

**Columbia Climate School:
Faculty & Researchers who have expressed interest in mentoring a postdoctoral researcher**

NOTE: You may choose a mentor not on this list, as the list below is not an exhaustive one. Candidates are encouraged to submit original innovative ideas and research proposals. Candidates are highly encouraged to reach out to faculty members & researchers to discuss their research proposals. Additional faculty and researchers can be found on the [Climate School directory](#).

Applications are due Friday, November 1, 2024

Possible Mentors	CS foundational knowledge areas	Proposed research project	Relevant Project Links
Adam Sobel	Earth Systems and Sustainability; Social Systems and Justice; Analytics for Action	Dr. Sobel's research has two related but distinct streams: 1) basic dynamics of weather and climate, especially tropical phenomena such as tropical cyclones, intraseasonal oscillations, and monsoons, and 2) applied questions in climate and extreme weather risk, including risks from tropical cyclones, extreme precipitation events, and droughts, in the context of global warming, with active connections to both the private sector and nonprofit climate adaptation finance. He would welcome postdoctoral proposals that engage with these themes or extend them in new ways.	Hurricane Risk Models for Vulnerable Populations
Beizhan Yan	Earth Systems and Sustainability; Analytics for Action	Plastic pollution and environmental impacts	Website
Daniel M. Westervelt	Earth Systems and Sustainability; Social Systems and Justice	We are a group of researchers working at the intersection of atmospheric chemistry, air quality, and climate change. We are located at the Lamont-Doherty Earth Observatory of Columbia University, in Palisades and New York, NY. We are led by Prof. Daniel M. Westervelt, Lamont Associate Research Professor. Any projects that fit within the broad topics of air pollution, climate change, and atmospheric chemistry are welcome. We use tools such as laboratory equipment, models, and satellite remote sensing. We have a state of the art "air sensors lab" at Lamont in which we design, build, and validate air sensors against research-grade methods. Topics of interest within the sensor research include source attribution of pollution using sensors, data fusion with satellite data, air pollution exposure and health studies, etc. We also work on climate modeling with a focus on the climate impacts of aerosols. We run several models and are founding members of the Regional Aerosol Model Intercomparison Project (RAMIP), which is part of CMIP7. We also run more chemistry-focused atmospheric models such as GEOS-Chem.	Westervelt Aerosol Group
Daniel Osgood	Earth Systems and Sustainability; Social Systems and Justice; Analytics for Action	We are performing applied and theoretical research driven by real world needs for the use of forecasts, climate information and financial mechanisms to benefit communities, nations, and individuals through novel approaches in massive scale community decisionmaking involving focus groups, games, and flexible group decision/analysis tools. This research is at the intersection of incentives, information issues, and agroclimatic processes.	Topic: Financial Instruments
Galen A. McKinley	Earth Systems and Sustainability; Analytics for Action	I would like to collaborate with a postdoctoral fellow on a quantitative investigation at the intersection of requirements for mCDR and the ocean carbon sink. This will require mapping the potential future trajectories of mCDR scale-up, based on current technological efforts and investments. Models and machine learning could be used to consider the scales of implementation which would be distinguishable outside current uncertainty bounds. This information can be integrated to propose needed next steps to shorten the timeframe on which additionality and net global impact could be identified.	McKinley Ocean Carbon Group
Gernot Wagner	Analytics for Action	The value of temporary carbon offsets.	Carbon Dioxide as a Risky Asset
Harry Verhoeven	Social Systems and Justice	I welcome the opportunity to work with postdoctoral fellows who are interested in the political economy of climate action in developing countries. This could include a focus on environmental peacebuilding, changing governance structures as climate impacts (and financial flows) increase or geopolitical tussles around international organization or capital as they pertain to the Global South	Center on Global Energy Policy

