Dr. Kerry Nice

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Research Summary

- Building on a previous career in software engineering and research into urban climates, Dr. Kerry Nice's work uses modelling and artificial intelligence to study urban environments. His PhD at Monash University focused on the creation of an urban micro-climate model (VTUF-3D) to assess the positive human thermal comfort impacts in urban areas of increased urban vegetation and water sensitive design (WSUD) infrastructure. Current research focuses on the investigation of urban factors impacting the accessibility of active transport, the impacts of urban vegetation on transport, health, and micro-climates, and using artificial intelligence (deep learning neural networks) to assess the influence of urban characteristics on urban environments and the health of people who live there.

Qualifications

Monash University, School of Earth, Atmosphere and Environment — Melbourne, Australia
PhD. in Science (Urban climate modelling) — *Mar 2017*
Master of Environment and Sustainability — *Jul 2011*

University of Colorado, Faculty of Arts & Sciences — Boulder, Colorado
Double B.A., English and Film Studies — *May 1990*

Research Experience

University of Melbourne — Faculty of Architecture, Building and Planning
Research Fellow — *Nov 2016 – Present*

- Research with Transport, Health and Urban Systems (THUS) Research Lab assessing urban design, transport, health, and micro-climates. Modelling urban systems. Urban green space. Neural network machine learning. Computer vision. Agent based modelling. Supervision of Masters and PhD students.

CRC for Water Sensitive Cities / Monash University — School of Earth, Atmosphere and Environment
Research Fellow/Specialist Cohort — *Jan 2017 – Jun 2018 and Mar 2019 – Dec 2020*

- Micro-climate modelling investigation of human thermal comfort impacts due to urban vegetation and water. Climate modelling consulting for local and state governments.

Publications

Selected publications on urban climate, public health, machine learning, and urban systems modelling

- Ruth F. Hunter, Selin Akaraci, Kerry Nice, et al., A global natural experiment on city mobility patterns during the COVID-19 pandemic: A multi-analytical approach, *Lancet Public Health*, 2024.
- Ellie Traill, Kerry A. Nice, Nigel Tapper, Julie Arblaster, Pavement watering as an urban heat mitigation technique, *Urban Climate*, 2024.
- Pui Kwan Cheung, Kerry A. Nice, Stephen J. Livesley, Impacts of irrigation scheduling on urban green space cooling, *Landscape and Urban Planning*, 2024.
- Pui Kwan Cheung, Naika Meili, Kerry A. Nice, Stephen J. Livesley, Identifying the mechanisms by which irrigation can cool urban green spaces in summer, *Urban Climate*, 2024.
- Branislava Godic, et al., A comparison of content from across contemporary Australian population health surveys, *Australian and New Zealand Journal of Public Health*, 2024.
- Kerry A. Nice, Matthias Demuzere, Andrew Coutts, Nigel Tapper, Present day and future urban cooling enabled by integrated water management, *Frontiers in Sustainable Cities*, 2024.
- Xinye Wanyan, Sachith Seneviratne, Kerry Nice, Jason Thompson, Marcus White, Nano Langenheim, Mark Stevenson, Scalable Label-efficient Footpath Network Generation using Remote Sensing Data and Self-supervised Learning, *DICTA 2023, 2023 International Conference on Digital Image Computing.*
- Nan Xu, Kerry Nice, Sachith Seneviratne, Mark Stevenson, Leveraging Segment-Anything model for automated zero-shot road width extraction from aerial imagery, *DICTA 2023, 2023 International Conference on Digital Image Computing.*
- Mathew Lipson, Sue Grimmond, et al., Evaluation of 30 urban land surface models in the Urban-PLUMBER project: Phase 1 results, *Quarterly Journal of the Royal Meteorological Society*, 2023

