The University of Arizona
Department of
Hydrology & Atmospheric Sciences
Presents

El Día del Agua y la Atmósfera

March 25, 2025
“Research to Resilience”

"Between Two Worlds”

A moment of reflection at the boundary of water and atmosphere, Torrey Pines, CA

Photo Taken By
Nabin Kalaumi

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El Día del Agua y la Atmósfera Agenda

8:00 Registration & Continental Breakfast - Courtyard

8:40 Welcome and Opening Remarks by Nathan Strom, El Dia Chair

8:45 Remarks by Dr. Peter Troch, Department Head ~ S107 Lecture Hall

9:00 Keynote Speaker: Giuseppe Mascaro ~ S107 Lecture Hall

10:00 Oral Session One ~ S107 Lecture Hall

11:00 Poster Session & Coffee Break ~ Courtyard

12:00 Lunch ~ Served in the Courtyard
Dining Areas: S215, S225, S107 & Courtyard

13:00 Oral Session Two ~ S107 Lecture Hall

14:00 Poster Session & Coffee Break ~ Courtyard

15:00 Oral Session Three ~ S107 Lecture Hall

16:00 World/Global Café ~ S107 Lecture Hall

17:00 Closing & Presentations of Awards ~ S107 Lecture Hall

18:00 El Día Reception ~ No Anchovies
870 E. University Boulevard

General Theme

This year's theme, "Research to Resilience", highlights the critical role of hydrology and atmospheric sciences in preparing our society for the challenges posed by climate change and extreme events. Research in these sciences is central to ensuring the resilience, sustainability, and adaptability of our natural resources, infrastructure, and communities.

2025 has been a year that tests our resilience on multiple fronts. Growing climate concerns continue to challenge us, while at the same time, vital research institutions and funding sources are facing increasing pressures, challenging the support essential for advancing critical solutions. As many organizations navigate a changing resource landscape, the need for science-backed strategies has never been more urgent. Through the lens of resilience, we explore how research can predict, model, and understand the implications of climate change, and how this knowledge can inform strategies for adaptation, ensuring a more sustainable future despite these challenges.

At the University of Arizona, we are proud of our students in the Department of Hydrology and Atmospheric Sciences who contribute to building a more resilient world through their dedication and research. Every student's work strengthens our ability to address and overcome environmental challenges.

The event will feature a combination of talks, research presentations, and collaborative discussions led by experts at the forefront of resilience and climate change research. In the afternoon, the World Café session will foster dialogue around these critical questions, encouraging interdisciplinary approaches and helping shape the future of climate resilience.

Through this event, we unite students, faculty, and attendees to collectively contribute to the future of sustainability and resilience. The work we do today lays the foundation for a more adaptable and sustainable tomorrow, ensuring that our research will help build a better future for all.

Message from the El Día Planning Committee

On behalf of the students in the Department of Hydrology and Atmospheric Sciences (HAS) at the University of Arizona, we are delighted to welcome you to El Día del Agua y la Atmósfera 2025! As the student-led planning committee, with the invaluable support of faculty and staff, we have worked to organize an event that celebrates research, fosters collaboration, and highlights the dedication of our department's students.

Since its establishment in 2016, following the merging of the Hydrology and Water Resources and Atmospheric Sciences departments, El Día has become a valued tradition in our academic community. As one of five symposia held during Earth Week, this event provides a unique opportunity for students to showcase their research and promote meaningful discussions on hydrologic and atmospheric sciences. It is a space for students to refine their communication skills, share their work, and engage with peers, faculty, and professionals.

We sincerely thank our sponsors, whose generous support makes this event possible, as well as the faculty and staff for their continued guidance and encouragement. Most importantly, we thank the students, the heart of El Día, whose passion for science and commitment to advancing knowledge drive the success of this symposium.

We hope you enjoy the symposium and join us in celebrating the outstanding research and collaboration that define our department. Thank you for your participation and support. We look forward to an inspiring and engaging day with you all!

