12th Annual Earth System and Space Science Poster Conference

Friday, November 30, 2018
CU Sustainability, Energy, and Environment Complex (SEEC)
4001 Discovery Drive, Boulder, CO

Sponsored by the University of Colorado
Department of Atmospheric and Oceanic Sciences (ATOC)

Program:
10:30AM – 11:30AM   Keynote Lecture
                                    Professor Brian O'Neill, University of Denver

11:30AM – 2:30PM   Poster Session

**Does half a degree of global warming matter?
Results from the BRACE 1.5 study**

Professor Brian O'Neill, University of Denver

In 2015, 195 countries negotiated the Paris Agreement on climate change, which set long-term goals of limiting global mean warming to well below 2 C and possibly 1.5 C. This event stimulated substantial scientific interest in climate outcomes and impacts on society associated with those levels of warming. Recently, a project coordinated at NCAR was undertaken to produce new global climate model simulations of scenarios that stabilize warming at 1.5 and 2 C, and to investigate their potential impacts. The project, BRACE 1.5 (Benefits of Reduced Anthropogenic Climate changE), asks whether impacts differ substantially between the two climate scenarios, accounting for uncertainty in climate outcomes and in societal conditions. Impact assessment focuses on extreme climate events and the health, agricultural, and building energy sectors. Modeling approaches include the use of three different global, multi-region integrated assessment models (IAMs), both a process-based and an empirical crop model, and an epidemiological model of heat-related mortality. I discuss the BRACE 1.5 study design and key conclusions, and give a more detailed account of an agricultural impact assessment linking an IAM to a climate model.

Brian O'Neill is a Professor at the Josef Korbel School of International Studies at the University of Denver. He also serves as Director of Research at the Korbel School's Pardee Center for International Futures. Brian holds a Ph.D. in Earth Systems Science and an M.S. in Applied Science, both from New York University. His research interests are in human-environment interactions, in particular the relationship between future societal development, greenhouse gas emissions, and climate change impacts. He has led research groups on Integrated Assessment Modeling and on Climate and Human Systems at the US National Center for Atmospheric Research (NCAR), and on Population and Climate Change at the International Institute for Applied Systems Analysis (IIASA). Brian is a Convening Lead Author for the Intergovernmental Panel on Climate Change's ongoing Sixth Assessment Report. He is also the lead author of Population and Climate Change, published by Cambridge University Press.

Participants by Research Area:

Posters are separated by research area and then listed in order by poster number, followed by the participant's name; poster title; and participant's home department. Posters signed up for the best student poster competition will be judged from 11:30 a.m. – 1:00 p.m. for Categories A-D and from 1:00 p.m. – 2:30 p.m. for Categories E-H.

Category A – Atmospheric Chemistry

A1   **Zachary Decker;** Nighttime aircraft intercepts of biomass burning plumes: observations and box model analysis (CU/CIRES/NOAA)

A2   **Helene Angot;** The mystery of nocturnal ozone depletion in a summertime tundra environment (CU/INSTAAR)

A3   **Kaixin Cui;** Tethered balloon ozone data analysis for Toolik Lake, Alaska (CU/INSTAAR)

Category B – Middle and Upper Atmosphere

B1   **Jack Wang;** Quantifying short-term variability of the migrating diurnal tide from different general circulation models (CU/ASEN/NCAR)

B2   **Ilann Bourgeois;** Spatial and temporal distribution of O3 in the remote troposphere from the NASA Atmospheric Tomography (ATom) mission (CU/CIRES/NOAA)

B3   **Colby Brabec;** Convectively driven Gravity Waves at the Stratopause (CU/ATOC/LASP)

Category C – Aerosols, Clouds, and Precipitation

C1   **Melissa Maestas;** Machine learning for spatiotemporal PM2.5 estimates across the western US, 2008-2014 (CU/CIRES/Earth Lab)

