

Life as a professor at a small liberal arts college

Josh Sandquist^a, Laura Romberg^b, and Paul Yancey^c

^aDepartment of Biology, Grinnell College, Grinnell IA 50112; ^bBiology Department, Oberlin College, Oberlin, OH 44074; ^cBiology Department, Whitman College, Walla Walla, WA 99363

ABSTRACT We present a look at what it is like to be a professor at a small college: one professor at Grinnell College, one at Oberlin College, and one at Whitman College.

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INTRODUCTION

One of the more common careers for PhDs in the biomedical sciences is that of college professor at an institution where the focus is on teaching but there are nevertheless research opportunities. Such professorships are often found in small (<3000 students) liberal arts colleges, institutions that abound in the United States. In this essay, three faculty from small liberal arts colleges were asked to provide some information about themselves, provide specific information concerning how they spend a typical day or week at work, detail some likes and dislikes, and share some general thoughts on their careers as professors at small college. In an effort to ensure that a breadth of experiences and perspectives is provided, each of the professors is from a different institution, and each is at a different stage of his or her career.

JOSH SANDQUIST, PhD

Assistant Professor of Biology, Grinnell College, started in 2012

Grinnell College basics

Location: Grinnell, Iowa, population 9169

Founded: 1846

Enrollment: 1693

Science departments: Anthropology, Biology, Biological Chemistry, Chemistry, Computer Science, General Science, Mathematics and Statistics, Physics and Psychology, Sociology

Number of tenure track biology faculty: 14

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Address correspondence to: William Bement (wmbement@wisc.edu).

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Personal background

On leaving high school, I attended Drake University, a private school of ~3500 students located in Des Moines, IA, with the intention of becoming a pharmacist. Sometime during my sophomore year I began to realize that I was less interested in the clinical aspect of pharmacy and more interested in the basic science of pharmacology. Fortunately for me, I developed strong relationships with a couple of mentors who helped me to find summer research opportunities and steered me toward a new degree offering, a B.S. in Pharmaceutical Sciences. As my senior year approached and I thought more about what I wanted to do after Drake, I took a closer look at my mentors and their chosen professions. I really valued the interactions I had with them. I also liked that they performed research in addition to teaching and that they used their research program as a tool to expose students to real, unscripted science. I went on to do my graduate work at Duke and then my postdoctoral work at the University of Wisconsin-Madison. While at both places I felt the call of the bench, it was the one-on-one interactions, either as the mentee or later as the mentor, that I prized the most. I came to appreciate two things about science education: better educational experiences occur in small groups, and it is easiest to learn science by doing science. These experiences and realizations led me to a career at a small liberal arts school where teaching, research, and mentoring are all highly valued.

A typical week

Describing a "typical" week in my life is no easy task, in that the 16 weeks of a semester play out in a nonuniform manner. Although there is a certain weekly ebb and flow to the semester, there are also intermittent periods of intense demand on my time and faculties. Moreover, the particular constellation of tasks that consume my time is different each week, although the evaporation of all free time is one common feature. Thus the following is less a description of an average week and more a list of the types of activities that occupy my time in any given week, although I can say that the three broad activities that occupy most of my time are

course preparation, grading, and interactions with students and colleagues.

I'll begin my week by describing my Friday afternoon. This is when I tackle things that did not require immediate action when they first came up during the week but cannot be put off any longer. Such tasks may include researching a piece of equipment I need for my lab, responding to email, or posting modifications to reading assignments for next week based on the progress made over the last week. In addition, this is often when I start grading assignments turned in during the week. I usually return to similar activities Friday evening and Saturday. Having a family, I attempt to limit work on the weekends to later in the evenings as much as possible. However, a few morning or afternoon hours on one or both days are often unavoidable, depending on how much grading I have to do and what activities are planned for Monday. Evenings before class days require several hours of class preparation, and Sunday evening is no exception.