~ 2025 El Día Planning Committee

El Día del Agua y la Atmósfera
2025 Planning Committee

Nathan Strom
Chairperson

Mohammad Farmani
Website Coordinator

James Lende
Logistics

Hossein Yousefi Sohi
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Omid Zandi
Volunteer Coordinator

Ty Ferré
Distinguished Professor
EDDAA Advisor

Erma Santander
Executive Assistant
Project Coordinator

Interview with El Dia's Photo Contest Winner
Nabin Kalauni

Nabin Kalauni is a first year MS Hydrology student in Dr. Andrew Bennett's research group. Nabin received his BS degree in Civil Engineering, Pulchowk Campus, Institute of Engineering, Lalitpur, Nepal. Nabin's research interests are land surface modeling, machine learning and differentiable programming.

Interviewer: Can you share a bit about your interests and the story behind your winning photo in the recent contest?
I love nature, which likely inspired my research in land surface modeling. The photo was taken at Torrey Pines in San Diego, capturing my friend immersed in the sunset. It reflects my experience as a Hydro and Atmospheric Science student, studying the interaction of land, water, and clouds.

Interviewer: Could you tell us about your experience working in our department and perhaps shed some light on your hobbies outside of academia?
Working in Dr. Bennett's group has been amazing—his guidance aligns perfectly with my interests. My first year had its challenges, but they've been valuable learning experiences. Outside research, I enjoy traveling, hiking, chess, and photography as a way to capture the beauty of the world.

Interviewer: Winning the photo contest must have been quite an achievement. How do you feel about this accomplishment, and would you like to share a few words with the department?
It's an honor to have my photo recognized. It represents what we study—land, water, and atmosphere in constant interaction. I'm grateful to be part of such a strong, collaborative department and look forward to continuing my journey here.

Special Thanks to Our Sponsors

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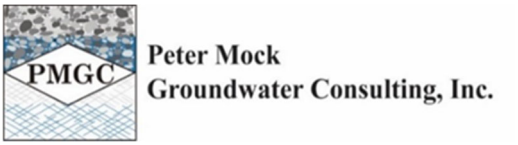

Awards and Prizes ~ Legacy Sponsors

Thank you to our legacy sponsors for their sponsorships of our major prizes and awards. You have our most profound gratitude for your continued loyalty and support. Students are recognized for their superior achievement in oral and poster presentations by juried committees.

Montgomery Prize

Most Outstanding Oral Presentation In Hydrology
Certificate and Award of $2,000
Second Prize for Oral Presentation in Hydrology
Certificate and Award of $500

Philip E. Krider Award

Most Outstanding Oral Presentation In Atmospheric Sciences
Certificate and Award of $2,000
Second Prize for Oral Presentation in Atmospheric Sciences
Certificate and Award of $500

Arizona Hydrological Society

First Place Poster Presentation in Hydrology
Certificate and Award of $1,000

Stanley Davis Award ~ Sponsored by Peter Mock

Second Place Poster Presentation in Hydrology
Certificate and Award of $500

Glenn E. Shaw ~ Sponsored by HAS Advisory Board

First Place Poster Presentation in Atmospheric Sciences
Certificate and Award of $1,000

Benjamin M. Herman Award

Second Place Poster Presentation In Atmospheric Sciences
Certificate and Award of $500

Donald R. Davis Undergraduate Distinction Award

Outstanding Undergraduate Poster Award
Certificate and Award of $500

Tom Meixner Spirit Award

Nominations will open on the day of El Día via the QR code located at the bottom of this page.

The year 2022 was a profoundly difficult one for our HAS community. We lost three cherished members—Jetal Agnihotri in August, Rodrigo Delgado in September, and Thomas Meixner in October. Their absence is deeply felt, and as we come together for El Día, we honor their memory and the lasting impact they had on our community.