C2   **Matthew Cann;** Impact of Moisture Pathways and Flow Regime on Mountainous Precipitation Distribution (CU/ATOC)

C3   **Robinson Wallace;** Investigating the characteristics of hail accumulating thunderstorms (CU/ATOC)

C4   **Chris Maloney;** UT/LS aerosol and cirrus simulations using the CAM/CARMA cloud model with MAM aerosols (CU/ATOC)

C5   **Steffen Mauceri;** Retrieving Sulfate, Brown Carbon and Dust Aerosols form Hyperspectral Imagery (ATOC/LASP)

C6   **Matthew Gentry**; Cloud changes affect Southern Ocean biology in the Community Earth System Model (CU/ATOC/CIRES)

Category D – Oceanography and Large-Scale Dynamics

D1   **Michelle Maclennan;** Circumpolar Deep Water intrusions drive phytoplankton blooms in the Amundsen Sea (CU/ATOC)

D2   **Danielle Lemmon;** Exploring the effects of global warming on ENSO diversity and Bjerknes feedback dynamics (CU/ATOC/CIRES/NSF)

D3   **John van Oosten;** Nitrogen cycle dynamics during the Cretaceous Oceanic Anoxic Event 2 in the Western Interior Seaway (CU/INSTAAR)

D4   **Lei Zhang;** A new coupling mechanism between Southeast Indian Ocean and tropical Pacific (CU/ATOC)

D5   **Rory Laiho;** Arctic Ocean Freshwater budget (CU/ATOC)

D6   **Riley Brady;** On the role of climate models in modulating the air-sea CO_2 fluxes in Eastern Boundary Upwelling Systems (CU/INSTAAR)

D7   **Kellie Gadeken;** Predicting Underwater Biomass From Sonar and Satellite Measurements (CU/ATOC)

Category E – Boundary Layer and Wind Energy

E1   **Chris Rodell;** Characterizing Outflow Boundary Characteristics in Complex Terrain (CU/ATOC)

E2   **Nick Luchetti;** Analyzing Outflow Boundary interactions with terrain in WRF-fire (CU/ATOC)

E3   **Camden Plunkett;** Environmental Controls on Pyrocumulus Formation using WRF-Fire Simulations (CU/ATOC)

E4   **Xiaolin Zhang;** Barrier layer formation during extreme El Ninos (CU/ATOC)

E5   **Ren Smith;** The Role of Radiation in Tropical Cyclogenesis (CU/ATOC/CIRES)

E6   **Sheevam Pooja;** Project Sim Turtle: Effects of Temperature and NPP Thresholds on Dispersal Range (CU/ATOC/INSTAAR)

E7   **Stephanie Redfern;** Incorporation of the Rotor-Equivalent Wind Speed into the Weather Research and Forecasting Model's Wind Farm Parameterization (CU/ATOC)

Category F – Snow and Ice

F1   **Tessa Gorte;** Antarctic surface mass balance trends over the 20th century in reconstructed reanalyses and CMIP5 climate model (CU/ATOC)

F2   **Patricia DeRepentigny;** Future Sea-Ice Decline Predicted to Bring the Arctic Nations Closer Together (CU/ATOC/INSTAAR)

F3   **Abigail Ahlert;** Arctic sea ice melt season length in the CESM Large Ensemble (CU/ATOC/INSTAAR)

F4   **Marissa Dattler;** Topographic- and wind-driven snow distribution: Analyzing absolute and relative accumulation airborne-radar observations over West Antarctica (CU/ATOC)

F5   **Kelly Kochanski;** Statistical classification of self-organized snow surfaces (CU/GEOL)

F6   **Eric Keenan;** Do Climate Models Properly Represent Atmospheric Rivers in East Antarctica? (CU/ATOC)

Category G – Remote Sensing and Radiative Transfer

G1   **Jeremy Diaz;** Predicting Wildfire Spread from SWIR Imagery using Convolutional Recurrent Neural Networks, Pt. 1: Creating the Training Set (CU/CIRES/Earth Lab)

