

Nicholas Z. Muller, Ph.D., M.P.A.

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Appointments

- July 2017 - Present: Lester and Judith Lave Associate Professor of Economics, Engineering, and Public Policy. Department of Engineering and Public Policy, Tepper School of Business, Carnegie Mellon University.
- September 2014 - Present: National Bureau of Economic Research, Environment and Energy Working Group, Research Associate.
- January 2020 - Present: Co-Editor Journal of the Association of Environmental and Resource Economists.
- April 2018 - Present: Fellow, Wilton E. Scott Institute for Energy Innovation, Carnegie Mellon University, Pittsburgh, PA.
- November 2019 - Present: Member Core Competency Advisory Board for the University Coalition for Fossil Energy Research (UCFER), DOE-NETL.
- January 2015 – August, 2017: United States Environmental Protection Agency, Science Advisory Board, Panel on the Economy-Wide Modeling of the Benefits and Costs of Environmental Regulation.
- July 2014 - June 2017: Middlebury College: Associate Professor (with tenure) in the Department of Economics.
- July 2015 - January, 2016: Carnegie Mellon University: Visiting Associate Professor of Economics, Scott Institute, Heinz School of Public Policy, Tepper School of Business, Department of Engineering and Public Policy.
- April 2012 - September 2014: National Bureau of Economic Research, Environment and Energy Working Group, Faculty Research Fellow.

- July 2007 - July 2014: Middlebury College: Assistant Professor in the Department of Economics and the Environmental Studies Program.

Education

- 2007 Doctor of Philosophy, Environmental and Natural Resource Economics, School of Forestry and Environmental Studies, Yale University, New Haven, CT 06511.
- 2002 Master of Public Affairs, Environmental Policy & Public Financial Administration, School of Public and Environmental Affairs, Indiana University, Bloomington, IN 47401.
- 1996 Bachelor of Science (Honors), Public Policy, Planning, and Management, School of Architecture and Allied Arts, University of Oregon, Eugene, OR, 97403.

Research

Books

- 2012 N.Z. Muller and R. Mendelsohn. "Using Marginal Damages in Environmental policy: A Study of Air Pollution in the United States." The American Enterprise Institute Press. Washington, D.C., USA.

Publications

1. 2020 "The McKeesport Natural Gas Boom, 1919-1921." N.Z. Muller, J.A. Tarr. *The Journal of Energy History*. energyhistory.eu/en/node/225.
2. 2020 "Recent Increases in Air Pollution: Evidence and Implications for Mortality." Karen Clay, N.Z. Muller. *Conditional Acceptance. The Review of Environmental Economics and Policy*.
3. 2020 "The Environmental Benefits of Transportation Electrification: Urban Buses." Stephen P Holland; Erin T Mansur; Nicholas Z Muller; Andrew J. Yates. *Energy Policy. Forthcoming*.

4. 2020 "Transboundary health damages of air pollution in the U.S." Brian Sergi, Nicholas Z. Muller, Ines Azevedo, Stephen Davis. *Environmental Research Letters*. *Forthcoming*.
5. 2020 "Decompositions and Policy Consequences of an Extraordinary Decline in Air Pollution from Electricity Generation." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. *American Economic Journal: Economic Policy*. *Forthcoming*.
6. 2020 "Optimizing emissions reductions from the U.S. power sector for climate and health benefits." Brian Sergi, Peter Adams, N.Z. Muller, Allen L. Robinson, Steven J. Davis, Julian Marshall, Inês Azevedo. *Environmental Science and Technology*. *Forthcoming*.
7. 2020 "Reducing mortality from air pollution in the United States" Thakrar, Sumil; Balasubramanian, Srinidhi; Adams, Peter; Azevedo, Ines; Muller, Nicholas; Pandis, Spyros; Polasky, Stephen; Pope, Clive; Robinson, Allen; Apte, Josh; Tessum, Chris; Marshall, Julian; Hill, Jason. *Environmental Science and Technology: Letters*. <https://pubs.acs.org/doi/10.1021/acs.estlett.0c00424>.
8. 2020 "Near Term Carbon Tax Policy in the U.S. Economy: Limits to Deep Decarbonization." Roth, Michael; Adams, Peter; Jaramillo, Paulina; Muller, N.Z. *Environmental Research Communications*. 2(5), 051004.
9. 2020 "Long-Run Environmental Accounting in the United States Economy." N.Z. Muller. *Environmental and Energy Policy in the Economy, Vol. 1: 158 - 191*. National Bureau of Economic Research, Cambridge, MA, USA.
10. 2019 "Quantifying the social equity state of an energy system: Environmental and labor market equity of the shale gas boom in Appalachia" Mayfield, E., Cohon, J., Muller, N.Z., Azevedo, I., Robinson, A. L. *Environmental Research Letters*, <https://dx.doi.org/10.1088/1748-9326/ab59cd>.
11. 2019 "Cumulative air, climate, and employment impacts of natural gas systems" Erin L. Mayfield, Jared Cohon, Allen L. Robinson, Inês Azevedo, N.Z. Muller. *Nature Sustainability*. DOI: 10.1038/s41893-019-0420-1.
12. 2019 "Fine Particulate Matter Damages and Value Added in the United States Economy," P. Tschofen, I. Azevedo. N.Z. Muller. *Proceedings of the National Academy of Science*. <https://doi.org/10.1073/pnas.1905030116>.
13. 2019 "Does Environmental Policy Affect Income Inequality? Evidence from The Clean Air Act." Akshaya Jha, Peter H. Matthews, Nicholas Z. Muller. *American Economic Review Papers and Proceedings*. 109: 271–276
14. 2019 "An Inter-Comparison of Air Quality Social Cost Estimates from Reduced-Complexity Models" by Gilmore, Elisabeth; Heo, Jinhyok; Muller, Nicholas ; Tessum, Chris; Hill, Jason; Marshall, Julian; Adams, Peter. *Environmental Research Letters*: 14(2019) 074016 <https://doi.org/10.1088/1748-9326/ab1ab5>.

