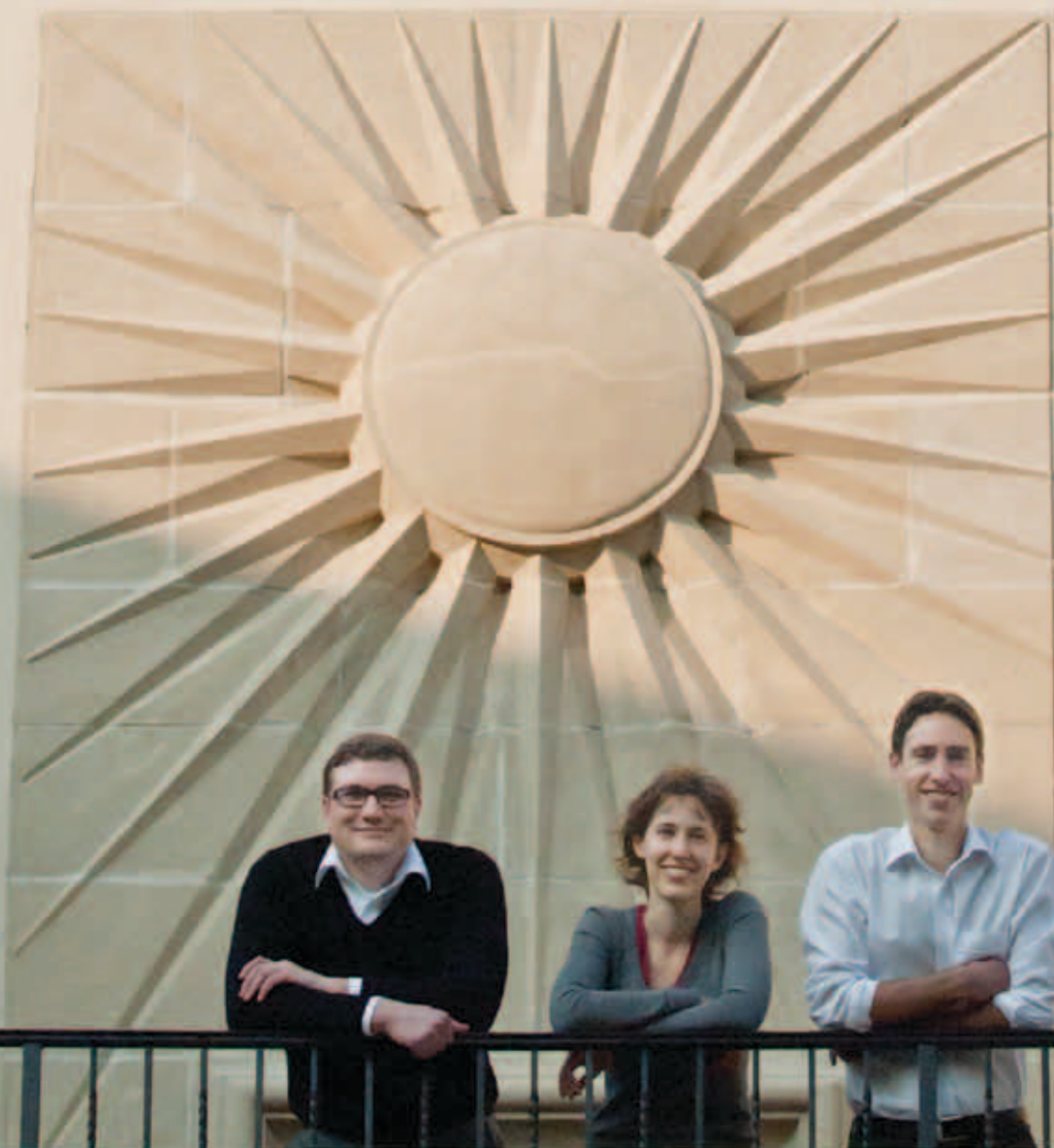


FROM THE GROUND UP

By Kathy Svitil



The transition from postdoc to professor is a pivotal phase in an academic career—the moment when you strike out on your own, as it were. Three of Caltech’s newly minted assistant professors—biochemist André Hoelz, computer scientist and economist Katrina Ligett, and physical oceanographer Andrew Thompson—tell us what it’s like.

E&S: All of you must have come in with an idea of the research program you wanted to develop. How do you take that idea and make it happen?

KL: I feel I have two challenges getting started here. One is bringing in students and postdocs, and the other is fostering a connection between computer science and economics. I’ve only been here a couple of months, but so far it’s good. There is a lot of support from both sides.

AT: I’ve got a challenge similar to Katrina’s. I do oceanography . . .

E&S: There’s not a lot of that here.

AT: Yes, that’s exactly the point. It is not traditionally something Caltech has done, but there’s a movement now to better understand the earth’s climate, and the ocean is an important part of this system. So when I was looking at coming to Caltech, the idea of being “the oceanographer” was an exciting prospect. I’m a physical oceanographer—I studied engineering as an undergrad, and I use fluid dynamics to understand how eddies of all sizes redistribute heat and nutrients on a global scale. Usually you are surrounded by other oceanographers; if you have questions, you go down the hall, and there’s likely that area of expertise. It is very different here. I’ve been in the library getting chemical and biological oceanography textbooks, because if I’m going to be effective here, I need that broader background. Recruit-

ing graduate students will be a challenge, because if someone says, “I want to do oceanography,” they may look to Woods Hole, Scripps, the University of Washington. I’ll need to attract students who came to Caltech to do physics but are interested in the environment. It will take some time to build that up, but long-term, by working with a broader group of people, I will be able to do research here that I might not have been able to do elsewhere.

