Undergraduate Educator Network Webinar

A Toxicologist's Perspective on Having and Doing it All: Teaching, Research, and Service at a Small Liberal Arts College

Sponsored by the Undergraduate Education Subcommittee of the Society of Toxicology Education Committee

Additional Panelist Responses

Speaker: Larissa M. Williams, Ph.D.
Bates College, Lewiston, ME

Panelists:

- Joshua Gray, Associate Professor, United States Coast Guard Academy
- Eli Hestermann, Assistant Professor, Furman University
- Eva Oberdorster, Senior Lecturer, Southern Methodist University
- Gregory Hall, Associate Professor, United States Coast Guard Academy and Accreditation Liaison Officer, New England Association of Schools and Colleges

A series of questions were asked of the panelists representing different institutions. In order to provide more depth than the oral responses given in the lecture, the panelists provided written answers to the following questions.

Tenure and Teaching Load

Slide 11 (5) – What is expected of a tenure-track faculty member at your school? What is the teaching load at the panelists' schools? How many research students and how much time in the lab? What are you expectations for teaching, research, and service?

Joshua Gray, United States Coast Guard Academy

Typically we have a 12 hour fall and 12 hour spring schedule at the U.S. Coast Guard Academy. A 3 credit lecture counts as 3 hours. A 1 credit laboratory also counts as 3 hours. Recently I have given teaching relief for having more research groups in lieu of teaching. For the past two semesters I have had 6 contact hours, not including laboratory research time.

An open door policy for tutoring is expected. This means that unless the time is otherwise booked for teaching or a meeting, we should tutor. I spend approximately 3-6 hours per week on tutoring.

I was told when hired that I should have on average one publication per year with no limitation on the author position (first, last, wherever).

I teach general chemistry 1 and 2, biochemistry, microbiology, toxicology, and part of the "Science of Terrorism" course that we offer.

Service: Service is a significant workload for me. For promotion to Associate, service on one or more Academy-wide committees seems to be important. I served on a committee focused on Freshman and

making their first year successful together with professors from all of the Freshman year courses. Currently I serve as the director of a faculty group working together to facilitate academic research and on a committee for program review for our major. I probably spend about 8 hours per week on committee work.

Research: Right now I have three research groups, composed of 3, 2, and 2 students. I also collaborate with the engineering department on a project related to corrosion (I consider this to be a hobby project, although it brings in money.)

Eli Hestermann, Furman University

In the biology department here at Furman, every course has a lab that is integrated into the course. We teach two lecture/lab courses each semester, so even though the math on the "hours" works differently, it sounds very similar to the rest of you. The teaching is a mix of intro and upper level courses that varies each year. This year I'm teaching cell biology, biochemistry, our methods course for majors, and an intro course for non-majors. I teach a pharmacology and toxicology course in alternating years.

Most of our research gets done in the summer months, with some minimal progress made during the school year. That is mostly due to the culture here, with change coming as we encourage more students to do research for credit during the academic year. Faculty here typically have 2-6 research students at a time; I am in the middle of that range but also host faculty and students from neighboring institutions with limited infrastructure.

We expect two publications with undergraduate authors before tenure; after that most people get a pub every 2-3 years. Collaborative publications with other institutions are valued as highly as pubs solely from your group, assuming the students had significant participation in the research. The focus here is very much on research as an avenue for undergraduate education as opposed to faculty productivity. A pub with an undergraduate author in a low-level journal is far more important than a paper without one in a top journal.

Everyone serves on at least one university committee, although these have widely varying time requirements. In addition there are departmental responsibilities that we share out collaboratively at the beginning of each academic year. On top of that, it seems we're getting ever increasing pressure from admissions to participate in recruiting activities.

Eva Oberdorster, Southern Methodist University

My answer: Like the Academy, a 3 credit lecture counts as 3 hours. A 1 credit laboratory also counts as 3 hours. Our Tenure/Tenure-track have 6 contact hours each semester, although most of them buy-out their time with grants and end up with 3 contact hours. We have several levels of faculty: Tenured/Tenure-track (like most schools), Professors of Practice (1-year teaching-only positions that will not be renewed), Senior Lecturers (in effect Tenured teaching faculty), Research faculty (no teaching), etc. Our University is primarily Tenure/Tenure track, but the ranks of teaching-only faculty are swelling in recent years as enrollment has increased.

I am a Senior Lecturer. Typically we have a 9 hour fall and 9 hour spring schedule at SMU. I usually end up doing more than that due to faculty retirements/sabbaticals, etc. Having 10-14 contact hours for me is the norm. The extra courses are seminars/special topics, or collaborative teaching—very fun and keeps me current on literature.

An open door policy for office hours is expected. We have a separate tutoring center (with free tutors to students) where I often send my freshmen (200 students in Intro Bio). I spend approximately 5-6 hours per week on office hours/virtual reviews/answering e-mails.

I teach: Intro Bio II (200+ students; I have a lab coordinator who runs the labs); Aquatic Biology with lab (I run the lab); Senior Seminar (special topics course); Intro Bio for non-Majors (as needed; up to 20 students); Human Physiology; Toxicology with lab (I run the lab); The Art of Science (co-instructor with a Professor in the Art Department; we have a new curriculum, and students need an interdisciplinary course to graduate; this fulfills that course).

