Peter Berrill - Curriculum Vitae

PERSONAL AND CONTACT DETAILS

Nationality: Irish
Date of Birth: 18 May 1989
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EDUCATION

2016 – 2021	*Doctor of Philosophy* in Industrial Ecology – Yale University (USA). Thesis: "A Comparison of Strategies for Mitigation of Lifecycle Greenhouse Gases from Residential Buildings in The United States". 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).
2014 –2015	*Master of Science* – Waseda University (Japan), study exchange
2015	*Master of Science* – NTNU Industrial Ecology (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
2008 – 2009	*Higher Certificate in Music Performance* – Royal Conservatoire of Scotland (UK)

ACADEMIC PROFESSIONAL EXPERIENCE

2024-	**Assistant Professor** Institute of Environmental Sciences, Industrial Ecology (CML-IE). Leading and contributing to research on sustainable urban development, and high resolution building stock and material mapping.
2021-2024	**Marie-Curie Individual Fellowship project lead**, TU Berlin (DE). 'Sustainable Urban Form For Integrated Climate Change Solutions', modelling influence of urban form on service levels, energy and emissions from buildings and transport.
2020	**Visiting researcher**, Residential Buildings Research Group, NREL (USA). Enhancing the modelling of multifamily buildings in the ResStock model.
2016-2021	**Researcher and Doctoral Candidate**, Yale University School of Environment (USA). Primary focus on modelling of past and future energy and GHG emissions from US residential sector. Additional research on multigeneration district energy systems, and role of capital in environmental impacts of consumption.
2015	**Researcher**, Industrial Ecology Programme NTNU (Norway). Life cycle assessment of electricity supply scenarios for Europe.

RESEARCH HIGHLIGHTS (top 3 most impactful research outputs)

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

- *High-resolution and detailed analysis of energy and embodied GHG emissions in 108 scenarios of residential decarbonisation, considering housing stock growth, renovation and electrification and grid decarbonisation. Featured as a research highlight in 'News and Views' column of NCC issue of publication.*

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

- *Retrospective analysis of federal government housing policies on housing typology mix in new construction over six decades, and knock-on effects for current urban residential energy demand. Runner up prize in EST 2021 best paper awards. Extensive coverage on twitter, and news piece written by Rocky Mountain Institute*

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.

- *Life cycle assessment of high renewable electricity supply scenarios for Europe, including impacts of energy storage and transmission grid infrastructure. Demonstrates land and metal requirements, and reduced environmental impacts for high renewable electricity supply. Research highlight in Nature Climate Change*

RESEARCH MENTORING EXPERIENCE

2023	Research mentor to two early-stage doctoral students on high-resolution mapping of building materials stocks
2023	Main research mentor to visiting PhD student on assessing implications of constrained supply of materials needed for energy transition
2023	Research mentor to visiting master student for cleaning and harmonising 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" (resulting in a journal publication)
2017	Research mentor to 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"

ACADEMIC TEACHING EXPERIENCE: (Teaching Assistant Role)

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

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

ACADEMIC SERVICE & SOCIETY MEMBERSHIP

Nominating Committee member (2024-)
Board Member: ISIE, Life Cycle Sustainability Assessment Section (2023-2024)
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, (2020)

Leader of advisory group on reducing air travel GHG emissions from international conferences - International Society for Industrial Ecology (2016-2017)

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*

RESEARCH OUTPUT

Summary (Google Scholar): h-index (13), total citations (915 on June 3 2024)

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

Berrill, P., F. Nachtigall, A. Javaid, N. Milojevic-Dupont, F. Wagner & F. Creutzig. 2024. Comparing urban form influences on travel distance, car ownership, and mode choice. *Transportation Research Part D* 128: 104087

Berrill, P., E.J.H Wilson, J.L. Reyna, A.D. Fontanini & 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. & E.G. Hertwich 2021. Material flows and GHG emissions from housing stock evolution in US counties, 2020-2060. *Buildings & Cities* 2(1): 599-617

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

Berrill, P., K. T. Gillingham, & 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

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

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

Berrill, P., A. Arvesen, Y. Scholz, H.C. Gils, & E.G. Hertwich. 2016. Environmental impacts of high penetration renewable energy scenarios for Europe. *Environmental Research Letters* 10(12): 123002.

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, 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

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

05/09/2023: "Urban Mobility Practices in Small, Medium and Large European Cities: The Mediating Roles of Urban Form and Car Ownership" – European Transport Conference 2023, Milan (Italy)

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

27/05/2024: “Urban form influences on emissions from buildings and mobility” – Industrial Ecology Gordon Research Conference, Les Diablerets (Switzerland)
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)

LANGUAGE AND COMPUTER 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
Academic Website: https://peterberr.github.io/ ; https://www.universiteitleiden.nl/en/staffmembers/peter-berrill