



Shadia Rifai Habbal was born in Damascus, Syria. Her love of physics and the Sun has taken her to different parts of the world to observe the solar corona or the Sun's crown, during total solar eclipses. In 1995, she formed a research group with six members called the Solar Wind Sherpas. They now have over two dozen members who share the same passion for exploration and discovery to unveil the secrets that keep the solar corona at over a million degrees. Follow their expeditions online at: bit.ly/solarwindsherpas

Tales of the Solar Wind Sherpas

Every 12 to 18 months, the Solar Wind Sherpas get ready for an expedition to different corners of the Earth, bringing heavy backpacks loaded with cameras, special filters and spectrometers. They await the arrival of a new Moon, with its perfect alignment between the Sun and Earth, that blocks the Sun's bright disk. As the Sun suddenly finds itself becoming obscured by the Moon, a feeling of suspense and awe, sometimes fear, electrifies the air when a shadow one hundred miles wide darkens the Earth in mid-day. One hour later, the darkness is total. The temperature drops by a few degrees. Not a sound can be heard, not a bird sings.

Luck brings the Sherpas clear skies and a cosmi spectacle beyond compare when suddenly a diamond ring glitters in the darkened sky. Totality follows, unveiling the solar corona with its wisps of shimmering filaments exploding outwards from the edges of the Sun into the infinity of space. Prominences sway erratically with bright pinkish red flames that are anchored to the Sun.

The Sherpas explore the invisible colors of the solar corona. They've designed cameras retrofitted with special filters, as well as a spectrometer to peer into the behavior and fate of the Sun's heavy elements that have lost most of their electrons and emit light at very specific colors. Some of the most dominant elements are hydrogen, helium, iron,

nickel, oxygen, carbon and calcium, to name a few. Each element holds a secret to the hot corona that escapes the Sun forming its own solar wind. The cool prominences at tens of thousands of degrees seem to be oblivious to the million degrees corona around them. How do prominences shield themselves from their scalding environment is also a mystery. Their erratic dance seems to have a hold on the dynamic nature of the coronal structures controlled by the magnets produced in the Sun's interior layers. Their dance occasionally goes wild leading to their eruption and the ejection of huge bubbles, known as coronal mass ejections, into the solar system. When they hit Earth, we are in trouble.

On 21 August 2017, in a span of 90 minutes the Moon's shadow will fall upon Oregon and spread to South Carolina. With a couple of minutes at each step along the way, millions can witness the clockwork of planetary motion that will reveal the beauty of their own star. That evening at dusk, a sliver from the new Moon will smile mischievously, proud to have put on a magnificent show. It will linger, asking for attention and thankfulness. In the days after all will be forgotten, but not for the Moon who knows that it can repeat its trick, even if it takes a little over a year. Fully aware of this trick, the Sherpas will get ready for yet another expedition.













SUN

MOON







ordgren is an astronomer and Professor of Physics at the ty of Redlands. He has worked as an astronomer at both the rall Observatory and Lowell Observatory. Since 2007, has worked closely with the U.S. National Park Service, park rangers across the country in astronomy. He is also a designer and illustrated the cover of this very book.







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ALL EYES ON THE MOON 2017 TOTAL SOLAR ECLIPSE





