Graduate students in the Rice University Department of Chemistry have established an extraordinary record of achievement. A 2013 study by the Max Planck Society ranked Rice Chemistry at No. 1 in the world, based on the citation records of student publications. Coupled with a prolific publication rate (seven publications and nearly three first authorships), a typical student in the program publishes multiple papers cited in the top 10% worldwide. Underlying the unusual development of Rice chemists is a strong, dynamic, interdisciplinary faculty that includes a Nobel Laureate, six members of the National Academy of Sciences, and two members of the National Academy of Engineering. The low student to faculty ratio (3:1) ensures that students have ample access to faculty time, instrumentation, and other resources.

The doctoral program at Rice is built around a close-knit community that promotes student achievement. This collaborative environment was critical to the development of nanotechnology, having facilitated the work of two Nobel laureates in the discovery of buckminsterfullerene. Rice’s culture of collaboration has minimized barriers between research areas for decades. Chemistry faculty members hold appointments in four of the seven departments in natural sciences at Rice and in six of the nine engineering departments (most Chemistry faculty members also hold appointments in an engineering department). Rice chemists do not take a prescribed set of courses, but construct an individualized curriculum consisting of six courses in any area of science or engineering. This flexibility to customize courses is ideal for chemists who want to branch out into other areas and for people who want to move into chemistry from another discipline.

### CHEMISTRY FACULTY AND RESEARCH

**Pulickel Ajayan**\(^{3,7}\), PhD (Northwestern, 1989). Multifunctional nanostructures and hybrid platforms for energy storage, composites, sensors, electronics, and biomedicine.

**Pedro J. Alvarez**\(^{7,9}\), PhD (U of Michigan, 1992). Bioremediation of contaminated aquifers, fate and transport of toxic chemicals, and environmental implication and application of nanotechnology.

**Zachary T. Ball**, PhD (Stanford, 2004). Current research includes reaction discovery, biomimetic catalysis, and organometallics for biology and medicine.

**Enrique Barrera**\(^{4}\), PhD (UT Austin, 1987). Formation of hybrid nanotube materials and the development of fully integrated nanotube composites.

**Andrew R. Barron**\(^{7}\), PhD (Imperial College, U of London, 1986). Chemistry, nanoscale science and materials science of the Group 13 elements leading to the development of new materials and catalysts.

**Cecilia Clementi**\(^{3}\), PhD (International School for Advanced Studies, 1998). Theoretical and computational investigation of protein folding, protein interactions and functions.

**Michael Diehl**\(^{7}\), PhD (UCLA, 2002). Biomotor cooperativity, biomaterials, supramolecular biophysics and molecular bioengineering.

**Jason H. Hafner**\(^{6}\), PhD (Rice, 1998). Application of nanometer-scale tools and materials to problems of biological and biomedical interest.

**Naomi J. Halas**\(^{2,6,7,8}\), PhD (Bryn Mawr, 1987). Nanofabrication chemistry and nano-optics.

Jeffrey D. Hartgerink, PhD (Scripps, 1999). Self-assembly of nanostructured materials with a focus on molecular structures of proteins and peptide based biomaterials for tissue regeneration, drug delivery and other biomedical applications.


Christy E. Landes, PhD (Georgia Tech, 2003). Experimental physical, biophysical, and nanomaterials physical chemistry; single molecule spectroscopy. Dynamic complexity and its role in biological and synthetic polymer functions.

Stephan Link, PhD (Georgia Tech, 2000). Physical chemistry of nanomaterials, nanophotonics and plasmonics, spectroscopy of individual & coupled nanoparticles with applications in opto-electronics, energy, and medicine.

Jun Lou, PhD (Princeton U, 2004). Nanomaterial synthesis, nanomechanical characterization and nanodevice fabrication for energy, environment and biomedical applications.

Angel Martí, PhD (Puerto Rico, 2004). Development of molecules to diagnose and treat disorders that involve protein aggregates, e.g. Alzheimer’s; development of supramolecular materials based on nanoscale building blocks.


Seiichi P. T. Matsuda, PhD (Harvard, 1994). Bioorganic and organic chemistry, terpenoid biosynthesis, enzyme evolution, redesign of enzymes to have new activities, and genomic approaches to find biologically active molecules.

Antonios G. Mikos, PhD (Purdue U, 1988). Synthetic biodegradable polymers as supportive scaffolds for cells, as conduits for guided tissue growth, as specific substrates for targeted cell adhesion, or as stimulants for a desired cellular response.

Emilia Morosan, PhD (Iowa State, 2005). Design and synthesis of novel magnetic and superconducting materials.

K.C. Nicolaou, PhD (U London, 1972). Specializes in organic chemistry with a focus on the synthesis of natural and designed molecules of biological and medical importance to cancer research.

Jose Onuchic, PhD (Harvard, 1976). Theoretical and computational methods for molecular biophysics and chemical reactions in condensed matter; protein folding funnels as a mechanism for the folding of proteins.

Matteo Pasquali, PhD (Minnesota, 1999). Interaction of flow and liquid micro- and nanostructure in complex fluids, with application to the manufacturing of engineered materials.


Emilie Ringe, PhD (Northwestern, 2012). Atomic resolution and three dimensional elemental mapping of alloy nanoparticles relevant for catalysis applications.


Gustavo E. Scuseria, PhD (U Buenos Aires, 1983). Development of theoretical and computational quantum chemistry techniques (many in the Gaussian program). Application of quantum mechanics to predict the structure and properties of molecules.


Ned Thomas, PhD (Cornell, 1974). Polymer physics and engineering, photonics and phononics and mechanical and optical properties of block copolymers, liquid crystalline polymers, and hybrid organic-inorganic nanocomposites.

James M. Tour, PhD (Purdue, 1986). Organic chemistry, materials science, polymer chemistry, nanoscience, and nanotechnology.

R. Bruce Weisman, PhD (U Chicago, 1977). Basic studies of carbon nanotube spectroscopy and photophysics and related analytical, mechanical engineering and biomedical applications.

Kenton H. Whitmire, PhD (Northwestern, 1982). Inorganic and organometallic chemistry, precursor design for advanced nanomaterials, structural and mechanistic chemistry, catalysis, bioactivity of heavy main group elements.


Boris I. Yakobson, PhD (Russian Acad. of Sciences, 1982). Theory and modeling of materials derived from macroscopic and fundamental molecular interactions.


* currently not taking students