Overview
This Research Associate II position is a 12-month appointment with a flexible start date between March 2022 and June 2022. A 1-year renewal is possible, contingent upon receipt of additional funding. The Cooperative Institute for Research in the Atmosphere (CIRA) with Colorado State University seeks to fill a full time, professional research position to conduct collaborative research with the National Oceanic and Atmospheric Administration (NOAA) located at the Global Systems Laboratory (GSL) in Boulder, CO. The primary office for this position will be located in Boulder, CO, at a federal facility and requires the ability to pass a National Agency Check with Inquiries (NACI, federal background check) for building access. Office space is also available at the National Center for Atmospheric Research (NCAR) in Boulder, 1 or 2 days per week, to enhance communication with their risk communication team.

Background
This position is situated within the Advanced Technology Division (ATD) of GSL. ATD identifies, investigates, and develops high-performance computing methods, products, systems, and tools to support NOAA transforming these new technologies and capabilities into innovative and valuable forecast and analysis systems to help multiple users including the NOAA National Weather Service (NWS) and their partners. NWS forecasters help protect life and property and enhance the economy by issuing forecasts (including outlooks, watches, and warnings) and providing impact-based decision support services (IDSS) to their core partners.

New developments in Artificial intelligence (AI) have the potential to augment the existing suite of guidance available to NWS forecasters and their partners, by providing new types of forecast information, generating more skillful predictions, and/or generating more computationally efficient guidance. Visualization of AI information, including interactive visualizations, are essential to developing useful and usable AI for users, and developing such visualizations would be at the core of this position. This position will thus focus on developing visualizations for AI guidance for different weather, climate, and coastal hazards (severe convective, winter, tropical cyclones, coastal flooding, coastal fog).
**Position Overview**

The individual in this position will join the research team of the NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES; www.ai2es.org) to design, develop, and code visualizations and web-based interactive user interfaces of AI weather, climate, and coastal information in order to support the development of meaningful and trustworthy AI tools for forecasters. The individual will closely collaborate with the interdisciplinary AI2ES team, including risk communication scientists, atmospheric scientists, and AI scientists at CIRA, NOAA GSL, NCAR, and the University of Oklahoma to develop AI visualizations in conjunction with the team’s user-oriented research about forecasters’ attitudes, interpretations, perceptions, and uses of AI. The proposed work is likely to include visualizing uncertainty and confidence, evaluating the temporal consistency of AI predictions, and facilitating interactivity of and interactions with AI output as an approach to explaining AI, to enhance the existing AI2ES efforts along these lines. This position reports directly to the Principle Investigator.

**Decision Making:**

Decision making depends on the analysis of the subject, phase, or issues involved in each assignment; the chosen course of action may need to be selected from many alternatives. This individual in this position will normally receive little instruction on day-to-day work and receives general instructions on new assignments. They will set priorities that accurately reflect the relative importance of job responsibilities and established deadlines, and provide technical leadership to their teams, including making technical recommendations and decisions.
Essential Job Duties:

Design, Implementation, and Analysis of User Information 60%
- Lead development of visualizations and web-based interactive user interfaces of AI information, including design and coding of charts, maps, interactives, dashboards, etc., for weather, climate, and coastal hazards.
- Collaborate regularly with interdisciplinary teams to understand and incorporate key features of AI and environmental science information into visualizations. This will include working with AI scientists to understand how to use developed AI models and what aspects should be represented to end users for evaluation.
- Collaborate regularly with interdisciplinary teams to understand and incorporate user input from forecasters about trustworthiness of AI information into the design and development of visualizations. This will include participating in discussions about interview and survey data analysis and interpretation.
- Lead development of a web-based platform for conducting randomized experiments with forecasters with different AI visualizations and interactives, in order to assess the effects on forecasters’ perspectives and decision-making. Collaborate on virtually conducting experiments, analyzing data, and synthesizing findings to guide development of trustworthy AI information.
- Collect and analyze web-based analytic data to augment the other forms of user-oriented data collection and analysis.

Collaborative Activities 20%
- Collaborate with GSL, CIRA and other AI2ES scientists working on similar research projects.
- Actively participate in team meetings and occasionally lead team meetings to develop and refine visualizations and interactives of AI information, in conjunction with AI2ES research efforts.

Documentation and Reporting 20%
- Prepare documentation of visualization and interactive software for sharing with the broader research and development community, in collaboration with other team members.
- Prepare training material about AI visualizations and user interfaces for forecasters and other users, in collaboration with other team members.
- Prepare results for at least one publication in a peer-reviewed journal and presentations at scientific meetings and conferences and/or for sponsors, which could involve travel, in collaboration with other team members.
**Required Qualifications:** Please detail each of these items in your cover letter.

- Master’s Degree in information science, data science, visualization science, computer science, social or behavioral science, atmospheric sciences, or other discipline with expertise in human-centered design and engineering, user experience/user interface, visual analytics, or geospatial visualizations, completed by the time position begins;
- Programming experience, including experience building web-based visualizations or graphics and web-based interactive interfaces (to be documented in the cover letter);
- Expertise in HTML, CSS, and Javascript
- Experience or interest in the interactions between weather/climate information and society and/or the interactions between AI/machine learning and society;
- Ability to pass a National Agency Check with Inquiries (NACI, federal background check) for building access.

**Preferred Qualifications:** Please highlight applicable preferred qualifications in your cover letter.

- Experience with 2D/3D visualization libraries, toolkits, and environments used for displaying geospatial scientific data on web browsers, such as d3.js, plotly, leaflet, or ESRI ArcGIS Javascript API.
- Experience in scientific programming with a high level language (e.g., Python, R, MATLAB, Javascript) and ability to learn other additional programming languages as needed;
- Basic understanding of statistical or machine learning methods, demonstrated through course work or projects;
- Experience with social science qualitative data analysis, experimental design, survey methodology, and/or statistical analysis;
- Basic knowledge or interest in atmospheric science;
- Basic knowledge of the operational weather forecasting environment (e.g., forecast tools, processes, actors)
- Experience with large atmospheric, climate, or physical science data sets;
- Appreciation of research designs for working with human subjects;
- Ability to communicate well, particularly across disciplinary boundaries;
- Demonstrated ability to work independently and as part of an interdisciplinary research team;
- Experience with processing web data file formats, such as JSON.
Applications will be accepted until all positions are filled; however, to ensure full consideration applications should be submitted by midnight Monday, February 7, 2022. Apply electronically by clicking “Apply to this Job” at the following website: https://jobs.colostate.edu/postings/97327. References will not be contacted without prior notification of candidates. NOTE: In your cover letter, please specifically address the required and preferred qualifications of this position. A cover letter that fails to address the required and preferred qualifications of this position may not be further considered after review by the search committee.

**Background Check:**
Colorado State University (CSU) strives to provide a safe study, work, and living environment for its faculty, staff, volunteers and students. To support this environment and comply with applicable laws and regulations, CSU conducts background checks. The type of background check conducted varies by position and can include, but is not limited to, criminal (felony and misdemeanor) history, sex offender registry, motor vehicle history, financial history, and/or education verification. Background checks will be conducted when required by law or contract and when, in the discretion of the university, it is reasonable and prudent to do so. The office for this position will be in Boulder, CO in a federal facility and will require the ability to pass a National Agency Check with Inquiries (NACI, Tier 1 federal background check) for building access.

**Commitment to Diversity and Inclusion:**
Reflecting departmental and institutional values, candidates are expected to have the ability to advance the Department's commitment to diversity and inclusion.