15. 2019 "Inequity in consumption of goods and services adds to racial-ethnic disparities in air pollution exposure" Tessum, C., Apte, J.S., Goodkind, A.L., Muller, N.Z., Mullins, K.A., Paolletta, D.A., Polasky, S., Springer, N.P., Thakrar, S.K., Marshall, J.D., Hill, J.D. *Proceedings of the National Academy of Science*. 116 (13) 6001-6006.
16. 2019 "Market-based Emissions Regulation When Damages Vary Across Sources: What Are the Gains from Differentiation?" M.Fowlie. N.Z. Muller. *Journal of the Association of Environmental and Resource Economists: Vol. 5(1): 593-632*.
17. 2019 "Distributional Effects of Air Pollution from Electric Vehicle Adoption" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. *Journal of the Association of Environmental and Resource Economists. Vol 6, S1: 65 - 94*.
18. 2019 "The Derivation of Discount Rates with an Augmented Measure of Income." N.Z. Muller. *Journal of Environmental Economics and Management*:
<https://doi.org/10.1016/j.jeem.2019.02.007>
19. 2019 "The External Costs of Shipping Petroleum Products by Pipeline and Rail: Evidence of Shipments of Crude Oil from North Dakota " Karen Clay, Akshaya Jha, N.Z. Muller, Randy Walsh. *The Energy Journal*. 40(1). 10.5547/01956574.40.1.kcla
20. 2018 "Effect of Model Spatial Resolution on Estimates of Fine Particulate Matter Exposure and Exposure Disparities in the United States" Paoletta, David; Tessum, Christopher; Adams, Peter ; Apte, Joshua; Chambliss, Sarah; Hill, Jason; Muller, Nicholas; Marshall, Julian. *Environmental Science & Technology Letters, 2018, 5 (7), pp 436-441*. <https://pubs.acs.org/articlesonrequest/AOR-xVZJ3tiESm6yuNsqbuuz>
21. 2018 "The Local Air Pollution Costs of Coal Storage and Handling: Evidence from U.S. Power Plants." Akshaya Jha, N.Z. Muller. *Journal of Environmental Economics and Management. 92: 360 - 396*.
22. 2018 "The Distribution of Income is Worse Than You Think." N.Z. Muller, P.H. Matthews, V. Wiltshire-Gordon. *PLoS ONE 13(3): e0192461*.
23. 2018 "The Impact of Trading on the Costs and Benefits of the Acid Rain Program." H.R. Chan, B.A. Chupp, M.L. Cropper, N.Z. Muller. *Journal of Environmental Economics and Management: 88, 180-209*.
24. 2017 "Does Environmental Policy Affect Scaling Laws Between Population and Pollution? Evidence from American Metropolitan Areas." N.Z. Muller, Akshaya Jha. 09 Aug 2017 *PLOS ONE* <https://doi.org/10.1371/journal.pone.0181407>.
25. 2017 "Environmental Benefit-Cost Analysis and the National Accounts." N.Z. Muller. *Journal of Benefit-Cost Analysis* <http://dx.doi.org/10.1017/bca.2017.15>.
26. 2017 "Air and Water: Integrated Assessment Models for Multiple Media." D.A. Keiser, N.Z. Muller. *Annual Review of Resource Economics* 9, pp. 165-184.

27. 2017 "What Forces Dictate the Design of Pollution Monitoring Networks?" N.Z. Muller, Paul Ruud. *Environmental Modeling and Assessment* 23(1), 1-14. DOI: 10.1007/s10666-017-9553-7.
28. 2016 "Are There Environmental Benefits from Driving Electric Vehicles? The Importance of Local Factors." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. *American Economic Review* 106(12): 3700 - 3729.
29. 2016 "Reply to Comment on "Damages and Expected Deaths Due to Excess NO_x Emissions from 2009-2015 Volkswagen Diesel Vehicles." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. *Environmental Science and Technology*. 50(7): 4137-4138. DOI: 10.1021/acs.est.6b01157
30. 2016 "On the divergence between fuel and service prices: The importance of technological change and diffusion in an American frontier economy." N.Z. Muller. *Explorations in Economic History*. 60: 93 - 111.
31. 2016 "Air pollution emissions and damages from energy production in the U.S.: 2002–2011." P. Jaramillo and N.Z. Muller. *Energy Policy* 90: 202 - 211.
32. 2016 "Damages and Expected Deaths Due to Excess NO_x Emissions from 2009-2015 Volkswagen Diesel Vehicles." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. *Environmental Science and Technology*. 50(3): 1111-1117. DOI 10.1021/acs.est.5b05190
33. 2016 "A Comment On: Diminishing Returns or Compounding Benefits of Air Pollution Control? The Case of NO_x and Ozone." R. Mendelsohn, N.Z. Muller. *Environmental Science and Technology*. 50(1): 500-501 DOI 10.1021/acs.est.5b05324
34. 2016 "Power Laws and Air Pollution." N.Z. Muller. *Environmental Modeling and Assessment*: 21(1): 31 - 52.
35. 2014 "Boosting GDP growth by accounting for the environment: Including air pollution and greenhouse gas damages increases estimated U.S. growth." N.Z. Muller. *Science*. August 22nd, 2014, Vol. 345 no. 6199 pp. 873-874: DOI:10.1126/science.1253506.
36. 2014 "The Air Pollution Damages from Offshore Energy Production." N.Z. Muller. *The Energy Journal* 35(4): 39 - 60.
37. 2014 "Towards the Measurement of Net Economic Welfare: Air Pollution Damage in the United States National Accounts - 2002, 2005, 2008." N.Z. Muller. In: *Measuring Economic Sustainability and Progress*. Eds. Jorgensen, D.W., J.S. Landefeld, P. Schreyer. NBER Book Series in Income and Wealth Vol. 72.
38. 2013 "Using Index Numbers for Deflation in Environmental Accounting." N.Z. Muller. *Environment and Development Economics*. doi:10.1017/S1355770X1300048X.
39. 2012 "PM_{2.5} Co-benefits of Climate Change Legislation Part 1: California's AB 32." C. Zapata, M. Kleeman, N.Z. Muller, *Climatic Change*. 10.1007/s10584-012-0545-y.

