

## Chemistry Faculty and their Research Interests

Our Department's faculty have a wide variety of research interests and hold joint appointments with <sup>1</sup>Biosciences, <sup>2</sup>Bioengineering, <sup>3</sup>Chemical & Biomolecular Engineering, <sup>4</sup>Computer Science, <sup>5</sup>Earth Science, <sup>6</sup>Electrical & Computer Engineering, <sup>7</sup>Material Science & NanoEngineering, <sup>8</sup>Physics & Astronomy, and <sup>9</sup>Civil & Environmental Engineering.

**Pulickel Ajayan**<sup>3,7</sup>, PhD (Northwestern, 1989). Multi-functional nanostructures and hybrid platforms for energy storage, composites, sensors, electronics, and biomedicine.

**Pedro Alvarez**<sup>7,9</sup>, PhD (U of Michigan, 1992). Bioremediation of contaminated aquifers, fate and transport of toxic chemicals, and environmental implication and application of nanotechnology.

**Zachary Ball**, PhD (Stanford, 2004). Chemical biology. Protein chemistry. Organic synthesis, bioinorganic, and medicinal chemistry.

**Enrique Barrera**<sup>7</sup>, PhD (UT Austin, 1987). Formation of hybrid nanotube materials and the development of fully integrated nanotube composites.

**Andrew Barron**<sup>7</sup>, 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.

**Philip R. Brooks**, PhD (U of California, Berkeley, 1964). Physical Chemistry. Molecular-beam studies of chemical reaction dynamics.

**Cecilia Clementi**<sup>3</sup>, PhD (International School for Advanced Studies, 1998). Theoretical and computational investigation of protein folding, protein interactions and functions.

**Michael Diehl**<sup>2</sup>, PhD (UCLA, 2002). Biomotor cooperativity, biomaterials, supramolecular biophysics and molecular bioengineering.

**Paul Engel**, PhD (Harvard, 1968). Free radical initiators, inhibitors of polymerization, free radical of single walled carbon nanotubes with organic free radicals.

**Jason Hafner**<sup>8</sup>, PhD (Rice, 1998). Application of nanometer-scale tools and materials to problems of biological and biomedical interest.

**Naomi Halas**<sup>2,6,7,8</sup>, PhD (Bryn Mawr, 1987). Nanofabrication chemistry and nano-optics.

**Jeffrey Hartgerink**<sup>2</sup>, 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.

**John Hutchinson**, PhD (UT Austin, 1980). Chemical education

**Matthew Jones**, PhD (Northwestern, 2014). Nanoparticle synthesis, surface chemistry, supramolecular chemistry, soft matter assembly, and liquid-phase electron microscopy

**Anatoly Kolomeisky**<sup>3</sup>, PhD (Cornell, 1998). Theoretical physical chemistry, biophysics and statistical mechanics. Modeling of biological transport systems and protein-DNA interactions, and investigation of nanocars and other artificial nanoscale devices.

**László Kürti**, PhD (Penn, 2006). Synthetic Organic Chemistry. Specializes in the development of new catalytic asymmetric transformations, modes of chirality transfer, methods for the synthesis of bioactive N- and O-heterocycles as well as novel aminating agents & transition metal-free amination reactions.

**Christy Landes**<sup>6</sup>, 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**<sup>6</sup>, 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**<sup>7</sup>, PhD (Princeton U, 2004). Nanomaterial synthesis, nanomechanical characterization and nanodevice fabrication for energy, environment and biomedical applications.

**Angel Marti**<sup>2,7</sup>, PhD (U 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.

**Carrie Masiello**<sup>5</sup>, PhD (U of California, Irvine, 1999). Fundamental mechanisms of the carbon cycle, carbon sequestration, climate change, black carbon, terrestrial-river-ocean biosphere interactions.

**Seiichi Matsuda**<sup>1</sup>, 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 Mikos**<sup>3,7</sup>, 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**<sup>7,8</sup>, 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**<sup>1,8</sup>, 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**<sup>3,7</sup>, PhD (Minnesota, 1999). Interaction of flow and liquid micro- and nanostructure in complex fluids, with application to the manufacturing of engineered materials.

**George Phillips**<sup>1</sup>, PhD (Rice, 1976). Three-dimensional structure and dynamics of proteins to their biological functions, computational biology.

**Emilie Ringe**<sup>7</sup>, PhD (Northwestern, 2012). Atomic resolution and three dimensional elemental mapping of alloy nanoparticles relevant for catalysis applications.

**Peter Rossky**<sup>3</sup>, PhD (Harvard, 1978). The elucidation of the fundamental molecular-level origins of chemical behavior in condensed phases and clusters.

**Gustavo Scuseria**<sup>7,8</sup>, 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.

**Isabell Thomann**<sup>6,7</sup>, PhD (U of Colorado, Boulder, 2009). Energy, photocatalysis, ultrafast spectroscopy and nanophotonics.

**Ned Thomas**<sup>3,7</sup>, 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 Tour**<sup>4,7</sup>, PhD (Purdue, 1986). Organic chemistry, materials science, polymer chemistry, nanoscience, and nanotechnology.

**R. Bruce Weisman**<sup>7</sup>, PhD (U Chicago, 1977). Basic studies of carbon nanotube spectroscopy and photophysics and related analytical, mechanical engineering and biomedical applications.

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

**Lon Wilson**, PhD (U Washington, 1971). Nanoparticle development in biology and medicine. Nanotechnologically-enhanced medical imaging and therapeutic agents.

**Peter Wolynes**<sup>7,8</sup>, PhD (Harvard, 1976). Theoretical chemical physics, theory of glasses, protein dynamics and folding. Stochastic cell biology.

**Michael Wong**<sup>3,7</sup>, PhD (MIT, 2000). Chemical engineering, chemistry, and materials science, functional nanoparticle-based materials.

**Han Xiao**<sup>1</sup>, PhD (Scripps Research Institute, 2015). Synthetic chemistry, chemical biology, molecular biology, cancer biology, and immunology.

**Boris Yakobson**<sup>7</sup>, PhD (Russian Acad. of Sciences, 1982). Theory and modeling of materials derived from macroscopic and fundamental molecular interactions.

**Eugene Zubarev**<sup>7</sup>, PhD (Russian Acad. of Sciences, 1998). Organic chemistry and polymer chemistry, synthesis and characterization of self-assembling molecules.