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PROFESSIONAL EXPERIENCE:

- September 2020- present Presidential Distinguished Professor of Chemical Engineering and Energy Policy, University of Pennsylvania, PA
- May 2020- present Senior Fellow, World Resources Institute, leading Carbon Removal Program
- January 2021- May 2024 Principal Deputy Assistant Secretary (PDAS), Office of Fossil Energy and Carbon Management (FECM), US Department of Energy, Washington, D.C.
- January 2021- May 2022 Acting Assistant Secretary, Office of Fossil Energy and Carbon Management, US Department of Energy, Washington, D.C.
- August 2018- December 2020 James H. Manning Chair Professor, Chemical Engineering, Worcester Polytechnic Institute, Worcester, MA
- August 2017 -July 2018 Interim Department Head, Chemical and Biological Engineering, Colorado School of Mines, Golden, CO
- June 2016 -July 2018 Associate Professor, Chemical and Biological Engineering, Colorado School of Mines, Golden, CO
- January 2008 -May 2016 Assistant Professor of Energy Resources Engineering, Stanford University
- July 2004 -December 2008 Assistant Professor, Chemical Engineering, Worcester Polytechnic Institute

EDUCATION:

- June 2004 Ph.D. Chemical Engineering, University of Arizona, Tucson
June 2004 M.A. Physical Chemistry, University of Arizona, Tucson
June 1998 B.S. Mathematics; Pre-med, Wellesley College

FIELDS OF SPECIALIZATION:

- Separation Processes and Catalysis
Carbon Capture and Carbon Conversion
Greenhouse Gas Removal *with focus on direct air capture and mineral carbonation*
Hydrogen Production and Conversion
Sustainable Critical Minerals
Sustainable Building Materials

BOOKS:

Wilcox, J. Carbon Capture, Springer Publishing, March 2012, ISBN 978-1-4614-2214-3.

435 citations

over 65,000 e-book downloads and *ca.* 2000 hardcopies sold in in 2012-23; 4000 translated copies sold (Chinese Electricity Press) in China in December 2013.

Wilcox, J., Kolosz, B., and Freeman, J., [CDR Primer](#), 2021

This primer reflects more than two years of thoughtful work and collaboration among dozens of authors, all experts in different areas of carbon dioxide removal. The effort spanned several workshops and an extensive period of writing, reading, and constructive feedback.

HONORS AND DISTINCTIONS:

2023	Included in TIME100 Most Influential Climate Leaders in Business for 2023
2023	CDR Primer featured in Fast Company, “This climate science guide looks like an art book for a reason, CDR could help save the planet – with a little help from design.”
2022	Included in NY Times Visionaries in Climate series, “Can Carbon Capture Be Part of the Climate Solution?”
2021	Department of Energy Secretary award, “Roads to Removal, Getting to Neutral” report, co-author with researchers at Lawrence Livermore National Lab
2019-20	U Penn’s Kleinman Center for Energy Policy Fellows Program
2019-20	Max-Planck Sabbatical Award, Inst. for Dynamics Complex Technical Systems
2018	TED Talk – The Age of Amazement – Direct Air Capture, Vancouver, Canada
2017	Member of the 2 nd Cohort, DOE’s Oppenheimer Energy Sciences Leadership Group, started by former Secretary of Energy, Ernie Moniz in 2016
2017	Air & Waste Management Association Stern Award on Mercury Capture
2017	Interviews in Nature, The Economist, Rolling Stone, Advanced Science News, and VICE News on Carbon Capture and Negative Emissions
2017	Science Magazine Climate highlight for our 2017 Env. Sci. & Tech. paper on Carbon Capture from the Industrial Sector
2016	ACS best presentation identified by William Koros on Novel Material for Separation, Storage, and Utilization, ACS Fall Meeting, PA
2010	Best Paper Award, “Trace Metal Emissions,” Geological Society of America
2009	Frederick E. Terman Fellowship, Stanford University
2009	University of Arizona Advances Junior Scientist Award
2007	ARO Young Investigator Award, Energy Conversions Division
2007	ACS Petroleum Research Fund Young Investigator Award
2006	Featured in USA Today as a “New Face in Engineering for 2006”
2005	NSF Career Award, Combustion & Plasma Division

BOOK CHAPTERS:

1. *Overview and Current Status of Deployment* in Greenhouse Gas Removal Technologies, Royal Society of Chemistry, Ed. Niall Mac Dowell, 2022.
2. *CCS in the Iron and Steel Industry* in Carbon Capture and Storage, Royal Society of Chemistry, Ed. Niall Mac Dowell, 2019.
3. *Atomistic-Level Models* in Mercury Control for Coal-Derived Gas Streams, Wiley-VCH, Eds. Evan Granite, Constance Senior, Henry Pennline, 2014.

