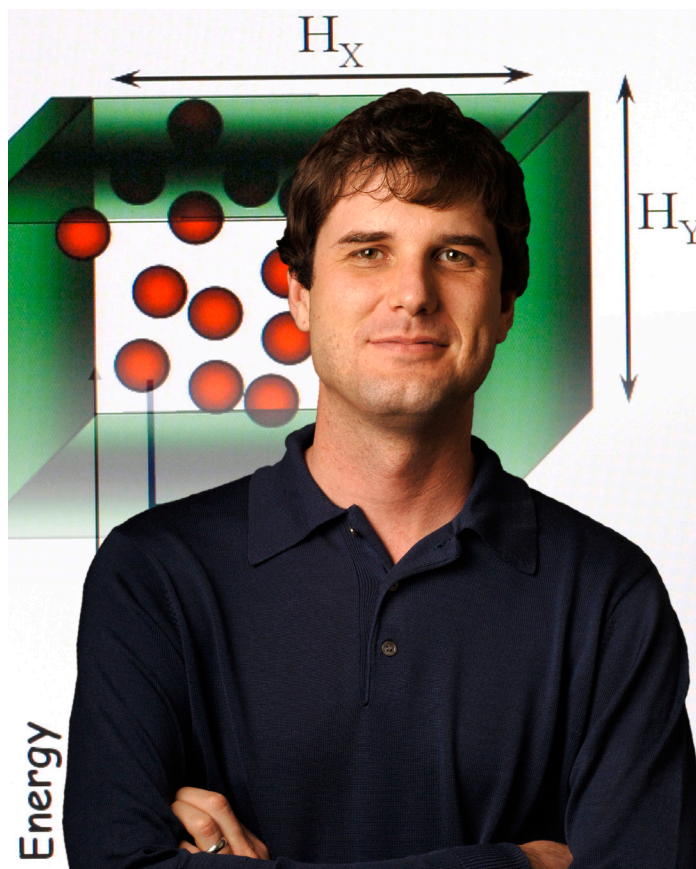


faculty spotlight: Dr. Thomas Truskett

A brief survey of chemical engineering students reveals that Dr. Thomas Truskett is one of the most popular professors in the engineering school.

Upon first encountering him, you may never believe that this young professor is such a rising star in academia. His passion for his chosen field is masked by a quiet, unassuming demeanor and a “guy next door” persona. When we interviewed him about his research, he animatedly discussed his work and his brilliance clearly shone through his youthful exterior.

Upon completion of his bachelor's degree in chemical engineering at UT in 1996, Dr. Truskett jumped into the world of theoretical chemistry and studied behaviors of simple liquids at Princeton University. He successfully earned his Ph.D. degree in chemical engineering at Princeton in 2001, with numerous awards and honors that recognized his outstanding work in research. His post-doctoral research found him at the University of California at San Francisco relating and applying what he had learned in physical chemistry to biological problems. “I didn't think about biology until I did my post doc really...In the world of studying these [biological] problems, I'm more of a physicist than a



biologist,” explained Dr. Truskett.

After two years of post-doc experience, Dr. Truskett came back to UT Austin to hold his professorship in chemical engineering and to pioneer the advanced biological physics class that he now teaches for both undergraduate and graduate students. He has won numerous teaching excellence honors and prestigious research awards

since he accepted his professorship at UT.

Dr. Truskett's research is largely theoretical. In his lab, pipettes and flasks are nowhere to be seen; instead, motherboards and circuit parts lay scattered everywhere. Instead of directly conducting experiments, Dr. Truskett's research team develops simulation computer models that help predict physical and thermodynamic

behaviors of various matters in different conditions.

The research focuses on understanding different properties of fluids, liquid crystals, colloidal suspensions, protein solutions, and glasses in molecular levels. Studying how these materials interact with each other and how they behave under different conditions provides us with useful pharmaceutical, as well as industrial, information. For instance, knowing how to stabilize proteins in concentrated solutions may help increase the shelf-life of related pharmaceutical products.

Dr. Truskett currently focuses on the following three research areas:

- Physical chemistry of solid-liquid interfaces and nano-confined materials
- Structural order and physical transformations of condensed phases: freezing, jamming, and glass formation
- Coarse-grained models for proteins in solution

Intrigued? Visit Dr. Truskett's lab website and learn more about his research: <http://www.che.utexas.edu/~truskett/>

YungAh Lee & Sneha Kumar
Vector Staff

Interview

1. What is your secret of your outstanding academic success in your research field?

Failing a lot. Seriously, the only way I know of to make progress over the long haul in science is to have a lot of ideas and to test them. Most of them turn out to be terrible but a few work and turn out to be useful.

2. Why physical chemistry? Theoretical chemistry?

At some point, I became interested in understanding how the properties of materials connect to the molecules that make them up. Statistical mechanics, which lies at the heart of theoretical physical chemistry, is the scientific tool that allows

one to make that connection. Of course, many technological applications, whether designing new materials or biological therapeutics, require doing engineering at the molecular scale. Statistical mechanics provides insights into how to carry it out in an effective way.

3. Are your works just theoretical or do you actually do physical lab work? If so, what kind of lab techniques do you use?

Our expertise is in theory and computer simulation, and we focus on that part of the research exclusively. We collaborate closely with other research

groups that do experiments; that is to say we leave experiments to the experimental experts. This is actually a fairly common approach in engineering and the sciences. Very few research groups are well-positioned to perform world class research on both experiments and theory. So they focus their efforts on one to keep from compromising both.

4. How do you come up with your model equations? Could you briefly describe some steps involved in designing such models?

Most of the empiricism in our modeling comes in at the level of molecular interactions. One usually can't readily derive these from "first principles", and so they usually are given simple mathematical forms that are consistent with known experimental behaviors. Once one assumes the mathematical form of the interactions, one is still left with trying to understand how many molecules in-

teract together to give the system its macroscopic properties. We tackle that latter problem using computer simulations and statistical mechanical theories.

5. What is your favorite restaurant in Austin and why?

My favorite place to eat, Smitty's market, is about $\frac{1}{2}$ hour from Austin, in Lockhart. It's funny because people travel 1000 miles to eat barbecue in Lockhart, but plenty who live here in Austin have never made the short drive. In Austin, my choice might be Fonda San Miguel.

6. Who is your favorite historical scientist besides yourself?

Probably J. Willard Gibbs (1839–1903). His name is well known among chemical engineers because of "Gibbs free energy" of chemical thermodynamics. He was also instrumental in formulating statistical mechanics and vector calculus, both of which my

research group uses every day. The scientific and technological impact of Gibbs has been enormous, but relatively few outside of science and engineering have heard of him. That's unfortunate, since he may have been the greatest American scientist.

7. What is your very first memory of your life?

Perhaps going with my family to see the release of Star Wars at a drive-in movie theatre. I also vividly remember watching the US hockey team defeating the Soviet Union in the 1980 Olympic games.

8. What do you do in your spare time? Any hobbies?

These days, I spend most of my non-work time with my wife and two-year-old daughter. I also enjoy reading. Right now I am mostly into economics and philosophy.

9. What is your favorite TV show or movie or sports team?



Dr. Truskett smiles in his office

Movie: most anything by the Coen Brothers; Sport teams: Texas Longhorns, Dallas Cowboys, Dallas Mavericks

10. How would you describe yourself using three adjectives?

Analytical, self-reliant, approachable