At my institution we teach five courses a year, generally resulting in alternating three-course and two-course semesters. Labs count as half a course. So, in my three-course semester, let's say two classes each with a lab, I will spend ~11 hours in class or lab per week. The amount of time it takes to prepare for these classroom hours varies depending on the nature of the lecture/activities to be given/performed in class. I find that class preparations usually expand to fill whatever time I have to give. Besides physically preparing the lecture slides/notes (which can take several hours for a 50-minute lecture if starting from scratch), at least 1 hour before each class/lab meeting is spent doing one or more of the following: last-minute writing/reviewing of lecture, reading up on subject matter outside my comfort zone, researching questions I was unable to answer during the last class, preparing points for class discussion, reviewing the wording on an assignment/quiz/exam to ensure that there are no ambiguities, making sure all materials and equipment are ready for lab, and so on. On top of preparing assignments, quizzes, and exams, they have to be graded, too. Sometimes the grading can wait until the weekend, but some things require a short turnaround so that the feedback can be used in the next assignment. Thus at times grading can create a major demand on my time, leading to late nights.

Although I spend the majority of my time preparing for class and grading, I spend what I find to be a surprising amount of time in meetings. These include regular meetings of the department and less regular meetings of teaching and learning discussion groups, as well as class-related meetings such as organizational sessions with lab instructors. Of course several hours each week are devoted to office hours with students, which are more or less heavily used by the students at different times during the semester.

The foregoing meetings are mostly scheduled events and thus able to be planned around. However, more impromptu meetings, usually with students but also with colleagues or prospective students or someone else, also take up a surprising amount of time. These may take the form of answering questions immediately after class or a surprise visit in my office. In the latter case I may find myself recapping a lecture, explaining a test answer, discussing summer research internships, or working on a student's 4-year plan. On top of in-person meetings, emails from students seem to come in 24 hours a day. I also find myself working on things for students no longer in my class, such as letters of recommendation. All of these interactions and meetings consume a significant amount of time. However, extensive interaction with students is one of the things that drew me to a small school, and such interactions are the best experiences I have.

The foregoing descriptions give the impression that weekends are busy but manageable, whereas the workweek comes across as a never-ending litany of tasks, and I have yet to mention scholarship and service, which are two other key aspects of the job. Service involves one or more commitments that can take many forms. As a newcomer I have been shielded from demanding service roles so far, and thus service obligations have not yet taken up much time. Scholarship involves many activities likely to be familiar to the reader—planning and performing experiments, ordering supplies, training students at the bench, and writing papers or grants. So far, most of my scholarship activities have involved getting my lab up and running. The tricky thing with science is that not a lot of experiments fit into sporadic 30-minute windows of time. I am thus finding it difficult to squeeze in meaningful bench work during the semester, and although I will not have lectures to prepare in the summer, I plan to have students in my lab working on independent research. Training these students and helping them design their projects will be fun and exciting but will also eat into research time.

I am not trying to downplay the importance of scholarship and service activities. Eventually, I expect to make time for scholarship and service through increased efficiencies in teaching-related activities. In fact, I felt far more efficient with respect to course preparation after only a semester. In particular, I feel like my ability to frame lectures, write exam questions (writing good exam questions was a surprisingly time-consuming process for me), grade papers, and the like is constantly improving and becoming more streamlined. I still have to work as hard, but instead of simply sprinting to keep up, I now have more time for critical reflection, which results in an increase in the quality of my work.

Likes and dislikes

I would call them stress sources rather than dislikes. Perhaps the biggest source of stress is grading. The work can be grueling at times; there are only so many lab reports I can read in one sitting. However, often the more taxing thing is assigning a grade. Making comments and suggestions are work, but generally the goal of those is still to teach. Assigning a grade, on the other hand, does not really instruct, and the letter at the top of the page is such a source of anxiety for many students. Preparing for class, in particular for a new course when last year's notes do not exist, can be stressful. Between lecture and lab I essentially have eight deadlines a week, which gets to be draining, particularly as lecture and discussion preparation is open ended, with activities such as finding that one perfect example taking up unnecessary time. Another stress is the intellectual isolation. At a small school each professor is generally the lone representative of a particular area of science. As such, I do not often have the opportunity for in-depth discussions on esoteric aspects of my research.

