

# LUCAS KRUITWAGEN

## CLIMATE CHANGE & AI FOR SUSTAINABLE FINANCE

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### ACADEMIA

- DPhil in Geography and the Environment 2016.10 – 2021.03  
University of Oxford
- Title: *Technology, Information, and the Governance of Environmental Risk*
  - Supervisors: Professor Cameron Hepburn, Associate Professor Ben Caldecott
  - SusTec Academy Presenter: Invitational PhD academy hosted by ETH Zurich in Appenzall, CH
  - DescartesLabs Impact Science Grant
  - Microsoft AI for Earth Grant
  - NeurIPS Climate Change AI Reviewer and Expert Mentor
  - Frontier Development Lab Europe 2020 Applied AI Researcher
- Visiting Scholar, Global Projects Center 2018.01 – Present  
Stanford University
- Visiting Researcher, Centre for Environmental Policy 2015.09 – Present  
Imperial College London
- MSc, Distinction in Sustainable Energy Futures 2014.10 – 2015.09  
Imperial College London
- Climate-KIC Master's Label Programme
- BEng in Mechanical Engineering 2007.08 – 2012.04  
McGill University
- LORAN Award – Canada's highest-value undergraduate scholarship

### EMPLOYMENT HISTORY

- Oxford Earth Observation Oxford, UK 2017.08 – Present
- Co-founder, CTO
- Developing an environmental risk intelligence service for fund managers, beginning with water risk
  - Combining AI and earth observation, climate science, and a comprehensive infrastructure asset database
  - Member of European Space Agency Business Incubation Center and the Creative Destruction Lab
- Oxford Sustainable Finance Programme Oxford, UK 2015.09 – 2019.03
- Data Lead
- Lead the technical development of 2 Degree Pathways wargame and decision support tool, allowing finance, NGO, and policy analysts to roleplay energy company decision making through energy transition scenarios
  - Lead the technical development of Risk, Impact, & Opportunity Tool, assessing the asset-level exposure of companies in the power, steel and cement value chains to hypotheses of environment-related risk
- Ecosystem Energy Services Toronto, Canada 2012.05 – 2014.08
- Solutions Engineer
- Developed, sold, and implemented customized energy efficiency and renewable energy solutions worth \$23M

### SKILLS

Geospatial Data Science: Matlab, GDAL/ORG, Python: (Geo)Pandas; Tensorflow; Keras; Pytorch

Stack: Linux, PostgreSQL/PostGIS, Flask, Dash, AWS, Azure, GCP, Heroku

### AWARDS

- |      |                                       |  |
|------|---------------------------------------|--|
| 2020 | Copernicus Master's Finalist          | European Space Agency Phi-Week               |
| 2019 | Best Paper Prize - Innovative Methods | GRASFI Conference 2019                       |
| 2018 | Best Pedagogical Innovation           | UN Principles for Responsible Investment     |
| 2018 | Doctoral Fellowship                   | Social Science & Humanities Research Council |
| 2015 | Research Prize for Best MSc Thesis    | Energy Futures Lab, Imperial College London  |



## SELECT PUBLICATIONS

**Kruitwagen, L.** (2021). Towards *DeepSentinel*: Self-supervised Sentinel-1, Sentinel-2 sensor fusion for general purpose semantic embedding, Presented at *NeurIPS 2020 Climate Change Workshop*.

**Kruitwagen, L.**, Klaas, J., Lakeh, A. B., & Fan, J. (2021). Transition Risk in the global coal, oil, and gas supply chains, submitted to *International Conference on Fossil Fuel Supply and Climate Policy*.

Christensen, M., Jones, W., Kusner, M., **Kruitwagen, L.**, Pearce, T., Saeongkyongam, S., & Watson-Paris, D (2020). Aerosol effects on mesoscale structures in marine boundary layer clouds, *Frontier Development Lab Europe 2020 Technical Memo*.

**Kruitwagen, L.**, Story, K., Freidrich, J., Skillman, S., & Hepburn, C. (2019). A global inventory of utility-scale solar photovoltaic generating units, Presented at *NeurIPS 2019 Climate Change Workshop*, currently 4<sup>th</sup> round peer review at *Nature*.

Moore, C., **Kruitwagen, L.**, Mendiola, J., R., Morel, A., & Malhi, Y. (2019). Classifying Land Use in Complex Mosaic Landscapes using Drone Imagery and Machine Learning, submitted to *Remote Sensing of Environment*.

**Kruitwagen, L.** (2018). Power Sector Asset Networks: determinants of the diffusion of renewables 2007 through 2017, presented at *ETH SusTec Academy*, June 17-22, Appenzell, CH.

Caldecott, B., **Kruitwagen, L.**, McCarten, M., & Zhou, X. (2018). *Climate risk analysis from space: remote sensing, machine learning, and the future of measuring climate-related risk*, Smith School of Enterprise and the Environment, Oxford, UK.

**Kruitwagen, L.**, Collins, S., & Caldecott, B. (2017). 'Thermal Coal Power Stations', in *Coal in the 21 st Century*, ed. R. Hester, Royal Society of Chemistry, Cambridge, UK.

**Kruitwagen, L.** (2016). 'Financing 1.5 Degrees', Conference Proceedings of 1.5 Degrees: Meeting the challenges of the Paris Agreement, September 20-22, 2016, Environmental Change Institute, Oxford, UK.

**Kruitwagen, L.**, & Holmes, I. (2016). 'Future Pathways to 1.5°C/2°C-Compatible Oil & Gas Majors: Survey of energy outlooks and key uncertainties', Conference Paper presented at *Fossil Fuel Supply and Climate Policy*, September 26-27, 2016, Oxford, UK.

**Kruitwagen, L.** (2016). 'Decision Making under Risk & Uncertainty', White Paper, Grantham Institute for Climate Change and the Environment, London, UK.

**Kruitwagen, L.**, Madani, K., Caldecott, B., Workman, M. H. W. (2016). Game theory and corporate governance: conditions for effective stewardship of companies subject to climate change risks. *Journal of Sustainable Finance and Investment*, 6(3): 1-23.

Caldecott, B., **Kruitwagen, L.**, & Kok, I. (2016). Carbon Capture and Storage in the thermal coal value chain. *Oxford Energy Forum*, 105: 50-55. Oxford Institute for Energy Studies, University of Oxford, Oxford, UK.

Caldecott, B., **Kruitwagen, L.**, Dericks, G., Tulloch, D. J., Kok, I., Mitchell, J. (2016). *Stranded Assets and Thermal Coal: An analysis of environment-related risks*, Smith School of Enterprise and the Environment. University of Oxford, Oxford, UK.



## OTHER ENTREPRENEURIAL ACTIVITIES & PROJECTS

Oxford COVID-19 Impact Monitor *Oxford, UK* 2020.03 – 2020.06

- Develop insight for policy makers into the development of COVID-19 in the UK using cellphone user data

OpenWatt (Founder) *London, UK* 2015.02 – 2016.09

- A start-up to enable the rapid integration of legacy equipment into 21st-century electricity systems
- Finalists at *Mayor of London's Low Carbon Entrepreneur 2015*; the *Cleantech Challenge* hosted by UCL and LBS; *Climate Launchpad 2015*

Solar Cargo (Cofounder) *London, UK* 2014.09 – 2016.05

- A start-up to deliver deployable thin-film photovoltaic power from a standard shipping container
- Kick-start funded by the Climate-KIC Greenhouse Programme

