Curriculum Vitae

Peter Berrill

Born: 18th May, 1989
Nationality: Irish
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PERSONAL PROFILE

Peter is an industrial ecologist, working on issues related to urban sustainability and is an active researcher in the fields of environmental assessment and climate change mitigation, with foci in the building, energy, and transport sectors. He has a background in energy system and civil engineering, and much of his research deals with embodied, operation, and indirect (e.g. influence of urban built environments on transport emissions) environmental impacts of buildings and long-lived infrastructure. His current research project explores integrated approaches for reducing energy demand and emissions from transport and buildings in European cities. His research has employed key industrial ecology methods of life cycle assessment, material stock and flow analysis, and environmental footprinting, in addition to traditional and novel statistical techniques, building energy simulation, and energy system analysis.

EDUCATION

2016 – 2021	*Doctor of Philosophy* in Industrial Ecology – Yale University (USA). Thesis: "Energy and emissions in the U.S. residential sector, historical perspectives and opportunities for climate change mitigation". Supervisor Edgar G. Hertwich
2013 – 2015	*Master of Science* in Industrial Ecology – Double degree awarded by University of Graz (Austria) & TU Delft/Leiden University (Netherlands). Thesis Supervisor Edgar G. Hertwich
2014 –2015	*Master of Science* – Waseda University (Japan), study exchange
2015	*Master of Science* – Norwegian University of Science and Technology Industrial Ecology Programme (Norway), research exchange
2009 – 2013	*Bachelor of Engineering* in Energy Systems Engineering, with minor in Civil Engineering – National University of Ireland, Galway (Ireland). Result: 1.1 Thesis Supervisor Jamie Goggins
2008 – 2009	*Higher Certificate in Music Performance* – Royal Conservatoire of Scotland (UK)

PROFESSIONAL EXPERIENCE

2021-Present	**Marie-Curie Individual Fellowship experienced researche**r, TU Berlin; Guest Researcher, MCC Berlin (Germany)
2020	**Doctoral intern researche**r, Residential Buildings Research Group, National Renewable Energy Laboratory (USA)
2016-2021	**Researcher and Doctoral Candidate**, Yale University, Centre for Industrial Ecology (USA)
2016	**Business English Instructor**, IBEC (Japan)
2015	**Researcher**, Industrial Ecology Programme, Norwegian University of Science and Technology (Norway)
2012	**Intern** civil, environmental engineer, Alan Kerins Project (Ireland, Zambia)
2009 – 2016	**Musician** and **Music Tutor**, EMK Productions and Freelance (Ireland)

ACADEMIC SERVICE & SOCIETY MEMBERSHIP

Board Member: International Society for Industrial Ecology, Life Cycle Sustainability Assessment Section (2023-)
Member of Scientific Committee: International Conference on Industrial Ecology, Leiden (2023)
Society Member: International Society for Industrial Ecology (2016-)
Contributing Author: IPCC Assessment Report 6 Working Group 3, Buildings Chapter (2022)
Contributing Author: 'Ten insights from industrial ecology for the circular economy' (ISIE white paper, 2023)

Student Representative on Faculty Search Committee: Yale School of the Environment, Professor in Industrial Ecology and Sustainable Systems (2020)

Leader of advisory group on reducing air travel GHG emissions from international conferences - International Society for Industrial Ecology

Academic Referee: Performed peer-reviews of articles submitted to *Journal of Industrial Ecology*, *Environmental Science & Technology*, *Environmental Research Letters*, *Joule*, *Scientific Data*, *Resources, Conservation & Recycling*, *Applied Energy*, *Nature Communications*

GRANTS AND AWARDS

April 2021	Marie Skłodowska-Curie Actions Individual Fellowship (2yr) for project "Sustainable Urban Form For Integrated Climate Change Solutions" (SUFFICCS), €175,000
December 2018	Yale Institute for Biospheric Studies, Doctoral Dissertation Improvement Grants, $5,000
April 2017	Charles Kao Fund Research Grant, for project "Low-carbon Energy Development in 21st Century Japan", $5,000
March 2014	Sole student to win competitive award for one-semester study exchange to Waseda University (Japan) as part of Erasmus Mundus MSc in Industrial Ecology
September 2013	Finalist in national competition for best final year project (bachelor thesis project) held by the Republic of Ireland Regional Group of the Institution of Structural Engineers
March 2013	Erasmus Mundus Masters in Industrial Ecology (MIND) Category B scholarship award (covering tuition, plus stipend totalling €16,000 over two years)
September 2012	National University of Ireland, Galway 'University Scholar', awarded to undergraduate students achieving overall excellence, €500

