

**Annual ESSM Community Workshop**  
**2019 Theme: Climate Research to Enhance Resilience to Extreme Heat**  
**November 18-19, 2019; Silver Spring, MD**

**LOCATION** Hilton DoubleTree, Silver Spring: 8727 Colesville Rd, Silver Spring, MD 20910  
Pinnacle Ballroom

**OBJECTIVE & EXPECTED OUTCOME** Engage researchers, users, and stakeholders inside and outside NOAA to identify needs and opportunities for the Climate Program Office, Earth System Science and Modeling Programs (CPO/ESSM) to support climate research to enhance resilience to extreme heat. A workshop report with key ideas from participants to inform CPO/ESSM future research directions and funding priorities.

**Day 1 ( November 18th): User Perspectives**

08:00: REGISTRATION & REFRESHMENTS

**08:30 - 9:50: Introduction and Overview; Presentations and Discussions: User Perspectives on impacts of extreme heat**  
**Ben DeAngelo** (Chair), Deputy Director, NOAA Climate Program Office

08:30: WELCOME

08:40: CPO AND ESSM OVERVIEW & Q/A

**Jin Huang**, Division Chief, NOAA CPO ESSM Division

09:10 HEAT AND URBAN

**Kizzy Charles-Guzman**, Deputy Director, NYC Mayor's Office of Resiliency (Remote)

09:30 [HEAT AND HEALTH](#)

[Shubahyu Saha](#), Senior Fellow, Climate and Health Program, Centers for Disease Control and Prevention

09:50 BREAK

**10:20 - 12:00: Presentations and Discussions (*continued*): User Perspectives on impacts of extreme heat**  
**Dan Barrie** (Chair), Program Manager, Modeling, Analysis, Predictions, and Projections program and Assessments program, ESSM Division

10:20 [EXTREME HEAT IMPACTS ON WORKING LANDS](#)

[Steven McNulty](#), Director, Southeast Regional Climate Hub, US Department of Agriculture

10:40 [EXTREME HEAT: PRODUCTS & STAKEHOLDER REQUIREMENTS](#)

[Jon Gottschalck](#), Chief/Operational Prediction Branch, Climate Prediction Center, National Weather Service

11:00 [OCEAN HEAT WAVES & FISHERIES](#)

[Mike Jacox, NOAA Southwest Fisheries Science Center and NOAA OAR Earth System Research Lab & Toby Garfield, Director, Environmental Research Division, NOAA Fisheries Southwest](#)

11:20: DISCUSSION & QUESTIONS

12:00: GROUP PHOTO

12:15: LUNCH

**13:00 - 14:00: Lightning Talks (3 minute talks)**

**Hunter Jones** (Chair), Climate Health Projects Manager, National Integrated Heat Health Information System (NIHHIS)

#### *Health*

- Decision-maker needs identified by NIHHIS, Hunter Jones (NOAA/OAR/CPO)
- Combining heat exposure indices with socioeconomic data to build a heat vulnerability index for the Southeast United States, Howard Diamond (NOAA/OAR/ARL)

#### *Air Quality*

- When extreme heat meets with dry spell: how does air quality respond? Yuxuan Wang (University of Houston)
- Potential Impacts of Extreme Heat on Air Quality Forecasting, Rick Saylor (NOAA/OAR/ARL)
- Substantial increase in the joint occurrence and human exposure of heat and haze hazards over South Asia in the mid-21st century, Yangyang Xu (Texas A&M University)
- Land-biosphere feedbacks exacerbate climate penalty on air pollution extremes, Meiyun Lin (NOAA/GFDL, Princeton University)

#### *Monitoring and Observations*

- Urban Heat Island Mapping & Modeling Campaigns, David Herring (NOAA/OAR/CPO)
- A Global Monitoring System for Excessive Heat: Summary of Heat Events during Boreal Summer 2019, Augustin Vintzileos (University of Maryland)

#### *Extreme Heat Waves Perspectives*

- Temporally Compound Heat Wave Events and Global Warming: An Emerging Hazard, Jane Baldwin (Lamont-Doherty Earth Observatory, Columbia University)
- Understanding future change in heat waves and planetary waves in the boreal summer, Haiyan Teng (NCAR)
- Indoor Heat Waves, Brian Vanthull (NOAA/CESSRST)

14:00 Break

**14:15 - 15:45: Breakout Group Discussions & Writing Sessions. Summaries of groups' writing sessions will be included in the workshop report.**

**Questions for discussion:**

- What are the most critical problems for decision makers when it comes to the impacts of extreme heat in a changing climate?
- What climate information is needed?

