



CIRES Rendezvous 2018

Annual Science Symposium • May 18 • Glenn Miller Ballroom, UMC



Celebrate outstanding science with your CIRES colleagues!



Hosted by



cires-cmc@lists.
colorado.edu



Rendezvous2018

Friday, May 18 • University Memorial Center, Glenn Miller Ballroom, Terrace, and Aspen Rooms

The CIRES Members' Council is pleased to announce the 13th annual CIRES Rendezvous. This institute-wide symposium spotlights the depth, breadth, and quality of the pacesetting science being done at CIRES. We hope to encourage collaborations that might result in new interdisciplinary research, and to facilitate connections among our many innovative scientists, science support staff, and administrative staff. The event includes an entire afternoon devoted to science and poster presentations by CIRES members.

Agenda

POSTER SET-UP: 10:00 am – 11:30 am (UMC Terrace tent and Aspen Rooms)

CHECK-IN: 11:00 am – 11:25 am (UMC Glenn Miller Ballroom Foyer)

LUNCHEON, ADDRESS & AWARDS: 11:30 am – 1:30 pm (UMC Glenn Miller Ballroom)

POSTER SESSION: 1:30 pm – 4:30 pm (UMC Terrace tent and Aspen Rooms) Includes a cash bar and appetizers starting at 3 pm

Looking for a certain poster?

USE A COLOR TO FIND A POSTER:

Poster displays are color-coded by category. See key at right.

USE YOUR DEVICE TO FIND

A POSTER: Locations and abstracts are available at ciresevents.colorado.edu/rendezvous/poster-abstracts

USE A MAP TO FIND A POSTER:

See pages 10-11 or view the poster maps on display in the UMC Terrace Tent or Aspen Room.

ADMINISTRATION

ENVIRONMENTAL CHEMISTRY

CENTER FOR SCIENCE AND
TECH POLICY RESEARCH

ENVRNMTL OBSERVATIONS,
MODELING, FORECASTING

CRYOSPHERIC AND POLAR
PROCESSES DIVISION

SOLID EARTH SCIENCES

ECOSYSTEM SCIENCE

WEATHER AND CLIMATE
DYNAMICS

EDUCATION & OUTREACH

WESTERN WATER ASSESSMENT

From the Director



Dear Colleagues,

Welcome to the annual CIRES Rendezvous! I am pleased to say that we had another outstanding year in terms of both funding and productivity. We are officially now in our fifties, and I think CIRES is aging beautifully. We continue to constitute a major fraction of the university's research budget, bringing in nearly one-fifth of CU Boulder's research dollars. This is on par with the entire College of Engineering or the College of Arts and Sciences. Our journal publication output exceeded 800 papers last year—you all published in journals from *Aerobiologia* to *Water Resources Research*. But CIRES is about so much more than dollars and publications. CIRES is about understanding the world in which we live in ways that improve our lives and livelihoods at the individual level; at local, state, and regional levels; at the national level; and at the global level. We make the world a better place.

We have an important legacy to look back on, and tremendous potential to look forward to. We support many of the most highly cited researchers in geoscience and other fields. Many of you are international leaders in your fields, and your work is earning significant attention online from diverse audiences. So CIRES plays a major leadership role in environmental research today, and with nearly 200 students in CIRES and dozens of postdocs and early career scientists, that legacy is sustainable. CIRES is, and will continue to be, a world leader in environmental research.

Our achievements and stature in the scientific community would not be possible without the outstanding contributions of the administrative and other support staff that make CIRES a well-run and highly respected organization on campus. I would like to express my most sincere gratitude to all of you who play these critical roles. Whether you have been here 30 years or 30 days, I am glad you are here and part of our team.

This past year also marked the addition of a new research unit to CIRES, Earth Lab. Earth Lab, which emerged from the Chancellor's Grand Challenge investment, expands our capabilities in big data and data analytics. Building on the university's foundational investment of several million dollars, CIRES now provides the infrastructure and intellectual home to help Earth Lab reach its full potential—it adds an important new dimension to the CIRES research portfolio.

CIRES is well positioned for future success. These are challenging times in many ways, but I am confident that the quality of our research, its importance to society, and the commitment and talent of our people will continue to be recognized and supported.

So thank you all for your efforts. Thank you for contributing to our success as an institute. Thank you for all we have collectively achieved in the past year, and most importantly, thank you for all you do to position CIRES so strongly as we move ahead.



