

John Wesley Powell Center

for Analysis and Synthesis



Director's Message

So much has taken place in 2020 that it has been difficult to process. While the Powell Center is stronger than ever, the COVID-19 pandemic and the Black Lives Matter movement have had profound effects on the activities that form the core purpose of the Powell Center. While larger events have brought changes in how we work, I'd first like to share a smaller change, closer to home (and one we can celebrate!) Our beloved Administrative Operations Assistant, Leah Colasuonno, is moving up in the U.S. Geological Survey. Since 2015 Leah's capable management has been synonymous with what it means to have a Powell Center experience, and we will miss her very much. Please join me in wishing Leah well as she transitions to the next phase of her career.



Leah Colasuonno at the USGS booth at the AGU meeting in Washington DC, 2018.

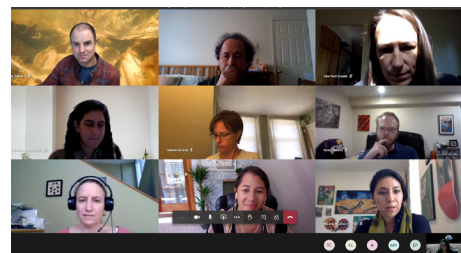
The John Wesley Powell Center exists to offer the opportunity for emergent knowledge in Earth system science through collaborative analysis and synthesis. The Powell Center's unique combination of culture, infrastructure, and support has a proven record of facilitating creative discovery on issues crucial to science and society. Our "special sauce" is the model of small,

intense, in-person Working Groups. In-person meetings have been denied us due to the potential for COVID-19 transmission, and the Powell Center has postponed all Fort Collins meetings until we can safely meet again, hopefully later in 2021. In the meantime, we are helping Working Groups to meet virtually, and pooling our expertise with those of other Synthesis Centers to share our tools, advice, and experiences. Virtual meetings can work, as you all know, since they have become the way scientific discourse is now conducted worldwide. Some great links to suggestions for successful virtual synthesis meetings can be found in the News section of the Powell Center website: <https://www.usgs.gov/centers/powell-ctr>.

An aspiration since our inception has been to increase the proportion and influence of underrepresented populations in the Earth and Environmental Sciences, and in doing so, help change the culture to be more inclusive and more collaborative. In 2018 we changed the diversity statement required in synthesis proposals submitted to us. This has taken on greater urgency since the killing of George Floyd and the subsequent protests that continue to highlight systemic racism in the US and other nations. While diversity in terms of gender, career stage, discipline and ethnicity among participants is still required in successful Working Group proposals, this is no longer sufficient. In order to broaden our reach, proposals are now required to provide additional ideas for how to strengthen the participation of less well-represented groups in the Earth and Environmental Sciences. Groups must describe how they will achieve the broader impacts of increasing diversity over time in STEM fields. Some proposed ideas include offering instructional short courses at professional meetings, mentoring early career scientists beyond those participating in the Working Group, and using the

synthesis science topic as the topic of a hands-on event for middle-school girls at regional STEM conferences. An exciting new idea is to pledge to create or amend Wikipedia pages related to Working Group topics or people. While this is a beginning, a recent call to action for an anti-racist science community (<https://notimeforsilence.org/>) reminds us our efforts are not enough. We invite your suggestions on what more we can do to actively stop being "perpetrators of the status quo," in the words of American Association for the Advancement of Science CEO Sudip Parikh.

Finally, a brief encouraging note on the convergence of these two topics. The rise of virtual meetings has led to much greater communication among experts and students from under-represented groups that would not otherwise be possible. Stephanie Ross, the Principal Investigator of the Tsunamis Source Synthesis Working Group shared a recent example. Expert 90-year-old USGS emeritus scientist Roland von Heune was able to participate in their Working Group meeting, as were graduate students from UC-Riverside, creating stimulating discussions that would not otherwise have taken place.