The sources of stress in my job are actually relatively few. In contrast, there are many things I like. The small-group or one-on-one interactions with students, while demanding, are the best part of the job. Students often have a broad curiosity that is refreshing after my years of focused research on vary narrow topic. There are also those "ah-hah" moments at the white board in my office when I find just the right way to explain something and a visible connection is made in the student's mind. Other virtues of being at small liberal arts school include having the same student in introductory and advanced courses and interacting with more non-science majors, as fewer nonmajors science courses exist. Even in my advanced class several students were double majors, with one major in the humanities. I enjoy teaching on broad topics to broad audiences because I get to learn a lot, too.

Conclusion

In the course of writing this I realized that there are a few aspects to being a professor, especially at a small liberal arts school, that have not quite matched my expectations. For one, I have many more premed students in my classes than I was expecting. Another thing, which I touched on earlier, is that with so many demands on my time I often do not feel that I have the time to be as thoughtful about and creative with my teaching as I would like to be or am expected to be. Although this will change some now that I have a base set of lectures and activities to expand on, service activities will soak up that “spare” time. As I also mentioned earlier, it is a little bothersome how much energy both my students and I spend producing a single-letter grade. It is not that I expect students to be completely oblivious to grades, but I anticipated a little more focus on the process. Together these things sometimes make me feel that my role is to generate some defined product as opposed to provide students an opportunity to expand their minds. Despite these things, I have come to the conclusion that while this job is demanding, the activities that occupy the majority of my time are ones that attracted me to the job in the first place, and those are the activities that will keep me in front of a class for as long as I am allowed.

LAURA ROMBERG, PhD

Associate Professor of Biology, Oberlin College, started in 2004

Oberlin College basics

Location: Oberlin, Ohio, population 8286

Founded: 1833

Enrollment: 2900 (2300 + 600 in the Conservatory of Music)

Science departments: Anthropology, Archeology, Biology, Chemistry/Biochemistry, Computer Science, Environmental Studies, Geology, Mathematics, Neuroscience, Physics and Astronomy, Psychology, Sociology

Number of tenure track biology faculty: 13

Personal background

Coming out of high school, I knew I was interested in science, but not in which discipline. However, in my freshman year at Princeton I took an introductory biology course and found it utterly fascinating. I was never interested in medicine, and I was not initially interested in teaching, in part because I did not (and still do not) consider myself primarily a “people person.” After graduating with a B.A. in Molecular Biology, I earned a PhD from the University of California, San Francisco, and then did postdoctoral work at Duke and then Harvard. In the course of my graduate and postdoctoral work, I noticed several things about myself and what I valued about being a scientist: first, the process of seeking underlying explanations appealed to me; second, I very much enjoyed fitting small pieces into a larger whole; third, I came to find that I enjoyed preparing for and giving lab meetings and the challenge of explaining myself clearly to my lab mates. The last two realizations provided one of my first inklings that I might enjoy teaching, as much of teaching is concerned with preparing the clearest possible explanations for students and helping them fit apparently disparate pieces into an integrated whole. To more explicitly explore what teaching might be like, I taught a class as an adjunct professor during my postdoc and then spent a year as a visiting professor before beginning my tenure-track position at Oberlin. Having taught classes where I was the one in charge (as opposed to being a TA) really helped me decide that this was a job that I wanted. Although not absolutely necessary,

these experiences likely made me a more attractive candidate for the position I landed at Oberlin.

Typical day/week

Strictly speaking, any given week can vary quite a bit from any other, so the most accurate way to describe how I spend my time is to first consider those activities and responsibilities that happen every week and then consider those that occur less often.

The first weekly responsibility is, of course, teaching. I teach two or three classes per semester, and these may be lectures, labs, or seminars. The standard lecture class is three 1-hour periods per week, the standard lab class is one 3-hour period per week, and a standard seminar might be two 1.5-hour periods per week. These times represent contact hours, and preparation time must be added to them. Assuming that the lectures are ones that I have already taught a number of times, I use an additional 2–3 hours per course per week for preparation and modification. Lab classes require setup, and although much of this is done by laboratory support staff, not all of it is, and so I usually need at least 1 hour. For seminars, preparation entails reading the relevant papers and preparing handouts, which takes 1–2 hours.