PATENTS:

- P1. Wilcox, J. Nitrogen-Permeable Membrane and Uses Thereof, U.S. Patent Application No. 13/011,748, 2011.
- P2. Wilcox, J., D.T. Stack, Z. Bao, J. He, J. Tao, G. Brannon, Sorbents for Carbon Dioxide Capture, U.S. Patent Application No. 9,155,996, 2015.
- P3. King, P.E., Wilcox, J., Nitrogen Extraction from a Gaseous Carbon Dioxide Reactant Stream, U.S. Patent Application No. 10,053,634, 2018.
- P4. Wilcox, J., Liguori, S., Ammonia Synthesis Using a Catalytic Nitrogen-Selective Membrane, U.S. Patent Application No. 10,556,803, 2020.
- P5. Kelemen, P., Wilcox, J., McQueen, N., Dipple, G., Renforth, P., Systems and methods for enhanced weathering and calcining for CO₂ removal from air, U.S. Patent Application No. 17/621,752, 2022.

PEER-REVIEWED ARTICLES:

Total citations: ~ 21,384 and 141 publications

h-index: 67

**Student and postdoctoral advisees underlined*

1. Renforth, P., Bellamy, R., ... **Wilcox, J.**, "Specialty grand challenge: renaming our section to 'Carbon Dioxide Removal'," *Front. Climate*, 5, 2023.
2. Granite, E.J., Bromhal, R., ... **Wilcox, J.**, "Domestic Wastes and Byproducts: A Resource for Critical Material Supply Chains," *The Bridge*, 53(3), 2023.
3. Pisciotta, M., Pilorge, H., Feldmann, J., Jacobson, R., Dauids, J., Swett, S., **Wilcox, J.**, "Current state of industrial heating and opportunities for decarbonization," *Prog. Energy Comb. Sci.*, 91, 2022.
4. Qiu, Y., Lamers, P., Daioglou, V., McQueen, N., ... **Wilcox, J.**, "Environmental trade-offs of direct air capture technologies in climate change mitigation toward 2100," *Nature Communications*, 13(1), 2022.
5. Jackson, R., Abemethy, S., Canadell, J.G., Cargnello, M., Davis, S.J., Pisciotta, M., ... **Wilcox, J.**, "Atmospheric methane removal: a research agenda," 379(2210) 2021.
6. Haertel, C.J.J., McNutt, M., Ozkan, M., ... **Wilcox, J.**, "The promise of scalable direct air capture," *Chem*, 7(11), 2021.
7. Woodall, C.M., Lu, X., Dipple, G., **Wilcox, J.**, "Carbon mineralization with north American pgm mine tailings – characterization and reactivity analysis," *Minerals*, 11(8), 2021.
8. McQueen, N., Gomes, K.V., McCormick, C., Blumanthal, K., Pisciotta, M., Psarras, P., **Wilcox, J.**, "A review of direct air capture (DAC): scaling up commercial technologies and innovating for the future," *Prog. Energy*, 3(3), 2021.
9. Alatiq, A., Aljedani, W., Abussaud, A., Algarni, O., Pilorge, H., **Wilcox, J.**, "Assessment of the carbon abatement and removal opportunities of the Arabian Gulf Countries," *Clean Energy*, 5(2), 2021.