In this spirit, we have established the Tom Meixner Spirit Award to honor students who reflect the kindness, generosity, and supportive nature that Tom Meixner exemplified and valued. This award recognizes individuals who help create the welcoming and collaborative environment that defines El Día.

Throughout the event, if you notice someone demonstrating the spirit of El Día—whether by offering constructive feedback, asking insightful questions, bringing humor to the day, or fostering a sense of community—we encourage you to nominate them using the QR code provided. The recipient(s) will be announced during the award ceremony as we celebrate the values that make our department strong.

This year's award has been generously sponsored by the Meixner Memorial Fund.

The Montgomery Prize

We would like to thank Errol L. Montgomery & Associates, Inc., a

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for their support. For many years, Montgomery & Associates has sponsored the premier cash award, *The Montgomery Prize*, for the Best Oral Presentation prize in hydrology and is presented to the winner by a representative from Montgomery & Associates. The award symbolizes the company's commitment to encouraging and rewarding excellence in oral presentation of hydrologic research. Montgomery & Associates offers similar awards during annual events at the University of Arizona and Northern Arizona University Geology Departments.

MONTGOMERY & ASSOCIATES
Water Resource Consultants

Errol L. Montgomery & Associates, Inc., founded by HWRS Alumnus Errol L. Montgomery, is a water resource consulting group with more than 25 years of experience addressing groundwater availability, sustainability, and quality issues for municipal, industrial, mining, and governmental clients. Professional services include:

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The firm's principal office is located in Tucson, Arizona, and branch offices are maintained in Scottsdale, Arizona, Lima, Perú, and in Santiago de Chile.

E. Philip Krider Prize

We would like to thank Dr. E. Philip Krider, a

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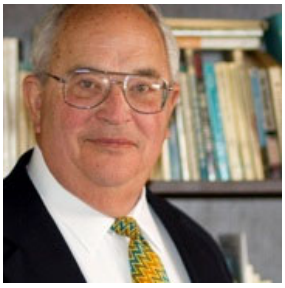
for his support. Dr. Krider has sponsored the premier cash award, *The E. Philip Krider Prize*, for the Best Oral Presentation in Atmospheric Sciences at our annual student research symposium.



Dr. E. Philip Krider is known worldwide for his work on lightning and thunderstorm electricity and writings on Benjamin Franklin's electrical experiments. He led the group that developed the first gated, wideband magnetic direction-finders that are now the basis of the U.S. National Lightning Detection Network. Dr. Krider is a Fellow of the American Geophysical Union and the American Meteorological Society and a former Co-Chief Editor and Editor of the *Journal of the Atmospheric Sciences*; he is also past President of the International Commission on Atmospheric Electricity.

Dr. Krider received his MS in Physics (1964) and PhD in Physics (1969) from the University of Arizona. Dr. Krider joined the faculty at The University of Arizona in 1971 and retired in 2009. His research has focused primarily on the physics of lightning detection and protection, and related problems in atmospheric electricity. Dr. Krider is the author or co-author of more than 130 reviewed publications, and holds 8 patents.

Arizona Hydrological Society (AHS) Prize
Best Poster Presentation in Hydrology

We would like to thank the Arizona Hydrological Society, a

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for their support. For many years the Arizona Hydrological Society (AHS) has sponsored cash awards for best student presentations (oral and poster) and now sponsors the Arizona Hydrological Society Award for Best Poster Presentation in Hydrology.

AHS was formed in 1985 as a professional member organization with its mission to advance the science of hydrology and water resources research, planning and development; the establishment of an open forum for information exchange among professionals concerned with hydrology and water resources; and, the dissemination of ideas and information about the field of hydrology and other water resources professions to the public.