In addition to teaching, I have weekly meetings with students working in my lab and with my colleagues. For seasoned students conducting research in my lab (i.e., students who have at least a semester’s worth of experience), I spend about 1 hour a week with each of them (I usually have two or three students doing independent research with me). I also have a weekly 1-hour faculty meeting.

Some activities take more time when first undertaken. The first time teaching a course is a huge amount of work. For example, it may take 8–16 hours to prepare each new lecture. Similarly, new student researchers take far more time than their more experienced peers: I typically spend up to 8 hours a week with them. For this reason, I usually try to have the new students start in the summer.

Preparing and grading exams and assignments is intermittent but quite time consuming. For exams, besides the exam preparation itself, I have to hold group review sessions, meet one on one with students who need extra help to prepare for the exam, grade the exam, and then meet with any students who wish to go over their exam answers. For paper assignments, I prep the students, read and discuss drafts of their papers, and then grade the papers.

Once each semester, I have a series of meetings with student advisees. The meetings are not particularly long, maybe 20 minutes or so, but it is not uncommon to have as many as 20 advisees, so they add up.

After tenure, the amount of committee work increases. Tenured faculty may be expected to serve on a variety of time-consuming committees, including curriculum committees, hiring committees, and grant committees. In addition, everyone is expected to serve a 4-year stint as department Chair at least once.

That’s all during the school years; summers are for research. Nonetheless, the time commitment is significant, and it is not unusual for me to pull 40–60 hours a week during the summer supervising student research and/or conducting my own research.

Likes/dislikes

With respect to “likes,” there are many. At the top of the list is the opportunity to interact with the students. I find that it is possible to get outstanding students here, ones who are not only bright and talented, but also completely engaged in the process of learning. That is, many of the students want to interact with professors and

value the time they spend learning from them. The one-on-one interactions with students are the best part of the job. I get to know the students well, I get to talk serious science with them, and I get to watch them grow into sophisticated thinkers.

While researching, I often felt as if my efforts represented little more than a drop in the bucket. In contrast, with teaching I get direct and often rapid feedback, which makes it clear to me that I am having an impact on a person. Similarly, the hardwired requirements of teaching provides one with a continual sense of accomplishment, assuming of course that one takes care of business. In contrast, in pure research, one can literally work for years on a single topic before a paper comes out of it. I also find that the emphasis on teaching, as well as the relatively small number of faculty, has resulted in me becoming a much more broadly grounded biologist than I used to be. I understand now many things—metabolism and medical applications, for example—far better than I used to as a result of having to teach about them.

A welcome side product of increased breadth and, perhaps ironically, the relatively small size of the campus and faculty is that it facilitates interdisciplinarity. For example, I became involved in a collaboration with a math professor largely because I was sitting next to him at a faculty meeting. Similarly, the fact that we are in the same building as the chemists foments interactions that might not be as likely to happen at a larger institution where a given department is housed within its own building or buildings.

Paradoxically, one of the consequences of being at a small liberal arts school with a heavy teaching load is that you often end up spending more time at the bench than you would if you were running your own lab at an R1 institution, where the principal investigators typically spend most of their time administrating science rather than doing experiments themselves.

With respect to dislikes, they often revolve around time allocation. Specifically, it is often hard to balance my teaching and research activities. The teaching comes with hard and immediate deadlines that cannot be missed. In contrast, research deadlines are far more open ended, meaning that the one has to work hard not to procrastinate. Letters of recommendation also come with deadlines, as does grading. Although I am comfortable writing letters of recommendation for students I know well, writing letters for students I do not know well can be irritating, and I dislike grading outright. However, it is better than it used to be. I have learned how to establish and employ grading rubrics and how to write clear questions and other skills that make the grading less painful.

Oberlin and many other small liberal arts colleges are often in the middle of nowhere. Although this may make them safe places to raise families, it comes with a distinct downside: it is often hard for a partner to find a job. In addition, there is the more obvious issue of isolation that comes with transitioning from a place with a large population base (like Boston) to one with a very small population base (like Oberlin).