Waleed Abdalati

PROMOTIONS

Associate Scientist II

Matthew Gebert
Maria Gehne
Semere Ghebrechristos
Stephen Kasica
Marin Klinger
Yan Wang

Research Scientist II

John Albers
Caroline Alden
Tilottama Ghosh
Raina Gough
Benjamin Green
Lei Hu
Weiwei Hu
Joseph Katich
Gabriela Anat Adler Katz
Therese Ladwig
Katherine Manfred
Brian Charles McDonald
Tanya Peevey
Zhe Peng
Laura Slivinski
Colleen Strawhacker
Hagen Telg
Jih-Wang Wang
Christina Williamson
Kyle Zarzana

Associate Scientist III

Evelyn Grell
Jeffrey Hamilton
John Mund
Jennifer Roberson
Carolina Siso

Research Scientist III

Patrick Alken
Gijs de Boer
Jeffrey Deems
Curt de Koning
Mimi Hughes
Anne Perring
Vera Schulte-Pelkum
Troy Thornberry
Matthew Wandishin
Takanobu Yamaguchi

Senior Associate Scientist

Richard Fozzard
Timothy Newberger
Catherine Rasco
Michael Stowe

Senior Research Scientist

Stuart McKeen
Matthew Shupe

SERVICE

As of December 31, 2017:

5 Years of Service

Kevin Beam
Michael Brandt
Genoveva Deheza
Luis Lopez Espinosa
Agnieszka Gautier
Feng Chi Hsu
Benjamin Koziol
Megan Larson
Shannon Leslie
Ben Livneh
Janet Machol
Brian Meyer
Eric Moglia
David Reynolds
Jennifer Roberson
William Rowland
Michael Sutherland
Dustin Swales
Jih-Wang Wang
Alana Wilson
Pamela Wyatt
Mikhail Zhizhin

10 Years of Service

Martin Aubrey
Christopher Bond
Kara Csibrik
David Gallaher
Ming Hu
Jonathan Kovarik
Karla LeFevre
Glenn Scott Lewis
Glen McConville
Manoj Nair
Mark Seefeldt
Jesse Varner
Natasha Vizcarra
Houjun Wang
Ann Windnagel

15 Years of Service

Kimberly Baugh
Owen Cooper
Andrew Crotwell
Lisa Ho
Jose Luis Jimenez
Amanda Leon
James McCutchan
Linda Pendergrass
Vera Schulte-Pelkum
Amy Solomon
Ken Tanaka
Richard Tisinai

20 Years of Service

Donald David
Kelvin Fedrick
Catherine Fowler
Claire Granier
Gary Hodges
Jim Kastengren
Roy Miller
Laura Cheshire Naranjo
Andy Neuman

25 Years of Service

Ted De Maria
Geoffrey Dutton
Christopher McNeave

30 Years of Service

William Lewis
Emily Verplanck
Ann Weickmann

35 Years of Service

Stuart McKeen

CIRES Outstanding Performance Awards: Science and Engineering

CRITERIA 1: Development of new scientific, engineering, and/or software tools or models directly resulting in novel research valuable to CIRES and the wider scientific community.

CRITERIA 2: Uncommon initiative, resourcefulness, and/or scientific creativity conducting research with potential to expand or change the direction of a particular field or discipline.

CRITERIA 3: Participation in collaborative and/or multidisciplinary research that engages a broader cross-section than the nominee's typical scientific or engineering community.

The OPA committee has selected four winners in the Science and Engineering category:

ANDREW CROTWELL NOAA'S GLOBAL MONITORING DIVISION

NOAA's Global Monitoring Division manages a global network of scientists and institutions that track and understand atmospheric greenhouse gas levels. At the foundation of that network are accurate measurements and calibration standards. Andrew Crotwell is recognized for work that modernized and significantly improved several core measurements systems.

To start, Crotwell developed a new calibration scale transfer system for carbon dioxide; a system that can accommodate the latest laser-based measurement technologies. He also innovated a method to address long-standing challenges in measuring carbon monoxide. And finally, he developed a new system to more efficiently and accurately measure key species (CO₂, CH₄, N₂O, CO, and SF₆) from weekly flask-air samples collected around the world.

Crotwell's expertise earned him a spot on a World Meteorological Organization committee that advises the entire international atmospheric community on technical aspects of these measurements and calibrations.

