

Curriculum Vitae, Full

Peter Berrill

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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”
- 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* – 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)
- 2008 – 2009** *Higher Certificate in Music Performance* – Royal Conservatoire of Scotland (UK)

PROFESSIONAL EXPERIENCE

- 2021-Present** **Marie-Curie Individual Fellowship Post-doc researcher**, Sustainability Economics of Human Settlements, TU Berlin / Guest Researcher MCC Berlin
- 2020** **Doctoral intern researcher**, Residential Buildings Research Group, National Renewable Energy Laboratory (USA)
- 2016-2021** **Researcher and Doctoral Candidate**, Yale University, Centre for Industrial Ecology. Supervision from Edgar G. Hertwich, Kenneth T. Gillingham, Karen C. Seto, and Peter Yost
- 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, EMK Productions and Freelance (Ireland)

TEACHING EXPERIENCE:

During my PhD, I have served as a teaching fellow six times, for four different courses. Tasks associated with this position include design and grading of homework assignments, assisting professors with communications to students and input to course design, and offering feedback and advice to students on course projects.

Teaching fellow posts:

- 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

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Selected guest classroom lectures:

2020	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”

SCIENTIFIC PUBLICATIONS

Summary (Google Scholar): h-index (9), total citations (346) (on June 1 2022)

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

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>

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

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

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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:

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*.

Pauliuk, S., Heeren, N., **Berrill, P.**, Fishman, T., Nistad, A., Tu, Q., Wolfram, P., & Hertwich, E. (2020). Global Scenarios of Resource and Emissions Savings from Systemic Material Efficiency in Buildings and Cars. *Research Square (Preprint)*, 1–18.

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

Berrill, P. 2015. Life cycle assessment of power systems with large shares of variable renewable energy (Masters Thesis) University of Graz.

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

ACADEMIC SERVICE

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

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

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

Contributing author to IPCC AR6 WG3 Buildings Chapter - Intergovernmental Panel on Climate Change

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

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

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- 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

- 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)

PERSONAL GRANTS AND AWARDS

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| 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 excellence in overall grades, €500 |

MENTORING EXPERIENCE

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| 2022 | Research mentor to master student for MSc dissertation research on reducing per-capita floor area while maintaining high welfare levels |
| 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” |

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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”

PERSONAL SKILLS

Native Languages: English

Other Languages (European CEFR level): Japanese (Independent – B1), German (Basic user – A2)

Computer Programming Languages:

Programming languages: R (advanced), Matlab (advanced), Python (proficient), Google Earth Engine (basic), Bash/Shell (basic), Javascript (basic), ArcGIS/ArcPy/QGIS (basic)