Sara Nawaz (she/her)

Curriculum Vitae

Institute for Responsible Carbon Removal
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CURRENT POSITION

2023— **Director of Research**, Institute for Responsible Carbon Removal, American University, Washington, DC

EDUCATION

2021 **PhD**, Resources, Environment, and Sustainability, University of British Columbia (Supervisor: Terre Satterfield; Committee: Shannon Hagerman, Milind Kandlikar, Emily Marden)

2013 **MPhil**, Development Studies, University of Oxford, UK (Supervisor: Laura Rival)

2011 **BA** with high honors, major: Economics, minor: Public Policy, Swarthmore College, USA

PROFESSIONAL APPOINTMENTS

2021—22 **Postdoctoral Fellow**, Institute for Science, Innovation and Society, University of Oxford

2021—22 **Postdoctoral Fellow**, Pacific Institute for Climate Solutions, University of Victoria (via UBC Institute for Resources, Environment and Sustainability)

GRANTS AND FELLOWSHIPS

2024—25 PI, "Re-assessing expert views on soil carbon in croplands", Environmental Defense Fund, USD 49,998

2024 Co-I, "Optimizing the integration of aquaculture and ocean alkalinity enhancement for low-cost carbon removal and maximum ecosystem benefit", PI Matt Eisamann (Yale University/Ebb Carbon), Department of Energy, Office of Fossil Energy and Carbon Management, USD 29,500

2024—25 Co-I, "Assessing efficacy of electrochemical ocean alkalinity enhancement at an existing outfall using tracer release experiments and oceanographic models", PIs David Ho (University of Hawaii) & Matt Long ([C]Worthy), National Oceanic and Atmospheric Administration—National Oceanographic Partnership Program, co-funded with ClimateWorks Foundation, USD 111,062

2023—25 PI, "Building best practices for public and community engagement on carbon removal", ClimateWorks Foundation, USD 109,277

2017—21 UBC Four-Year Fellowship, CAD 72,800 (18,200/year); UBC International Tuition Award, CAD 39,409

2012 Oxford Department of International Development Fieldwork Grant, GBP 2000

2011 Swarthmore College Lucretia Mott Fellowship for Graduate Study, USD 5000

GRANTS IN REVIEW

PI, "Piloting a model for community-oriented deliberations on marine carbon dioxide removal (mCDR)", Alfred P. Sloan Foundation, USD 951,463 (600k to American University)

Co-PI, "Co-designing biogeochemical Marine Carbon Dioxide Removal (mCDR) scenarios with communities to support decision making in the Pacific Northwest", National Science Foundation, USD 398,000

REFEREED JOURNAL ARTICLES

Buesseler, K., Bianchi, D., Chai, F., Cullen, J.T., Estapa, M., Hawco, N., John, S., McGillicuddy, D., Morris, P.J., **Nawaz, S.,** Nishioka, J., Pham, A., Ramakrishna, K., Siegel, D., Smith, S., Steinberg, D.K., Turk-Kubo, K.A., Twining, B., Webb, R., Wells, M., White, A., Xiu, P., Yoon, J.-E., 2024. Next steps for assessing ocean iron fertilization for marine carbon dioxide removal. *Frontiers in Climate,* 6. https://doi.org/10.3389/fclim.2024.1430957

Nawaz, S. & Lezaun, J. (2024) Grappling with scale: Latent assumptions in expert imaginaries of marine carbon dioxide removal. *Global Environmental Change,* 805:102806. https://doi.org/10.1016/j.gloenvcha.2024.102806

Nawaz, S., Scott-Buechler, C., & Caggiano, H. (2024) An independent public engagement body is needed to responsibly scale carbon removal in the US. *Environmental Research Letters,* 19(1): 011002. https://doi.org/10.1088/1748-9326/ad1081

Goldberg, D.S., **Nawaz, S.,** Lavin, J., Slagle, A.L. (2023). Upscaling DAC Hubs with Wind Energy and CO2 Mineral Storage: Considerations for Large-Scale Carbon Removal from the Atmosphere. *Environmental Science and Technology,* 57:21527–21534. https://doi.org/10.1021/acs.est.3c03492

Satterfield, T., **Nawaz, S.,** & Boettcher, M. (2023) Social considerations and best practices to apply to engaging publics on ocean alkalinity enhancement, in: Guide to Best Practices in Ocean Alkalinity Enhancement Research, edited by: Oschlies, A., Stevenson, A., Bach, L. T., Fennel, K., Rickaby, R. E. M., Satterfield, T., Webb, R., and Gattuso, J.-P., *State of the Planet,* 2-oae2023 1–22. https://doi.org/10.5194/sp-2-oae2023-11-2023.

