



## What is the CCE?

The Center for Chemical Evolution is a group of chemists from across the nation funded by the National Science Foundation and NASA to investigate chemical evolution and the chemistry associated with the origins of life. This team of scientists from 18 research laboratories search for clues as to how molecules have evolved from the simple molecules of the early earth to the complex biopolymers of today.

The CCE attacks this puzzling research question from three angles:

- Identification of molecules that may have been present on the early earth
- Exploration of reactions and conditions that create biological building blocks of long chain biomolecules (biopolymers)
- Self-assembly and self-organization of biopolymers

The collaborative nature of the CCE provides all members in the Center the opportunity to become experts across this fascinating field, and to build relationships with several mentors. Each research project involves multiple collaborators from two or more research groups at different institutions, including faculty, undergraduate and graduate students, and post-docs.

## CCE Senior Investigators and Research

Our research touches upon many areas of chemistry. We invite you to check out individual labs online to find what interests you the most. Please visit [www.centerforchemicalevolution.com/people](http://www.centerforchemicalevolution.com/people)

### Biomolecular Chemistry

**Prof. Nicholas V. Hud**, *Georgia Tech*: Understanding the chemical & physical factors that control the folding, assembly, and evolution of nucleic acids

**Prof. David Lynn**, *Emory University*: Understanding how chemical information can be stored & translated into new molecular entities, and how the forces of evolution can be harnessed to create new structures with new function

### Organic Chemistry

**Prof. Stefan France**, *Georgia Tech*: Developing new synthetic methodologies that can be applied toward the construction of alternative primordial informational oligomers

**Prof. Charlie Liotta**, *Georgia Tech*: Focuses on using fundamental prebiotic building blocks to investigate the formation of precursor molecules for biological systems

**Prof. Greg Springsteen**, *Furman University*: Searching for abiotic routes to biologically relevant molecules and comparing these pathways with fundamental biosynthesis

**Prof. Ram Krishnamurthy**, *The Scripps Research Inst*: Experimentally addressing questions concerning the origins of life with respect to the advent of functional monomers & emergence of informational polymers

**Dr. Art Weber**, *NASA Ames Research Center*: Prebiotic synthesis of autocatalytic and self replicating molecules from sugars as the primary carbon substrate

### Analytical Chemistry

**Prof. Facundo Fernandez**, *Georgia Tech*: Mass spectrometric analysis of potentially prebiotic molecules and surfaces that may have interacted with these molecules

**Prof. Thomas Orlando**, *Georgia Tech*: Studying the interaction of small molecules that may have been present on the early earth with mineral surfaces

**Prof. John Dimandja**, *Spelman College*: Developing 2-dimensional gas chromatography methods to identify unique molecules in complex reaction mixtures

**Prof. Jeff Bada**, *Scripps Inst. of Oceanography, Univ. of California - San Diego*: Re-analysis of classic Miller-Urey experiments to determine what complex molecules could form from a mixture of simple gases that may have been present on the early earth

### Computational/Theoretical Chemistry

**Prof. Martha Grover**, *Georgia Tech*: Using process systems to understand macromolecular organization and the emergence of biological function

**Prof. Jerzy Leszczynski**, *Jackson State University*: Computational studies of mineral surface interactions with small molecules

### Chemical Engineering

**Prof. Andreas Bommarius**, *Georgia Tech*: Studying the use of green solvents in biological condensation and redox reactions and understanding how these non-aqueous solvents may have played a role in chemical evolution and the origin of life



## CCE Undergraduate Summer Research Program

The CCE Summer Undergraduate Research Program allows undergrad scientists to conduct supervised research with a faculty mentor working in the field of chemical evolution and origins of life chemistry. Students are trained in research methods, data analysis, & written/oral communication of their results.

### Details

- All undergrad researchers will receive a minimum stipend of \$3,500 for 10 weeks of participation.
- You will be provided with campus housing, should you need it. Some students may be given a housing allowance instead (certain advisors only).
- The exact dates of the program will depend on the school/advisor to which you are assigned, but the 10 week session will fall sometime between May 21 and August 10, 2012.
- Application deadline is **February 13, 2012 at noon**
- Download the application form & recommendation letter form from: [www.centerforchemicalevolution.com/opportunities](http://www.centerforchemicalevolution.com/opportunities)
- Questions? Contact Meisa Salaita at 404.727.8953 or [meisa.salaita@emory.edu](mailto:meisa.salaita@emory.edu)