AHS has three chapters in Arizona; Flagstaff, Phoenix, and Tucson. The chapters hold monthly meetings and activities. The meetings feature presentations by local professionals and researchers. AHS membership is open to professionals and students

Glenn E. Shaw Prize
Best Poster Presentation in Atmospheric Science

We would like to thank the HAS Advisory Board for their support this award as a

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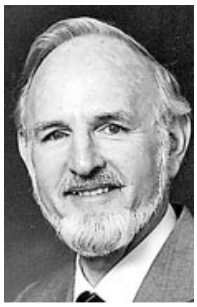
Glenn Shaw received a BS in 1963 from Montana State University, a MS in 1965 from University of Southern California, and a PhD in 1971 from University of Arizona. His PhD advisors were Benjamin S. Herman and John A. Reagan, and his dissertation was "An experimental study of atmospheric turbidity using radiometric techniques."

Dr. Shaw specialized in atmospheric physics, especially relating to global climate change and long-range transport of aerosol material. He was Emeritus Professor of Physics and Atmospheric Science at the University of Alaska Fairbanks and a member of the scientific staff of the Geophysical Institute. He conducted research on global atmospheric transport of aerosols and feedback of biogenic aerosols on global climate. He and Kenneth Rahn did research on the sources and climatic effect of Arctic haze. He did pioneer work on the scientific concept of climate homeostasis through the sulfur cycle and atmospheric aerosol.

Stanley N. Davis Award

Sponsored by Peter Mock



Dr. Davis was internationally recognized expert in the study of ground water. Dr. Davis also served on the faculty of Stanford University, the University of Chile, the University of Missouri--Columbia, and Indiana University--Bloomington. Additionally, over his career, he was a consultant for the United States Bureau of Reclamation, the Kansas and Missouri geological surveys, the Arctic Institute of North America, Princeton University, and the University Oriente and the University de los Andes, both of Venezuela. He also was the recipient of multiple honors throughout his career, in 1989 he was presented with the O.E. Meinzer Award by the Geological Society of America, and in 1996 he was made a Fellow of the American Geophysical Union. Over the course of his career, Dr. Davis was author or coauthor of more than 100 scholarly publications, and coauthor of the seminal textbook "Hydrogeology" with Dr. Roger DeWiest. From 1943-1946, Dr. Davis served in the U.S. Army during World War II in the Pacific Theater.

Benjamin M. Herman Award

Sponsored by Alumni of Dr. Herman

Benjamin M. Herman was the first PhD student in the newly founded Department of Meteorology at the University of Arizona and went on to become Professor and Chair of the Department of Atmospheric Sciences. He excelled in classroom instruction particularly in teaching atmospheric radiation, remote sensing, and physical meteorology. As a result of his previous experience as an US Air Force meteorological officer, he loved to challenge the Departments students in Synoptic Meteorology. He was a noted researcher, developing and applying the first numerical techniques to calculate scattering, emission and absorption of radiation in Earth and planetary atmospheres. Ben retired in 2005 as a Professor Emeritus, after 45 years of service. In 2006, NASA and DOI bestowed Ben and others with the William T. Pecora Award for satellite techniques to infer O3 and SO2. He also received the Distinguished Public Service Medal by NASA. Ben was a Fellow of the American Meteorological Society.

Donald R. Davis
Undergraduate Distinction Award

Sponsored by Salt River Project

Donald R. Davis joined the UA Department of Hydrology and Water Resources in 1972 and was one of the most senior members of the faculty at the time of his death in February 2009. His primary research focus was decision making under hydrologic and other uncertainties, and his basic approach utilized Bayesian decision theory in a general system setting. During the last decade of his life, even though the halcyon days of funded research were behind him, Don was still actively engaged in independent statistical studies with individuals both inside and outside the university. He continued to serve on MS and PHD exams and to advise masters and especially doctoral students who were majoring or minoring in Hydrology with the statistical aspects of their research projects. He was an active faculty examiner for the doctoral qualifying examinations in surface hydrology and water resources. Don served as the Undergraduate Coordinator and was the primary advisor to undergraduates with a major or minor in Environmental Hydrology and Water Resources. He taught the year -long Senior Capstone and Senior Honors Thesis courses and, when the department was part of the College of Engineering, was a rotating instructor for the COE's freshman course, Engineering 102. With Gary Woodard, he designed and oversaw the Master of Engineering degree program in Water Resources Engineering and helped that fledgling program get off the ground. Upon his death, he left an endowment to the Department of Hydrology and Water Resources specifically for undergraduates whom he especially supported and encouraged.