40. 2012 "The Design of Optimal Climate Policy with Air Pollution Co-Benefits." N.Z. Muller, *Resource and Energy Economics*. <http://dx.doi.org/10.1016/j.reseneeco.2012.07.002>
41. 2012 "Global air quality and health co-benefits of mitigating near-term climate change through methane and black carbon emission controls ." Susan C. Anenberg, Joel Schwartz, Drew Shindell, Markus Amann, Greg Faluvegi, Zbigniew Klimont, Greet Janssens-Maenhout, Luca Pozzoli, Rita Van Dingenen, Elisabetta Vignati, Lisa Emberson, Nicholas Z. Muller, J. Jason West, Martin Williams, Volodymyr Demkine, W. Kevin Hicks, Johan Kuylenstierna, Frank Raes, Veerabhadran Ramanathan. *Environmental Health Perspectives*. 120(6): 831 - 839.
42. 2012 "Efficient Pollution Regulation: Getting the Prices Right: Comment: Reply." N.Z. Muller, R.O. Mendelsohn. *The American Economic Review*.102(1): 608-612.
43. 2012 "Efficient Pollution Regulation: Getting the Prices Right: Mortality Rate Update (Corrigendum)." N.Z. Muller, R.O. Mendelsohn, *The American Economic Review*.102(1): 613-616.
44. 2012 "Simultaneously mitigating near-term climate change and improving human health and food security." Drew Shindell, Johan C. I. Kuylenstierna, Elisabetta Vignati, Rita van Dingenen, Markus Amann, Zbigniew Klimont, Susan C. Anenberg, Nicholas Muller, Greet Janssens-Maenhout, Frank Raes, Joel Schwartz, Greg Faluvegi, Luca Pozzoli, Kaarle Kupiainen, Lena Höglund-Isaksson, Lisa Emberson, V. Ramanathan, Kevin Hicks, Kim Oanh N. T., George Milly, Volodymyr Demkine, Martin Williams, David Streets, David Fowler. *Science* 335, 183 - 189.
45. 2011 "Environmental Accounting: Methods with an Application to the U.S. Economy." N.Z. Muller, W.D. Nordhaus, R.O. Mendelsohn. *The American Economic Review*. 101(5): 1649-1675
46. 2011 "Linking Policy to Statistical Uncertainty in Air Pollution Damages." N.Z. Muller. *The B.E. Press Journal of Economic Analysis & Policy*. Vol. 11 : Iss. 1 (Contributions), Article 32.
47. 2011 "The Ancillary Benefits of Climate Change Policy in the United States." B. Groosman, N.Z. Muller, E. O'Neill. *Environmental and Resource Economics*, 2011, 10.1007/s10640-011-9483-9.
48. 2011 "The Social Cost of Trading? Measuring the Increased Damages from Sulfur Dioxide Trading in the United States." D.Henry, N.Z. Muller, R. Mendelsohn. *Journal of Policy Analysis and Management* 30(3):598 - 612.
49. 2011 "Climate, health, agricultural and economic impacts of adopting tighter emissions standards for on-road motor vehicles." Drew Shindell, Greg Faluvegi, Michael Walsh, Susan Anenberg, Rita Van Dingenen, Nicholas Z. Muller, Jeff Austin, Dorothy Koch, George Milly. *Nature Climate Change*. Vol 1. 59-66.

50. 2009 "Efficient Pollution Regulation: Getting the Prices Right." N.Z. Muller, R.O. Mendelsohn, *The American Economic Review*. 99(5): 1714 - 1739.
51. 2009 "Using air quality modeling to study source-receptor relationships between nitrogen oxides emissions and ozone exposures over the United States." D.Q. Tong, N.Z. Muller, H. Kan, R.O. Mendelsohn. *Environment International*. 35(8): 1109-17.
52. 2009 "Regulating NO_x and SO₂ in Atlanta." N.Z. Muller, D.Q. Tong, R.O. Mendelsohn, *The B.E. Journal of Economic Analysis & Policy: Vol. 9 : Iss. 2 (Contributions), Article 3*.
53. 2009 "Using Hedonic Property Models to Value Public Water Bodies: An Analysis of Specification Issues." N.Z. Muller. *Water Resources Research*, 45, W01401, doi:10.1029/2008WR007281.
54. 2008 "Sinusoidal Modeling Applied to Spatially Variant Tropospheric Ozone Air Pollution." N.Z. Muller, P.C.B. Phillips. *Environmetrics*; 19(6): 567 - 581.
55. 2007 "Measuring the Damages Due to Air Pollution in the United States." N.Z. Muller, R.O. Mendelsohn. *Journal of Environmental Economics and Management*; 54: 1-14.
56. 2006 "An Integrated Assessment of the Spatial Variability of Ozone Impacts from Emissions of Nitrogen Oxides" Tong, D.Q., N.Z. Muller, D.L. Mauzerall, R.O. Mendelsohn. *Environmental Science and Technology*; 40(5): 1395-1400.