RESEARCH MENTORING EXPERIENCE

2023	Research mentor to early-stage doctoral student on project scoping and literature review related to high-resolution building materials stocks
2023	Research mentor to visiting master student for project on GIS and energy data in French buildings
2022	Research mentor to master student for MSc dissertation "Enhancing the sustainability of the residential sector with sufficiency measures"
2020	Research mentor to high-school student with Lumiere Education
2020	Research mentor to two masters students for summer internship research projects: "US economy-wide non-hazardous waste generation: an extension the us Input-Output tables", and "Comparison of physical vs economic allocation for airline GHG emissions"
2017	Research mentor to visiting masters student for thesis research project: "Assessment of the Embodied and Operational Trade-offs of a U.S. Multi-Family Building With Changing Energy Codes and Different Climate Zones"

OTHER SKILLS

First Language: English
Other Languages (European CEFR level): Japanese (Independent – B1), German (Basic user – A2)
Computer Programming Languages:
Programming languages: R (advanced), Matlab (advanced), Python, including libraries for geospatial analysis (advanced), Google Earth Engine (basic), Bash/Shell (basic), Javascript (basic), ArcGIS / QGIS (basic)

ACADEMIC AND PROFESSIONAL PROFILES

ORCID: 0000-0003-1614-3885
github: https://github.com/peterberr
Google Scholar: https://scholar.google.com/citations?user=PUMnjmMAAAAJ&hl=en
LinkedIn: https://de.linkedin.com/in/peter-berrill-b56b7250
Website: https://peterberr.github.io/

SCIENTIFIC PUBLICATIONS

Summary (Google Scholar): h-index (13), total citations (631 on July 7 2023)

Peer-reviewed publications in scientific journals, **as first author**:

Berrill, P., E.J.H Wilson, J.L. Reyna, A.D. Fontanini and E.G. Hertwich. 2022. Decarbonization pathways for the residential sector in the United States, 2020-2060. *Nature Climate Change* 12(8): 712-718

Berrill, P. & Hertwich, E. 2021. Material flows and GHG emissions from housing stock evolution in US counties, 2020-2060. *Buildings & Cities* 2(1): 599-617

Berrill, P., Gillingham, K. T., & Hertwich, E. G. 2021. Drivers of change in U.S. residential energy consumption and greenhouse gas emission , 1990-2015. *Environmental Research Letters* 16: 034045

Berrill, P., K.T. Gillingham and E.G. Hertwich. 2021. Influence of housing policy and housing typology on residential energy demand in the United States. *Environmental Science & Technology* 55(4): 2224-2233 http://dx.doi.org/10.1021/acs.est.0c05696

Berrill, P., T.R. Miller, Y. Kondo, and E.G. Hertwich. 2020. Capital in the American carbon, energy, and material footprint. *Journal of Industrial Ecology* 24(3): 589–600.

Berrill, P. and E.G. Hertwich. 2018. Ground truthing the environmental benefits of a polygeneration system: when to combine heat and power? *Energy & Buildings* 173: 221–238. https://doi.org/10.1016/j.enbuild.2018.05.020.

Berrill, P., A. Arvesen, Y. Scholz, H.C. Gils, and E.G. Hertwich. 2016. Environmental impacts of high penetration renewable energy scenarios for Europe. *Environmental Research Letters* 10(12): 123002. https://doi.org/10.1088/1748-9326/11/1/014012

Publications in preparation, **as first author**:

Berrill, P., A. Javaid, N. Milojevic-Dupont, F. Nachtigall, F. Wagner, and F. Creutzig. 2023. Urban form influences travel distances, car ownership, and mode choice: evidence from 19 European cities. *Under Review* https://doi.org/10.21203/rs.3.rs-2924076/v1

Peer-reviewed publications in scientific journals, **as co-author**:

Van Ewijk, S., Chaudhary, S., **Berrill, P**. 2023. Estimating passenger emissions from airfares supports equitable climate action. *Environmental Research Letters*

Jiang, M., Suo, C., Wu, L., **Berrill, P**. 2022. Consumption structure optimization for reducing energy footprint. *Economic Systems Research*

Wang, T., **Berrill, P**., Zimmerman, J. B., Rao, N.D., Min, J., & Hertwich, E. G. 2022. Improved Copper Circularity as a Result of Increased Material Efficiency in the US Housing Stock. *Environmental Science and Technology*, 56(7), 4565-4577