*Parallel Small Breakout Topics*

**Air quality**

Chair: Gregory Frost, NOAA/CSD; Rapporteur: Todd Christenson, NOAA/OAR/CPO

**Agriculture, Forestry, Wildfires**

Chair: Danica Lombardozzi, NCAR; Rapporteur: Sean Bath, NOAA/OAR/CPO

**Urban**

Chair: Ashish Sharma, UIUC; Rapporteur: Caitlin Simpson, NOAA/OAR/CPO

**Health**

Chair: Juli Trtanj, NOAA/OAR/CPO; Hunter Jones, NOAA/OAR/CPO

**Marine Heat waves and Fisheries**

Chair: Patrick Lynch, NOAA/Fisheries; Rapporteur: Roger Griffis, NOAA/Fisheries

15:45 BREAK

**16:00 - 17:30: Plenary report out by breakout sessions and Panel Discussion\* (next page)**

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**Ana P. Barros** (Chair), Edmund T. Pratt Jr. School Professor of Civil and Environmental Engineering, Duke University

**Mark Brusberg**, Chief Meteorologist, Office of Chief Economist/World Agriculture Outlook Board, US USDA

**Anne Hollowed**, Senior Scientist, Alaska Fisheries Science Center, NOAA Fisheries

**Adam Parris**, Deputy Director of Climate Science and Risk Communication, City of New York

**Day 2 (November 19th 2019): Research Capabilities, Highlights, and Future Opportunities**

08:00: REFRESHMENTS

08:30 DISCUSSION - RECAP of DAY 1

**08:40 - 10:20: Presentations: Current capabilities and gaps**

**Monika Kopacz** (Chair), Program Manager, Atmospheric Chemistry, Carbon Cycle, and Climate (AC4) program, ESSM Division

08:40: [EXTREME HEAT AND AIR QUALITY](#)

[\*\*Greg Frost\*\*, Research Chemist, and \*\*David Fahey\*\*, Director, Chemical Science Division, NOAA OAR Earth System Research Lab](#)

09:00: [WHENCE THE US HEARTLAND WARMING HOLE?](#)

[\*\*Marty Hoerling\*\*, Attribution and Predictability Assessments Team, Physical Science Division, NOAA OAR Earth System Research Lab](#)

09:20 [CLIMATE MODELING CAPABILITIES FOR EXTREME HEAT & IMPACTS](#)

[\*\*Tom Delworth\*\*, Senior Scientist, NOAA OAR Geophysical Fluid Dynamics Lab](#)

09:40 [PREDICTABILITY OF MARINE HEAT WAVES AND IMPACTS ON FISHERIES](#)

[\*\*Mike Jacox\*\*, Research Oceanographer, NOAA Southwest Fisheries Science Center and NOAA OAR Earth System Research Lab](#)

10:00 DISCUSSION & QUESTIONS

10:20: BREAK

**10:40 - 12:20: Presentations: Recent Research Highlights and Gaps**

**Sandy Lucas** (Chair), Program Manager, Climate Variability and Predictability program, ESSM Division

10:40: [NEXUS OF EXTREME HEAT, AIR QUALITY, CLIMATE, & HEALTH](#)

[\*\*Susan Anenberg\*\*, Associate Professor of Environmental and Occupational Health and of Global Health, George Washington University](#)

11:00: [EXTREME HEAT IN A CHANGING CLIMATE](#)

[\*\*Radley Horton\*\*, Associate Research Professor, Earth Institute, Columbia University](#)

11:20: [SYNERGIES BETWEEN URBAN HEAT ISLANDS AND HEAT WAVES](#)

[\*\*Dan Li\*\*, Assistant Professor, Department of Earth and the Environment, Boston University](#)

11:40: [EXTREME HEAT IN THE ARCTIC: ICE & SNOW MELT, WILDFIRES, AIR QUALITY & MARINE IMPACTS](#)

[John Walsh](#), Chief Scientist, International Arctic Research Center, University of Alaska