Then there are the “flip sides”: The flip side of the college smallness issue is that it is harder to find someone with a related specialty to bounce ideas off of, and it may be essential to develop collaborations with others at different institutions both to provide sounding boards and a place to learn new techniques or use more specialized, expensive equipment. The flip side of the student engagement is that some students can be very demanding and even a bit entitled. The flip side of direct, often rapid feedback from teaching is that when it isn't going well, one may end up the recipient of very public criticism.

Other thoughts and conclusions

My first year was very challenging. I found the job even more time-intensive than research: I was routinely working 80 hours a week my first year. A big chunk of this was lecture prep. Things improved over time as I developed my lectures and acquired test writing and grading skills. I've also become more savvy about how I approach my work. For example, I deal with the cyclical nature of the work by getting a jump start on future assignments during times when the load is lighter. That is, if I know that I am going to be presenting a new lab in the spring semester, I might start the reading for it in the fall, during times when I am not swamped with preparing or grading assignments. I also make a point of staggering exams and paper assignments and consider very carefully when to take on new students (usually the summer). I have also learned how to think very hard about what kind of experiments to give my students and how feasible they really are, given the constraints of time, money, and training. Focusing on what is cheap and dependent on repetitive labor is a good way to start. Here's a simple hierarchy as a guideline: picking colonies—great; subcloning multiple similar constructs—good; developing new protein purifications—not so good; working with sensitive mitotic cell extracts—impossible. Nevertheless, I still have to work fairly hard (~60 hours per week), and anyone who aspires to teach at a small liberal arts school should abandon the notion that it is a cake walk. That being said, I find my job very fulfilling and am more than satisfied with it as a career choice.

PAUL YANCEY, PhD

Professor of Biology, Whitman College, started in 1981

Whitman College basics

Location: Walla Walla, Washington, population 32,148

Founded: 1883

Enrollment: 1596

Science departments: Anthropology, Astronomy, Biochemistry/Biophysics/Molecular Biology, Biology, Chemistry, Environmental Studies, Geology, Mathematics, Physics, Psychology, Sociology

Number of tenure-track biology faculty: 12 faculty, but 2 positions are split by married couples

Personal background

I've always been fascinated by biology, especially marine life. My mother is a cell biologist (who later did pioneering work on gap junctions and aquaporins), and our family often took vacations to California beaches and cliffs, where she got me far more interested in tide pool life and seashells than in swimming in the surf. My dad is a chemical engineer who worked on the space program, which also inspired me. My interest in space initially won out, and I went to California Institute of Technology as an undergraduate to major in astrophysics. However, I soon learned of the exciting, new revolutions in biology there: in immunology (Leroy Hood, future inventor of the automated DNA sequencer), homeotic genes (Ed Lewis, future Nobelist), and gene regulation in development (Eric Davidson and Roy Britten). I got hooked on biology and changed majors. As a small institution, Caltech (800 undergraduates) had many opportunities for undergraduate research. I ended up working 2 years in the Davidson/Britten lab under the mentorship of Barbara Hough, who taught me the new techniques in DNA/RNA for studying genes in sea urchin and frog development. I even became a coauthor on a research paper. In my senior year, I got to be a TA in Davidson's Developmental Biology course and discovered that I loved teaching as much as research.

I decided I wanted to combine my love for marine life with cellular/biochemical/physiological approaches to discover how marine animals are adapted to survive in different environments. I went to Scripps Institution of Oceanography for my PhD and did my post-doctoral work at the University of St. Andrews in Scotland. There I not only worked on the biochemistry and physiology of muscle proteins in marine animals, but also got to teach in a physiology course. After much soul-searching, realizing how much I got out of a smaller institution as an undergraduate and that I wanted teaching, as well as research, to be valued, I started applying to small colleges. I landed a job at Whitman College in Washington State, where I was hired to teach Physiology, Marine Biology, and Developmental Biology.

Typical day/week

A week at Whitman College varies considerably. During a teaching semester, workday hours are consumed with teaching preparation, emails, student conferences, teaching itself, committee work, and some research-related activities. I grade papers, write, and catch up on journals at home Monday through Thursday evenings and Sundays, and might also do lab experiments on Sundays. Sometimes I have to work on Saturdays. I try not to work at home or weekends while on sabbatical, except during research trips.

