

# Scientists prepare for the great American eclipse of August 21

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Astronomer Jay Pasachoff is busy exciting people about their chance to experience the August 21, 2017, total solar eclipse, whose path of totality will sweep across the United States from coast to coast. He is leading an international team of astronomers in preparing scientific observations to study the sun's outer layer, the solar corona, and also the effect of the eclipse on the Earth's atmosphere. To attendees of the American Astronomical Society's meeting in Grapevine, Texas, this week, Pasachoff presented a paper about scientific observations of solar eclipses and a second paper about matters of outreach and education at all levels relevant to the eclipse. He also participated in a splinter session on eclipse preparations and in a science-writer's seminar.

Pasachoff tries to bring across to the general public how exciting it is to be outdoors in the path of totality of a [solar eclipse](#). He stresses that "being even 10 or 100 miles outside the path is like being outside a football stadium, technically 'at the stadium' but actually missing seeing the main event." He would like to convince 300 million Americans from all over the country to join the 12 million people who live within the path of totality for the 2 or so minutes of totality on August 21. (An additional 76 million people live within a 200-mile drive of the path, according to map-maker Michael Zeiler of Santa Fe.)

In a talk Pasachoff delivered to science writers on Saturday, August 7, he described a variety of professional efforts scheduled to observe the [eclipse](#). His own group includes scientists from Slovakia, Greece, and Australia in addition to students and colleagues from the United States.

They will study the dynamics of the [solar corona](#) and study the frequency of oscillations as seen through special coronal filters, part of testing models of how the corona is heated to millions of degrees. They are linking the shape of the corona, held in place by the magnetic field, to the phase of the sunspot cycle, with potential implications for the next cycle.

Prof. Shadia Habbal of the University of Hawaii observes with an international group she calls the Solar Eclipse Sherpas. They use a set of filters in visible and infrared light to study the shape of the corona and its polarization, which reveals the orientation of the [solar magnetic field](#). Prof. Alexander Kosovichev of the New Jersey Institute of Technology, working with Dr. Serge Koutchmy of the Institut of Astrophysics of Paris, also plans to study coronal polarization. Koutchmy has special methods for high-contrast and high-resolution processing of coronal images. Many eclipse astronomers work with the image-processing skills of Prof. Miloslav Druckmüller of Brno, Czech Republic.

Prof. Hugh Hudson and Laura Peticolas of the Space Science Laboratory of the University of California, Berkeley, are heading a Megamovie project to use thousands of images taken by members of the general public, so-called citizen scientists, to provide an animation of variations in images over the 90 minutes that the moon's shadow will take to cross the continental United States. In a separate citizen-science plan, Dr. Matt Penn of the National Solar Observatory is planning a Citizen Continental-America Telescope Eclipse Experiment (Citizen CATE), with 60 identical solar telescopes spaced across the path of totality to make an animation of highly calibrated identical images to show coronal dynamics.

A National Science Foundation plane will travel at high altitude to study coronal spectra in the infrared, in a plan led by Drs. Leon Golub and Ed DeLuca of the Harvard-Smithsonian Center for Astrophysics, with

graduate-student Jenna Samra.

Other scientists planning research during totality include Dr. Ulyana Dyudina of Caltech, who is planning to use a new light-sensitive chip that measures polarization pixel-by-pixel; Prof. Brad Schaefer of Louisiana State University, who plans a new version of the light-bending experiment that tested relativity and made Einstein famous; and Prof. Thanasis Economou of the University of Chicago, who plans to make spectra during the eclipse of the solar corona and solar chromosphere, the colorful atmospheric level between the everyday solar surface and the hot corona.

Provided by Williams College

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