10. Kian, K., Liguori, S., Pilorge, H., Crawford, J.M., Carreon, M.A., Martin, J.L., **Wilcox, J.**, “Prospects of CO₂ capture via 13x for low-carbon hydrogen production using a Pd-based metallic membrane reactor,” *Chem. Eng. J.* 127224, 2020.
11. Morrow, D., Thompson, M.S., Anderson, A., Batres, M., Buck, H.J., Dooley, K., **Wilcox, J.**, “Principles for Thinking about Carbon Dioxide Removal in Just Climate Policy,” *One Earth* 3(2), 150-153, 2020.
12. McQueen, N., Kelemen, P., Dipple, G., Renforth, P., **Wilcox, J.**, “Ambient Weathering of Magnesium Oxide for CO₂ Removal from Air,” *Nature Communications*, 11(1), 1-10, 2020.
13. McQueen, N., Psarras, P., Pilorge, H., McQueen, N., Liguori, S., He, J., Yuan, M., Woodall, C.M., Kourosh, K., Pierpoint, L., Jurewicz, J., Lucas, M.J., Jacobson, R., Deich, N., **Wilcox, J.**, “Cost Analysis of Direct Air Capture and Sequestration Coupled to Low-Carbon Thermal Energy in the U.S.,” *Env. Sci. Technol.*, 54(12), 7542-7551, 2020.
14. Pilorge, H., McQueen, N., Maynard, D., Psarras, P., He, J., Rufael, T., **Wilcox, J.**, “Cost Analysis of Carbon Capture and Sequestration of Process Emissions from the U.S., Industrial Sector,” *Env. Sci. Technol.*, 54(12), 7524-7532, 2020.
15. Psarras, P., He, J., Pilorge, H., McQueen, N., Jensen-Fellows, A., Kourosh, K., **Wilcox, J.**, “Part 1: Cost Analysis of Carbon Capture and Sequestration from U.S. Natural Gas-fired Power Plants,” *Env. Sci. Technol.*, accepted.
16. Liguori, S., Kourosh, K., Buggy, N., Anzelmo, B.H., **Wilcox, J.**, “Opportunities and Challenges of Low-Carbon Hydrogen via Metallic Membranes,” *Prog. Energy Comb. Sci.*, 80, 100851, 2020.
17. Renforth, P., **Wilcox, J.**, “Editorial: The Role of Negative Emissions Technologies in Addressing our Climate Goals,” *Front. Clim.*, 2020.
18. **Wilcox, J.**, “Carbon Capture: An electro-swing approach,” *Nature Energy*, 2019.
19. Baker, S.E., Peridas, G., Stolaroff, J.K., Goldstein, H.M., Pang, S.H., Lucci, F.R., Li, W., Slessarev, E.W., Pett-Ridge, J., Ryerson, F.R., Aines, R.D., Sanchez, D.L., Cabiyo, B., Baker, J., Uden, S., Runnebaum, R., **Wilcox, J.**, Psarras, P.C., Pilorge, H., McQueen, N., Maynard, D., McCormick, C., “Getting to Neutral: Options for Negative Carbon Emissions in California,” Lawrence Livermore National Lab, Livermore, CA, LLNL-TR-796100, 2019.
20. Woodall, C.M., McQueen, N., Pilorge, H., **Wilcox, J.**, “Utilization of mineral carbonation products: current state and potential,” *Greenhouse Gases: Science and Technology*, 2019.
21. Psarras, P., Anderson, R., **Wilcox, J.**, Gomez-Gualdrón, DA, “Dissociation, Dissolution, and Diffusion of Nitrogen in V_xFe_y and V_xCr_y Alloy Membranes Studied by First Principles,” *J. Phys. Chem. C*, 123 (50), 30416, 2019.
22. Pacala, S., ..., **Wilcox, J.**, “Negative emissions technologies and reliable sequestration: A research agenda, National Academies Press, 2019.
23. Psarras, P., Anderson, R., Gomez-Gualdrón, DA, **Wilcox, J.**, “Material Consequences of Hydrogen Dissolution in Palladium Alloys Observed from First Principles,” *J. Phys. Chem. C*, 123 (36), 22158, 2019.
24. Yuan, M., Teichgraber, H., **Wilcox, J.**, Brandt, AR, “Design and operations optimization of membrane-based flexible carbon capture,” *Int. J. Greenhouse Gas Control*, 84, 154, 2019.
25. Holmes, R.T., Aljamaan, H., Vishal, V., **Wilcox, J.**, and Kovscek, A.R., “Idealized Shale Sorption Isotherm Measurements to Determine Pore Capacity, Pore Size Distribution, and Surface Area” *Energy & Fuels.*, 33(2) 2019.
26. Kelemen, P., Benson, SM, Pilorge, H., Psarras, P.C., **Wilcox, J.**, “An Overview of the Status and Challenges of CO₂ Storage in Minerals and Geological Formations,” *Frontiers in Climate*, 1,9, 2019.
27. Liguori, S., Lee, S., Yuan, M., **Wilcox, J.**, “Innovative N₂-selective metallic membranes for the potential use of CO₂ capture,” *J. Memb. Sci.*, 2019.