Log for a teaching semester, spring 2013

We have a five-course teaching load (lectures, 1.0; seminars and labs, 0.5); mine is as follows:

- Fall, 2.5 load: Physiology lecture and two labs (load, 1 + 0.5 + 0.5); Student Research (0.5 load).
- Spring, 2.5 load: Marine Biology for majors (load, 1) and Marine Biology field trip (for a 45-hour week during spring break; load, 0.5); Bioethics seminar (0.5 load); Student Research (0.5 load). After a fall sabbatical, I lecture in Marine Biology for nonmajors instead of Bioethics (3.0 load)

This particular semester, I am working on the research projects noted earlier and teaching Student Research (eight students), Marine Biology for majors (28 students), Marine Biology for nonmajors (23 students), and Marine Biology field trip (21 students)

Monday: 10.5 hours

- 1) Answer numerous emails from students, research collaborators, and so on (1 hour)
- 2) Go over and fine-tune PowerPoint lecture (prepared on previous Friday) for afternoon nonmajors class (1 hour)
- 3) Prepare PowerPoint and extensive handout for Tuesday majors class; I always revise each lecture with new discoveries, which requires searching the Internet searches and reading journals (see evening, below) (1.5 hours)
- 4) Lunch in my office updating my Deep-Sea website, which is used worldwide by students, reporters, and so on (1 hour)
- 5) Lecture, 1 p.m., nonmajors Marine Biology (1.5 hours, including 10-minute setup, 80-minute lecture)
- 6) Write letters of recommendation for a student (1 hour)
- 7) Read proposals to the IRB (I am a member), writing recommendations (1 hour)
- 8) Work on paper on eel osmolytes (work done with colleague in Scotland; 1.5 hours)
- 9) Evening: begin reading this week's *Science*, *Nature*, *Science News*, *New Scientist*, and daily *New York Times* for news stories relevant to class and to my research (1 hour)

Tuesday: 12 hours

- 1) Answer numerous emails (1 hour)
- 2) Fine-tune morning lecture (1 hour)
- 3) Lecture 10 a.m., majors Marine Biology (1 hour, including 10-minute setup, 50-minute lecture)
- 4) Office hour 11 a.m.; meet with various students on their thesis writing (1 hour)
- 5) Lunch and haircut appointment (1 hour)
- 6) Administer senior oral exam with another faculty (required of all seniors; 1 hour)
- 7) Prepare PowerPoints and extensive handouts for Wednesday majors and nonmajors classes (3 hours)
- 8) Dinner 6 p.m. with selected faculty and the Trustees to discuss "teacher-scholar" model and the effect of our recent reduction in our course load from 6 to 5 (3 hours)

Wednesday: 11.5 hours

- 1) Answer numerous emails (1 hour)
- 2) Fine-tune morning lecture (1 hour)
- 3) Lecture 10 a.m., majors Marine Biology (1 hour)
- 4) Office hour 11 a.m.; meet with some thesis students (1 hour)
- 5) Lunch during a faculty committee meeting (1 hour)
- 6) Lecture 1 p.m., nonmajors Marine Biology (1.5 hours)
- 7) Prepare PowerPoints and extensive handouts for Thursday majors class (1.5 hours)
- 8) Faculty meeting 4 p.m. (1 hour)
- 9) Evening: continue reading journals and begin writing exam for Friday (2.5 hours)

Thursday: 10.5 hours

- 1) Answer numerous emails, including one from Scotland colleague on our paper (1 hour)
- 2) Fine-tune morning lecture (1 hour)
- 3) Lecture 10 a.m., majors Marine Biology (1 hour)
- 4) Office hour 11 a.m.; meet with some thesis students (1 hour)
- 5) Lunch in my office; international conference call on our NSF trench grant (1.5 hour)
- 6) Answer more emails (0.5 hour)
- 7) Administer senior oral exam with another faculty (1 hour)
- 8) Meet with colleague and student on planning new osmolyte-drink experiments (1.5 hours)
- 9) Evening: finish writing exam (2 hours)

Friday: 8.5 hours (go home a bit early!)