- Marzie Naserikia, Melissa A. Hart, Negin Nazarian, Benjamin Bechtel, Mathew Lipson, Kerry A. Nice, Land surface and air temperature dynamics: The role of urban form and seasonality, *Science of the Total Environment*, 2023
- Pui Kwan Cheung, C.Y. Jim, Kerry A. Nice, Stephen J. Livesley, Measuring the instantaneous cooling effect of turf irrigation in Melbourne, Australia, *6th International Conference on Countermeasures to Urban Heat Islands*, 2023
- Pui Kwan Cheung, C.Y. Jim, Nigel Tapper, Kerry A. Nice, Stephen J. Livesley, Daytime irrigation leads to significantly cooler private backyards in summer, *Urban Climate*, 2022.
- Kerry A. Nice, Negin Nazarian, Mathew J. Lipson, Melissa A. Hart, et al., Isolating the impacts of urban form and fabric from geography on urban heat and human thermal comfort, *Building and Environment*, 2022
- Mathew J. Lipson, Negin Nazarian, Melissa A. Hart, Kerry A. Nice and Brooke Conroy, A transformation in city-descriptive input data for urban climate models, *Frontiers in Environmental Science*, 2022
- Pui Kwan Cheung, Kerry Nice, Stephen Livesley, Irrigating urban greenspace for cooling benefits: the mechanisms and management considerations, *Environmental Research: Climate*, 2022
- Jasper S. Wijnands, Kerry A. Nice, Sachith Seneviratne, Jason Thompson, and Mark Stevenson, The impact of the COVID-19 pandemic on air pollution: A global assessment using machine learning techniques, *Atmospheric Pollution Research*, 2022.
- Jason Thompson, Rod McClure, Tony Blakely, Nick Wilson, et al., Modelling SARS-CoV-2 disease progression in Australia and New Zealand, *Australian and New Zealand Journal of Public Health*, 2022.
- Sachith Seneviratne, Kerry A. Nice, Jasper Wijnands, Jason Thompson, Mark Stevenson, Self-supervision, Remote Sensing and Abstraction, *Digital Image Computing: Techniques and Applications 2021, Gold Coast, 2021.*
- Pui Kwan Cheung, Stephen J. Livesley, Kerry A. Nice, Estimating the cooling potential of irrigating green spaces in 100 global cities with arid, temperate or continental climates, *Sustainable Cities and Society*, 2021.
- Jasper S. Wijnands, Haifeng Zhao, Kerry A. Nice, et al., Identifying safe intersection design through unsupervised feature extraction from satellite imagery, *Computer-Aided Civil and Infrastructure Engineering*, 2020.
- K.A. Nice, J. Thompson, J. S. Wijnands, G.D.P.A. Aschwanden, M. Stevenson, The "Paris-end" of town? Deriving urban typologies using three imagery types, *Urban Sci.*, 2020.
- J. Thompson, M. Stevenson, J. S. Wijnands, K. Nice, G.D.P.A. Aschwanden, et al., A global analysis of urban design types and road transport injury: an image processing study, *The Lancet Planetary Health*, 2020.
- C. V Gal and K. A. Nice 'Mean radiant temperature modeling outdoors: A comparison of three approaches', in *100th Annual Meeting of the American Meteorological Society*, 2020.
- Naika Meili, Gabriele Manoli, Paolo Burlando, Elie Bou-Zeid, et al., An urban ecohydrological model to quantify the effect of vegetation on urban climate and hydrology (UT&C v1.0), *Geosci. Model Dev.*, 2020.
- K.A. Nice, J. S. Wijnands, A. Middel, et al., Sky pixel detection in outdoor imagery using an adaptive algorithm and machine learning, *Urban Climate*, 2020.
- J. S. Wijnands, J. Thompson, K. Nice, et al., Real-time monitoring of driver drowsiness on mobile platforms using 3-D neural networks. *Neural Computing and Applications*, 2019.
- G.D.P.A. Aschwanden, J. S. Wijnands, J. Thompson, K.A. Nice, and M. Stevenson, Learning To Walk: modelling transportation mode choice distribution through neural networks. *Environment and Planning B*, 2019.
- J. Wijnands, K. Nice, J. Thompson, H. Zhao, and M. Stevenson, Streetscape augmentation using generative adversarial networks: optimising health and wellbeing., *Sustainable Cities and Society*, 2019.
- D. Dommenget, K. Nice, T. Bayr, et al., The Monash Simple Climate Model Experiments (MSCM-DB v1.0), *Geosci. Model Dev.*, 2019.
- A. Broadbent, A. Coutts, K. Nice, M. Demuzere, et al., The Air-temperature Response to Green/blue-infrastructure Evaluation Tool (TARGET v1.0): an efficient and user-friendly model of city cooling. *Geosci. Model Dev.*, 2019.
- K.A. Nice, A. Coutts, and N.J. Tapper, Development of the VTUF-3D v1.0 urban micro-climate model to support assessment of urban vegetation influences on human thermal comfort. *Urban Climate*, 2018.