28. Renforth, P., **Wilcox, J.**, “Field Grand Challenge: Negative Emissions Technologies,” *Frontiers Climate* 1,1, 2019.
29. Yuan, M., Lee, K., Van Campen, D. G., Liguori, S., Toney, M. F., **Wilcox, J.**, “Hydrogen Purification in Palladium-Based Membranes: An Operando X-ray Diffraction Study”, *Industrial & Engineering Chemistry Research*, 58(2), 926-934, 2018
30. Anzelmo, B., **Wilcox, J.**, Liguori, S., “Hydrogen production via natural gas steam reforming in a Pd-Au membrane reactor. Comparison between methane and natural gas steam reforming reactions” *Journal of Membrane Science*, 568, 113-120, 2018
31. Kian, K., Woodall, C., **Wilcox, J.**, Liguori, S. “Performance of Pd-Based Membranes and Effects of Various Gas Mixtures on H₂ Permeation” *Environments*, 5(12), 128, 2018.
32. Anzelmo, B., **Wilcox, J.**, Liguori, S. “Hydrogen production via natural gas steam reforming in a Pd-Au membrane reactor. Investigation of reaction temperature and GHSV effects and long-term stability” *Journal of Membrane Science*, 565, 25-32, 2018.
33. Kelemen, P. B., Aines, R., Bennett, E., Benson, S. M., Carter, E., Coggon, J. A., de Obeso, J.C., Evans, O., Gadikota, G., Dippleh, G.M., Godard, Harris, M., Higgins, J.A., Johnson, K.T.M., Kourim, F., Lafay, R., Lambart, S., Manning, C.E., **Wilcox, J.**, “In situ carbon mineralization in ultramafic rocks: Natural processes and possible engineered methods” *Energy Procedia*, 146, 92-102, 2018
34. Fuss, S., Lamb, W. F., Callaghan, M. W., Hilaire, J., Creutzig, F., Amann, T., Beringer, T., Garcia, W. D. O., Hartmann, J., Khanna, T., Luderer, G., Nemet, G. F., Rogelj, J., Smith, P., Vicente J. L. V., **Wilcox, J.**, Dominguez, M. D. M. Z., Minx, J.C., “Negative emissions—Part 2: costs, potentials and side effects” *Environmental Research Letters*, 13(6), 063002, 2018
35. Minx, J. C., Lamb, W. F., Callaghan, M. W., Fuss, S., Hilaire, J., Creutzig, F., , Amann, T., Beringer, T., Garcia, W. D. O., Hartmann, J., Khanna, T., Lenzi, D., Luderer, G., Nemet, G. F., Rogelj, J., Smith, P., Vicente J. L. V., **Wilcox, J.**, Dominguez, M. D. M. Z., “Negative emissions—Part 1: Research landscape and synthesis” *Environmental Research Letters*, 13(6), 063001, 2018
36. Anzelmo, B., Liguori, S., Mardilovich, I., Iulianelli, A., Ma, Y. H., **Wilcox, J.**, Basile, A. “Fabrication & performance study of a palladium on alumina supported membrane reactor: Natural gas steam reforming, a case study” *International Journal of Hydrogen Energy*, 43(15), 7713-7721, 2018
37. Fuerst, T. F., Petsalis, E. P., Lundin, S. T. B., **Wilcox, J.**, Way, J. D., Wolden, C. A., “Experimental and Theoretical Insights into the Potential of V₂O₃ Surface Coatings for Hydrogen Permeable Vanadium Membranes” *The Journal of Physical Chemistry C*, 122(6), 3488-3496, 2018
38. Liguori, S., **Wilcox, J.**, “Design Considerations for Postcombustion CO₂ Capture With Membranes” *Current Trends and Future Developments on (Bio-) Membranes* (pp. 385-413). Elsevier., 2018
39. Bui, M., Adjiman, C.S., Bardow, A., Anthony, E.J., Boston, A., Brown, S., Fennell, P.S., Fuss, S., Galindo, A., Hackett, L.A., Hallett, J.P., Herzog, H.J., Jeckson, J., Kemper, J., Krevor, S., Maitland, G., Matuszewski, M., Metcalfe, I., Petit, C., Puxty, G., Reimer, J., Reiner, D.M., Rubin, E., Scott, S.A., Shah, N., Smit, B., Trusler, J. P. M., Webley, P., **Wilcox, J.**, Dowell, N.M., “Carbon Capture and Storage: The Way Forward” *Energy Environ. Sci.*, 11(5), 1062-1176, 2018.
40. Jung, J.E., Liguori, S., Jew, A.D., Brown, G.E., Jr., **Wilcox, J.**, “Theoretical experimental investigations of mercury adsorption on hematite surfaces,” *J. Air & Waste Manag. Assoc.*, 68(1), 39-53, 2018. (invited based upon Stern Award)