Pauliuk, S., Heeren, N., **Berrill, P.,** Fishman, T., Nistad, A., Tu, Q., Wolfram, P., & Hertwich, E. G. 2021. Global scenarios of resource and emission savings from material efficiency in residential buildings and cars. *Nature Communications*, 12(1), 5097

Fishman, T., Heeren, N., Pauliuk, S., **Berrill, P**., Tu, Q., Wolfram, P., & Hertwich, E. G. 2021. A comprehensive set of global scenarios of housing, mobility, and material efficiency for material cycles and energy systems modeling. *Journal of Industrial Ecology*, 25(2), 305–320

Wang, T., **Berrill, P**., Zimmerman, J. B., & Hertwich, E. G. 2021. Copper Recycling Flow Model for the United States Economy: Impact of Scrap Quality on Potential Energy Benefit. *Environmental Science and Technology*, 55(8), 5485–5495

Pauliuk, S., T. Fishman, N. Heeren, **P. Berrill**, Q. Tu, P. Wolfram, and E.G. Hertwich. 2020. Linking service provision to material cycles: A new framework for studying the resource efficiency–climate change (RECC) nexus. *Journal of Industrial Ecology*: 25(2), 260-273

Miller, T.R., **P. Berrill**, P. Wolfram, R. Wang, Y. Kim, X. Zheng, and E.G. Hertwich. 2019. Method for endogenizing capital in the United States Environmentally-Extended Input-Output model. *Journal of Industrial Ecology* 23(6): 1410–1424.

Wang, C., X. Zheng, W. Cai, X. Gao, and **P. Berrill**. 2017. Unexpected water impacts of energy-saving measures in the iron and steel sector: Tradeoffs or synergies? *Applied Energy*. 205: 1119-1127

Reports, Book chapters, pre-prints, papers under review, and theses, as first and co-author:

van Ewijk, S., Ashton, W. S., **Berrill, P.,** Cao, Z., Chertow, M., Chopra, S. S., Fishman, T., Fitzpatrick, C., Heidrich, O., Leipold, S., Ritter, F., Sprecher, B., Yao, Y., & Myers, R. J. (2023*). 10 insights from industrial ecology for the circular economy*. https://is4ie.org/whitepaper

Cabeza et al (2022) Chapter 9 Buildings, in *IPCC AR6 Climate Change 2022 Mitigation of Climate Change*

Hertwich, E., Lifset, R., Pauliuk, S., Heeren, N., Ali, S., Tu, Q., Ardente, F., **Berrill, P**., Fishman, T., Kanaoka, K., Kulczycka, J., Makov, T., Masanet, E., & Wolfram, P. (2020). *Resource Efficiency and Climate Change: Material Efficiency Strategies for a Low-Carbon Future*.

Chertow, M.R., K.S. Kanaoka, T.R. Miller, **P. Berrill**, P. Wolfram, N. Heeren, and T. Fishman. 2020. The Systems Science of Industrial Ecology: Tools and Strategies Toward Meeting the Sustainable Development Goals. In *Science, Technology, and Innovation for Sustainable Development Goals*, ed. by Adenle A. Ademola, Marian R. Chertow, Ellen H. M. Moors, and David J. Pannell. Oxford University Press.

Berrill, P. 2021. A Comparison of Strategies for Mitigation of Lifecycle Greenhouse Gases from Residential Buildings in the United States (Doctoral Thesis) Yale University. Supervisor Edgar G. Hertwich

Berrill, P. 2015. Life cycle assessment of power systems with large shares of variable renewable energy (Masters Thesis) University of Graz. Supervisors Edgar G. Hertwich, Anders Arvesen

Berrill, P., Moran, P. 2013 Environmental Life Cycle Assessment of a University Building in Ireland (Bachelors Thesis) National University of Ireland, Galway. Supervisor Jamie Goggins

TEACHING EXPERIENCE:

Academic Teaching fellow posts:

2022	Urban Economics for Sustainability (Seminar), with Prof. Felix Creutzig
2020	Industrial Ecology, with Prof. Marian Chertow and Dr. Stijn van Ewijk
2019	Energy Systems Analysis, with Prof. Narasimha Rao
2019, 2017	Green Building: Issues and Perspectives, with Mr. Peter Yost
2018	Energy Systems Analysis, with Prof. Edgar Hertwich
2017	Carbon Footprints: Modelling and Analysis, with Prof. Edgar Hertwich