Reports

Selected industry and CRC reports

- N. Tapper, K. Nice, A. Coutts, and M. Demuzere, (2022), Health cost impacts of urban heat amelioration through IWCM measures. Prepared for the Department of Agriculture, Water and Environment
- Mark Siebentritt, Malcolm Eadie, Tim Watson, Sarah Day, Nigel Tapper, Kerry Nice, Negin Nazarian, Sebastian Pfautsch. (2022). Cool Suburbs: User Guide and Science Rationale. Western Sydney Regional Organisation of Councils
- Nice, K. (2021). Managing urban heat in water sensitive cities: research and policy responses. Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

- Sochacka, B., Kenway S., Bertram N., London G., Renouf M., Sainsbury O., Surendran S., Moravej M., Nice K., Todorovic T., Tarakemehzadeh N., Martin D.J. (2021). Water sensitive outcomes for infill development: final report, Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities
- Fishermans Bend Taskforce (2020) Fishermans Bend Urban Ecology Study: Volume 1.
- Tapper, N., Lloyd, S., McArthur, J., Nice, K., and Jacobs, S. (2019). Estimating the economic benefits of Urban Heat Island mitigation – Biophysical Aspects. CRCWSC Milestone Report. Melbourne, Australia

Grants

2024, Melbourne Data Analytics Platform Collaboration Engagement, Mapping air temperatures throughout Western Melbourne through machine learning, Stephen Livesley, Kerry Nice, Paul Cheung, Edoardo Tescari, Usha Nattala. $89,000.

2023, GC22011 Hort Innovation: Re-imagining streets with green infrastructure, Professor Sarah Bell (UoM), Dr Kerry Nice (UoM), Dr Nano Langenheim (UoM), Dr Marie Dade (UoM), Thami Croeser (RMIT), Dom Blackham (Mosaic Insights). $1,567,800

2022, Concurso FONDEF IDEA I+D 2023 (Chile), Development of public policies based on science for the transformation and development of green urban infrastructure that cool down cities in a context of water scarcity and risk

2022 Agile Funding Grant Scheme, ARC Centre of Excellence for Children and Families over the Life Course (Life Course Centre): Computer vision applications to derive a spatial index of access to social services.

2021-2023 ARC Discovery, $422,000: Sustainable mobility: city-wide exposure modelling to advance bicycling.

2021, Swiss National Science Foundation: Heat-Down: Integrated modelling of stormwater and urban heat for cooling cities.

2020, Melbourne Energy Institute, $30,000: The effects of COVID-19 on reduced transport and emissions for global city typologies.

2020 NHMRC/UKRI Built Environment And Prevention Research Scheme, $608,910: A Vision of Healthy Urban Design for NCD Prevention.

2016 Graham Treloar Early Career Researcher Fellowship/ABP Research ECR Project Grant (The University of Melbourne) $10,000, "Urban canyon mean radiant temperatures predictions through mining Google Street View imagery and neural network machine learning".

Student supervision

Xiaoyun He, Harbin Institute of Technology CSC visting PhD student, 'Children's thermal comfort in outdoor environments', 2024.

Guillermo A. Moncada-Morales, Pontifical Catholic University of Chile, 'Urban climate characteristics of Santiago, Chile, a bowl-shaped city', a visiting PhD student. 2024

Yayan Qiu, 'To what extent does a city designed by GNN-VR retain spatial topological relationships with regional characteristics?', 2024-2026.

Jianfeng Gao, 'Analysis of the 3D flows from park cool effect', Chinese Academy of Sciences CSC visting PhD student 2024.

Nan Xu, 'Transport Networks, Graph Networks and Air Pollution', 2023-2025,

Pui (Paul) Kwan Cheung, 'Irrigating urban green space as a cooling strategy – impacts on surface energy balance and microclimate', 2020-2023

Jingming Qian, 'The capacity for airport precinct cooling using recycled stormwater irrigation', 2016-2023,

Supervision of 9 Master of Information Technology COMP90055 Computing Project capstone research projects, 2018-2019.

Ellie Traill, 'Cooling through irrigated impervious surfaces', 2021, Honours project, Monash University.