Nawaz, S., & Satterfield, T. (2023) Towards just, responsible, and socially viable carbon removal: Lessons from offshore DACCS. *Environmental Science and Policy, 151(103633).* https://doi.org/10.1016/j.envsci.2023.103633

Nawaz, S., Lezaun, J., Valenzuela, J., & Renforth, P. (2023) Broaden Research on Ocean Alkalinity Enhancement to Better Characterize Social Impacts. *Environmental Science & Technology,* 57(24): 8863–69. https://doi.org/10.1021/acs.est.2c09595

Nawaz, S., Peterson St-Laurent, G., & Satterfield, T. (2023). Public evaluations of four approaches to ocean-based carbon dioxide removal. *Climate Policy*, 23(3), 379–394. https://doi.org/10.1080/14693062.2023.2179589

Satterfield, T., **Nawaz, S.** & St-Laurent, G. P. (2023) Exploring public acceptability of direct air carbon capture with storage: climate urgency, moral hazards and perceptions of the 'whole versus the parts.' *Climatic Change, 176*(14). https://doi.org/10.1007/s10584-023-03483-7

Nawaz, S., Satterfield, T. & Phurisamban, R. (2022) Does 'precision' matter? A Q study of public interpretations of gene editing in agriculture. *Science, Technology and Human Values,* 48(6). https://doi.org/10.1177/01622439221112460

Nawaz, S., & Satterfield, T. (2022) On the nature of naturalness? Theorizing 'nature' for the study of public perceptions of novel genomic technologies in agriculture and conservation. *Environmental Science and Policy, 136*, 291-303. https://doi.org/10.1016/j.envsci.2022.06.008

Nawaz, S., & Satterfield, T. (2022). Climate solution or corporate co-optation? US and Canadian publics' views on agricultural gene editing. *PLoS ONE*, *17*(3 March), e0265635. https://doi.org/10.1371/journal.pone.0265635

Hagerman, S., Satterfield, T., **Nawaz, S.,** St-Laurent, G. P., Kozak, R., & Gregory, R. (2021). Social comfort zones for transformative conservation decisions in a changing climate. *Conservation Biology*, *35*(6), 1932–1943. https://doi.org/10.1111/cobi.13759

Gregory, R., Kozak, R., Peterson St-Laurent, G., **Nawaz, S.,** Satterfield, T., & Hagerman, S. (2021). Under pressure: conservation choices and the threat of species extinction. *Climatic Change*, *166*(1–2), 1–21. https://doi.org/10.1007/s10584-021-03102-3

Nawaz, S., Satterfield, T., & Hagerman, S. (2021). From seed to sequence: Dematerialization and the battle to (re)define genetic resources. *Global Environmental Change*, 68:102260. https://doi.org/10.1016/j.gloenvcha.2021.102260

Nawaz, S., & Kandlikar, M. (2021). Drawing lines in the sand? Paths forward for triggering regulation of gene-edited crops. *Science and Public Policy*, *48*(2), 246–256. https://doi.org/10.1093/scipol/scab014

Nawaz, S., Klassen, S., & Lyon, A. (2020). Tensions at the boundary: Rearticulating 'organic' plant breeding in the age of gene editing. *Elementa: Science of the Anthropocene*, *8*(1), 34. https://doi.org/10.1525/elementa.429

MANUSCRIPTS UNDER REVIEW

Nawaz, S., McLaren, D., Caggiano, H., Hudson, A.D., and Scott-Buechler, C. "Carbon removal for a just transition." In review (*Climate Policy*).

MANUSCRIPTS IN PREPARATION

Buck, H. J. and **Nawaz, S.** "Reimagining social impact assessment for the climate transition."

REPORTS AND OTHER WRITING

Nawaz, S., McLaren, D., Caggiano, H., Honegger, M., Hudson, A.D., Scott-Buechler, C. "An Agenda for a Progressive Political Economy of Carbon Removal." Institute for Responsible Carbon Removal, Carbon Removal Briefing Paper No. 4. February 2024. https://www.american.edu/sis/centers/carbon-removal/upload/agenda-for-a-progressive-political-economy-of-carbon-removal.pdf

Nawaz, S. & Batchelor, N. "Breaking ground: Guidance for carbon removal companies and funders on responsible project development." XPRIZE. October 31, 2023. https://www.xprize.org/prizes/carbonremoval/articles/breaking-ground-guidance-for-carbon-removal-companies-and-funders-on-responsible-project-deployment

Buesseler, K., Bianchi, D., Chai, F., Cullen, J. T., Estapa, M., Hawco, N., John, S., McGillicuddy, D., **Nawaz, S.,** Nishioka, J., Ramakrishna, K., Siegel, D., Smith, S. R., Steinberg, D., Turk-Kubo, K. A,. Twining, B. S., Webb, R., Wells, M., White, A. & Yoon, J-E. "Paths forward for exploring ocean iron fertilization." Woods Hole Oceanographic Institution. October 27, 2023. https://oceaniron.org/wp-content/uploads/sites/54/2023/10/PathsForward-ExOIS-Full.pdf

