



American Chemical Society, Orange County Section

OCTOBER DINNER MEETING

Thursday, October 15, 2009

**The DoubleTree Club Hotel**  
7 Hutton Centre Drive, Santa Ana  
Phone: 714-751-2400

## The Astronomical Origins of the Chemical Elements of Biological Importance

**Dr. Virginia Trimble**  
*University of California, Irvine*

Social: 5:30 p.m.  
Dinner: 6:00 p.m.  
Program: 7:00 p.m.

**All Reservations:** Please contact us no later than 12 noon on Monday, October 12<sup>th</sup>. Email: [OCACS@sbcglobal.net](mailto:OCACS@sbcglobal.net). Please indicate if you will be attending dinner or program only! Please list the names of all attendees!

**Dinner Cost:** \$25 for members; \$25 for member's spouses; \$30 for non-members or those without reservations.

**Host:** OCACS pays the hotel on the basis of the number of dinner reservations made. Please help our efforts to keep the Dinner Program going by honoring your reservations.

**Program:** Members and guests are invited to attend the program at 7:30PM. There is no charge for the program but reservations are requested. Space may be limited.

**Directions:** Take the Costa Mesa freeway (55). Exit at MacArthur Blvd. and go west (towards South Coast Plaza). Turn left at MacArthur Place. DoubleTree Club Hotel is straight ahead slightly to the left. Use parking lot in front of hotel or follow signs to nearby parking. If in error you turn right at Hutton Centre Drive, you will find the DoubleTree Hotel. This is not the DoubleTree Club Hotel. Please be aware of the similar hotel names. Our dinner is at the DoubleTree **Club** Hotel.

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### Abstract

We are, as Carl Sagan (in)famously said, stardust -- indeed the dust of thousands of stars, if not quite billions and billions. The Universe of which we are a part is nearly 15 billion years old, and for at least 14 of those 15 billions, stars have been forming, living on nuclear reactions, and dying, sometimes in explosions called supernovae. The more massive the star, the more interesting the range of its nuclear reactions. Our own sun is currently fusing hydrogen to helium and will eventually turn some of that He into carbon and oxygen. But the most massive stars, 10 to 100 times heavier than the sun, which are also the shortest lived, can make a full range of elements, right on up to uranium. Thus many generations of stars had poured out CNO for proteins, Ca for bones, Fe for hemoglobin, and all the rest, long before the solar system formed almost 5 billion years ago. It is surely not a coincidence that the chemical elements most essential for life, CHON, are also the most abundant, nor that many simple molecules made in interstellar gas and dust - not just water and carbon dioxide, methyl and ethyl alcohol, but also amino acids - are relevant to Urey-atmosphere type scenarios for the origin of life as we know it. The talk will explore which essential elements are the most and least abundant and why and look briefly at implications for life on other planets.

### Biographical Sketch

Dr. Virginia Trimble is a native Californian and graduate of Hollywood High School, UCLA, and Caltech. She has been part of the UC Irvine physics department since 1971, and for 30 of those years also a visiting professor of astronomy at the University of Maryland, sharing appointments both places with her late husband, physicist Joseph Weber. Trimble's current research interests include the structure and evolution of stars, galaxies, and the universe, and of the communities of scientists who study them. Over the years, she has held many offices (generally reaching her level of incompetence at about the rank of vice president) and served on something like 100 committees for professional organizations in astronomy, physics, history of science, general relativity, and so forth. Publications? Maybe 500. Well, alright, 600, but who's counting? Her father, chemist Lyne Starling Trimble, was a member of ACS and Alpha Chi Sigma for most of his adult life.