Climate models

Development of the VTUF-3D v1.0 urban micro-climate model to support assessment of urban vegetation influences on human thermal comfort. https://github.com/mothlight/VTUF-3D-Java.v2/

The Air-temperature Response to Green/blue-infrastructure Evaluation Tool (TARGET v1.0): an efficient and user-friendly model of city cooling. https://github.com/mothlight/Target-Java.v2

Datasets

Pui Kwan Cheung, Naika Meili, Kerry Nice, Stephen Livesley, Dataset for: Identifying the mechanisms by which irrigation can cool urban green spaces in summer, 2024, https://zenodo.org/doi/10.5281/zenodo.10972538

Kerry A. Nice, Matthias Demuzere, Nigel Tapper, Dataset for: Present day and future urban cooling enabled by integrated water management, 2023, https://doi.org/10.5281/zenodo.10099761

Pui Kwan Cheung, Kerry Nice, Stephen Livesley, Dataset for: Impacts of irrigation scheduling on urban green space cooling, This record contains the microclimate and soil moisture data from a field experiment that investigated the impacts of irrigation scheduling on urban green space irrigation in Melbourne, Australia, 2023, https://doi.org/10.5281/zenodo.10140668

Kerry A. Nice, Jasper S. Wijnands, Dataset for: Sky pixel detection in outdoor imagery using an adaptive algorithm and machine learning, 2019, https://doi.org/10.5281/zenodo.2562395

Kerry A. Nice, Jasper S. Wijnands, Dataset for: Melbourne Google Street View imagery dataset, 2018, https://doi.org/10.5281/zenodo.1256251

Consulting

Monash Uni Nature+ Survey project, Jamie Ewert, Paul Maxwell, Kerry Nice, Nigel Tapper, Dom Blackham, Jan Orton, Jake Allen, Samantha Capon, Amala Mathew, Abigail Watkins, Ana Backstrom, Andrew Little. With Alluvium/Mosaic Insights/EcoFutures/Monash/UoM, 2024

The Mekong Thought Leadership and Think Tanks Network Program, 'Urban Heat Resilience: Bridging Science, Policy, and Sustainable Design', February 2024 - March 2025, Dr. Senaka Basnayake (Asian Disaster Preparedness Center (ADPC)), Dr. Jeeranuch Sakkhamduang (Thailand Environment Institute (TEI)), Simon Hammer (Alluvium Group), Dr. Matthias Demuzere (B-Kode), Dr. Kerry Nice (University of Melbourne).

Science advisory panel for Western Sydney Regional Organisation of Councils (WSROC) Cool Suburbs Rating and Accreditation tool version 2, 2023. https://coolsuburbs.com.au

'Health cost impacts of urban heat amelioration through integrated water cycle management (IWCM) measures', consortium under Marsden Jacob for the Department of Agriculture, Water, and Environment with a modelling team led by Prof. Nigel Tapper (Monash) with Dr. Andrew Coutts, and Dr. Matthias Demuzere (RUB) and health team led by Prof. Ping Bi (University of Adelaide). 2021-2022.

Science advisory panel for WSROC Cool Suburbs Rating and Accreditation tool. 2020.

Assessments of future heat vulnerability for the Queensland DES/QFES. 2020.

Microclimate Assessment for the ACT government. 2020.

CRC for Water Sensitive Cities and GHD for the Fishermans Bend Ecology Strategy. 2019.

Professional activities

Faculty of Architecture, Building and Planning Graduate Research Subcommittee, February 2024 onward

Early Career Development Committee for 11th International Conference on Urban Climate, ICUC11, 28 August-1 September 2023, Sydney.

Early Career Development Committee for 2022 IAUC Virtual Poster Conference, 30 Aug-1 Sep 2022.

111 peer reviews for 29 journals/grants including Advances in Meteorology, Atmosphere, Building Simulation, Cities, Designs, Environment and Planning B: Urban Analytics and City Science, Environmental Research Letters, Environmental Science & Technology, Forests, Geocarto international, Indoor and Built Environment, Information Processing in Agriculture, International Journal of Climatology, Journal of Transport Geography, Landscape and Urban Planning, Nature Cities, npj Natural Hazards, PNAS Nexus, Science of the Total Environment, Scientific Reports, Sustainability, Sustainable Cities and Society, Theoretical and Applied Climatology, Urban Climate, Urban Forestry & Urban Greening, and Australian Research Council grants

Teaching

Faculty of Architecture, Building and Planning, University of Melbourne - Representing Spatial Information (ABPL90407), 2023, 2024.

Faculty of Architecture, Building and Planning, University of Melbourne - Spatial Analytics (ABPL90408), 2023, 2024.