The evaluation for the Davis Undergraduate Distinction Award is made by a committee appointed by the department and recognizes an outstanding undergraduate who demonstrates excellence in writing, speaking, or technical communication or provides outstanding service through volunteerism or extracurricular activities that benefit the department or the profession.

El Dia Speaker
ENR2 Room S107 ~ 9:00 am

Dr. Giuseppe Mascaro
Associate Professor
School of Sustainable Engineering and the Built Environment
Arizona State University

Giuseppe Mascaro is an Associate Professor in the School of Sustainable Engineering and the Built Environment at Arizona State University (ASU). His research has the primary goal of quantifying the impacts of global warming on hydrologic processes and infrastructure at local scales, with a focus on extreme precipitation and flooding. Dr. Mascaro has developed creative ways to synergistically combine advanced statistical techniques with physics-based models of the Earth's climate and hydrologic cycle. He has been involved and taken an essential role in multi-institutional and single-investigator activities funded by federal agencies (NSF, NASA, NOAA, DoE, DoD) and a public utility (SRP) to conduct significant, internationally recognized research.

Dr. Mascaro holds a "Laurea" (B.S. and M.S.) in Civil Engineering and a Ph.D. in Hydrology from the University of Cagliari, Italy, and a Master in Environmental Management from the Scuola Superiore Sant'Anna in Pisa, Italy. Before joining ASU, he worked in the private sector and as a postdoctoral scientist at New Mexico Tech and the University of Cagliari.

"Recent progress in the characterization of precipitation statistics, generating mechanisms and trends in the United States"

Characterizing how global warming will impact mean and extreme precipitation (P) is key to supporting water resources management, flood protection, and infrastructure design in current and future conditions. In this talk, I will present our recent progress in two areas that address this need. I will first provide insights into the physical generating mechanisms (GMs) of daily mean and extreme P in the Conterminous United States (CONUS) using records of 2861 gauges from 1980 to 2018, atmospheric reanalyses, and publicly available datasets. The GMs include fronts, extratropical cyclones, atmospheric rivers, tropical cyclones, and North American Monsoon. After illustrating how the climatological occurrence of the GMs varies in space and time across the CONUS, I will present evidence that, at most sites, the dominant GMs generate P values characterized by different statistical distributions. This work provides valuable insights into incorporating mixed populations and nonstationarity in P frequency analyses. In the second part of the talk, I will show evidence that the frequency of heavy P at durations from hourly to daily has been increasing from 1949 to 2020 in most of the CONUS in a way that cannot be explained by natural climate variability. This was done using an updated database of hourly precipitation from 332 gages and a suite of statistical methods. I will also demonstrate that trends in hourly heavy precipitation have mainly emerged after ~2000. The findings of this effort support the climate adaptation of stormwater and flood protection infrastructure.

World/Global Café

16:00 - 17:00 ~ ENR2 S107

In the afternoon, join us for a dynamic World Café session where students and attendees will come together to discuss, envision, and innovate the future of Hydrology and Atmospheric Sciences. This workshop will focus on how research can enhance resilience to climate change and extreme weather events.

We'll explore key questions designed to provoke discussion at the intersection of science, climate predictions, and resilience strategies. Your insights are crucial in shaping the future of our field.

Here are the questions we will explore:

- Which new or understudied research methods or approaches in atmospheric and hydrological sciences can enhance climate resilience, and how can they be integrated into current practices?