Submitted Papers

- 2020 "The Growth of Nations Revisited: Global Environmental Accounting from 1998 to 2018." Aniruddh Mohan, Nicholas Z. Muller, Akshay Thyagarajan, Randall V. Martin, Melanie S. Hammer, Aaron van Donkelaar. *Submitted*.
- 2020 "Hurricane Katrina Floods New Jersey: The Role of Information in the Market Response to Flood Risk." Caroline A. Hopkins and N.Z. Muller. *Revision requested*.
- 2020 "Heterogeneous Environmental and Grid Benefits from Rooftop Solar and the Costs of Inefficient Siting Decisions." Steven E. Sexton, A. Justin Kirkpatrick, Robert Harris, Nicholas Z. Muller *Revision requested*.
- 2020 "Expected Health Effects of Reduced Air Pollution from COVID-19 Social Distancing" S. Cicala, S. Holland, E. Mansur, N.Z. Muller, A. Yates. *Submitted*.

Working Papers

- 2020 "The Growth of Nations Revisited: Global Environmental Accounting from 1998 to 2018." Aniruddh Mohan, Nicholas Z. Muller, Akshay Thyagarajan, Randall V. Martin, Melanie S. Hammer, Aaron van Donkelaar. NBER WP #27398.
- 2020 "The Environmental Benefits of Transportation Electrification: Urban Buses." Stephen P Holland; Erin T Mansur; Nicholas Z Muller; Andrew J. Yates. NBER WP# 27285.
- 2020 "Expected Health Effects of Reduced Air Pollution from COVID-19 Social Distancing" S. Cicala, S. Holland, E. Mansur, N.Z. Muller, A. Yates. NBER WP# 27135.
- 2019 "Recent Increases in Air Pollution: Evidence and Implications for Mortality." Karen Clay, N.Z. Muller. NBER WP#26381.
- 2019 "The McKeesport Gas Boom: 1919 - 1921." N.Z. Muller, J.A. Tarr.
- 2019 "Time Preference and the Great Depression: Evidence from Firewood Prices in Portland, Oregon." N.Z. Muller. NBER WP #25997.
- 2019 "Hurricane Katrina Floods New Jersey: The Role of Information in the Market Response to Flood Risk." Caroline A. Hopkins and N.Z. Muller. NBER WP #25984.
- 2019 "Long-Run Environmental Accounting in the United States Economy." N.Z. Muller. NBER WP #25910.
- 2018 "Decompositions and Policy Consequences of an Extraordinary Decline in Air Pollution from Electricity Generation." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. NBER WP #25339.
- 2018 "Heterogeneous Environmental and Grid Benefits from Rooftop Solar and the Costs of Inefficient Siting Decisions." Steven E. Sexton, A. Justin Kirkpatrick, Robert Harris, Nicholas Z. Muller NBER WP #25241
- 2018 "Livestreaming Pollution: A New form of disclosure and a catalyst for citizen engagement?" Emiliano Huet-Vaughn, N.Z. Muller, Yen-Chia Hsu. NBER WP #24664.
- 2017 "The External Costs of Shipping Petroleum Products by Pipeline and Rail: Evidence of Shipments of Crude Oil from North Dakota " Karen Clay, Akshaya Jha, N.Z. Muller, Randy Walsh. NBER WP #23852.
- 2016 "Distributional Effects of Air Pollution from Electric Vehicle Adoption" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. NBER WP #22862.
- 2016 "Handle with Care: The Local Air Pollution Costs of Coal Storage" Akshaya Jha, N.Z. Muller. NBER WP #23417
- 2016 "The Derivation of Discount Rates Using an Augmented Measure of Income." N.Z. Muller. NBER WP #22579

- 2016 "An Input-Output Model of the U.S. Economy with Pollution Externality." N.Z. Muller. NBER WP #22092.
- 2016 "On cost savings from innovation with market-based pollution control." N.Z. Muller.
- 2016 "What Forces Dictate the Design of Pollution Monitoring Networks?" N.Z. Muller, Paul Ruud. NBER WP #21966.
- 2016 "What Forces Dictate the Design of Pollution Monitoring Networks?" N.Z. Muller, Paul Ruud. *CESifo Working Paper No. 5739*.
- 2015 "The Market for Sulfur Dioxide Allowances: What Can We Learn from the Grand Policy Experiment?" H.R. Chan, B.A. Chupp, M.L. Cropper, N.Z. Muller. NBER WP #21383.
- 2015 "The Net Benefits of the Acid Rain Program: What Can We Learn from the Grand Policy Experiment?" H.R. Chan, B.A. Chupp, M.L. Cropper, N.Z. Muller. Resources for the Future Discussion Paper-15-25.
- 2015 "Environmental Benefits from Driving Electric Vehicles?" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. NBER WP #21291.
- 2013 "Market-based Emissions Regulation When Damages Vary Across Sources: What Are the Gains from Differentiation?" M.Fowlie. N.Z. Muller. NBER WP 18801.
- 2014 "Form Versus Function: What are the Policy Implications of the Form of the PM2.5-Mortality Relationship?" N.Z. Muller

Writing Not Subject to Peer Review.