"Achieving progress in these topics requires profound technical expertise, experimental rigor, and high attentiveness to small effects," one person wrote in support of the nomination. "Andrew Crotwell certainly has all these qualities."

BRIAN MCDONALD NOAA'S CHEMICAL SCIENCES DIVISION

Brian McDonald has done cutting-edge work to improve scientific understanding of how human activities affect air quality. McDonald's inventory development and analyses have improved the way scientists and policy

makers consider impacts of various sources of pollutants. His nominated research included assessments of nitrogen oxide emissions in a Utah oil and gas basin, and volatile organic compound emissions in the Los Angeles region. In both areas, he has been able to elegantly combine emissions estimates, atmospheric observations, and models to provide insight into air quality challenges with important human health considerations. McDonald's work has also inspired new fields of research. He finds, for example, that indoor emissions (eg, from consumer products) can have substantial effects on outdoor particulate matter levels; that discovery is inspiring new lines of research at NOAA and beyond.

According to a letter from an internationally recognized scientist who supported McDonald's nomination: "In summary, Dr. McDonald's research has had a major impact on atmospheric science and environmental policy...he's well on his way to becoming a true leader in air quality and atmospheric chemistry research."

CARRIE MORRILL NOAA'S NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION

Paleoclimatologist Carrie Morrill published a field-changing analysis last year, which dissected possible explanations for why it was so wet in the western United States during the Last Glacial Maximum. Her work showed that the accepted scientific explanation, which involved a southerly shifted jet stream, is likely incorrect. Rather, the primary driver was reduced humidity over land, caused by the strong cooling from the ice sheet, and subsequent dynamics. These factors, working in the opposite direction, are probably behind the observed and projected drying in western North America under increased greenhouse gas concentrations, Morrill and

her co-author found. “This work represents one of the leading results in the past several decades for last 20,000-year paleoclimatology in North America,” her nominator wrote.

That nominator also highlighted Morrill’s extraordinary scientific accomplishments combining informatics and paleoclimate data. This aspect of her work involved working directly with stakeholders—mostly, scientists who need access to reliable, standardized paleoclimate data—to better understand their disparate needs. Morrill was a “quick study in the practice and theory of thesaurus and ontology construction,” one of her colleagues wrote in a letter supporting her nomination, and Morrill’s work improved access to and use of the NCEI World Data Service for Paleoclimate.

**ANDY NEUMAN AND RICHARD MCLAUGHLIN
NOAA’S CHEMICAL SCIENCES DIVISION**

Andy Newman, Richard McLaughlin, and federal colleague Patrick Veres first identified the atmospheric

chemistry need: a sophisticated new instrument and a “ride” for it to help scientists fill in gaps in our understanding of the chemistry of the global atmosphere. The team successfully advocated for the new instrument in 2015, obtaining funds to obtain a time-of-flight mass spectrometer. Then they found it a ride, on NASA’s Atmospheric Tomography mission. In record time, they ruggedized and integrated the instrument into the aircraft, meeting stringent weight, configuration, and power requirements. Among many critical innovations: Newman and McLaughlin innovated an inlet and sampling scheme that provided a constant sample mass flow with extraordinary pressure stability.

The CIMS data are of particular interest to those studying the oxidation chemistry that determines the lifetimes of ozone and methane in the atmosphere—with implications for climate and air quality.

“My conclusion is that I would love to have a copy of their instrument,” one person wrote in support of the nomination. “The deployment was nearly flawless and the data they collected was unique and of the highest quality.”

CIRES Outstanding Performance Awards: Service

CRITERIA 1: Implementation of a creative or innovative idea, device, process, or system that aids in research, teaching, or outreach at CIRES.

CRITERIA 2: Development or improvement of a service that increases the efficiency, quality, or visibility of scientific research or outreach.

CRITERIA 3: Providing a service that promotes or inspires excellence and dedication to research performed at CIRES or in the wider community.

The OPA committee has selected two winners in the Service category:

**ANDREW CLARKE
NOAA’S GLOBAL MONITORING DIVISION**

Andrew Clark designed and built a new meteorological system for NOAA’s atmospheric baseline observatory network, after consulting extensively with partners around the world to ensure he understood their data needs. The system is exceeding all expectations, setting up the science community with higher-resolution, more accurate data. Clark’s new data logger and software design allow researchers to view data in near real-time

at 1-min intervals, and his incorporation of heated sonic anemometers increased not only accuracy of wind measurements, but has improved safety—eliminating the need for technicians to climb towers in the dead of winter to remove daily frost.