Nawaz, S. "Improving community engagement on carbon removal: Initial reflections and recommendations." Illuminem. May 10, 2023. https://illuminem.com/illuminemvoices/improving-community-engagement-on-carbon-removal-initial-reflections-and-recommendations

AWARDS AND HONOURS

2024 Bezos Earth Fund Greenhouse Gas Removal Ideation Prize, Phase I (USD 4000)

2022 Freda Pagani Award for Outstanding PhD Dissertation, UBC IRES (CAD 700)

2022 UBC Nominee for CGS/ProQuest Social Sciences Distinguished Dissertation Award (--)

2015 Service Excellent Award, Environmental Resources Management (USD 1500)

2015 Star Award, Environmental Resources Management (USD 2000)

CONFERENCE PRESENTATIONS

2024 Invited plenary panel, "How do we ensure carbon dioxide removal supports emission reductions instead of slowing them?" Oxford Negative Emissions Technology Conference. Oxford, UK

"An agenda for a progressive political economy of carbon removal", POLLEN Political Ecology Network conference, Lund, Sweden (paper presented by second author Duncan McLaren)

2023 "The challenges of gigaton thinking: Designing deliberations on (ocean-based) carbon removal." 4S (Society for Social Studies of Science) Annual Meeting, Honolulu, Hawaii/online

2022 "Testing the waters: Expert imaginaries of marine CDR." Earth Systems Governance Conference, Online/Toronto

"Rearticulating 'organic plant breeding' in the age of gene editing?" Co-presented with Susanna Klassen. Organic Seed Grower's Conference. Online

2021 "Social comfort zones in a transforming climate." American Association of Geographers Annual Meeting. Online

2020 "Beyond 'precision': A Q-method study on public perceptions of gene editing and gene drives for agriculture." Conference on Gene Editing in Agriculture and Food. Online

2019 "From seed to sequence: Making sense of debates over the dematerialization of agricultural genetic resources." Canadian Anthropology Association/American Anthropology Association Annual Meeting. Vancouver, BC

EXPERT TESTIMONY

2023 "Making carbon removal more just, equitable and socially acceptable." Massachusetts State Senate Committee on Global Warming and Climate Change. Online

PUBLIC TALKS

2024 Panel on "Environmental Justice and Indigenous Leadership in Carbon Removal". Centering Indigenous Leadership & Community Voices: A Workshop on Defining Responsible & Respectful Carbon Removal Deployment, organized by Carbon Removal Canada. Vancouver, BC

"Social science & mCDR: What does it look like to responsibly research & develop this tech?" Ocean Conservancy monthly NGO forum on CDR. Online

"What does it look like to responsibly research and develop marine carbon dioxide removal technologies?" North Olympic Development Council. Sequim, Washington

Panel on "'Our' Role in Informing Good Decision Making". Carbon to Sea Initiative Annual Convening. Washington, DC

"Community engagement on carbon removal." Presentation & interactive activity. Responsible & Regional Deployment of Carbon Removal: A Pacific Northwest Symposium. Seattle, Washington

Report launch: "Mapping a progressive political economy of carbon dioxide removal." Online

2023 "A social science research agenda on ocean-based carbon removal." Presentation for panel on ocean-based carbon dioxide removal at NYC Climate Week, hosted by the Sabin Center at Columbia University and Ocean Visions. New York City

"Community engagement on carbon removal." Carbon Removal Deployment Symposium, co-hosted by the Carbon Business Council, American University, XPRIZE Carbon Removal, and Arizona State University. Washington, DC

Panel on "Elevating Social Science, Partnership, and Ethics in Ocean-based Carbon Dioxide Removal". Capitol Hill Ocean Week (CHOW). Online

"Incorporating social considerations for ocean iron fertilization field studies." Exploring Ocean Iron Solutions workshop. Moss Landing, California

"Improving community engagement for mCDR", at panel on "Responsible CDR governance in practice." Ocean Visions Biennial Summit. Online/Atlanta, Georgia

Panel on marine carbon dioxide removal, hosted by the Foundation for Climate Restoration. Online

CAMPUS TALKS

2022 Gene editing and animal welfare, Animal Welfare Program, Faculty of Land and Food Systems, UBC. Online

2021 "Beyond naturalness? Social dimensions of gene editing in agriculture." UBC Institute for Resources, Environment and Sustainability Student Symposium. Online

GUEST LECTURES

2024 "Social and ethical dimensions of marine carbon dioxide removal." Vassar College. (Scheduled for November 2024)

"Carbon removal: What is it, why do we need it, and what will it take to do it well?" UBC School of Community and Regional Planning graduate seminar. Vancouver, BC