41. Psarras, P., He, J., **Wilcox, J.**, “Effect of water on the CO₂ adsorption capacity of amine-functionalized carbon sorbents,” *Ind. Eng. Chem. Res.*, 56(21), 6317-6325, 2017. (invited by William Koros, based upon ACS Best Presentation Award in 2016)
42. Lee, K., de Lannoy, C.F., Liguori, S., **Wilcox, J.**, “Thermochemical Analysis of Molybdenum Thin Films on Porous Alumina, *Langmuir*, 33(38), 9521-9529, 2017.
43. Bains, P., Psarras, P., **Wilcox, J.**, “CO₂ capture from the industry sector,” *Prog. Energy Combust. Sci.*, 63, 146-172, 2017. (invited by Hai Wang, Stanford University)
44. Yuan, M., Liguori, S., Lee, K., Van Campen, D.G., Toney, M.F., **Wilcox, J.**, “Vanadium as a Potential Membrane Material for Carbon Capture: Effects of Minor Flue Gas Species,” *Environ. Sci. Technol.*, 51(19), 11459-11467, 2017.
45. Psarras, P.C., Comello, S., Bains, P., Charoensawadpong, P., Reichelstein, S., **Wilcox, J.**, “Carbon Capture and Utilization from in the Industrial Sector,” *Environ. Sci. Technol.*, 51(19), 11440-11449, 2017.
46. Kirchofer, A., Firouzi, M., Psarras, P., **Wilcox, J.**, “Modeling CO₂ Transport and Sorption in Carbon Slit Pores,” *J. Phys. Chem. C*, 121(38), 21018-21028, 2017.
47. Holmes, R., Rupp, E.C., Vishal, V., **Wilcox, J.**, “Selection of shale preparation protocol and outgas procedures for applications in low-pressure analysis,” *Energy & Fuels*, 31(9), 9043-9051, 2017.
48. Psarras, P., Krutka, H., Fajardy, M., Zhang, Z., Liguori, S., Dowell, N.M., Wilcox, J., “Slicing the pie: how big could carbon dioxide removal be?” *Wiley Interdisciplinary Reviews: Energy and Environment*, 6(5), 2017. (invited by Mark Barteau, U of Michigan)
49. Lee, S.S., **Wilcox, J.**, “Behavior of mercury emitted from the combustion of coal and dried sewage sludge: The effect of unburned carbon, Cl, Cu, and Fe,” *Fuel*, 203, 749-756, 2017.
50. Psarras, P., Holmes, R., Rupp, E.C., Vishal, V., **Wilcox, J.**, “Selection of shale preparation protocol and outgas procedures for applications in low-pressure analysis,” *Acc. Chem. Res.*, 50(8), 1818-1828, 2017. (invited by Ian Bourg, Princeton University)
51. Lee, K., Liguori, S., Psarras, P., **Wilcox, J.**, “Theoretical Study of Nitrogen Absorption in Metals,” *J. Phys. Chem. C*, 121(31), 17016-17028, 2017.
52. Aljama, H., **Wilcox, J.**, “Microscopic diffusion of CO₂ in clay nanopores,” *Chem. Phys. Lett.*, 677, 162-166, 2017.
53. **Wilcox, J.**, Psarras, P., Liguori, S., “Assessment of reasonable opportunities for direct air capture,” *Environ. Res. Lett.*, 12(6), 065001, 2017. (invited by Rob Jackson, Stanford University)
54. To, J.W.F., Ng, J.W.D., Siahrostami, S., Koh, A.L., Lee, Y., Chen, Z., Fong, K.D., Chen, S., He, J., Bae, W.-G., **Wilcox, J.**, Jeong, H.Y., Kim, K., Studt, F., Norskov, J.K., Jaramillo, T.F., Bao, Z., “High-performance oxygen reduction and evolution carbon catalysis: From mechanistic studies to device integration,” *Nano Res.*, 10(4), 1163-1177, 2017.
55. Aljamaan, H., Holmes, R., Vishal, V., Haghpanah, R., **Wilcox, J.**, Kovscek, A.R., “CO₂ Storage and Flow Capacity Measurements on Idealized Shales from Dynamic Breakthrough Experiments,” *Energy & Fuels*, 31(2), 1193-1207, 2017.
56. Anzelmo, B., **Wilcox, J.**, Liguori, S., “Natural gas steam reforming reaction at low temperature and pressure conditions for hydrogen production via Pd/PSS membrane reactor,” *J. Memb. Sci.*, 522, 343-350, 2017.
57. Psarras, P., **Wilcox, J.**, Ball, D.W., “Effect of Ag and Pd promotion on CH₄ selectivity in Fe(100) Fischer-Tropsch Catalysis,” *Phys. Chem. Chem. Phys.*, 19(7), 5495-5503, 2017.
58. Geatches, D.L., S. Metz, D.N. Mueller, **J. Wilcox**, “An ab initio characterization of the electronic structure of LaCo_xFe_{1-x}O₃ for x ≤ 0.5,” *Phys. Status Solid. B*, 253(9), 1673-1687, 2016.