12:00: DISCUSSION

12:20: LUNCH

**13:00 - 14:00: Lightning Talks (1-slide) to bring up research highlights**

**Virginia Selz** (Chair), Program Manager, Climate Observations and Monitoring Program, ESSM Division

*Land/Land-use Feedbacks*

- Extreme heat on the Arctic Tundra and the consequences for greenhouse gas emissions, Colm Sweeney (NOAA/OAR/ESRL/GMD, OOMD)
- How dry soil moisture extremes exacerbate heat waves over the contiguous United States, David Benson (George Mason University)
- Irrigation impacts on humid heat extremes, Nir Krakauer (City College of New York)

*Climate Variability and Change*

- Detection of anthropogenic influence on a summertime heat stress index: global analysis and U.S. perspective, Thomas Knutson (NOAA/OAR/GFDL)
- Impacts of decrease in extratropical cyclone activity in summer on extreme heat events, Edmond Chang (Stony Brook University)
- The 2012 extreme warm anomaly in the Northwest Atlantic: from understanding to predictability, Ke Chen (WHOI)
- Which El Niño flavors are more important for US West Coast marine warming? Antonietta Capotondi (NOAA/OAR/ESRL/PSD)

*Urban perspectives*

- Lessons from Workshop on Urban Scale Processes and their Representation in High Spatial Resolution Earth System Models, Ashish Sharma (University of Illinois)
- Extreme heat and coastal urban areas- A perspective on modeling & observations, Prathap Ramamurthy (CUNY City College/NOAA-CREST)
- Elie Bou Zoud

*Observational needs*

- A NOAA Surface Energy Budget and Aerosol Network for Improving Understanding and Predictions of Extreme Heat Events, Kathleen Lantz (NOAA/OAR/ESRL/GMD)

14:00: BREAK

**14:15 - 15:45: Breakout Group Discussions & Writing Sessions. Summaries of groups' writing sessions will be included in the workshop report.**

**Questions for discussion:**

- What capabilities already exist to address critical problems and user needs identified in Day 1?
- What are the gaps and opportunities for further research and partnership?
- What can CPO and ESSM do to advance climate research for resilience to extreme heat?
  - What are the near-term (low hanging fruit, leveraging on-going activities, 1 - 3 years) and long-term (3-5, 5-10 years) research opportunities?
  - What would be a game changer or a high-risk/high-return area to pursue?
  - What are the most effective funding mechanisms (e.g. competitive grants, contracts, prizes, etc.) to engage the external research community to advance NOAA's mission in the climate area?

*Parallel Small Breakout Topics*

**Observations and datasets**

Chair: Russell Vose, NOAA/NESDIS/NCEI; Rapporteur: Young-Oh Kwon, WHOI

**Modeling**

Chair: Yi Ming, NOAA/OAR/GFDL ; Rapporteur: Sandy Lucas NOAA/OAR/CPO

**Predictions and Projections**

Chair: Ben Kirtman, University of Miami; Rapporteur: Dan Barrie, NOAA/OAR/CPO

**Process understanding and predictability**

Chair: Edmond Chang, Stony Brook University; Rapporteur: Sukyoung Lee, Penn State University

**Applications and Products: Urban, Air Quality, Health**

Chair: Vaishali Naik, NOAA/OAR/GFDL; Rapporteur: Monika Kopacz, NOAA/OAR/CPO

**Applications and Products: Fisheries, Living Marine Resources**

Chair: Enrique Curchitser, Rutgers University; Rapporteur: Todd Christensen, NOAA/OAR/CPO

**Applications and Products: Agriculture, Forests, Wildfire**

Chair: Rong Fu, UCLA; Rapporteur: Sean Bath, NOAA/OAR/CPO

15:45: BREAK

**16:00 - 17:30: Plenary report out by breakout sessions and Panel Discussion\* (next page)**

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**James W. Hurrell** (Chair), Professor and Scott Presidential Chair in Environmental

Science and Engineering, Colorado State University

**Antonietta Capotondi**, Scientist, Physical Sciences Division, NOAA OAR ESRL

**Brian McDonald**, Scientist, University of Colorado Boulder - Cooperative Institute for Research in Environmental Sciences, NOAA

**Xubin Zeng**, Agnese N. Haury Chair in Environment, Professor of Atmospheric Sciences, Director of Climate Dynamics and Hydrometeorology Center, University of Arizona

17:30 -17:40: CLOSING REMARKS

**November 20th Morning: ESSM Council Meeting - Executive session (Closed)**