Jacqueline Klopp	Social Systems and Justice	<p>The Resilient Coastal Communities Project (RCCP) is a partnership between the Columbia Climate School and the New York City Environmental Justice Alliance working in four distinct but overlapping areas: 1. Conducting catalytic research designed to strengthen understanding of the flood-related risks frontline communities face and their priorities for protective and restorative action, 2. Acting as an effective ally and a valued resource to frontline communities seeking to gain the organizational capacity and influence necessary to achieve their resilience goals, 3. Centering community needs and priorities by fostering co-production in the public planning, policy, and legislative spheres, 4. Supporting broader and more effective environmental justice and community empowerment practices at the Columbia Climate School, through initiatives like the "Environmental and Climate Justice at Columbia" Project and the ongoing development of the Climate School's internal strategic framework and fundraising planning. In 2024 and 2025, RCCP will focus on research designed to identify more inclusive and empowering approaches to coastal flood protection planning, to foster greater resilience in coastal communities and ecosystems. Building upon participatory research RCCP conducted in 2022, which focused on understanding and analyzing New York and New Jersey residents' lived experiences of past resilience planning processes, RCCP is preparing to conduct additional interviews, research and dialogues to clarify tangible actions for change at the level of implementation. The ultimate goal of this research is to identify strategies and protocols that could successfully address the many flaws in resilience planning processes previously underscored by our 2022 interviewees. Postdoctoral fellows who join RCCP will also be encouraged and supported in connection with their own intersecting and independent research and practice goals and activities.</p>	Resilient Coastal Communities Project
Jason E Smerdon	Earth Systems and Sustainability	<p>Dr. Smerdon's work spans investigations of the physical processes that drive hydroclimate variability and change globally (with a specific focus on droughts), how those processes will change into the future under global warming scenarios, and the relevant impacts on humans and ecosystems. He welcomes postdoctoral scientists who want to work in this interdisciplinary space, which requires a willingness to work with paleoclimatic, observational and modeling data. CS postdocs are particularly welcomed for their willingness to extend the physical elements of this work to social implications.</p>	Smerdon Climate Lab
Jessica Fanzo	Earth Systems and Sustainability	<p>Climate change and climate-related extreme events have multiple negative effects on global public health including food insecurity, infectious disease burden, malnutrition, and diet-related non-communicable diseases. Today, there is a growing recognition that public health and nutrition practitioners (PHNPs) need access to information, tools, and training—what is called climate services (CS)—to be better equipped and tackle more effectively the complex health challenges of climate disruption for the populations they serve. CS provides decision-making aids that assist individuals and organizations in making better-informed public policy in response to, or in anticipation of climate extremes and climate change. However, evidence suggests that local PHNPs rarely use CS efficiently to prevent malnutrition and provide better health care to the populations in which they serve. This is a critical gap, as these PHNPs are responsible for designing and implementing health-nutrition program interventions when and where they are most needed. This project is designed to address this gap directly. In this project, we posit that targeted CS that focus more intentionally on improving nutrition and health programming have the potential to lead to even greater improvements in health outcomes. Bringing together a transdisciplinary team of climate and public health, nutrition, and policy experts, this project will be conducted in three different countries where multiple forms of malnutrition and infectious disease are endemic, and where risks of climate stress are recognized and well documented – Cambodia, Ethiopia and Indonesia.</p>	Website
Jessica Fanzo	Analytics for Action	<p>Food systems encapsulate our choices about which foods to consume and grow and how we transport, store, process, and market them. Food systems are responsible for 30% of greenhouse gas emissions, significant biodiversity loss, environmental degradation, and food consumption is linked to 6 of the top 10 global disease burden risk factors. Yet, to date, all stakeholders' choices have relied on fragmented information of variable quality, which is difficult to access or use. We have established two tools to increase awareness and knowledge of how food systems are performing and increase accountability. The first is the Food Systems Dashboard is an open-access data platform to address these issues. Led by Columbia University, the Global Alliance for Improved Nutrition, the FAO, and other collaborators, with support from anchor investors, the Dashboard was launched in June 2020. The Dashboard has three goals: (1) describe a country's food system, (2) diagnose the strengths and challenges of those systems, and (3) inform decision-making on actions to address these challenges. The Dashboard has the potential to scale in 3 ways: (1) spatially, by disaggregating to sub-national levels, (2) sectorally, through clustering data and evidence on multiple outcomes: health, environment, livelihoods, equity, and resilience, and (3) temporally, through linking the Dashboard to real-time data sources such as natural resource mapping, food purchases, and commodity prices indices. The second is the Food Systems Countdown to 2030 Initiative that proposes a rigorous, science-based monitoring framework to support evidence-based policymaking, guide public and private decisions, and support those who hold decision-makers to account for food system transformation.</p>	Food Systems Dashboard

