

RADIATION & REMOTE SENSING at UCLA

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Purpose:

To inform perspective graduate students about the radiation and remote sensing group at UCLA.

About me:

I was born in Chicago and have worked as a high school teacher before coming to UCLA. My undergraduate academic background was in mathematics. I was attracted to the atmospheric science field because of a strong interest in learning how to forecast the weather. I pondered the idea of studying tropical meteorology, mesoscale phenomenon, or radar applications before deciding on the research field of satellite remote sensing of cirrus clouds and aerosols. I also met my wife here in LA and we now have a 2 year old son.

Southern California (the good, the bad, and the ugly) from a non-native:

UCLA is located in Westwood near the posh neighborhoods of Bel Air and Brentwood, unaffordable to normal humans. Most under grads live swarmed together in tiny apartments near campus. Graduate students tend to live about 4 miles south in West LA or Palms/Mar Vista where the apartment prices are lower. UCLA has good graduate housing and I have lived in it my entire stay here. Surprisingly, there is very good public transportation (bus) between Santa Monica and UCLA that passes through Palms and Mar Vista. It is very cheap for UCLA students as well as I remember it. I now drive to UCLA and pay \$165 each quarter for parking. A car is worth having in this town though. It is nice to be able to get out of the city toward the beautiful mountains, inland to the deserts, or along the coast. You can definitely ski, skateboard, and surf in the same day. Traffic is indeed bad in LA, but if you stay off the freeways during peak times you'll be fine. At night driving in this town is a blast. The sheer amount of pavement is incredible. You can get anywhere in 15 minutes at night. Now I must mention the weather. If you like warm and sunny than this is the place. Shorts and T-shirt weather. It may be odd that people choose to study the weather in this town, a place in which qualified meteorologists on TV are rare to find. But the longing for storms soon fades in the constant sunshine. One of the best things about a big city like LA is its culture and diversity. You can spend years discovering its different neighborhoods, restaurants, and attractions. On weekends you can always go out to the small towns like

San Diego and Las Vegas.

Program at UCLA:

The program at UCLA focuses on radiation transfer through the atmosphere across the solar and terrestrial spectral regions but the ultraviolet and microwave wavelengths are also examined. Course work also includes Radiative forcing and climatic effects as well as active and passive remote sensing techniques from satellites and ground instruments. The group has a history of producing important contributions to light scattering by atmospheric particles such as non-spherical ice crystals. There is a great deal of work being done in the remote sensing of cirrus clouds and aerosols by satellites. Researchers in the group are also working on 3-D radiative transfer models, radiation transfer through between the atmosphere and ocean, and general circulation models.

Who you'll work with:

The Radiation and Remote Sensing group also referred to as the Institute of Radiation and Remote Sensing (IRRS) is directed by the distinguished Professor Kuo-Nan Liou. Other professors in the field are Professor Yongkang Xue working on atmospheric-land interactions and modeling primarily in the Geography department and Adjunct Assistant Professor Annmarie Eldering who works out of the Jet Propulsion Laboratory (JPL) in Pasadena. You can also learn about a bit about radar meteorology and remote sensing from Professor Roger Wakimoto whose primary focus is mesoscale phenomenon. The group is fortunate to have two senior researchers, Dr. Steve Ou and Dr. Yoshihide Takano, as well as two assistant researchers Dr. Yu Gu and Dr. Brian Barkley who works out of the University of Utah. Seven graduate students are presently supported by funding from the group.

What you'll do:

As a new graduate student you will initially enroll in classes during the first and part of the second year. This does not exclude doing research during this time, but you will be focused primarily on passing the written and oral exams at the Master and Doctoral levels. Once you find a niche in the group and have a slight idea of what your research may be you will be given an office with other students in the group and be able to use the group's facilities. Finding your direction is not as difficult as one might think because there is a great deal of interesting work being performed and yet to be performed in this field. Plus, with so many members of our group, we are working on a lot of different topics which have many offshoots. I began my time here by working with a senior graduate student who taught me many things about manipulating satellite data. Such mentoring is generally how we all begin. Besides, with so many years of experience among the professors and researchers, help is always available. As a graduate student, I have had many unique opportunities. I have exposure to powerful programs developed in our group over the years and access to researchers with knowledge about how they work. I have been provided great direction in my career through discussions with my advisor, Professor Liou as well as with our researchers and other professors in the department. I feel lucky to have had many great colleagues as well, in which great discussions and collaborations have resulted. Once your research starts taking form you

will be given the opportunity to attend conferences. This is always exciting as it provides a chance to display your work to the community via oral or poster presentations and to make interesting acquaintances that often lead to further collaborations, important for life after UCLA.

Research topics:

Presently, some of the work being done by graduate students in our group include the following:

- 3-D radiation transfer involving clouds and land surfaces.
- Radiative forcing from aerosols and its effects.
- Radiative Transfer between the ocean and atmosphere.
- Modeling high spectral resolution atmospheric transmission near absorption bands for deciphering any information content.
- Satellite remote sensing using the MODIS instrument to detect cirrus and retrieve aerosol and cirrus cloud properties.
- Satellite remote sensing using the AIRS instrument to infer cirrus properties and identify sensitivity to specific atmospheric parameters.
- Analysis of measurements taken from various radiometric sensors on site.
- Modeling cloud processes and light scattering through cloud chamber experiments.

Research in our group is generally well funded through organizations such as NASA, DOE, NOAA, NSF, and Northrop Grumman..

Facilities

Besides departmental resources such as servers and network printers, our group maintains its own computer lab which houses 4 sun stations, 6 PC's, 2 printers, and a photocopy machine. We record radiometric data measured from various radiometers and a sunphotometer located on the roof of our building which is all coordinated by a graduate student. We possess a small cloud chamber and are in the process of building a much larger one to produce more realistic cloud particles.

Connections to the Outside:

Being at UCLA provides many opportunities to interact with members of other agencies and organizations situated in the greater Los Angeles area. Personally, I have taken advantage of this a great deal. During my graduate work at UCLA I have interned at the National Weather Service in San Diego as part of an undergraduate Atmospheric Science course, taught a semester of Weather and Climate at Santa Monica College, and obtained a part-time position at Northrop Grumman Space Technologies before having completed my dissertation. I have known many more students that have done the same thing. If you enjoy teaching, physical science classes are often available at junior colleges. The National Weather Service has offices in San Diego and Oxnard, both a couple hours away. Two students recently obtained positions at the Raytheon Corporation and many others find computer jobs in the area. The Air Quality Management District (AQMD) is a great option for those interested in air pollution. The largest local connection with our

group at UCLA is the Jet Propulsion Laboratory (JPL). Besides the fact that many professors receive NASA grants from JPL, a lot of students also work there while they study at UCLA. As a result, there is a great deal of collaboration between our group and scientists at JPL.