2022 "Survey design with analysis in mind." Co-taught with Erika Gavenus. UBC IRES graduate seminar: Survey Design in Interdisciplinary Environmental Research. Vancouver, BC

"Engineering carbon removal: New technologies and social considerations." UBC IRES graduate seminar: Climate Change: Science, Technology and Sustainable Development. Online

2020 "Owning seeds, owning sequences?" UBC IRES graduate seminar: Human Technological Systems. Vancouver, BC

RESEARCH EXPERIENCE

2017—21 **Research Assistant,** Institute for Resources, Environment and Sustainability & Faculty of Forestry, UBC

2016—17 **Independent Social-Environmental Consultant**, Washington, DC

2014—16 **Social Impact Assessment Consultant**, Environmental Resources Management, Washington, DC

2013—14 **Research Analyst**, World Resources Institute, Washington, DC

PROFESSIONAL SERVICE

2023— Co-lead, Ocean Carbon & Biogeochemistry Pacific Northwest mCDR regional node

2022— Expert Governance Reviewer, Frontier Climate

2023— Science Advisor, Carbon to Sea Initiative

2023 Science Advisor, Ocean Visions' Nutrient Fertilization Suitability Analysis

Reviewer for *Risk Analysis, Energy Research and Social Science, Environmental Research Letters, Carbon Management, Journal of Environmental Management*, *Agriculture and Human Values*, and *Elementa: Science of the Anthropocene*

DEPARTMENTAL SERVICE

2022 Committee member, IRES Director Search Committee, UBC

2012—13 Co-Leader, Oxford Global Food Security Forum, University of Oxford

2013 Organizer, Women in Development Forum, University of Oxford

OTHER SERVICE

2018—19 Co-president, IRES Student Society, UBC

MEDIA COVERAGE

2024 Undark, "Will burying biomass underground curb climate change?" https://undark.org/2024/07/17/bury-biomass-curb-climate-change/

Interview with Compass Science Communications, "Just communication and engagement around new climate technologies with Dr. Sara Nawaz" https://www.compassscicomm.org/just-communication-and-engagement-around-new-climate-technologies-with-dr-sara-nawaz/

Grist, "Taylor Swift's Super Bowl flight shows what's wrong with carbon removal" https://grist.org/technology/taylor-swifts-super-bowl-flight-shows-whats-wrong-with-carbon-removal/

Plan Sea Podcast, “Just, responsible and socially viable carbon removal”
https://podcasts.apple.com/us/podcast/sara-nawaz-and-terre-satterfield-on-just-responsible/id1660848987?i=1000642705301&l=ru

2023 Atmos, “The Hijack and Reclamation of Direct Air Capture”
https://atmos.earth/the-hijack-and-reclamation-of-direct-air-capture/

MaRS Solve for X Podcast, “Sea change: Can we alter the chemistry of the ocean to save the climate?”
https://www.marsdd.com/magazine/sea-change-can-we-alter-the-chemistry-of-the-ocean-to-save-the-climate

Smithsonian Magazine, “Little Luxuries Made With Captured Pollution Hint at Big Frontiers in Climate Science”
https://www.smithsonianmag.com/innovation/little-luxuries-made-with-captured-pollution-hint-at-big-frontiers-in-climate-science-180982925/

Bloomberg News, “How Biden’s Regional Carbon Cleanup Hubs Could Spur Innovation”
https://www.bnnbloomberg.ca/how-biden-s-regional-carbon-cleanup-hubs-could-spur-innovation-1.1958448

The Straits Times, “How US regional carbon clean-up hubs could spur innovation in country”
https://www.straitstimes.com/world/how-biden-s-regional-carbon-cleanup-hubs-could-spur-innovation-in-us

The Verge, “Why this new plant is capturing carbon dioxide just to let it back out again”
https://www.theverge.com/2023/4/6/23669582/american-climate-tech-company-colorado-global-thermostat-direct-air-capture

Nature, “Carbon capture nets 2 billion tonnes of CO2 each year — but it’s not enough”
https://www.nature.com/articles/d41586-023-00180-4

People’s Dispatch, “Carbon dioxide removal behind Paris Agreement target”
https://peoplesdispatch.org/2023/01/31/carbon-dioxide-removal-behind-paris-agreement-target/

Reviewer 2 Does Geoengineering Podcast, “Breaking! DAC and public opinion”
https://open.spotify.com/episode/51tzkApcWnM3tRTBP4ok5V?si=a2IdSxUSQCSree9cy0-7nA&utm_source=twitter&nd=1&utm_medium=social&utm_campaign=hootsuite

OTHER CURRENT AFFILIATIONS

2023— **Research Affiliate**, Institute for Science, Innovation and Society, University of Oxford
2023— **Honorary Adjunct Professor**, Institute for Resources, Environment and Sustainability, UBC

LANGUAGES

English—native speaker
Spanish—excellent