Laia Andreu Hayles	Earth Systems and Sustainability	There is a paucity of tree-ring records in tropical regions and this prevents a complete understanding of the true range of climate variability, particularly at decadal to centennial time scales and in response to changes in radiative forcing. Of particular concern are potential recent and future changes in the position and width of the Intertropical Convergence Zone (ITCZ) and how these have or will in turn affect patterns of tropical rainfall in both the northern (NH) and southern (SH) hemispheres. Here, we propose to use stable oxygen isotopes ($\delta^{18}O$) measured in cellulose from the annual growth rings of trees located in Guatemala, Honduras, Peru, Bolivia and Chile in order to reconstruct wet season precipitation variability for at least the last 200 years across the neotropics and provide novel insights on large-scale tropical climate dynamics. This information is otherwise unavailable from both current observations and existing paleoclimate records. This project is novel and potentially transformative in applying the advantages of stable isotope dendroclimatology to provide novel information about fundamental tropical climate process and advance knowledge about internal and forced variability in tropical rainfall patterns.	Website
Lauren Marbella	Earth Systems and Sustainability	Development of non-hazardous electrolytes for Li and Na batteries	Using NMR spectroscopy to link structure to function at the Li solid electrolyte interphase
Lisa Sachs	Social Systems and Justice; Analytics for Action	The Columbia Center on Sustainable Investment (CCSI) is seeking a post-doc researcher to contribute to its portfolio of projects focused on financing sustainable development and climate action. CCSI, together with the Sabin Center for Climate Change Law, has launched a Climate Law and Finance Initiative (CLFI) that creates an institutional hub at the Climate School for applied research on climate finance and the financing of sustainable development. The post-doc researcher will contribute to CLFI's applied research on how the financial architecture and its various economic actors must be realigned with global development goals and trajectories. Current projects are focused on a critical examination of the financing challenges and solutions by region, sector and objective, including reforms to the international financial architecture, the capitalization of development banks, reform of credit ratings, development of innovative blended finance structures, and more. We also collaborate with banks, investors and other financial institutions on developing more climate-consistent capital allocation across asset classes, and improved targets and metrics for financial sector alignment with climate goals. Our work on sustainable finance is dynamic and growing, so we anticipate new projects over the course of each academic year.	Columbia Center on Sustainable Investment
Lola Ben-Alon	Earth Systems and Sustainability; Social Systems and Justice	Environmental, social, and financial impacts are critical to fully evaluate low-carbon and climate positive buildings, materials, and projects. By addressing the environmental, social, and financial impact streams, the intricacies between carbon and energy, profitability, health, and circularity can be assessed to gain a more complete evaluation of sustainability of the built environment. However, while environmental and financial performance have been extensively studied for building materials, social impacts have been far less addressed and analyzed to their effects on people, energy, and the environment. From the extraction of raw components to end of life, building materials inherently engage a variety of stakeholders. The social impacts of these involvements can –and should– be qualitatively and quantitatively assessed. The Natural Materials Lab is inviting postdoctoral researchers to join the development of novel impact assessment tools for social conditions along building materials life cycle that links for the first time environmental and financial impact factors with societal considerations for decarbonized built environment. Our SLCA research accounts for health and safety, worker conditions, and regional impacts, throughout the extraction, production, construction, and demolition phases of the building. The proposed project will use our newly developed methodology to analyze the social impacts of a range of building materials: from conventional materials such as concrete and steel, to eco- and bio-materials such as hempcrete and rammed earth. The study will involve an online survey that will be administrated and analyzed for a range of respondents: construction workers, contractors, distributors, designers and project managers.	Natural Materials Lab
Malgosia Madajewicz	Analytics for Action	The Climate Impacts Group at the Center for Climate Systems Research (CCSR) would welcome a postdoc who could contribute to a project that is investigating trade offs between different approaches to adaptation to flooding. The interdisciplinary research team is collaborating with communities on Long Island and in coastal Virginia to support decisions about flood adaptation and identification of approaches that can produce equitable adaptation outcomes. The research will enable the communities to compare expected outcomes of different approaches to flood adaptation. It will also produce an adaptation decision framework that can inform decisions beyond the study communities.	Website
Marco Tedesco	Earth Systems and Sustainability	Improving estimates of melting of the Greenland ice sheet via machine learning and remote sensing.	Website
	Social Systems and Justice	Using machine learning to quantify the impact of climate hazards on socially vulnerable populations	Website
Maria Uriarte	Earth Systems and Sustainability; Social Systems and Justice	We would like to hire a postdoctoral researcher to evaluate the challenges associated with sustainable finance of forest conservation and restoration projects in the Amazon.	Uriarte Lab
Merlin Chowkwanyun	Social Systems and Justice	AI/text analysis methods on a unique dataset (corporate documents on industrial poisons, e.g. lead, PFAS/PFOS, PCBs, PVC, asbestos, etc.)	Toxic Docs