Importantly, improved meteorological measurements and data access support operations as well as science. In American Samoa, for example, new-and-improved meteorological data went into the official storm report for Tropical Storm Gita, helping forecasters and

AWARDS

leadership make critical decisions about continuity of operations plans at the federal level.

According to a letter submitted by a NOAA partner in Hawaii: “His contribution ... has improved the access of obtaining meteorological data for both NOAA and cooperative research staff and translates to saving both time and money in our organization.”

SUSAN LYNDS CIRES' EDUCATION & OUTREACH GROUP

Susan Lynds conducts innovative and important evaluation work for the CIRES Education & Outreach group, CIRES, others at the University of Colorado, NOAA, and countless other organizations and agencies. Notably, she designed and implemented evaluations for the NOAA Climate.gov and Drought.gov websites, critical information portals for diverse audiences.

Her professional and exhaustive approach to evaluation goes well beyond her normal job, according to her nomination package. Lynds balances many projects at once, works at home and on weekends to complete necessary tasks, and she offers her clients remarkable skill and insight that creates efficiencies and improves return on investment.

Lynds' work “has advanced the field and our program practices and standards for evaluations,” one person wrote in support of her nomination. “Those not familiar with evaluation as a profession may not realize that it requires constant generation of small methodological innovations, which may be easily overlooked but are essential to effective evaluation work. Moreover, this range and variety in Susan's work is possible—and only possible—because she has remarkable skill in managing projects and time.”

CIRES Medals and More

CIRES scientists are often integral to NOAA award-winning science and engineering teams but cannot be given certain federal awards, such as the prestigious Department of Commerce Gold and Bronze Medals. The CIRES Director recognizes the extraordinary achievements of CIRES scientists working in partnership with federal colleagues.

CIRES Gold Medal

ATHANASIOS BOUDOURIDIS, SAM CALIFF, ABRAM CLAYCOMB, STEFAN CODRESCU, JONATHAN DARNEL, VICKI HSU, BRIAN KRESS, LARISZA KRISTA, PAUL LOTO'ANIU, JANET MACHOL, JUAN RODRIGUEZ, WILLIAM ROWLAND, DANIEL SEATON, MARGARET TILTON
NOAA'S NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION

These researchers were part of a NOAA team that won a Department of Commerce Gold Medal for a successful GOES-R satellite launch, proving the nation's foundation for the world's highest quality weather monitoring and forecasting.

The Gold Medal, the highest honorary award given by the Department of Commerce, is granted by the Secretary for distinguished performance, characterized by extraordinary, notable, or prestigious contributions that impact the mission of the Department and/or one operating unit and that reflect favorably on the Department.

The GOES-R (now GOES-16) satellite launched successfully in late 2016 and earned recognition for the broad group of federal employees who contributed. That team, which included more than a dozen CIRES scientists as well as other NOAA affiliates, “completed a highly complex, integrated operational mission-system development; readied the satellite and system for launch and operations, including active engagement with a network of operational users; and delivered the GOES16 satellite to orbit within cost and meeting all technical requirements,” according to the Gold Medal citation. “Their excellence sets the foundation for the next 20+ years of weather forecasting for our Nation.”

CIRES recognizes our scientists involved in the mission: In preparation for launch, the CIRES GOES-R Space Weather Team reviewed instruments and first-level algorithms; attended ground calibrations and analyzed test data; planned the post-launch product tests; and developed the second level of space weather products. Post launch, the team worked to ensure GOES-16 data were ready for operational use by the NOAA Space Weather Prediction Center.

CIRES Technology Transfer Awards

WAYNE ANGEVINE, LAURA BIANCO, TIMOTHY BONIN, ADITYA CHOUKULKAR, IRINA DJALALOVA, JEFFREY HAMILTON, MING HU, ERIC JAMES, JAYMES KENYON, TERRA LADWIG, JOSEPH OLSON, KATHLEEN LANTZ, CHUCK LONG, KATHERINE MCCAFFREY, YELENA PICHUGINA, AND TANYA SMIRNOVA
NOAA'S EARTH SYSTEM RESEARCH LABORATORY

These researchers were part of a team that won a NOAA Technology Transfer Award from NOAA for improving forecasts of turbine-height winds and solar irradiance from the HRRR weather model to improve usage of renewable power by industry in summer 2017.

