Columbia Climate School: Eaculty & 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 <u>Climate School directory.</u>					
Applications are due October 31, 20.	23 Possible Mentors	Research focus	Relevant Poject Links		
Artificial Intelligence (AI) and Climate	Susanne Bauer. Kara Lamb (co-mentor with Susanne Bauer)	Dr. Bauer is a climate modeler and leads the atmospheric composition team at NASA GISS. She uses climate models and observational datasets to understand and simulate the processes that determine how climate is changed by the chemical composition of the atmosphere. Her goal is to advance the understanding of how anthropogenic and natural pollutant emissions influence atmospheric chemistry, climate, and air pollution. Dr Lamb is an atmospheric physicist in the NSF Learning the Earth with Artificial Intelligence and Physics (LEAP) Center at Columbia University who studies aerosols and clouds and their impacts on the climate. She investigates how reduced order modeling, graph-based methods, and physics-informed neural networks can be used to improve parameterizations of sub-grid-scale processes in models and to reduce uncertainty between models and observations. The postdoctoral fellow will work closely between both institutions and develop inovative new science that applies maschine learning technices to chemictry climate questions	LEAP		
Artificial Intelligence (AI) and Climate	Radlev Horton	Dr. Horton is a climate scientist focused on extreme events, climate impacts, and climate solutions. His research exposes 'tail-risk' blind spots in existing models and risk assessment approaches used by diverse stakeholders ranging from governments, to underserved communities, to the private sector. Current topic areas include 1) compound extreme events including humid heat, sequences of extreme precipitation and heat, and simultaneous heatwaves, 2) extreme event impacts on human health, crop yields, and human mobility, and 3) synergies and tradeoffs between mitigation and adaptation.	Website		
Artificial Intelligence (AI) and Climate	<u>Marco Tedesco</u>	Dr. Tedesco's primary research will involve the use of machine learning and attribution analysis applied to either Greenland melting / sea levels rise or to socio-economic datasets to discover relationships among socio economic and physical drivers. In the case of Greenland, we will be looking at applications of machine learning to better understand the processes that have been driving the recent increase in melting and what we can learn to irpove future projections. In the case of the socio- economic application, we will be exploring the potential impact of climate hazards on climate gentrification and how we can develop tools and best practices to address climate justice, with an emphasis on (but not limited to) community engagement and policy tools. The candidate will have machine learning experience, good programming skills and teamwork attitude. Critical skills and independent attitude while working on a team are extremely important.	Coastal Resilience Network		
Artificial Intelligence (AI) and Climate	Yutian Wu	Dr. Wu's primary research aims to understand the interaction between the atmosphere and the Arctic sea ice, and more specifically how the atmospheric processes contribute to the melting of sea ice and how the melting of sea ice feeds back to the atmospheric circulation. The methodologies include the use of observations, idealized and comprehensive model experiments as well as statistical analysis and machine learning methods. He would welcome postdoctoral proposals that complement this research with their own research ideas including the understanding of ocean processes, the impact of the new Arctic on the local ecosystem, the Arctic communities and the global environment.	<u>Dr. Wu's Personal Website</u>		
Artificial Intelligence (AI) and Climate	Daniel M Westervelt	Dr. Westervelt's research aims to use observations, remote sensing, and modeling coupled with data science techniques to close the air pollution data gap in underserved regions of the world, including sub- Saharan Africa. Postdoctoral fellows interested in environmental justice, air quality, climate change, machine learning, and computer modeling are welcome to submit their innovative proposals. Postdoctoral fellows would have the opportunity to work with a variety of Westervelt group collaborators, including the Columbia Mailman School of Public Health, the School of Engineering and Applied Sciences, the NASA Goddard Institute for Space Studies, the Data Science Institute (where he is an affiliate faculty), and numerous universities and organizations around the world.	Westervelt Aerosol Group		
Carbon Management	Pierre Gentine	Dr. Gentine's research interests include discovering regulators of the terrestrial carbon cycle: the terrestrial carbon cycle remains highly uncertain limiting our capacity to project natural climate mitigation. In this project, we will use a new perspective merging physical models and machine learning to discover new regulations of the carbon cycle that are not correctly captured by current models, with a focus on tropical forests. Specifically we will investigate the drivers of seasonal and interannual changes in tropical rainforests using a data assimilation framework based on satellite data and develop new hypothesies on the regulators of the variability of carbon cycle in the tropics using combined physical models and machine learning models (using a modern tool called automatic differnitation to merge physical and machine learning models). Results from this work should lead to new understanding of the regulators of the carbon cycle in the tropics, espically disturbances and water stress. These will allow better projecting the future of the terrestrial carbon cycle and specifically of tropical forests and any potential dieoff of those forests, reducing global carbon uptake. This project will be done in partnership with the LEAP Science and Technology center. The postdoc will be part of a new Max Planck center in collaboration between Max	Learning the Earth with Artificial Intelligence and Physics (LEAP)		