- 2020 "Monetary Damages - A Better Measure of Sustainability than Emissions?" A. Mohan, N.Z. Muller. United Nations Principles for Responsible Investment Blog <https://www.unpri.org/pri-blogs/monetary-damages-a-better-measure-of-sustainability-than-emissions/6633.article>
- 2020 "Growth, Sustainability, and the Measurement of Global Gross Product." A. Thyagarajan, A. Mohan, N.Z. Muller. VOXEu. https://voxeu.org/article/growth-sustainability-and-measurement-global-gross-product?qt-quicktabs_cepr_policy_research=0
- 2019 "Carnegie Mellon Did Not Say No or Yes to Shale Gas." J. Cohon, I. Azevedo, E. Mayfield, N.Z. Muller, A. Robinson. <https://www.post-gazette.com/opinion/letters/2019/12/22/Carnegie-Mellon-did-not-say-no-or-yes-to-shale-gas/stories/201912220073>

- 2019 "Why a GDP Adjustment for Damage to Our Air Makes Good Sense." N.Z. Muller, P. Tschofen, I. Azevedo. Pittsburgh Post-Gazette.
<https://www.post-gazette.com/opinion/Op-Ed/2019/12/11/Research-study-recommends-GDP-adjustment-for-pollution-damage/stories/201912050128>
- 2018 "Pittsburgh: Think twice about allowing more rail traffic to roll through the city." K. Clay, A. Jha, N.Z. Muller, R. Walsh. Pittsburgh Post Gazette.
<http://www.post-gazette.com/opinion/Op-Ed/2018/07/29/Pittsburgh-Think-twice-about-allowing-more-rail-traffic-to-roll-through-the-city/stories/201807290012>
- 2018 "Livestreaming Polluters to Enforce Environmental Policy: Evidence from a Natural Experiment in Pittsburgh." Emiliano Huet-Vaughn, N.Z. Muller, Yen-Chia Hsu. Pro-Market: The Blog of the Stigler Center at the University of Chicago, Booth School of Business. <https://promarket.org/livestreaming-polluters-enforce-environmental-policy-evidence-natural-experiment-pittsburgh/>
- 2018 "'Rightly Valuing' Baseload Power Must Include Risks to Health" N.Z. Muller. Pittsburgh Post Gazette Letter to the Editor.
<http://www.post-gazette.com/opinion/letters/2018/07/12/Rightly-valuing-baseload-power-must-include-risks-to-health/stories/201807120031>
- 2018 "Breathing Inequality: Air Pollution Widens the Gap Between the Two Pittsburghs" N.Z. Muller, P.H. Matthews.
<http://www.post-gazette.com/opinion/Op-Ed/2018/05/19/Breathing-inequality-Air-pollution-widens-gap-between-the-two-Pittsburghs/stories/201805170048>
- 2017 "Why electric cars aren't always environmentally sound" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. LSE Business Review.
- 2017 "Environmental Accounting" N.Z. Muller. Emerging Trends in the Social and Behavioral Sciences: An Interdisciplinary, Searchable, and Linkable Resource. John Wiley & Sons, Inc.
- 2017 "The Deadly 90-Day Rule." N.Z. Muller, A. Jha, J. Apt. <http://www.post-gazette.com/opinion/Op-Ed/2017/11/02/The-deadly-90-day-rule-will-help-coal-barons-not-coal-miners-And-kill-people/stories/201711020013>
- 2017 "The Constant Risk from the Bruce Mansfield Plant." N.Z. Muller <http://www.post-gazette.com/opinion/Op-Ed/2017/09/11/The-constant-risk-from-the-Bruce-Mansfield-plant/stories/201709110013>
- 2016 "A Letter on Divestment of the Vermont State Pension Fund." N.Z. Muller. State of Vermont Public Investment Committee.

- 2015 "DTE makes poor arguments for continued pollution." N.Z. Muller. Pittsburgh Post-Gazette. Letter to the Editor. December 10, 2015.
- 2015 "Public Policy Evaluation in the Face of Strong Prior Beliefs: The Case of Electric Cars." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. CATO Institute. Research Briefs in Public Policy NO. 34
- 2015 "Analyzing environmental benefits from driving electric vehicles." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. Vox. August, 2015
<http://www.voxeu.org/article/measuring-environmental-benefits-electric-vehicles>
- 2015. "Pittsburgh's Air Quality is Complicated." N.Z. Muller. Pittsburgh Post-Gazette. Letter to the Editor. August 2, 2015.
- 2011 "Damage Assessment." N.Z. Muller. *The Environmental Forum*, March-April.
- 2010 "Efficient Pollution Control: Weighing the Value of a Ton" N.Z. Muller, R.O. Mendelsohn. *Regulation* 33(2): 20-24.
- 2007 "What Do the Damages Caused by U.S. Air Pollution Cost?" R.O. Mendelsohn, N.Z. Muller, Resources for the Future, Policy Commentary, December 17th, 2007.

Grants

- 2020 Carnegie Mellon University and Tepper School of Business Alumni. "Research on the Design and Implementation of an "E" Index for ESG Investing." Combined Award: \$295,000. PI.
- 2020 The Heinz Endowments. "An Index for the Measurement of a Sustainable Economy." Grant #E7565. \$200,000. PI
- 2020 U.S. Department of Energy, National Energy Technology Laboratory. "Reduced Form Air Quality Modeling Support and Maintenance." Grant#FP00004527. Total Award: \$125,000. PI
- 2019 U.S. Department of Energy, National Energy Technology Laboratory. "Coal-Fired Power Plants – Modeling A Role For Clean and Reliable Electric Power Generation." Total Award: \$125,000. PI
- 2019 The Heinz Endowments. "An Index for Economy and the Environment." Grant #E1268. Total Award: \$42,000. PI
- 2018 The Heinz Endowments. "An Index for Economy and the Environment." Grant #E5548. Total Award: \$40,000. PI

- 2018 Alfred P. Sloan Foundation, U.S. Department of Energy. "Effects of On-Demand Ridesourcing on U.S. Vehicle Ownership, Travel Patterns, and Energy Use Externalities." Total Award: \$12,500. Co-I
- 2018 Alfred P. Sloan Foundation, U.S. Department of Energy. "Environmental Benefits from Transportation Electrification." Total Award: \$12,500. Co-I
- 2014 United States Environmental Protection Agency: EPA-G2014-STAR-J1. Center for Air, Climate, and Energy Solutions (CACES). Total Award: \$10,000,000. Co-I
- 2014 United States Environmental Protection Agency: EPA-G2014-STAR-G. Optimal Energy Portfolios to Sustain Economic Advantage, Achieve GHG Targets, and Minimize PM2.5. Total Award: \$790,000. Co-I
- 2013 Resources for the Future, Retrospective Program Initiative. Joint with: Maureen Cropper, Andrew Chupp, Ron Chan. Total Award: \$37,500. Co-I
- 2009 United States Environmental Protection Agency: EPA-OPEI-NCEE-08-02. Announcement: "Design of Policies for Pollution Control Using Market Mechanisms." 2009 - 2013. Total award: \$295,000. Co-I.

