



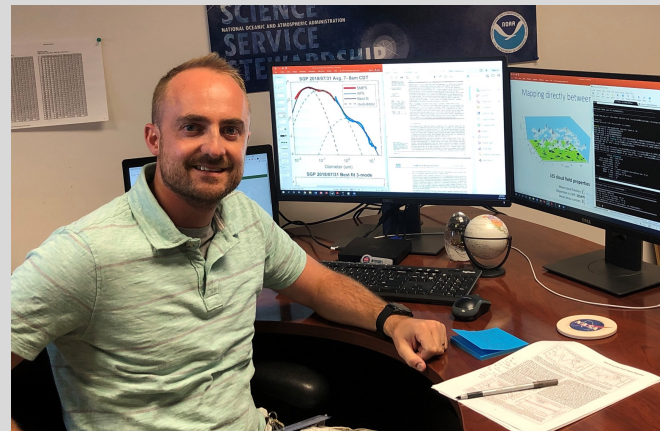
# ATOC COLLOQUIUM

## Welcome!

Please join us for the next ATOC Colloquium on **Friday, November 10** from **11:00 AM–12:00 PM**, which will be held in **SEEC S228 and simulcast over Zoom**. This week's colloquium features **Dr. Jake Gristey (CIRES/NOAA CSL/LASP)**. Please join us for conversation beginning at 10:45 AM and stay for lunch catered by Illegal Pete's afterwards.

## Shedding Light on Solar Radiation Variability at Earth's Surface

Energy originating from the sun and reaching Earth's surface, known as the surface solar irradiance (SSI), is strongly modulated by ubiquitous shallow cumulus clouds. The detailed 3D spatial structure of shallow cumulus clouds, their rapid evolution, and coexisting aerosol all lead to complex variability in SSI that has proven challenging to understand and predict. In this talk, I will show how this SSI variability is encapsulated by the bi-modal shape of the SSI probability density function (PDF), which is robustly observed but only reproduced with 3D radiative transfer. Machine learning is explored to construct a mapping between cloud and aerosol properties, from large eddy simulation, and the corresponding SSI PDF, from 3D radiative transfer. This enables a drastic improvement in prediction of SSI, relative to traditional 1D radiative transfer, with negligible computational expense. I will also demonstrate how machine learning inference techniques reveal an inordinately large importance of aerosol between clouds. The findings have direct relevance for solar renewable energy assessments and highlight the significance of neglecting 3D radiative effects in atmospheric modeling.



**Location:** SEEC S228 & Zoom

**Zoom:**

<https://cuboulder.zoom.us/j/98582201579>

**Password:** ATOC

## About the ATOC Colloquium

The Department of Atmospheric and Oceanic Sciences (ATOC) Colloquium is typically held **every other Friday** from **11:00 AM–Noon**. Colloquia alternate between the following formats: (A) Full-length talk by a faculty member or invited speaker, (B) Three conference-length talks by graduate students. If you would like to nominate a speaker (including self), please email the ATOC Colloquium Committee Chair, Prof. Andrew Winters ([andrew.c.winters@colorado.edu](mailto:andrew.c.winters@colorado.edu)). Please visit [www.colorado.edu/atoc/colloquium](http://www.colorado.edu/atoc/colloquium) for further details.