Carbon Management	Dhruv Balwada	Dr. Balwada's research is focussed on better understanding ocean turbulence and transport, and their role in the climate system, using observational and modeling approaches. At the moment he is focussed on improving representation of this transport in climate models with the help of machine learning, as part of the M2LInES project. He is also actively involved in using observations from autonomous ocean sensors to better quantify the turbulent nature of our oceans	<u>M²LInES - Multiscale Machine Learning In</u> Coupled Earth System Modeling
Climate and Environmental Justice	<u>Anirban Basu</u>	Dr. Basu's research focuses on developing metal isotopic biomarkers to understand health effects of metals and quantify exposure. Metal isotope analysis uniquely reveals the molecular mechanisms of metal cycling in both environmental and biological systems. Utilizing isotopic composition of both biological and environmental samples as a powerful tool, we probe metal cycling in the environment, accumulation of metals in human body, disruption of metabolism and disease development, and we develop reliable non-invasive biomarkers of metal exposure.	<u>Metal Isotopes</u>
Climate Finance and Risk	Harry Verhoeven	Dr. Verhoeven's scholarship focuses on the global political economy of climate change and explores how the world's poorest states are trying to adapt to global warming. Ambitious research on the role of sovereign debt, various types of climate finance and initiatives by the multilateral development banks in redefining adaptation and shaping the policy options available to low-income countries in Africa and elsewhere in the Global South is needed. He welcome proposals for postdoctoral work that complement this research agenda with their own, original exploration of these and related topics, including the geopolitics of energy transitions, climate and financial (in)stability, (re-)emerging powers and the international financial institutions, and Africa in multilateral climate initiatives.	Columbia Center on Global Energy Policy (CGEP)
Climate Finance and Risk	<u>Lisa Sachs</u>	Dr. Sachs' research aims to advance global understanding of the role of finance in addressing climate change and accelerating the energy transition, and to explore corresponding implications for integrating climate science into corporate and financial decision making, law and regulations that shape financial flows, frameworks and initiatives that define climate alignment, and legal approaches to fiduciary duty, corporate governance, and more. A postdoctoral fellow could support ongoing applied research in these interdisciplinary areas. Dr. Sachs would welcome postdoctoral proposals that complement this research agenda with their own focus on an aspect of climate finance. Postdoctoral research fellows would collaborate with other Climate School centers, including notably the Sabin Center for Climate Change Law, among others.	Columbia Center on Sustainable Investment
Coastal Viability	<u>Robbie Parks</u>	Dr. Parks's research aims to use novel computer vision methods to understand how the health impacts of tropical cyclones vary by physical neighborhood characteristics, e.g., power lines above ground, house type and material. Differences in physical neighborhood features, which are indicative of social, environmental, and health inequalities, can also be identified using publicly available satellite and ground-based images, along with scalable machine learning and computer vision algorithms. Dr. Parks would very much welcome postdoctoral proposals that combine his research interests in climate change and public health with novel research directions that the potential mentee would be interested in.	SPARK Lab NYC
Coastal Viability	<u>Suzana J. Camargo</u>	Dr. Camargo's main topic of research focuses on tropical cyclones (or hurricanes) and how they relate to climate on various time-scales, from subseasonal to climate change. The research group has been focusing on tropical cyclone risk in a collaborative environment led by multiple Columbia scientists. We would like to continue developing novel modeling tools to explore the risk of extremes, including their social and economic impacts. We are seeking a postdoctoral fellow to help us develop new tools to explore these topics, as well as to improve and modify our current approaches to examine tropical cyclone risk.	Lamont Research Division: Ocean & Climate Physics
Coastal Viability	Michael S. Steckler	Dr. Steckler proposes two projects for mentoring a postdoc on coastal resilience, focused on the delicate balance between sea-level rise, land subsidence and sedimentation. One project will use dynamic models of shoreline movements and associated geomorphic change to improve projections of coastal changes in response to sea level variations, calibrated using Bayesian inversion of preserved NJ Pleistocene-Holocene stratigraphy. The other will use multiple measurements of land subsidence and landscape change (e.g., GNSS, RSET-MH, InSAR, archeological sites, etc.) in the Ganges-Brahmaputra Delta to improve spatial, temporal and depth discrimination of subsidence processes and use them, along with climate models, to explore their implications for coastal sustainability.	<u>ResearchGate</u>
Coastal Viability	Adam Sobel	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.	<u>Google Scholar</u>
Disaster Resilience	Alex de Sherbinin	Dr. de Sherbinin is a geographer whose research interests broadly address the human aspects of global environmental change and geospatial data applications, integration, and dissemination. A primary research focus is climate-related mobility (including migration, displacement, and planned relocation), but additional topics include climate vulnerability mapping, urban climate risks, environmental justice, population dynamics and the environment, environmental indicators, and remote sensing data applications. Sponsors of these projects include agencies such as NSF, NASA, the World Bank, USAID, DoD Minerva, UNOPS, and IOM.	CIESIN