- How can we incorporate uncertainty in climate predictions when developing effective resilience-building policies?

- How can interdisciplinary research help address both environmental and socio-political challenges to improve resilience?

- How can we create a bipartisan, widely accepted narrative on climate change that focuses on resilience and adaptation?

These questions aim to foster a discussion on the theme of "Research to Resilience," encouraging cross-collaboration to explore how science can improve our capacity to predict, model, and adapt to the impacts of climate change and extreme events in atmospheric and hydrologic sciences.

Oral Session One: 10:00 ~ S107

10:00 **Keming Pan** ~ Assimilation of planetary boundary layer height measurements with multi-physics using an ensemble Kalman filter during the PECAN field campaign

10:15 **Omid Zandi** ~ UofA-HIPAA V1: University of Arizona High Latitude Infrared-based Precipitation retrieval Algorithm using AVHRR sensor Version 1

10:30 **Aldo Tapia** ~ From 1-Year to 3-Year Inputs: How Extended Data Sequences Impact Data-Driven Model Performance in Streamflow Prediction

10:45 **Xiang Zhong** ~ A partitioning method for deriving VIS and NIR fluxes from SW observations under clear-sky conditions

Oral Session Two: 13:00 ~ S107

13:00 **Nathan Strom** ~Assessing groundwater recharge feasibility across soil textures and environmental factors using a Python-integrated HYDRUS-1D workflow

13:15 **Jianwen Du** ~ Quantifying the impact of CO2 transport and transient hydrological flow on basalt weathering at the Biosphere 2 Landscape Evolution Observatory

13:30 **Tong Guo** ~ Fluid-Rock Reactions and Hydrologic Drivers of Iron Cycling in Former Redbed Sandstones

13:45 **Muhammad Jawad** ~ Improved Evapotranspiration Estimation using the Penman-Monteith Equation with a Deep Learning (DNN) Model over the Dry Southwestern US: Comparison with ECOSTRESS, MODIS, and OpenET

Oral Session Three: 15:00 ~ S107

15:00 **Sabrina Wilson** ~ Parameterizing biochar effect on climate-smart agriculture using artificial intelligence and land surface model

15:15 **Taiwo Ajayi** ~ An Examination of the Weekly Periodicity of Surface Ozone Concentrations in Tucson, Arizona

15:30 **Annalisa Minke** ~ A statistical analysis of applying Haar wavelets to predict planetary boundary layer decoupling

15:45 **James Lende** ~ Land model sensitivity to leaf area index in CESM2 and E3SM

Poster Sessions ~ Courtyard ~ 11:00 & 14:00

Renad Alsufyani ~ Estimating groundwater recharge using chloride mass balance in the Umm Er Radhuma aquifer (south), Saudi Arabia P1

Maria Castro ~ Probabilistic Dam Break Flood Mapping via Monte-Carlo Simulations using a 2D Local-Inertial Model ~ P2

Mohammad Farmani ~ Improving Streamflow Predictions in the Arid Southwestern United States Through Understanding of Baseflow Generation Mechanisms ~ P3

Jack Flanigan ~ Recharge Feasibility of Tucson Stormwater Infrastructure ~ P4

Shujie Guo ~ Experimental Investigation of Salt Precipitation in a Free-Flow/Porous-Media Microfluidic System ~ P5

Thabo Makgoale ~ Quantifying Precipitation Efficiency in Tropical Mesoscale Convective Systems: Insights from Global Cloud-Resolving Models and IMERGE Observations ~ P6

Sahar Karimi ~ Ensemble-Based Risk Assessment Model of Projected Precipitation Changes in Mexico ~ P7

David Drainer ~ Exploring the capability of Noah-MP LSM in predicting fractional flooded area using U-Net architecture ~ P8

Eden Harper ~ Empirical Analysis and HEC-HMS Modeling of Green Stormwater Infrastructure: Stormwater Capture, Ponding, and Infiltration in Urban Tucson ~ P9