AH: You don’t step on anyone’s toes here . . .

AT: [laughing] There’s not that problem. There are no toes to step on!

E&S: To Katrina and Andrew: Did you have any reservations about coming here, because there aren’t people who are doing exactly what you are doing?

KL: There’s a growing number of people working at the intersection of computer science and economics, but it’s not very many, and there are actually very few places anywhere where there is substantial interaction between the two fields. So this is a rare opportunity rather than a risk.

AT: It was certainly something that I thought about a lot. There is a strong oceanography group up at JPL that does a lot of satellite sensing of the ocean, which is where most of our data comes from, and I did my graduate work at

Scripps, which is reasonably nearby, so I felt that there were people I could see on a fairly regular basis, even if they aren’t down the hall.

AH: Mine is a totally different story. My work is essentially a continuation of a structural-biology project that I started seven years ago at the Rockefeller University.

E&S: Caltech is pretty well known for structural biology . . .

AH: Yeah, this is the place to be for structural biology. There is a very strong tradition that goes back to Linus Pauling and the correct proposal of the alpha helix and beta sheet as the primary structural motifs in protein structure. We’re sort of a little family—we have shared group meetings, shared lab meetings, and journal clubs. The synergistic effect was one of the big attractions. I had other very prestigious offers that I lost out because of that intensity and community. Another major factor was the superb infrastructure for X-ray crystallography—the Molecular Observatory—which was established with generous support from the Gordon and Betty Moore Foundation.

E&S: What is the biggest challenge for you?

AH: Moving from one place to another is always risky until you get a critical mass of people that can actually do the



KATRINA LIGETT

agenda, and helping to direct your portion of the field's research.

AT: It's a little bit scary, right?

KL: [laughing] Yeah!

AT: As a professor, if you're working on a project and it doesn't pan out, well, you've probably got two or three other projects going on at the same time, and it's fine. But if you give it to a student, and it fails, it's a big deal.

AH: That's why I said that it's very important to generate an environment where people help each other. You cannot bail out every single person. The lab has to regulate itself.

E&S: It seems like that would be a challenge for all of you. I imagine that you're all control freaks in some way, because of where you are.

AH: Letting go is the most important thing. You have to let people make their own mistakes. You would like to put a

science. And that's where most of my effort has been. I would say the biggest consideration has been generating a group spirit, and a lab culture that is supportive rather than highly competitive. It takes a great deal of energy to generate.

E&S: How much did Caltech's reputation factor into your decision to come here?

AT: It is certainly a well-respected name. Graduate students associate Caltech with a very high standard. When you're starting up a research group, you want to make sure you have very good students, and students require a lot of time. It's a big investment. If you have good ones, then you see a larger return on that investment than otherwise.

E&S: As graduate students, you work on particular projects, with a particular goal in mind. I imagine it's a different mindset when you become a professor and suddenly have to look at a much longer timescale.

AT: As a graduate student and a post-doc, I could look at a problem and say, "This is what I can do, I know how long it will take, and I know I have the skills to do it." But when you run a research group and devise projects, you have

to factor in how long it will take someone else. Will they be able to learn the techniques necessary to do it? What is a reasonable time frame? Will it be suitable for a PhD? That's something I haven't had much experience with, and I think it will be an interesting challenge.

E&S: [To Katrina] You're nodding.

KL: Yeah, there's definitely a transition from working on problems to laying out a research agenda to figuring out how a whole team of people fits into that



ANDRÉ HOELZ

bridge over every single hole that they could fall in, but that's impossible. In the end, you go crazy. You may know exactly how *you* would do it, and how to get there the fastest, but this is not the only way. That's why it's absolutely true that you need to have very strong students, because they ultimately carry the lab. They know all the techniques, and they train the next generation that comes in.

E&S: Is it scary, though, worrying, "Do I have the right people?"

AT: That *is* scary. I feel this pull between getting people in and getting a research program started, and taking the time to be sure I get the *right* people in.

KL: It's a big investment. It's a big risk. You want it to be the right people. They are going to set the tone.

E&S: How will you know when you get there, when you've built the program that you want?

KL: I don't think it's ever going to be stable, where you think, "I've arrived!"—particularly when you're talking about a handful of people. From year to year, you'll have a slightly different mix of people, in slightly different places.

AH: You always have to keep reinventing what you are doing, and the moment you are not doing that, you will be phased out. I think there should never be an endpoint. For a scientist, it would be a little bit sad.

AT: Like Katrina said, I don't think you ever say "I made it, it's done." But it will be really exciting to get to the point where people come to you and say "I've seen your research, I have a bit of a different background and think there will be some nice overlap there," and

you can say, "Yes, I'd love to bring you in because I'll be learning new things as well." That will bring a lot more diversity to the group.

That's something you can do at Caltech, because it is a small place and you've got all these interactions that wouldn't occur being with people doing roughly the same thing.

E&S: Is it intimidating coming to a place like Caltech because it is so small?

AH: And so accomplished.

AT: It is intimidating, but that's exciting as well.

AH: I think it is inspiring. Ultimately, you want to have an environment where you strive to be better. It's certainly not for somebody with a weak personality. I think everybody here has done something great, and everybody has a great shot at doing something outstanding. But it doesn't mean you don't worry, "I hope I don't blow it." [laughs] **E&S**



ANDREW THOMPSON