
20. 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 | 21. Willing, C., **Klemmer, K.**, Brandt, T. & Neumann, D. Moving in time and space – Location intelligence for carsharing decision support. *Decision Support Systems* (2017).
- 2016 | 22. **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.