Professional Activities

- 2018 New York State Attorney General. A Report on the Damages in New York, Massachusetts, and Connecticut from Power Plants in Midwestern States. Prepared for the New York State Attorney General. Contract: T104646.
- 2016 Industrial Economics, Incorporated, Contractor to: State of Minnesota Public Utilities Commission. IN THE MATTER OF THE FURTHER INVESTIGATION INTO ENVIRONMENTAL AND SOCIOECONOMIC COSTS UNDER MINNESOTA STATUTE 216B.2422, SUBDIVISION 3. MPUC Docket No. E999/CI-14-643 OAH Docket No. 80-2500-31888. Served as expert witness for the State of Minnesota.
- 2012 United States et al., v. Louisiana Generating, LLC. Civil Action NO. 09-100-RET-CN, Served as expert witness for Plaintiff, the United States of America.
- 2011 Industrial Economics Incorporated, Contractor to Bureau of Ocean Energy Management, Regulation and Enforcement. Contract: MMS M09PC00036. Project: Offshore Environmental Cost Model (OECM).
- 2011 United Nations Environment Programme. Project: Global Assessment of Black Carbon and Tropospheric Ozone. Contributing author on chapters 4 & 5 covering economic analysis and policy recommendations of Assessment.

- 2010 Industrial Economics Incorporated, Contractor to USEPA. Contract: EP-D-09-054. Project: Materials Damage Assessment.
- 2009 National Academy of Science, National Research Council. Contract: DELS-F290142. Project: Hidden Costs of Energy.
- 2009 Industrial Economics Incorporated, Contractor to USEPA. Contract: EP-W-04-023. Project: ECONOMIC IMPACT OF ACHIEVING NAAQS WITH AND WITHOUT CAIR EPA Innovations Contract

Awards

- 2013. United States Environmental Protection Agency Scientific and Technological Achievement Award, Level II. Awarded for: 2012 "Global air quality and health co-benefits of mitigating near-term climate change through methane and black carbon emission controls ." Susan C. Anenberg, Joel Schwartz, Drew Shindell, Markus Amann, Greg Faluvegi, Zbigniew Klimont, Greet Janssens-Maenhout, Luca Pozzoli, Rita Van Dingenen, Elisabetta Vignati, Lisa Emberson, Nicholas Z. Muller, J. Jason West, Martin Williams, Volodymyr Demkine, W. Kevin Hicks, Johan Kuypenstierna, Frank Raes, Veerabhadran Ramanathan. *Environmental Health Perspectives*. 120(6): 831 - 839.

Invited Lectures and Presentations

- 2020 Scheduled and cancelled due to COVID-19: World Bank, International Monetary Fund, UC Davis, University of Southern California, Yale University.
- 2019 "Recent Increases in Air Pollution: Evidence and Implications for Mortality." N.Z. Muller, K. Clay. Group Against Smog and Pollution Seminar, Pittsburgh, PA.
- 2019 "On the Relationship Between Environmental and Macroeconomic Policy." N.Z. Muller. Federal Reserve Bank of San Francisco. The Economics of Climate Change. San Francisco, CA.
- 2019 "On the Relationship Between Environmental and Macroeconomic Policy." N.Z. Muller. U.S. Environmental Protection Agency. Washington, D.C.
- 2019 "On the Relationship Between Environmental and Macroeconomic Policy." N.Z. Muller. Federal Reserve Board. Washington, D.C.
- 2019 "Long Run Environmental Accounting in the United States Economy." N.Z. Muller. Environmental and Energy Policy in the Economy, National Press Club, Washington, D.C.

- 2019 "Long Run Environmental Accounting in the United States Economy." N.Z. Muller. TREE Seminar, Research Triangle Park, North Carolina.
- 2019 "An Index for Economic and Environmental Performance: Methods with an Application to Pittsburgh." N.Z. Muller. Metro21 Lunch and Learn Seminar. Pittsburgh, PA.
- 2018 "The Remarkable Decline in Air Pollution from the US Electricity Sector from 2010-2017" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates (Muller presented.) Carnegie Mellon Electricity Industry Center Board Meeting. Pittsburgh, PA.
- 2018 "Boosting Growth by Accounting for the Environment." N.Z. Muller. Carnegie Mellon University, Tepper School of Business. Alumni Webinar.
- 2018 "The Remarkable Decline in Air Pollution from the US Electricity Sector from 2010-2017" S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates (Muller presented.) EPRI Electrification Conference. Long Beach, CA.
- 2018 "Reduced Complexity Models: Methods and Policy Applications." EPA ACE Center Meetings, Pittsburgh, PA.
- 2018 "Time Preference and The Great Depression: Evidence from Firewood Prices in Portland, Oregon." N.Z. Muller Northeast Workshop on Energy Policy and Environmental Economics, New York, NY.
- 2018 "Time Preference and The Great Depression: Evidence from Firewood Prices in Portland, Oregon." N.Z. Muller EEEP Seminar. Penn State University, State College, PA.
- 2018 "Reduced Complexity Models: Methods and Policy Applications." Society for Benefit-Cost Analysis. Washington, DC, USA.
- 2018 "Time Preference and The Great Depression: Evidence from Firewood Prices in Portland, Oregon." N.Z. Muller National Bureau of Economic Research, EEE Spring Meetings. Cambridge, MA.
- 2017 "Livestreaming Pollution: A New form of disclosure and a catalyst for citizen engagement?" Emiliano Huet-Vaughn, N.Z. Muller, Yen-Chia Hsu. EEEP Seminar. Penn State University, State College, PA.
- 2017 "The Environmental Consequences of Coal Storage and Delivery." Akshaya Jha, N.Z. Muller. Carnegie Mellon Electricity Industry Center Advisory Committee Meeting. Carnegie Mellon University, Pittsburgh, PA.
- 2017 "Pollution, Mortality Risk, and the Distribution of Income." N.Z. Muller, P.H. Matthews, V. Wiltshire-Gordon. Iowa State University Economics Department Seminar. Ames, IA.