- 1) Answer numerous emails (1.5 hours)
- 2) Write abstract for summer conference in Scotland on our fish research (1.5 hours)
- 3) Work on eel paper (1 hour)
- 4) Lunch during department meeting to go over sabbatical replacement interviews (1 hour)
- 5) Administer exam in nonmajors class 1 p.m. (1.5 hours); I only use Friday slots for exams; later in the semester, this time slot will be taken with senior thesis presentations

- 6) Prepare PowerPoints and extensive handouts for Monday nonmajors class (2 hours)
- 7) Nonwork: attend Dean's TGIF party

Saturday

Day off! I try to get in some exercise (biking, walking), as well as do household errands and read recreational books

Sunday: 7 hours

- 1) Morning: bike in (for exercise) to work in my lab with student finishing coral analyses for a new paper (4 hour)
- 2) Afternoon: at home grading exams (which will consume several evenings to follow; 3 hours).
- 3) Later in the semester, I will have students' extensive reports from the field trip to grade, which will take all day every Sunday and many evenings

Abbreviated log for a semester sabbatical, fall 2012

I worked on four research projects and involved eight research/thesis students:

- Analyzing coral tissues from Hawaii (where I and a student worked in June) for sugars potentially important in coral-symbiont attraction
- Testing a new osmolyte-based sports drink from Danisco-Dupont, which the company based on my research (with two students)
- Implementing a new collaborative NSF grant with Woods Hole, University of Hawaii, University of Aberdeen, and NIWA New Zealand (and later with James Cameron's DEEPSEA CHALLENGE) for exploration of the world's deepest oceans (trenches); my part is to investigate biochemical pressure adaptations in proteins (involving osmolytes); with two students
- Analyzing osmolytes in endangered European eels from Scotland (where a student and I went in July); on an NERC grant to a colleague in Scotland

The sabbatical work included trips to Scotland, Hawaii, and New Zealand; here I describe a week at Whitman in September 2012.

Monday: 9 hours

Morning: Instrument, reagent prep; conference call with Hawaiian colleagues; meet with thesis student #1 to plan coral analysis; meet with student #2 to help with graduate school applications

Afternoon: Meet with student #1 to conduct first coral analysis; order more research supplies online; answer emails, begin making travel and housing arrangements for research trip to New Zealand for me and student #3.

Tuesday: 8.5 hours

Morning: Meet with departmental colleague and thesis student #4 to finalize report for Danisco-Dupont for completion of Phase 1 with their sports drink; brainstorm a new grant proposal for a Phase 2 study; finish making travel arrangements; answer emails.

Afternoon: Continue coral sample analysis with student #1; look online for analytical laboratories to help us solve the structure of an unknown molecule we found in the Scotland fish related to osmotic adaptation

Wednesday: 9 hours

Morning: Drive my pickup truck (while wife follows in our car) to repair shop for tune-up. On the way, a radiator hose ruptures. We go

to buy antifreeze and a new hose; install these; finally take truck to shop. Meet with thesis student #5 and a Whitman analytical chemist to plan her analyses of iron in seawater samples she collected over the summer with an off-campus researcher; read an advisee's Watson Fellowship application and make extensive edits.

Afternoon: Meet with a geologist who brings in a mysterious blob creature from a local stream, which I quickly identify as a bryozoan, then show him its statoblasts in a microscope; take raw HPLC data of fish-osmolyte analyses done previously for the Scotland project and convert to concentrations in tissues, with statistics, with student; answer emails; write letter of recommendation for student.

Thursday: 8.5 hours

Morning: Confer with director of college alumni office on an alumni trip I will help lead in early November to Florida Keys, which includes two lectures to alumni; book tickets to Miami; help student #7 set up equipment for his separate project on the sports drink (treadmill, refractometer for urine specific gravity, osmometer); go with wife to get pickup truck, then run to office supply store for items needed in the lab.

Afternoon: International conference call (United States, United Kingdom, New Zealand) with all colleagues on our NSF trench-exploration grant: Plan a meeting of grant collaborators and testing in November of the submersible we will use (*Nereus* at Woods Hole Oceanographic Institute); meet with student #1 to plan next week's coral experiments; find and book tickets, housing, car for Woods Hole in November; answer emails, including one from Scotland colleague on beginning a research paper on our findings.