Disaster Resilience	Jeff Schlegelmilch	Schlegelmilch is able to support projects related to disaster prevention, response, and recovery. We have multiple projects focused on social sciences as well as policy and training on science education and practice. We are well situated to mentor applied projects, but less so for methodological development, and foundational research projects.	Resilient Children / Resilient Communities Initiative
Energy Storage	Nicolò Daina	Highway Charging Infrastructure Planning For Medium and High Duty. Freight Vehile Electrification and Renewable Energy Integration This project will provide quantitative research to inform the development of a plan for a nationwide network of grid-integrated photovoltaic, energy storage and charging stations (PV+ES+EVSE) for medium & heavy- duty battery electric trucks (MHDBET) across the US interstate system corridors. This research project seeks to identify candidate locations and to evaluate the system sizing requirements. The siting and sizing of PV+ESS+EVSE systems is to be based on current medium-heavy duty truck movements on the US interstate system. The reseach questions this project seeks to address, include: What are the trucking movement data requirements and data sources to evaluate truck stops utilization on interstate corridors and potential charging demand from MHDBET? What is the potential MHDBET? What is the potential MHDBET charging demand along interstate corridors considering current trucking movement data? Where are the truck stops locations on US interstate corridors with the highest MHDBET charging demand potential and ROI potential for PV+ESS+EVSE systems? What are the PV+ESS+EVSE system sizing requirements at such sites? The postdoc will perform data modeling, simulation, optimization, geospatial analysis, and other quantitative work. Candidates should have expertise in large dataset handling and analysis and transportation modeling.	<u>Nicolò Daina</u>
Energy Storage	Matthias Preindl	Dr. Preindl's research areas are: design and control of power electronic systems, motor drive systems, and energy storage systems for transportation electrification and a sustainable power system. More details are listed at: https://mplab.ee.columbia.edu/research	Lab Website
Energy Storage	James Glynn	 Dr. Glynn and team are building a global integrated assessment model with a technology-rich process-based representation of the energy system at the core and would like to collaborate with a CS post-doc to recalibrate the climate emulator to be consistent with the CMIP6 round of simulations. A similar IAM TIMES based global model with an climate emulator was the basis of this recent paper. This may give insight to prospective post-doctoral researcher with an interest in energy systems modeling and integrated assessment modeling. Panos, E., Glynn, J., Kypreos, S., Lehtilä, A., Yue, X., Gallachóir, B.Ó., Daniels, D. and Dai, H., 2023. Deep decarbonisation pathways of the energy system in times of unprecedented uncertainty in the energy sector. Energy Policy, 180, p.113642. https://www.sciencedirect.com/science/article/pii/S0301421523002276 	Energy systems modeling & analytics team at. CGEP.
Food for Humanity	<u>Walter Baethgen</u>	Dr. Baethgen is the PI of a World Bank funded project to advance Climate Services research and implementation for agriculture in 6 African countries (Senegal, Ethiopia, Kenya, Mali, Ghana, and Zambia). Two specific areas offer opportunities for postdoctoral research. (1) Establishing decision support systems (DSS) that use climate information (past, present and future) and crop simulation models to explore best management practices to reduce climate related risks. For example, the DSS can be used at the farm level and allow to work with "What if" questions such as what are the best management practices (planting dates, cultivars, fertilizer use) for a given farm considering seasonal and sub-seasonal climate forecasts. They can also be used at national or sub-national level to produce outlooks of crop production as early warnings of food insecurity. (2) Understand the process of embedding scientific/technological information into actual decisions and policies at different levels (from farmers, to governments, to international development agencies). For example: (a) Identifying and mapping the networks through which information flows and reaches end users, (b) understanding the needed processes of co-production, (c) understanding the language, format needed to communicate scientific knowledge and effectively inform decisions and policy.	International Research Institute for Climate and Society
Food for Humanity	Joaqium Goes	Dr. Goes' primary research is focused on the development of satellite data products to understand the role of marine phytoplankton in mitigating the build-up of atmospheric CO2 and in coastal resource management under climate change. The postdoctoral fellow would be expected to develop innovative methods (GIS, statistical, machine learning, AI) and drone based imaging techniques to enhance the utility of satellite data products for ocean carbon accounting, fisheries management and blue-economy based sustainable marine food production initiatives.	<u>Goes-Gomes Lab</u>

Food for Humanity	Daniel Osgood	Dr. Osgood investigates the role of meaningful participation and access to information embedded in the implementation of in large scale index insurance and Anticipatory Action forecast and monitoring triggers across several developing countries, primarily in Africa, at scales ranging from millions of individual farmers to meso level organizations to national governments. Through a suite of projects, we explore the value of information from forecasts and models as well as information from end beneficiaries. We test the impacts of increases in transparency, local governance, and stakeholder, and end-beneficiary participation in adoption, accuracy, and impacts of products. The goal is to directly inform projects and policy through research publications.	Financial Instruments Sector Team
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