What Does a Professor Really do?

By: Ford Burkhart

Penguins, whales, and lots of students populate Joellen Russell’s professorial days and nights. The penguins waddle about in a landscape of oceanographic theory, where she builds statistical models of global warming and carbon uptake by the world’s oceans. The students flock into Centennial Hall twice a week for her class, a whopper, where enrollment runs up to 1,100.
That’s what professors do mostly, research and teach. For details, we followed Russell, an assistant professor of geosciences and expert on climate change, to class and asked her to write notes about her day. Bottom line: This work is not for the faint-hearted.

Each Tuesday and Thursday at 12:30 p.m., she opens geosciences 212, introduction to oceanography, with a dose of humor. The other day, Russell and teaching assistant Martin Pepper dissected a red snapper to show students how a sea creature works from the inside out. The lesson had a big “yuck” factor. Never again, she decided.

Yet the students must find the class worthy. Even without anyone taking roll, they attend, toting laptop computers and an occasional lunch, filling much of the auditorium’s orchestra level for an hour and 15 minutes of movies and photos, drawings done live by Russell, then projected onto a wide screen, and a steady flow of graphics run by a technician using Russell’s script. The class once was limited to 400 students. With 1,100 enrolled, there’s a bigger budget for technology and the eight teaching assistants.

On a giant screen, the students watch swaying 100-foot-tall strands in a kelp forest as fish swim about. They laugh as Russell struts up and down the aisles, lecturing, questioning, making eye contact with young listeners one by one, calling some by name, telling an occasional side joke to a few. When class ends, some students file up to talk about grades, a field trip, or an alternative view of a point in the lecture. Russell stays until the last students wander off.

It’s a workday much like that of most faculty members, save for the huge class, which she co-teaches with geosciences Professor George Gehrels. But that’s only a fraction of her workload. Overall, a professor is to divide time into 40 percent teaching, 40 percent research, and 20 percent service.

It starts at home, well before 8 a.m. She writes:

“During my first cup of coffee, I hit my e-mail inbox. This morning, my collaborator at the University of Pennsylvania had made some changes to our joint proposal for funding at the National Science Foundation about modeling rapid climate change in Antarctica, so I made some edits of my own, and sent it back to her — tag, you’re it!”

Thus, UA professors gather $500 million per year in UA research dollars, two thirds of the research dollars awarded to Arizona universities. Those funds help establish a scholar’s national reputation and pay the costs of expensive research programs.

Next, Russell shifts to her datebook, suggesting times to meet with Ph.D.-candidate students, collaborations that consume a large portion of her time. The relationships she builds are crucial in determining whether a new Ph.D.-level student’s job application can land on top of the stack of 200 to 300 others.

Russell moves on to the daily grind of a researcher. She turns to her academic paper, which has come back with the required anonymous criticism from top scholars, and ponders responses to the journal editor. She writes: “I plowed through the reviews of the paper that my former student — now a successfully launched National Research Council post-doc — and I submitted to the Journal of Climate.” They go through several tedious rounds of the criticism, crafting their responses.

Next, she directs her attention back to teaching. She has invited her 200-level students on a trip to the marine field station in Puerto Peñasco, Mexico, working extra hours on logistics.

All this takes place in the morning hours, before Russell heads to the campus. She writes, “After a walk with the dogs, I dropped my 2-year-old, Joseph, off at his school and stopped on the way into the office to chat with our business manager about the budget for my new research proposal and my undergraduate research assistant’s missing paycheck.”

At her office, she focuses on another class, upper-division geosciences 342, evolution of the earth, atmosphere, and ocean. Homework papers slipped under her door mean another late night of grading.

For geosciences 342, Russell kicks the intellectual level up a few notches. The class Web site includes a hypothetical review question: “You’ve invented a cold-fusion reactor that produces 4He from 1H with 100-percent efficiency. Congratulations! How many liters of 4He (STP) will you need to produce, per day, in order to replace a typical coal plant that generates 1.5 GW of energy? One mole of a noble gas occupies 22.414 liters at STP.”
But the clock is ticking. Russell heads off to plan the day’s oceanography lecture with Gehrels. She calls him “master of the geochronology universe and one of my top-10 reasons for loving my department and the University of Arizona.”

That done, she’s back at her desk and back to research. She writes:

“I checked in with Paul Goodman, my collaborator (who happens to be my husband), about the atmospheric model we are using to study the climate of the methane atmosphere on Titan, the largest moon of Saturn, with colleagues in the (UA) Lunar (and Planetary) Laboratory. Paul responded with the output from our latest experiments from a different project, where we are exploring the interactions between the uplift of the Andes and the local and global climate with colleagues in our department and at ExxonMobil.”

The clock intrudes. Time for oceanography. She walks the 200 paces across the street to the auditorium in time to talk with students before class.

“After class, I administered an exam to one of our students who is visually impaired and needs to have the maps, pictures, and graphs we use described to her. (She did great!)”

Russell says more than 100 students in her oceanography class have learning disabilities and need extra time for exams.

“When I finished giving the exam, I finally had a chance to eat my lunch, while looking up the recent publications of the speaker in a seminar over in (lunar and) planetary sciences that I planned on attending.

“After the seminar and a chat with my grad student, it was time to bike home for dinner and walk with the baby and the dogs before bath and bedtime for our little guy.”

For professors, evening is just another time for work. Fortunately, Joseph goes to bed early.

“Once he was down for the night, the second shift began — but on my back porch, under the stars, with my laptop on my knees and my puppies under my feet. Life doesn’t get any better than this!”

Joellen Russell collaborates at theUA Lunar and Planetary Laboratory with her husband, Paul Goodman, a research scientist in geosciences, and Jonathan Lunine, a UA professor of planetary sciences and physics who worked on NASA’s $3.4 billion Cassini mission to Saturn.