During the last five years, CIRES, NOAA, and other researchers across all ESRL divisions worked with the Department of Energy and the private sector to develop foundational improvements in wind and solar forecasts in the NOAA hourly-updated 13-km Rapid Refresh (RAP) and 3-km High-Resolution Rapid Refresh (HRRR) models. Those model changes allow improved decision-making for power generation from different sources, supporting the renewable energy industry and the larger energy industry. They also benefit all users of the RAP and HRRR models, including those in aviation, surface transportation, severe weather, and fire weather. CIRES scientists and other NOAA affiliates were essential parts of the team that earned this NOAA Technology Transfer Award (which can only be given to federal employees).

PAUL JOHNSTON AND DAVID COSTA **NOAA'S PHYSICAL SCIENCES DIVISION**

Paul Johnston and David Costa were part of a team that won a NOAA Technology Transfer Award for designing, implementing, and operating a 21st-Century observing network to address water resource and flood protection issues in the Western United States.

During the last decade, NOAA PSD scientists have been using their observing system expertise in collaboration with California water resource experts to better understand and forecast the winter storms that buffet the state, sometimes causing extreme precipitation and flooding. The work began as a research project and evolved into the establishment of a critical observing system of unequalled magnitude: California now owns a statewide network of more than 100 observing sites that provide terrestrial and atmospheric

information to the California Department of Water Resources. The network serves diverse stakeholders, including those involved in the state's Enhanced Flood Response and Emergency Preparedness program. CIRES researchers Paul Johnston and David Costa were critical parts of the federal team that earned a NOAA Technology Transfer Award (which can only be given to federal employees) for their accomplishment.

CIRES Administrator's Awards

PHILIP PEGION **NOAA'S PHYSICAL SCIENCES DIVISION**

Philip Pegion was part of a team that won a NOAA Administrator's Award for leading and executing the selection of the new dynamical core, the engine of a numerical weather prediction model, two years ahead of schedule.

At the heart of a numerical weather prediction system is the dynamical core, which describes how the air moves and how the atmosphere behaves. The first step in building NOAA's Next Generation Global Prediction System is to select the best possible dynamical core to give us the most accurate representation of the atmosphere. In 2016, NOAA leadership had narrowed the decision down to two models (GFDL's FV3 and NCAR's MPAS). Researchers from NOAA's Physical Sciences Division led the evaluation of many of the criteria used to judge those two finalists, including conservation of mass, entropy and energy; demonstration of variable resolution capability including physically realistic simulation of convection; performance in cycled data assimilation; realistic climate statistics in long integrations; and more. The work earned Jeff Whitaker a NOAA Administrator's Award; Phil Pegion, who cannot share that federal award, earned the CIRES version.

DAVID REYNOLDS **NOAA'S PHYSICAL SCIENCES DIVISION**

David Reynolds was part of a team that won a NOAA Administrator's Award for advancing weather and climate models to balance flood and drought risks while providing water reliability for fish and people in the Western United States. Reynolds and colleagues worked on improving both precipitation and frost forecasts for vineyard owners in California's Russian River valley, as a way to ensure that when water wasn't needed, it could be kept in rivers for fish.



The CIRES Members' Council (CMC) was created in 1997 to act as an information and policy conduit between CIRES' leadership and the institute's members (associate scientists, research scientists, and administrative associates).

The Council represents the interests of all CIRES members with respect to CIRES governance, scientific direction, and the day-to-day workplace environment. As a representative group made up of CIRES members, it is tasked with:

- Representing the concerns of the CIRES Membership by bringing issues to the attention of the CIRES administration;
- Working to improve the lines of communication within and between all CIRES units;
- Providing a means of Member participation in CIRES governance and a voice on committees and working groups which form the core of that governance;
- Contributing to the process which determines CIRES' research direction and areas of research;
- Fostering a positive workplace environment and Members' connection with CIRES by facilitating Members' understanding of their roles within CIRES.

The CIRES Members Council provides the opportunity for service as well as career enhancement, benefiting representatives and constituents alike.

