

The Winding Road:

COMPUTER MODELER MOVES FROM CLIMATE TO ENERGY

Lindsey Gulden has taken a circuitous career path. She entered Harvard University as a pre-med biology student, but she soon realized that she didn't like the sight of blood. So she earned a computer science degree, which she believed would be a useful tool in any scientific pursuit. She graduated just as the dotcom bubble was popping. Bad timing. No jobs. She worked as a proofreader and copyeditor at the New England Journal of Medicine while taking night classes. When she took a course in hydrology and near-surface geology, she decided to turn her life-long love of nature into a formal study of earth science.

She came to the Jackson School of Geosciences where she worked on computer models. As part of her Ph.D. work, she developed a framework for evaluating the performance of land-surface models, which are a component of climate models. The ultimate goal of the work was to be able to determine how much confidence can be placed in the results of an environmental model and to use that information to help improve it. Gulden received her Ph.D. in May 2009.

A few months earlier, as part of her job search, she applied to work in the oil industry. She wasn't sure it would be the right place for her, but she thought she should at least give it a try. The representatives from ExxonMobil impressed her. They were smart, down to earth, excited about what they were doing and were working on meaty earth science problems. She accepted a research position in Houston working on computer models of how coral reefs grow under different climatic conditions, a topic of interest to ExxonMobil because some ancient coral deposits form carbonate rock with the potential for storing oil and gas.



Lindsey Gulden

Many of her friends and colleagues have struggled to understand what seems to them like a huge shift from fundamental climate research to the petroleum industry, worlds that appear to have little in common. Still, she's drawn by the opportunity in industry to work on fundamental earth science questions and problems with real world applications. And she reasons that, despite climate impacts from burning fossil fuels, finding additional sources of energy is still of enormous value to society. Because our economy runs on petroleum energy, she believes that a transition to other energy sources can't happen overnight. A stable transition requires continued petroleum exploration.

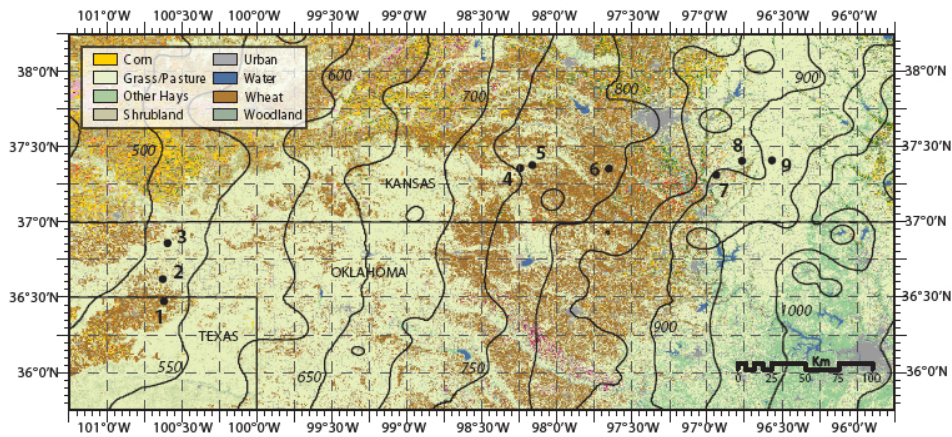
IF YOU WOULD LIKE TO TALK TO LINDSEY OR OTHER CURRENT OR FORMER STUDENTS AT THE JACKSON SCHOOL, CONTACT PHILIP GUERRERO, GRADUATE PROGRAM COORDINATOR, AT PHILIPG@MAIL.UTEXAS.EDU OR 512-471-6098.

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Gulden used surface water and water vapor data from the U.S. Southern Great Plains to test three versions of the Noah Land Surface Model. The goal: to determine how sensitive the versions were to changes in parameters.

Shopping for Graduate Schools

Gulden visited the Jackson School as a prospective graduate student in spring. She preferred Austin's sunny weather to Boston's (where she lived at the time). She enjoyed visiting with her advisor Liang Yang, a professor of climate systems science. She realized her computer skills and interests in physical processes were a good match for the research opportunities he could provide. She also was impressed by the graduate students.

"They were really relaxed, interested in what they were doing and had lives outside of school," she says, "whereas when you went to some of

the other schools, the students appeared to hate their research topics and looked overworked and depressed."

She especially liked the five years of guaranteed full support for Ph.D. students, something few institutions offer.

"Other schools had support, but they were 'sort of guaranteed,' or were only for a year or were far below the actual cost of living there," she says. "I thought, hmm, can I live on peanut butter and ramen? Will I need to get a second job to pay the rent?"

Advice for Incoming Students

After five years as a Ph.D. student, Gulden has some advice for incoming graduate students.

Always start a research project with a hypothesis, whether it's a small one for a class or your full Ph.D. dissertation. In other words, know what question you're trying to answer and then go out and try to answer it.

Do research in chunks that can be published as individual papers. "Whether you're going into academia or industry or elsewhere, no one cares if you've written a 300 page dissertation," she says, "they want to know how many papers you've published."

And finally, choose your advisor carefully. Find an advisor who is motivated by work that benefits society, or is driven by curiosity, or is passionate about teaching and mentoring. Be wary of those who are primarily motivated by prestige, she warns. For her, one of the main advantages of the Jackson School is that a student's funding isn't tied to a specific advisor.



According to Gulden, guaranteed financial support is a major draw for the Jackson School—and Austin's beautiful weather, which can be enjoyed year round at places like Barton Springs pool (pictured), doesn't hurt either.