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60. Lulianelli, A., Alavi, M., Bagnato, G., Liguori, S., **Wilcox, J.**, Rahimpour, M.R., Eslamlouyan, R., Anzelmo, B., Basile, A., “Supported Pd-Au membrane reactor for hydrogen production: Membrane preparation, characterization, and testing,” *Molecules*, 21(5), 581, 2016.
61. Tsai, C., Lee, K., Yoo, J.S., Liu, X., Aljama, H., Chen, L.D., Dickens, C.F., Geisler, T.S., Guido, C.J., Joseph, T.M., Kirk, C.S., Latimer, A.A., Loong, B., McCarty, R.J., Montoya, J.H., Power, P., Singh, A.Y., Willis, J.J., Winterkorn, M.M., Yuan, M., Zhao, Z.-J., **Wilcox, J.**, Norskov, J., “Direct water decomposition on transition metal surfaces: structural dependence and catalytic screening,” *Catal. Lett.*, 146(4), 718-724, 2016.
62. Lulianelli, A., S. Liguori, J. Wilcox, A. Basile, “Advances on methane steam reforming to produce hydrogen through membrane reactors technology: A review,” *Catalysis Reviews*, 58(1), 1-35, 2016
63. To, J.W.F., J. He, J. Mei, R. Haghpanah, Z. Chen, T. Kurosawa, S. Chen, W.-G. Bae, L. Pan, J.B.-H. Tok, J. Wilcox, Z. Bao, “Hierarchical N-doped Carbon as CO₂ Adsorbent with High CO₂ Selectivity from Rationally Designed Polypyrrole Precursor,” *J. Amer. Chem. Soc.*, 138(3), 1001-1009, 2016.
64. Psarras, P., He, J., Wilcox, J., Molecular simulations of nitrogen-doped hierarchical carbon adsorbents for post-combustion CO₂ capture,” *Phys. Chem. Chem. Phys.*, 18(41), 28747-28758, 2016.
65. Jung, J.E., D. Geatches, K. Lee, S. Aboud, G.E. Brown, Jr., J. Wilcox, “First-Principles Investigation of Mercury Adsorption on the α -Fe₂O₃ (1102) Surface,” *J. Phys. Chem. C*, 119(47), 26512-26518, 2015.
66. **Wilcox, J.**, B. Wang, E. Rupp, R. Taggart, H. Hsu-Kim, M.L.S. Oliveira, C.M.N.L. Cutruneo, S. Taffarel, L.F.O. Silva, S.D. Hopps, G.A. Thomas, J.C. Hower, “Observations and Assessment of Fly Ashes from High-Sulfur Bituminous Coals and Blends of High-Sulfur Bituminous and Subbituminous Coals: Environmental Processes Recorded at the Macro- and Nanometer Scale,” *Energy & Fuels*, 29(11), 7168-7177, 2015.
67. Lee, K., M. Yuan, J. Wilcox, “Understanding Deviations in Hydrogen Solubility Predictions in Transition Metals through First-Principles Calculations,” *J. Phys. Chem. C*, 119(34), 19642-19653, 2015.
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69. To, J.W.F., Z. Chen, H. Yao, J. He, K. Kim, H.H. Chou, L. Pan, J. Wilcox, Y. Cui, Z. Bao, “Ultrahigh Surface Area Three-Dimensional Porous Graphitic Carbon from Conjugated Polymeric Molecular Framework,” *ACS Central Science*, 2015.
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72. McNutt, M.K., W. Abdalati, K. Caldeira, S.C. Doney, P.G. Falkowski, S. Fetter, J.R. Fleming, S. Hamburg, J.E. Penner, G. Morgan, R. Pierrehumbert, P.J. Rasch, L.M. Russell, J.T. Snow,

- D. Titley, **J. Wilcox**, "Climate Intervention: Carbon Dioxide Removal and Reliable Storage," 2015.
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75. **Wilcox, J.**, "Grand Challenges in Advanced Fossil Fuel Technologies," *Frontiers in Energy Research*, 2, 47, 2014.
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78. **Wilcox, J.**, A. Kirchofer, G. Glatz, J. He, P. Rochana, "Revisiting Film Theory to Consider Approaches for Enhanced Solvent-Process Design for Carbon Capture," *Energy Environ. Sci.*, 7(5), 1769-1785, 2014.
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SCHOLARSHIPS AWARDED AS PI:

Funding Period	Award Title	Sponsor	Amount
2021-23	Oxide Looping for Carbon Removal	Grantham Institute	363,967
2020-21	Enhancing Kinetics of CO ₂ Mineralization	ARPA-E SEED	500,000
2020-21	Magnesium Looping of CO ₂	Grantham Institute	400,000
2020-21	Developing a Primer on Negative Emissions	Sloan Foundation	20,000
2019-20	Global Mapping of Carbon Dioxide Removal	Environmental Defense Fund	100,000
2019	Workshop on Negative Emissions	National Science Foundation	31,000
2018	N ₂ Membrane Technology for Ammonia Synthesis	OTL, CO School of Mines	15,000
2017-18	Distributed Power & CO ₂ Storage Reformer	Colorado Energy Research	25,000
2017-18	CO ₂ Conversion Processes	X-Prize	3,000
2017	International Conference on CCUS Deployment	National Science Foundation	15,000
2016-19	DFT Studies of H ₂ /N ₂ Saturation	Air Force	348,000
2015-17	Material Testing for Mercury Uptake	Alstom	150,000
2013-16	Catalytic Membranes for N ₂ Separation	National Science Foundation	324,999
2015-16	N ₂ -Selective Separation with Membrane Reactor	DOE-NETL	150,000
2011-16	CO ₂ Storage Potential of Gas Shales	Stanford Consortium on CCS	160,000
2012-15	Trace Metals Interactions with Fly Ash	National Science Foundation	327,001