- 2017 "Pollution Damage, Output, and Growth in the United States." N.Z. Muller. Environmental Defense Fund. Applied Economics Seminar. New York, NY.
- 2016 "The Distribution of Air Pollution from Electric Vehicle Adoption." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates (Holland presented.) Energy Policy Tradeoffs between Economic Efficiency and Distributional Equity Conference. Durham, NC. Sponsored by NBER and the Sloan Foundation.
- 2016 "Deriving Discount Rates with an Augmented Measure of Income." School of Economics Seminar, University of East Anglia, Norwich, U.K. N.Z. Muller
- 2016 "Social Costs of Power Production: Unanticipated Impacts on Measures of Output and Growth." Tyndall Centre for Climate Change Research Seminar, University of East Anglia, Norwich, U.K. N.Z. Muller
- 2016 "Air Pollution, Health, Policy, and Progress." N.Z. Muller. Stockholm Environmental Institute, York Environment and Sustainability Institute, York University Seminar and Panel Discussion. York, U.K. N.Z. Muller
- 2016 "The Distribution of Environmental Benefits and Costs Associated with the Federal Subsidy on the Purchase of Electric Vehicles." S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates (Yates presented.) NBER Meeting on Energy Policy Tradeoffs between Economic Efficiency and Distributional Equity.
- 2016 "Economics and Externalities of Moving Crude Oil by Pipelines and Railroads: Evidence from the Bakken Formation" K. Clay, A. Jha, N. Muller, R. Walsh. (Clay presented.) NBER Spring Meetings.
- 2016 "Deriving Discount Rates with an Augmented Measure of Income." University of Michigan, Environmental Economics Seminar. Ann Arbor, Michigan. N.Z. Muller
- 2016 "Carbon Management." Testimony to the State of Vermont House Committee on Natural Resources and Energy. Montpelier, VT. N.Z. Muller.
- 2016 "Deriving Discount Rates with an Augmented Measure of Income." University of Minnesota, Applied Economics Seminar. St. Paul, Minnesota. N.Z. Muller
- 2015 "Are there environmental benefits from driving electric vehicles? The importance of local factors." Carnegie Mellon University, Tepper School of Business Applied Micro Seminar. S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. (Muller presented.)
- 2015 "The Social Costs of Energy Production and Use in the United States: Consequences for Measures of Output and Growth." University of Texas-Austin Energy Symposium. Austin, TX.
- 2015 "Environmental Benefit-Cost Analysis and the National Accounts." United States Association of Energy Economics Conference, Pittsburgh, PA.

- 2015 "Social Costs of Power Production: Unanticipated Impacts on Measures of Output and Growth." Carnegie Mellon Electricity Industry Center Advisory Committee Meeting. Carnegie Mellon University, Pittsburgh, PA.
- 2015 "Implications of Pollution Damage for Measures of Output, Growth, and Policy Analysis." Climate and Energy Decision Making Center Seminar, Carnegie Mellon University, Pittsburgh, PA.
- 2015 "Direct and Indirect Environmental Externalities in Oil Production: Evidence from the Bakken Formation." NBER Hydrocarbon Infrastructure and Transportation Meetings. Karen Clay, Akshaya Jha, N.Z. Muller. (Jha Presented.)
- 2015 "The AP2 Model" Minnesota Department of Commerce. St. Paul, Minnesota.
- 2015 "Measuring Spatial Heterogeneity in Environmental Externalities from Driving: A Comparison of Gasoline and Electric Vehicles." NBER Energy and Environment Working Group Spring Meetings. S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. (Yates presented.)
- 2015 "Measuring Spatial Heterogeneity in Environmental Externalities from Driving: A Comparison of Gasoline and Electric Vehicles." ASSA and AEA Meetings, Boston, MA. S.P. Holland, E.T. Mansur, N.Z. Muller, A.J. Yates. (Yates presented.)
- 2014 "Environmental Benefit-Cost Analysis and the National Accounts." Workshop on Recent Advances and Challenges in Benefit-Cost Analysis, Toulouse School of Economics, Toulouse, France.
- 2014 "Environmental Benefit-Cost Analysis and the National Accounts." Sustainable Development Seminar, Columbia University, New York, New York.
- 2014 "The Net Benefits of the Acid Rain Program: What Can We Learn from the Grand Policy Experiment?" Resources for the Future, Washington, DC., with Maureen Cropper, Andrew Chupp, Ron Chan.
- 2014 "Environmental Benefit-Cost Analysis and the National Accounts." Heinz College Applied Micro Seminar, Carnegie Mellon University, Pittsburgh, Pennsylvania.
- 2014 "The Impact of Air Pollution Damage on Growth in the United States.", Engineering and Public Policy, Carnegie Mellon University, Pittsburgh, Pennsylvania.
- 2013 "The Impact of Air Pollution Damage on Growth in the United States.", Georgia Institute of Technology, School of Economics, Atlanta, Georgia.
- 2013 "Retrospective Study of the Acid Rain Program: How Large Were the Net Benefits of the ARP?" Resources for the Future, Washington, DC., with Maureen Cropper, Andrew Chupp, Ron Chan.
- 2013 "Using Marginal Damages in Environmental Policy." American Enterprise Institute, Washington, DC.