Friday: 7.5 hours

Morning: Answer emails; meet with student #7 and his first volunteer to do initial test on athlete hydration state during workouts with and without the new sports drink (IRB has given permission).

Afternoon: Receive (by express courier) frozen corals from Hawaii and frozen amphipods from the bottom of the Mariana Trench (from Scripps Institute of Oceanography; collected by Cameron's expedition); meet with students #3 and #8 to do tissue dissections for biochemical analyses; write up draft of grant proposal for Phase 2 to Danisco-Dupont.

Likes/dislikes

The single duty that makes me most want to retire is GRADING. That has gotten increasingly tedious because 1) I now have seen the same essay answers over and over (despite trying to be creative in varying the essay questions), 2) the most recent generations of students are more demanding in terms of questioning the grades they receive, 3) enrollments in Biology have soared (this year 100 of our college's 390 seniors are life-science majors), and 4) innovative active-engagement exercises require more work. Grading is the number one reason professors near my age have taken early retirement/phase-out options.

With some exceptions, I find administrative work to be another tedious activity. This has gotten worse over the years for the college as a whole; for example, there are far more safety protocols with accompanying paperwork. A 4-year stint as Science Division Chair (somewhat like an Assistant Dean) nearly burned me out. However, some faculty enjoy administrative duties and do more over time as their research output slackens.

Whitman's isolation in a small rural city, a situation for many liberal arts colleges, has engendered both likes and dislikes. There are many benefits that drew us here to raise a family: a safe,

non-rat-race environment, a daily commute of 2 miles with no traffic jams, affordable housing, friendly citizens, and access to great outdoor activities. In addition, the college brings in many cultural events, and the city itself has many activities and amenities that have grown with the phenomenal winery industry here. But there are so many things lacking that one takes for granted in a major metropolitan area; for example, we have no Whole Foods, Costco, high-fashion shopping, large museums, zoo, or wide range of international cuisines. My wife and I have always made up for the things we miss by traveling frequently, often for research, and the College, in recognition of our isolation, provides funds for travel to meetings and research sites. So, overall we've been satisfied. But I do wish we were a 1-hour drive from a major city rather than 4 to 5 hours.

Also on the "likes" side, I have found that academic freedom and a flexible schedule make up for a lower salary compared with those in industry and medicine. I still love the teaching itself and research with students and colleagues around the world. In fact, by being at a college that not only does not expect you to do cutting-edge research (freeing you to try things that might not get funded right away) and provides travel funds to overcome isolation, I think I've been able to do more-interesting, innovative research and develop more worldwide collaborators than I would have at a large R1 university.

Changes and concluding thoughts

Over my 30-plus years as a professor, a number of things have changed in my job.

Our college has changed loads from six courses, not counting student research, before 1990, then to six courses, with student research counting as one course (1990), then to a five-course load in 2010. Also in 1990, the college increased the frequency of sabbati-

als from every seventh semester/seventh year to every fifth semester/fifth year (although the criteria for earning a sabbatical became very strict, with some faculty being denied every year). These changes occurred as my department increasingly emphasized undergraduate research and the college as a whole increasingly emphasized scholarly productivity as a criterion for tenure, sabbaticals, merit pay, and promotion. However, excellence in teaching remains the #1 criterion here. As part of that, we've been expected to implement more-active engagement techniques in traditional lecture and even laboratory courses.

When I first started out and certainly through tenure, I often worked 7 days a week during the school year, typically half of Saturday and much of Sunday. Over time, I have become more efficient at exam writing, grading, paper writing, and making time for research. As a result of this and our course-load reductions, I am now able to take off most Saturdays. Evening work is also more feasible and less stressful since our son grew up and moved away.

I've witnessed two very different tracks among the full professors here. First, as I noted earlier, there are many senior faculty who have transitioned to doing more service and less (often very much less) research. In contrast, there are those like me who have less committee and other college service work (as younger faculty tend to get elected to committees) concomitant with more research. In my case, earlier successes in research have led to even more research with colleagues around the world, which the five-course load enables me to do.

In conclusion, I feel that the core components of this profession have made it all worthwhile, despite the stresses and long hours. I can't think of another profession I would have chosen instead.