G3   **Ryosuke Masuda;** Development of a method for cloud optical thickness retrieval from digital-camera image using the deep convolutional neural network and 3D radiative transfer model (Tohoku University, Japan)

G3   **Hong Chen;** Validating satellite imagery derived cloud optical thickness and albedo with airborne observations from the 2016 – 2018 deployments of the ORACLES (CU/LASP)

G4   **Kyle Connour;** Analysis of Martian dust scattering properties as derived from the 2018 PEDE (CU/LASP/APS)

G5   **Julia Kent;** Cloud Retrievals from Hyperspectral Data (CU/ATOC/LASP)

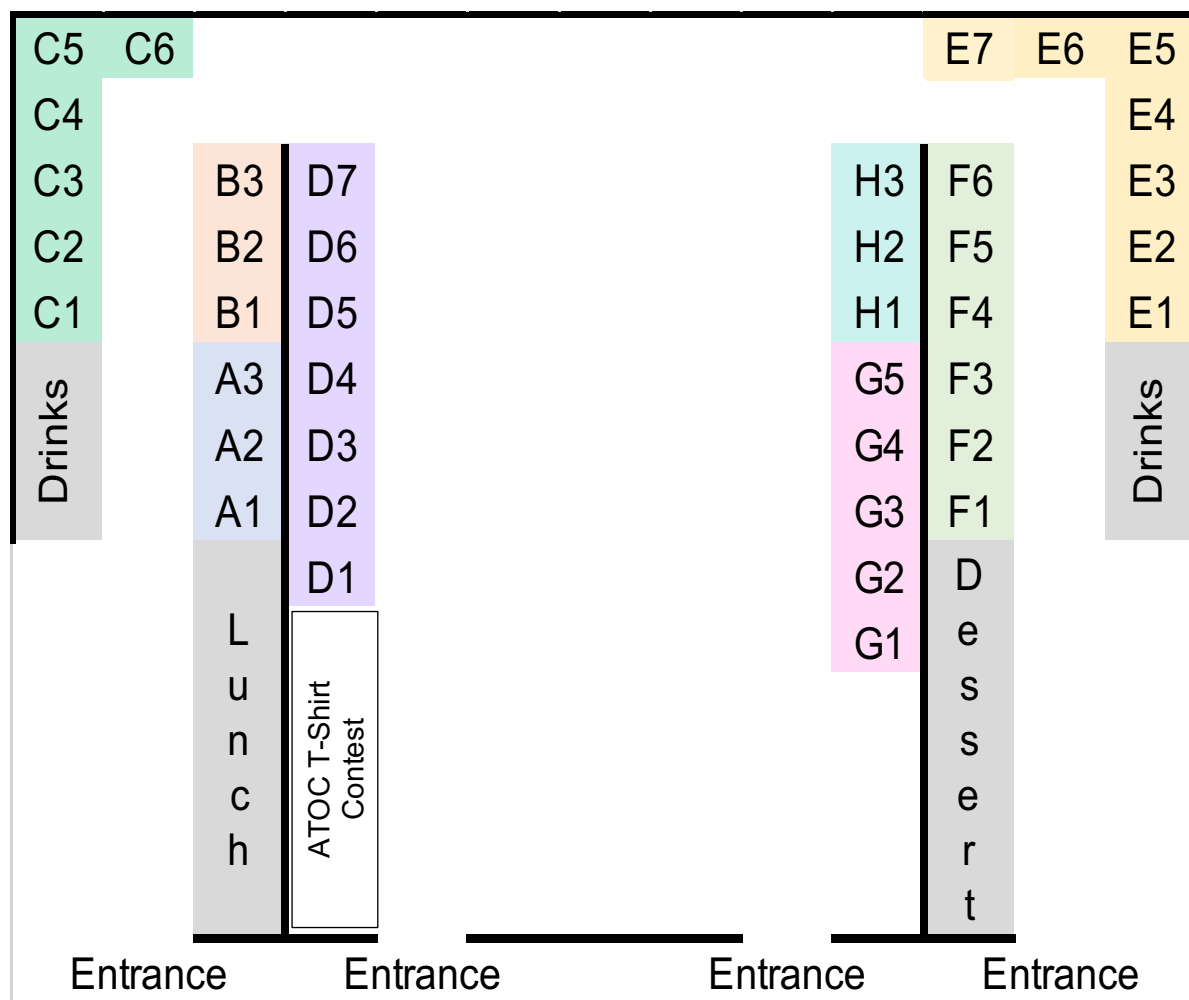## Category H – Space and Planetary Physics