Non-Academic Teaching experience:

2023	Tutor with 'Prometeruse' project which connects scientists with secondary school students who develop a mini-research into a question related to climate change
2009-2016	Trumpet Tutor to individual beginner trumpet students

Teaching training and qualifications:

2020	'Planning a Seminar or Lecture for an English-Speaking Audience', training at TU Berlin. Aimed at inclusive teaching of students with various cultural backgrounds whose first language is not necessarily English
2016	Teaching English as a Foreign Language certificate from i-to-i, accredited by Open and Distance Learning Quality Council

Selected guest classroom lectures:

2020 & 2021	Guest lecture in Industrial Ecology: Impacts Embodied in Trade
2019	Guest lecture in Green Building: Issues and Perspectives course: "Trends and drivers of US residential energy consumption, 1990-2015"
2018	Guest lecture in Industrial Ecology: "Input-Output Life Cycle Assessment"
2017	Guest lecture in Industrial Ecology: "Life Cycle Assessment - Introduction"

ORAL PRESENTATIONS AT SCIENTIFIC CONFERENCES

Invited Presentation

30/06/2020: "Estimation of demolition and new construction of housing in US counties until 2060 - Implications for building material reuse potential" - The 15th International Conference on Waste Management and Technology Zero-waste City High Level Forum (Online)

Presentations

05/07/2023: "Influence of Urban Form on Car Ownership, Mode Choice, and Travel Distance in European Cities" – International Society for Industrial Ecology 2023, Leiden (Netherlands)

20/09/2022: "Decarbonization pathways for the residential sector in the United States" – International Society for Industrial Ecology – Socioeconomic Metabolism Conference, Wien (Austria)

03/06/2022: "Building and Shelter" Session chair and introductory presentation – ECCC Symposium, Berlin (Germany)

25/05/2022: "Decarbonization pathways for the residential sector in the United States" – International Energy Workshop, Freiburg (Germany)

03/06/2020: "Housing policy, housing typology, and residential energy in the United States" - Actionable Science for Urban Sustainability (Online)

08/07/2019: "Dynamic stock, energy and lifecycle analysis of residential buildings in the US" - 10th biennial International Conference on Industrial Ecology (ISIE 2019), Beijing (China)

11/04/2019: "Drivers of residential energy consumption in the US and options for GHG reductions" – Yale FES Research Day, New Haven (USA)

20/04/2018: "Making less bad things happen when we build houses and make our homes feel warm" (Up-Goer-Five presentation) – Yale FES Research Day, New Haven (USA)

28/06/2017: "Environmental performance of university campus buildings: An energy system evaluation" 9th biennial International Conference on Industrial Ecology (ISIE 2019), Chicago (USA)

28/09/2016: "Life Cycle Analysis of Electricity Systems: High Penetration Renewable Scenarios and the Roles of Energy Storage and Grid Transmission" - American Center for Life Cycle Assessment, LCA XVI, Charlestown (USA)

03/06/2016: “Environmental impacts of high penetration renewable energy scenarios for Europe” – International Energy Workshop, Cork (Ireland)

INVITED SEMINAR PRESENTATIONS

12/05/2022: “Decarbonization pathways for the residential sector in the United States” – MCC (Germany)
01/11/2019: “Drivers of change in residential energy consumption in the US, 1990-2015, The roles of housing age cohorts, fuel switching, and household size” – Yale University (USA)
08/06/2018: “Reducing carbon, energy, and material footprints from the residential sector in the united states: the importance of capital stocks and energy supply systems” – Waseda University, Tokyo (Japan)
03/08/2017: “Accounting for consumption of capital in the US Input-Output tables: approaches and impacts” – Waseda University, Tokyo (Japan)

POSTER PRESENTATIONS AT SCIENTIFIC CONFERENCES/SCIENCE OUTREACH EVENTS

10/09/2022: “Urban form's influence on GHG intensity of urban mobility in European cities” – Berlin Klima Tag 2022 (Germany)
21/06/2021: “Pathways for sustainable material use and GHG emission reductions from housing stock evolution in US counties to 2060” – Industrial Ecology Day 2021 (Online)
23/05/2018: “Reducing carbon, energy, and material footprints from the residential sector in the US: The importance of capital stocks and energy supply systems” – Industrial Ecology Gordon Research Conference, Les Diablerets (Switzerland)
27/06/2017: “Environmental performance of university campus buildings: An energy system evaluation” 9th biennial International Conference on Industrial Ecology (ISIE 2019), Chicago (USA)