Virtual meeting showing some members of the Mosquito Phenology Working Group

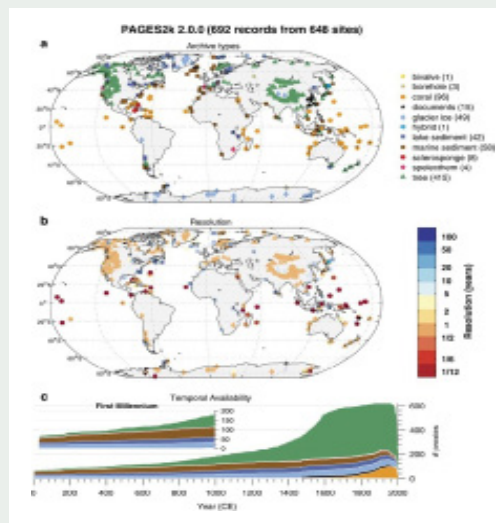
Jill Baron and Marty Goldhaber,
Co-Directors

Featured Working Group

Collaborative synthesis fosters continuing collaborative synthesis: an example from NAM2K

The North American 2K Working Group, active from 2014-2016, assembled federal and academic scientists for a broader view of North American climate over the past two millennia in a project titled: *Synthesizing paleoclimate records from diverse archives*. Nicknamed NAM2K, this group was and is part of the international Past Global Changes (PAGES) project that coordinates and promotes past global change research as a window for exploring future climates and environments. NAM2K constructed state-of-the-art paleoclimatic proxy databases and explored evidence of North American hydroclimatic changes over the Holocene. As a group, NAM2K summarized the last 2,000 years of hydroclimatic changes across North America using multiple proxy data sources (i.e. Ice Cores, Lake Sediment Cores, Speleothems, Tree-rings). *A global multiproxy database for temperature reconstructions of the Common Era* was published in 2017 in the journal *Scientific Data* and has already been cited over 100 times (doi.org/10.1038/sdata.2017.88).

Seeds planted at the Powell Center led to many other databases and papers published since 2019, including the Iso2k global compilation of paleo-d18O and d2H records (doi.org/10.5194/essd-2020-5), Holocene mid-latitude precipitation decreases (doi.org/10.1038/s41586-019-1060-3) and similarities across global temperature reconstructions (doi.org/10.1038/s41561-019-0400-0), and recent temperature driven changes in runoff efficiency and increased drought severity in the Upper Colorado (doi.org/10.1002/2017WR021663) and Missouri River Basins (doi.org/10.1073/pnas.1916208117). The unique opportunity afforded by the Powell Center to bring together a diverse group of scientists, each with extensive datasets, launched many spin-off research collaborations that likely otherwise would not have been produced.



Spatiotemporal data availability in the PAGES2k Global database. (a) Geographical distribution, by archive type, coded by color and shape. (b) Temporal resolution in the PAGES2k database, defined here as the median of the spacing between consecutive observations. Shapes as in (a), colors encode the resolution in years (see colorbar). (c) Temporal availability coded by color as in (a).



Featured Fellow

Melissa Lombard

is the fellow in the synthesis Working Group linking environmental and public health data to evaluate health effects of arsenic exposure from drinking water. She is a hydrologist in the New England Water Science Center and joined the USGS as an employee in September 2017. The working group has brought together water quality scientists, geographers, epidemiologists, and public health scientists to estimate exposure to arsenic from private wells throughout the conterminous United States and compare this exposure to human health data. Melissa has developed machine learning models with input from epidemiologists who are using the model results to evaluate potential human health outcomes from exposure to arsenic in drinking water. She appreciates the collaborative and collegial atmosphere of this Working Group and finds it gratifying that her models meet the needs of epidemiologists and will be used in research related to human health. She is excited to build upon this collaboration and help advance the science of environmental health.

Prior to joining USGS as a hydrologist, Melissa volunteered with USGS and was a college lecturer. Her primary interests are in water quality and statistical modeling and she has a range of previous experience in private consulting, university research, and college teaching. Melissa is a cyclist and thinks it is fantastic that the Powell Center provides you with a bike when you visit Fort Collins. Melissa looks forward to Working Group meetings to take advantage of the many mountain bike trails outside Fort Collins after exciting days of deep technical discussions and collaboration.