Michael S. Steckler	Earth Systems and Sustainability	Dr. Steckler proposes mentoring a postdoc on coastal resilience, focused on the delicate balance between sea-level rise, land subsidence and sedimentation. They will join Dr. Steckler's group using multiple measurements of land subsidence and landscape change (e.g., GNSS, RSET-MH, InSAR, archeological sites, etc.) and modeling of the observations in the Ganges-Brahmaputra Delta to improve spatial, temporal and depth discrimination of subsidence processes and its implications for coastal sustainability.	State of the Planet
Mukund Palat Rao	Earth Systems and Sustainability; Analytics for Action	Proposed projects could investigate a variety of themes including the forest carbon cycle under climate change and increasing extreme events, tipping points in terrestrial ecosystems, and Measurement, Reporting, and Verification (MRV) of carbon offsets in terrestrial ecosystems.	Website
Nicolò Daina	Earth Systems and Sustainability; Analytics for Action	The deployment of renewable energy sources (RES) in power systems and the electrification of transportation are two pillars of climate mitigation. However, the intermittency of RES challenges grid reliability, and uncoordinated charging of electric vehicles (EVs) can exacerbate peak-on-peak scenarios, further threatening grid stability. Massive deployment of energy storage systems is required to mitigate grid reliability challenges from RES. Coordinated optimal charging and discharging of EV batteries through vehicle-to-grid (V2G) systems offer a solution that supports RES integration into power systems, reducing the need for additional storage systems, such as stationary batteries. This research aims to develop holistically sustainable planning and operational strategies for integrated shared autonomous electric fleets and power grid systems. We will develop novel quantitative models to optimize battery sizing and types for fleet vehicles, V2G-enabled chargers' deployment and charging/discharging strategies, considering the impacts of climate change and extreme weather. We will ensure maximum critical raw material resource efficiency by considering material inputs and battery degradation in fleet planning and operational strategies. This work will involve system modeling, simulation, optimization, and data science and artificial intelligence approaches to deliver resilient and resource-efficient coupling of transportation and power systems in the context of renewable energy use and climate change adaptation.	Website
Pierre Gentine	Earth Systems and Sustainability; Analytics for Action	Foundational model for the Earth system. There have been tremendous developments over the last couple of years of foundational AI models that are meant to replace components of the Earth system, especially for the atmosphere and ocean. We are looking for postdocs interested in developing foundational models of the Earth's components (cryosphere, land, ocean, atmosphere). This work could be made in collaboration with Nvidia and IBM. Those models will be used to better predict climate across a range of time scales from seasonal to century. The work will involve developing first a benchmark dataset to evaluate progress and then developing a new AI model to better predict the climate system. Finally, interpretability using explainable AI techniques will be used.	Leap
	Analytics for Action	Detecting and better predicting extreme events is challenging, especially in the context of climate change where the distribution of those events is changing. In addition extreme events tend to not be isolated but instead covarying in space and time as they are due to larger conditions (e.g blocking) and are inherently multivariate. Developing strategies to quantify and model those extreme events, and detecting them and their changes can be challenging. The postdoctoral fellow will be working on the use of modern machine learning and new statistical techniques such as diffusion to reproduce and classify extreme events.	Leap
Richard Seager	Earth Systems and Sustainability	Climate change will lead to a change in what is grown and where in the United States. The massive dependency on California, Florida and the Midwest could be upended. At the same time there is interest in moving towards food production closer to markets to reduce transportation costs and emissions, improve the supply of fresh and nutrient rich food and to revitalize local rural economies reconnecting them with urban markets. But does a reinvigoration of the northeast US agricultural economy - which began to collapse in the mid 19th century following construction of the Erie Canal and railways - make sense in terms of climate change, transportation, GHG emissions, water use, pests, economics etc.? We propose a study of how climate change and groundwater depletion will disrupt the US food production system and what it can be transformed into that will guarantee high quality, tasty, fresh, affordable and nutrient rich food for all. A prism to view this through will be a revitalized northeast agricultural system. Work will combine analysis of climate change, crop tolerances and preferences, transportation networks etc. and will draw on experts across the Food for Humanity Initiative.	Website

Robbie M Parks	Social Systems and Justice; Analytics for Action	Dr. Parks has several potential projects that are ready to start with a Climate School post-doc. These projects are relevant to climate change, public health, food for humanity, AI and climate, and disaster resilience. He would be happy to co-mentor with other appropriate faculty. Some projects for consideration are 1- "Uncovering the hidden burden of hazardous heat on incarcerated people in the United States", 2- "Using computer vision work with Google street view and hurricane and tropical cyclone risk", 3- "Novel Assessments of the Health Impacts of Typhoons in the Philippines in a Changing Climate".	SPARK Lab NYC
Yushu Xia	Earth Systems and Sustainability; Analytics for Action	This project will focus on improving and comparing a number of remote sensing-driven, process-based models for estimating soil carbon sequestration, greenhouse gas emissions, and ecosystem productivity associated with regenerative agricultural practices. The goal is to reduce the uncertainty tied to soil health and ecosystem service evaluation. The postdoc will have the opportunity to leverage various modeling tools (e.g., machine learning models and ecosystem models) with both large-scale datasets from surveys and networks (e.g., AgMIP), as well as targeted samples collected from local partners (e.g., Stone Barns).	Xia Soil Systems Lab