AIHEC & University of Miami – CIMAS/IDSC REU

Extreme Events in a Changing Climate

Research Leads: Ben Kirtman & Emily Becker
Graduate Student Mentors: Marybeth Arcodia, Kurt Hanson, Kelsey Malloy, Kayla Besong, Houraa Daher, Simge Bilgen, Karen Papazian, Victoria Schoenwald

Research Project: The 8-week program will focus on understanding how extreme events (heat waves, cold spells, inland and coastal floods, drought, fire weather, and tropical storms) have evolved in the historical record, to what extent they predictable, how well we can forecast them with current dynamical and statistical models and what climate change simulations estimate for the future.

The research teams (see below) will meet 4-5 days a week typically for one hour. The REU students are expected to work on the research projects outside the group meeting for 3-hours per day. The entire REU class will have a topical lecture once a week. The research project on be divided into 2-sections each taking approximately 4-weeks as follows:

Section 1: Observational estimates of temperature, rainfall and winds, data wrangling, defining extremes, documenting how extremes have evolved over the historical record. Early in this section each REU student will identify their particular research focus (i.e., what kind of extreme event, study area of interest, time-scale and season of interest). Students will be expected to develop python codes and Jupyter notebooks (or another interface e.g., Spyder) to analyze the statistics of extreme events and how they have evolved over the historical record.

Section 2: Comparing climate model simulations with observation estimates of extreme events over the historical record, projecting changes in extreme events as the climate changes. Climate model data wrangling, quantitative comparisons of model statistics of extremes with observation estimates. Do the models capture the observed trends? Documenting model projections of extreme event trends including sensitivity to climate change scenario.

REU Student will be divided into one of two research groups (max 4 students per group). The research groups will be led by either Ben Kirtman or Emily Becker. Each REU student will have a graduate student mentor that will help with data wrangling and code development. However, it is expected that the students will have had substantial experience with python. The two groups will meet together once a week for a topical seminar and a larger group meeting to assess progress and challenges.

Applications: To apply, please submit a short letter of interest, between 250 and 500 words. Please provide field of study, describe your goals in STEM, and how this opportunity relates to those. Additionally, provide your unofficial transcripts and a letter of recommendation from a faculty member. Send all materials to rhofmann@aihec.org before April 31st, 2021.