More: <https://cires.colorado.edu/about/institutional-programs/cires-members-council>

CMC Officers



Chair: Mimi Hughes
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Secretary: Mistia Zuckerman
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Rendezvous Chair: Nate Campbell
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Poster session floorplan: UMC Terrace Tent

Use your device to find a poster: Locations and abstracts are available at ciresevents.colorado.edu/rendezvous/poster-abstracts

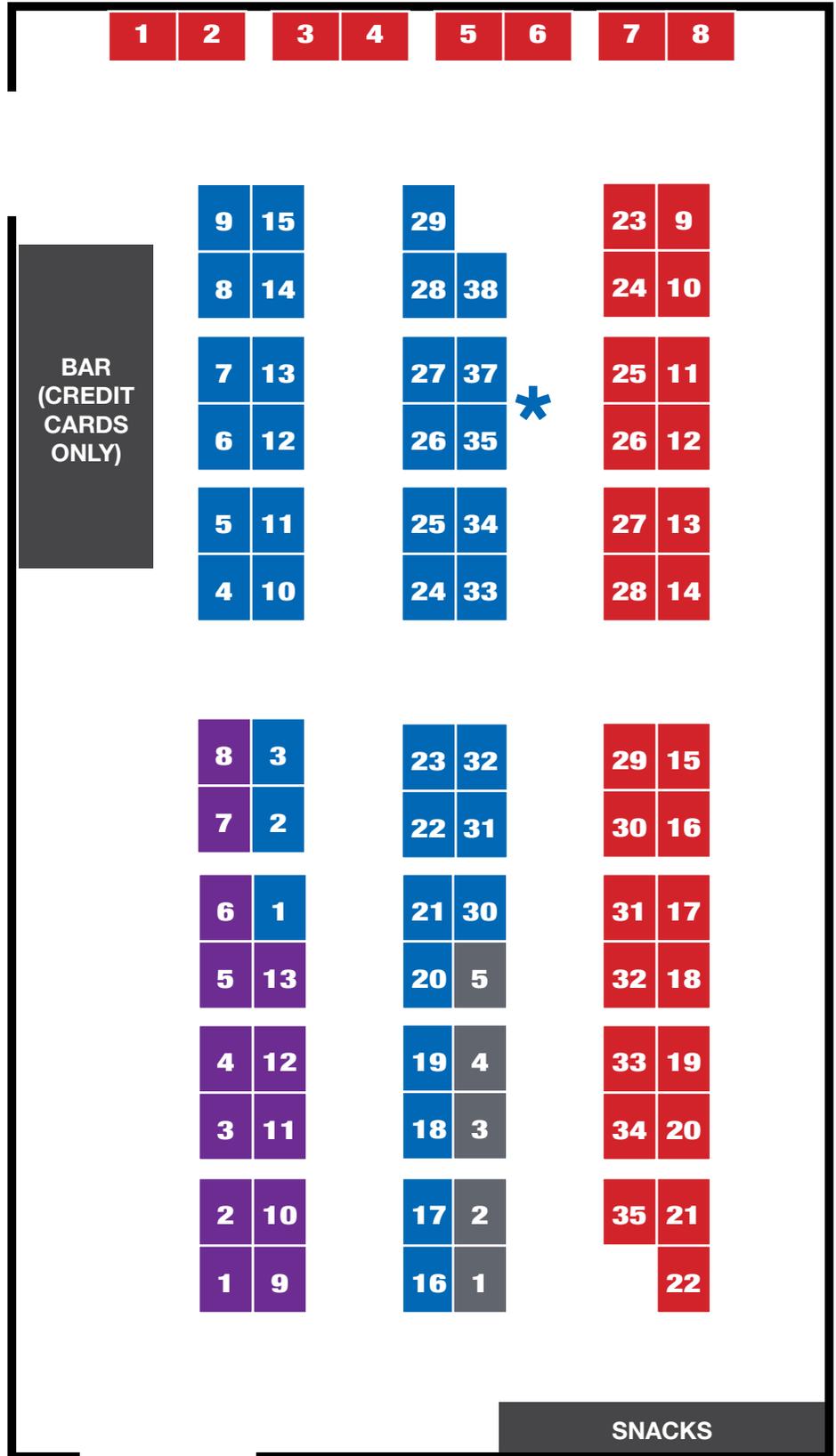
CRYOSPHERIC AND POLAR PROCESSES DIVISION

ENVIRONMENT OBSERVATIONS, MODELING, FORECASTING