2012-15	Biomimetic Sorbents for Carbon Capture	Global Climate Energy Project	1,368,665
2014-15	Enhancing of Hydride Thermodynamics	Global Climate Energy Project	100,000
2009-13	Experimental Mercury Adsorption on Carbons	Electric Power Research Institute	405,833
2011-13	Preventing Mercury Release into Atmosphere	United Postal Service	91,800
2011-12	Carbon-based Sorbents for Carbon Capture	Global Climate Energy Project	99,897
2011-12	Gas Adsorption and Diffusion in Group V Metals	Army Research Office	150,000
2011-12	Life Cycle Efficiency of Mineral Carbonation	National Renewables Energy Lab	37,031
2010-12	N ₂ -Selective Membranes for Ammonia Synthesis	National Science Foundation	123,284
2010-11	Mercury Adsorption on Carbon Sorbents	SolmeteX, Inc	15,000
2010-11	Nitrogen Membranes for Carbon Capture	Environmental Protection Agency	10,000
2006-07	PRF YIP: Heterogeneous Mercury on Carbon	American Chemical Society	40,000
2006-07	Arsenic and Selenium Adsorption on Metals	Environmental Protection Agency	10,000
2006-10	YIP: Alloy Design for H ₂ Separation	Army Research Office	350,000
2005-10	CAREER: Preventing As and Se Release	National Science Foundation	400,000
2004-05	Ab initio Investigation of Hg-Br Reactions	Environmental Protection Agency	35,000

GIFT FUNDS AWARDED AS PI (Reduced Overhead and No Contract):

<u>Funding Period</u>	<u>Subject of Work</u>	<u>Sponsor</u>	<u>Amount</u>
2022-23	Carbon Dioxide Removal Research	ClimateWorks Foundation	446,000
2020	Carbon Dioxide Removal Research	Thistledown Foundation	36,870
2020	Carbon Dioxide Removal Research	ClimateWorks Foundation	170,000
2020	Carbon Capture Research	Hewlett Foundation	200,000
2019	Negative Emissions Research	Prime Energy Fund	65,000
2018-19	Negative Emissions Research	ClimateWorks Foundation	165,000
2017-18	Mineral Carbonation Research	Community Energy	55,000
2016	Carbon Capture Research	Ferus	15,000
2011-15	Mercury Sorbent Research	Novinda	239,341
2013-14	Mercury Sorbent Research	Cabot	15,000
2013-14	Mercury Sorbent Research	ADA	20,000
2009-15	Carbon Capture and Storage Research	Chevron	300,000

SCHOLARSHIPS AWARDED AS CO-PI:

<u>Funding Period</u>	<u>Award Title</u>	<u>Sponsor</u>	<u>Amount (as Co-PI)</u>
2022-24	Carbon Storage in Building Materials (Pete Psarras)	ARPA-E	160,000
2022-23	Net-zero Emissions in Nevada (Pete Psarras)	TNC	26,000
2022-23	SEAMATE Integration (Pete Psarras)	Stony Brook	41,673
2021-23	Mineral Carbonation (Pete Psarras)	SGI	70,000
2021-23	Flexible CCS (Colorado State)	ARPA-E	144,500
2021	Carbon Capture Research (Pete Psarras)	Getty	20,000
2017-18	Renewable Electricity-Powered CO ₂ Conversion PI (Opus 12)	ARPA-E	125,000
2011-15	Enhancing Natural Gas Recovery in Shales with CO ₂ PI (Mark Zoback)	BP	336,028
2013-14	Characterization of Gas Shales PI (Mark Zoback)	Aramco	24,506
2011-13	Modeling Nanoparticle Catalysts for Water Splitting PI (Stacey Bent)	DOE-EFRC-CNEEC	184,476
2011-12	Trace Metal and Ash Deposition on Land PI (Scott Fendorf)	Woods Institute	30,000
2010-12	Feasibility of CO ₂ Storage in Gas Shales	DOE-NETL	339,343

2009-11	PI (Mark Zoback) Nanocatalysts for Liquid Fuel Combustion	Air Force	242,375
2005-08	PI (Ilhan Iksay, Princeton) Modeling H ₂ Permeation in Pd Membranes PI (Yi Hua Ma, WPI)	Shell	300,000

Approximate Total Funds Raised from 2005-present ~ \$9.7M

ADVISEES RECEIVING DEGREES:

<u>Year</u>	<u>Name and Dissertation or Thesis Title</u>	<u>Degree</u>	<u>Place of Employment</u>
2020-2024	Maxwell Pisciotta, A Multifaceted Approach to CO ₂ Emissions Reduction and Removal	Ph.D.	Postdoc, Penn
2017-2021	Noah McQueen, Process Development and Modeling for the Advancement of Direct Air Capture	Ph.D.	Co-Founder, Heirloom
2017-2021	Caleb Woodall, Carbon Mineralization Enhancement	Ph.D.	DOE
2015-2020	Kian Kourosch, Low-Carbon Hydrogen Production	Ph.D.	DOE
2012-2017	Mengyao Yuan, Membrane Technology for Low-Carbon Energy Systems	Ph.D.	E3
2009-2016	Bryce Anzelmo, On-Board H ₂ Production with CO ₂ Capture	Ph.D.	LytEn
2009-2016	Kyoungjin Lee, Synthesis and Testing of N ₂ -Selective Membranes	Ph.D.	Applied Materials
2009-2016	Ji-Eun Jung, Sorbent Design for Hg Capture	Ph.D.	Samsung Electronics
2014-2016	Panunya Charoensawadpong, Potential of CO ₂ Utilization for Enhanced Oil Recovery	M.S.	PTT, Bangkok
2014-2016	Praveen Bains, Opportunities for CO ₂ Utilization in the U.S.	M.S.	Imperial College
2009-2015	Jiajun He, Sorbent Design and Testing for CO ₂ Separation	Ph.D.	U of Illinois
2008-2013	Abby Kirchofer, Molecular-to-Process Level Approach to Advancing Carbon Capture and Storage	Ph.D.	Chevron
2007-2013	Ana Suarez Negreira, Mechanism of Mercury Oxidation Across SCR Catalysts	Ph.D.	U Texas, Dallas
2011-2013	Kumnoon Narakornpijit, Optimization of Membrane Separation for Post-Combustion Capture of CO ₂	M.S.	PTT, Bangkok
2008-2012	Ekin Ozdogan, Theoretical and Experimental Investigations of Metallic Membranes for CO ₂ Capture	Ph.D.	Shell
2007-2012	Panithita Rochana, Computational Catalysis for Carbon Capture and Utilization	Ph.D.	PTT, Bangkok
2007-2012	Yangyang Liu, Fundamental Investigations of Gas Adsorption in Micro and Mesopores	Ph.D.	BP
2005-2011	Erdem Sasmaz, Mercury Adsorption and Oxidation Catalysis	Ph.D.	U Cal Irvine
2005-2011	Bihter Padak, Direct Mercury Measurements in Coal-Fired Flue Gas Emissions	Ph.D.	U Cal Irvine
2009-2011	Keith Mosher, Predicting Methane Adsorption in Carbon Slit Pores using GCMC	M.S.	1-Block Off the Grid
2009-2011	Ondra Sestak, Measuring Mercury Oxidation		

	on Precious-Metal Catalysts	M.S.	Shell
2006-2008	Terumi Okano, Homogeneous Mercury Oxidation via Bromine	M.S.	Dow Chemical
2005-2007	David Urban, Selenium and Arsenic Capture in Coal-Combustion Flue Gas	M.S.	ExxonMobil

TEACHING EXPERIENCE:

Carbon Capture and Sequestration 2020, University of Pennsylvania
Carbon Capture and Sequestration 2019, Worcester Polytechnic Institute
Fundamental Separations Processes 2019-20, Worcester Polytechnic Institute
Carbon Capture and Sequestration 2016, Colorado School of Mines
Introduction to Petroleum Engineering 2009-13, Stanford University
Carbon Capture and Sequestration 2008-16, Stanford University
Electronic Structure and Application to Chemical Kinetics 2009-13/15, Stanford University
Renewable Energy Processes 2011/12/13, Stanford University
Graduate Chemical Kinetics 2005-08, Worcester Polytechnic Institute
Undergraduate Fluid Mechanics Fall 2004-08, Worcester Polytechnic Institute

UNIVERSITY SERVICE:

2009-19 Defense committee chair in chemistry, mechanical engineering, civil engineering, chemical engineering, and geophysics departments
2014 Committee Member, Report on SLAC-Stanford Energy Task Force
2014 Member, School of Earth Sciences Teaching Task Force
2012-2015 Advisor, Undergraduate Program in Energy Resources Engineering

EXTERNAL SERVICE:

2022-present Editorial Board, *Energy and Environmental Science*, RSC Publishing
2020-2021 Committee Member, NASEM Report on Deep Decarbonization
2020-2021 Associate Editor, *Chemical Engineering Journal*
2020-2021 Member of Scientific Council of the CarMa Chair, IFP School, Paris
2019 Founding Editor of specialty section of Frontiers journal, *CDR*
2019-2021 Specialty Chief Editor, *Frontiers Climate journal on CDR*
2018-2021 Brain Trust Member, Helena Group
2017-20 Scientific Advisory Board, Carbon 180
2014-20 Associate Editor, *Energy & Fuels*
2016-2019 Committee Member, 3 NASEM Reports on Climate Intervention and CDR
2013-2014 Committee Member: NRC/NAS Study on Climate Intervention
2013 Committee Member: Novim Study on Methane Leakage
2010-2013 Advisory Board Member, C12 Energy
2010-2011 Committee Member: APS Study on Feasibility of Direct Air Capture

CURRENT MEMBERSHIPS:

- American Institute for Chemical Engineers (AIChE)
- American Association for the Advancement of Science (AAAS)
- American Chemical Society (ACS)
- North American Membrane Society (NAMS)
- The Ninety-Nines, Inc – International Organization of Women Pilots