H1   **Alberto Roper Pol;** Generation of Gravitational Waves due to Magnetohydrodynamic Turbulence in the Early Universe (ASEN/LASP)

H2   **Alexander Sandoval;** Robotic Arm and Rover for Future Low-Latency Telerobotic Assembly Experiments (CU/CASA/NESS)

H3   **Amanda Alexander;** The nature and origin of ancient oxygen isotope heterogeneities in Mars' crust (CU/ASTR-GEOL)

Map of Poster Location

Poster viewing and judging are from 11:30 a.m. – 1:00 p.m. for Categories A-D and from 1:00 p.m. – 2:30 p.m. for Categories E-H.

C5	C6						E7	E6	E5
C4									E4
C3	B3	D7				H3	F6		E3
C2	B2	D6				H2	F5		E2
C1	B1	D5				H1	F4		E1
Drinks	A3	D4				G5	F3	Drinks	
	A2	D3				G4	F2		
	A1	D2				G3	F1		
		D1				G2	Dessert		
	Lunch	ATOC T-Shirt Contest				G1			

Entrance   Entrance   Entrance   Entrance

Participants by Alphabetical Order:

Participants are listed in alphabetical order by last name of the author followed by the poster location.

Abigail Ahlert, F3
Amanda Alexander, H3
Helene Angot, A2
Ilann Bourgeois, B2
Colby Brabec, B3
Riley Brady, D6
Matthew Cann, C2
Hong Chen, G4
Kyle Connour, G5
Kaixin Cui, A3
Marissa Dattler, F4
Zachary Decker, A1
Patricia DeRepentigny, F2
Jeremy Diaz, G1
Kellie Gadeken, D7
Matthew Gentry, C6
Tessa Gorte, F1
Eric Keenan, F6
Julia Kent, G6
Kelly Kochanski, F5

Rory Laiho, D5
Danielle Lemmon, D2
Nick Luchetti, E2
Michelle Maclennan, D1
Melissa Maestas, C1
Chris Maloney, C4
Ryosuke Masuda, G3
Steffen Mauceri, C5
Camden Plunkett, E3
Sheevam Pooja, E6
Stephanie Redfern, E7
Chris Rodell, E1
Alberto Roper Pol, H1
Alexander Sandoval, H2
Ren Smith, E5
John van Oosten, D3
Robinson Wallace, C3
Jack Wang, B1
Lei Zhang, D4
Xiaolin Zhang, E4

Acronyms Key

APS – Department of Astrophysical and Planetary Sciences
ASEN – Department of Aerospace Engineering Sciences
ASTR – Astrophysical and Planetary Sciences
ATOC – Department of Atmospheric and Oceanic Sciences
CASA – Center for Astrophysics and Space Astronomy
CIRES – Cooperative Institute for Research in Environmental Sciences
CU – University of Colorado Boulder
GEOL – Department of Geology
INSTAAR – Institute of Arctic and Alpine Research
LASP – Laboratory for Atmospheric and Space Physics
NCAR – National Center for Atmospheric Research
NOAA – National Oceanic and Atmospheric Administration
NSF – National Science Foundation