Jonathan Hasenstab ~ Determining the ages, sources, and connections between groundwater and surface waters in the upper Babocomari watershed ~ P10

Nabin Kalauni ~ A Hybrid Differentiable Land Surface Model for Improved Land-Atmosphere Flux Predictions ~ P11

Aamir Raj Lamichhane ~ Improving snow water equivalent prediction with a hybrid SNOW17-LSTM model ~ P12

Amin Mirrezaei ~ Investigating the Role of Short-Lived Halogen Chemistry and Chemical Feedback on CH_4-CO-OH Distributions Using Emission-Driven CESM/CAM-Chem Simulations ~ P13

Kayla Preisler ~ Contrasting airborne cloud water pH measurements in diverse regions: Statistics and relationships with constituents ~ P14

Min Ma ~ Evaluating the representativeness of suction lysimeter for sampling PFAS porewater concentration in the vadose zone ~ P15

Floor Plan

1– Registration Table

2– Breakfast & Lunch Table

3– HASSA Table

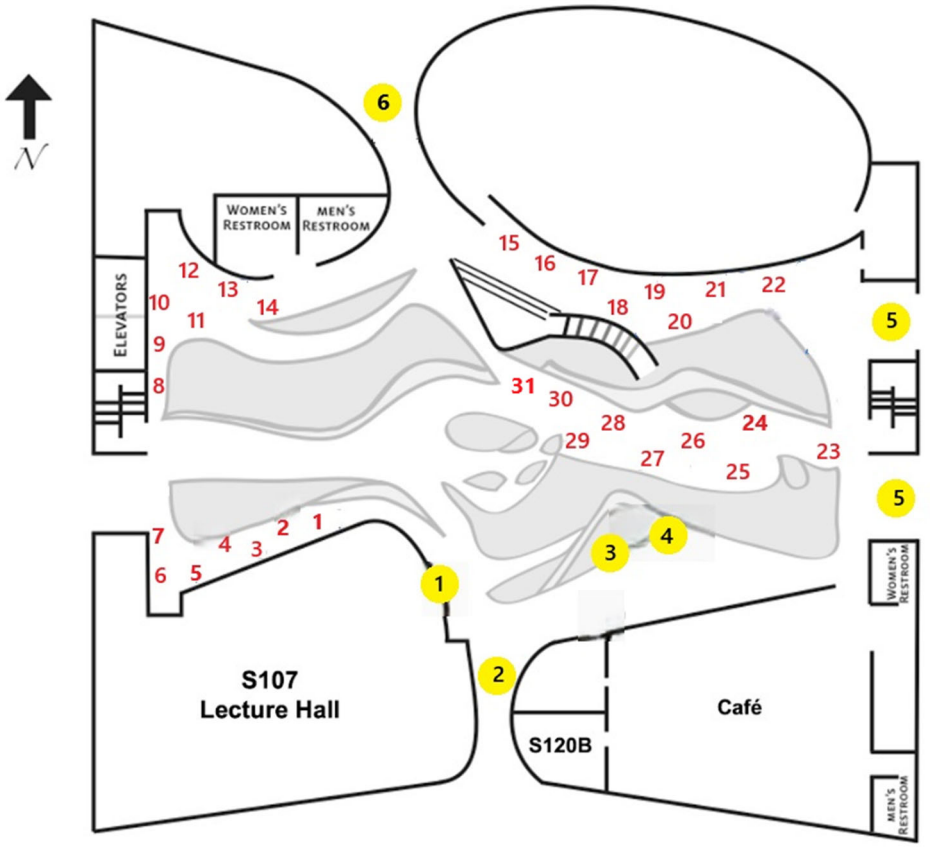
S107 - Oral Presentations

4– Sponsor Tables

5– Sixth Street Garage Entrance

6– Lowell Street Entrance

Nos 1-31 Poster Presentations



Meixner Spirit Award

Event Website