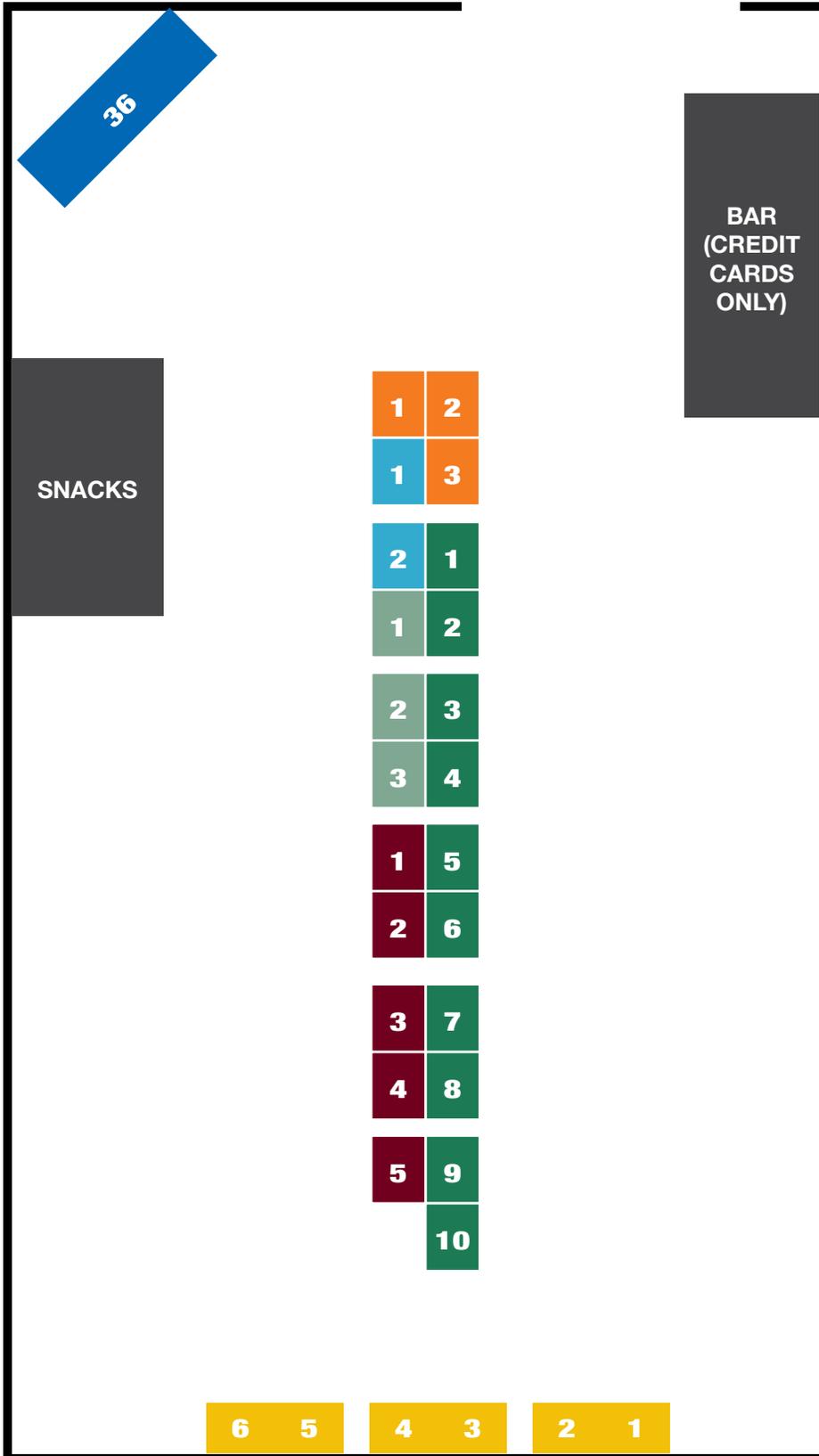
WEATHER AND CLIMATE DYNAMICS

WESTERN WATER ASSESSMENT

* WCD36 (Science On a Sphere®) is in the UMC Aspen Room



Poster session floorplan: UMC Aspen Room



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- ADMINISTRATION
- CENTER FOR SCIENCE AND TECH POLICY RESEARCH
- ECOSYSTEM SCIENCE
- EDUCATION & OUTREACH
- ENVIRONMENTAL CHEMISTRY
- SOLID EARTH SCIENCES
- WEATHER AND CLIMATE DYNAMICS

**Help us make the CIRES Rendezvous even BETTER next year
by answering a few quick questions:**

<http://bit.ly/CIRES2018>

Thank you very much, from the CIRES Members' Council.