- 2013 "Towards the Measurement of Net Economic Welfare: Air Pollution Damage in the United States National Accounts - 2002, 2005, 2008." Congressional Budget Office, Washington, DC.
- 2012 "Towards the Measurement of Net Economic Welfare: Intertemporal Environmental Accounting in the United States." Department of Agricultural and Development Economics, Environmental Policy Initiative, Columbus, OH.
- 2012 "Towards the Measurement of Net Economic Welfare: Intertemporal Environmental Accounting in the United States." National Bureau of Economic Research Conference on Research on Income and Wealth, Cambridge, MA.
- 2012 "Towards the Measurement of Net Economic Welfare: Intertemporal Environmental Accounting in the United States." Association of Environmental and Resource Economists, 2nd Summer Conference, Asheville, NC.
- 2012 "The Air Pollution Damages from Onshore Energy Production." Association of Environmental and Resource Economists, 2nd Summer Conference, Asheville, NC.
- 2012 "Towards the Measurement of Net Economic Welfare: Intertemporal Environmental Accounting in the United States." 1st Northeast Workshop on Energy Policy and Environmental Economics, Cornell University, Ithaca, NY.
- 2011 "The Air Pollution Emissions Experiments and Policy Model." United States Department of Justice, Environmental and Natural Resources Division, Washington, D.C.
- 2011 "Green Accounting: Air Pollution Damages by American Industry." Yale University, School of Forestry and Environmental Studies, New Haven, VT.
- 2011 "Optimal Climate Policy with Air Pollution Co-Benefits." University of Vermont, Economics Department Seminar, Burlington, VT.
- 2011 "Optimal Climate Policy with Air Pollution Co-Benefits." APPAM Fall Conference, Washington, DC.
- 2011 "Optimal Climate Policy with Air Pollution Co-Benefits." AERE Sessions, AAEA, NAREA, Joint Meetings, Pittsburgh, PA.
- 2011 "Optimal Climate Policy with Air Pollution Co-Benefits." Harvard School of Public Health Seminar, Boston, MA.
- 2011 "Optimal Climate Policy with Air Pollution Co-Benefits." UM Agricultural and Resource Economics Seminar, College Park, MD.
- 2010 "The Impact of Ozone Air Pollution on Livestock Mortality in the United States." AERE Sessions, SEA Joint Meetings, Atlanta, GA.
- 2010 "Optimal Climate Policy with Air Pollution Co-Benefits." UMASS-Amherst College Seminar Series, Amherst, MA.

- 2010 "The Impact of Ozone Air Pollution on Livestock Mortality in the United States." AERE Sessions, AAFA, WAEA, CAEA Joint Meetings, Denver, CO.
- 2010 "Environmental Accounting: Methods with an Application to the U.S. Economy." United States Environmental Protection Agency, National Center for Environmental Economics Seminar Series, Washington, D.C.
- 2010 "Environmental Accounting: Methods with an Application to the U.S. Economy." Executive Office of the President, The White House Council on Environmental Quality, Washington, D.C.
- 2010 "The Ancillary Benefits of Climate Change Policy in the United States." Yale University Environmental Economics Seminar, New Haven, CT.
- 2009 "Environmental Accounting: Methods with an Application to the U.S. Economy." National Bureau of Economic Research, Summer Institute, Cambridge, MA.
- 2009 "The Ancillary Benefits of Climate Change Policy in the United States." University of Southern California, Los Angeles, CA.
- 2009 ""Environmental Accounting: Methods with an Application to the U.S. Economy." Harvard University Environmental Economics Seminar, Cambridge, MA.
- 2009 ""Environmental Accounting: Methods with an Application to the U.S. Economy." Yale University Environmental Economics Seminar, New Haven, CT.
- 2008 "The Dirty Dozen: Measuring the Impacts of Air Pollution on the U.S. Economy." Howard E. Woodin Colloquium Series, Middlebury College, Middlebury, VT.
- 2007 "Efficient Pollution Regulation: Getting the Prices Right." National Bureau of Economic Research, Summer Institute, Cambridge, MA.
- 2007 "Price-Based Regulation of Air Pollution with Spatially-Variant Marginal Damages." Harvard University Environmental Economics Seminar. Cambridge, MA.
- 2006 "Price-Based Regulation of Air Pollution with Spatially-Variant Marginal Damages." Yale University Environmental Economics Seminar. New Haven, CT.
- 2006 "Towards Efficient Regulation of Air Pollution in the United States." Harvard Center for Risk Analysis Seminar Series. Harvard University, Cambridge, MA.
- 2006 "Measuring the Damages of Air Pollution in the United States." Camp Resources XIV. Wilmington, NC.
- 2006 "Measuring the Damages of Air Pollution in the United States." (Research Sketch). National Bureau of Economic Research, Summer Institute. Cambridge, MA.

Teaching

- AY 2019 - 2020: Sustainability, Energy, and Environmental Economics, Benefit-Cost Analysis, Energy Policy and Economics, Microeconomic Analysis.
- Principles of Microeconomics, EPP Projects, Environmental Economics and Policy, Climate Change Economics, Conservation and Environmental Policy.

Professional Affiliations

American Economics Association

Association of Environmental and Resource Economists.

Ad-Hoc Referee

American Economic Review, Science, Proceedings of the National Academy of Science, Climate Change Economics, Atmospheric Environment, Journal of Environmental Economics and Management, Energy and Resource Economics, Journal of Economic Education, Water Resources Research, Contemporary Economic Policy, Environmental Science and Technology, Berkeley Press Journal of Economic Analysis and Policy, Review of Income and Wealth, Review of Economic Statistics, Climatic Change.