Service: This has changed over the years, depending on the Provost. Most of my service has been on departmental job searches; on SOT/Society committees; but I also serve on the Board for SMU's "Center for Teaching Excellence". I also serve on ad-hoc University-wide committees, as well as MS-Thesis. Tenure/Tenure-track are expected to do at least one University-wide committee, one College committee, and advising for ~20 students.

Research: Tenure/Tenure Track faculty are expected to obtain/keep research grants for the tenure process. These have to be extramural, and it is expected that grants support grad-students. Otherwise, we do have TA salaries to support grad students earlier in their career/coursework. Publications should average 2 per year, and although it is not required, it is a bonus if you have undergraduates as co-authors. There are SMU-wide scholarships/grants available to support undergraduates in the lab. After Tenure, some faculty continue research (and buy out their teaching time), others taper off with research and do more teaching. Of the teaching tenured faculty, most still publish 1-2 papers per year, with undergraduate co-authors. Of the research tenured faculty, most publish 2-3 papers per year, with undergrads and graduate students as co-authors.

Since I am a Lecturer, my situation is a bit different. When I came to SMU, I brought a grant with me. I was doing 2-3 publications per year, many with undergraduates taking Biol 3395: Research in Biology. (Similar to tenure/tenure track faculty.) Then SMU hired a new Provost, who insisted that Lecturers were not allowed to do research. So I stopped doing research. Fast-forward a few years, and SMU hired another new Provost, and he is OK with Lecturers doing research, as long as we cover our classes. So I collaborate, publish maybe 1 paper every two years. So I guess the research/teaching varies depending on Administration.

Although I am limited to collaborations, in my Aquatic Lab and Toxicology Lab courses we run LC50 assays for one of the Chemists at SMU who is developing new nanoparticles for drug-delivery; if any chemicals turn out to be interesting, we will likely do some Biomarkers with the Tox course (currently we use B[a]P and CuCl2 in our biomarker studies). So we integrate research into our upper-level lab courses, which makes it more interesting for our students, and helps us with basic range-find assays and preliminary data for grants.

Gregory Hall, United States Coast Guard Academy

Additionally to Josh's answer, we have a variety of types of faculty. The Rotating Military Faculty who only teach here for about 4 years are not required to participate in research, but many do. They are not required to develop new courses, but in fact Toxicology was a course that an RMF faculty and I created together.

We have many fewer administrators at CGA than is typical at a institution of higher education. At the present time we only have one full-time person in Academics who isn't also teaching at least a half load, and that is our Chief Academic Officer. Therefore the senior military faculty have a heavy administration load.

I teach general chemistry 1 and 2, toxicology, petroleum and oil spill science, and physical chemistry.

Service: We have many fewer administrators at CGA than is typical at a institution of higher education. At the present time we only have one full-time person in Academics who isn't also teaching at least a half load, and that is our Chief Academic Officer. Therefore the senior military faculty have a heavy administration load, and civilian professors have a high committee load.

Research: Right now I have one research student that I share responsibility for with another professor.

Slide 6 (13) – How is tenure evaluated? What is the timing? And what things are weighted more heavily?

Joshua Gray, United States Coast Guard Academy

Tenure occurs quickly at the Academy, primarily because of the timing of military promotions. Assistant Professor = Lieutenant Commander, Associate Professor = Commander, and Professor = Captain. Captain is the highest military rank permitted at the Academy (the next one is Admiral - only the Superintendent is an Admiral).

Six years is the minimum time period for tenure. Six years following is the minimum time period for promotion to Full Professor.

Teaching is rated far and above the most important consideration for promotion to Associate with tenure. Teaching is evaluated by supervisor evaluation, with student evaluations being considered as well.

Service is probably the second most important aspect. CGA evaluates service to sports teams, extracurricular activities for students, service to section, department, academics branch, the academy in general, the greater Coast Guard, and the Department of Homeland Security.

Only recently has research become more of a priority, although this is specific to various departments. There are many examples of professors who do no research being promoted with tenure, but this situation might be changing.

Eli Hestermann, Furman University

Tenure is evaluated by tenured members of the department, then a university committee, and finally the dean and president (although rarely does the decision change after the university committee). We have a pre-tenure review in the third year to gauge progress, and the tenure application comes in the sixth year. This timetable can be accelerated for those who arrive with previous teaching experience, and can be delayed a year for family leave.

Teaching > Research > Service
Teaching is evaluated each term by tenured members of the department, i.e. every tenured member visits the class of every untenured person at least once a semester. The department chair also does annual reviews with each probationary faculty member that includes information from student evaluations. Research is evaluated in terms of publications, grants applied for and received, and external evaluations. Service (to the department, university and community) is a factor, but generally not an overriding one in tenure decisions. We spend a lot of time on advising (I have 20-30 advisees at any given time), and there has been a recent push to make this more prominent in tenure and merit raise decisions (I'm banging this email out in between meetings with advisees this afternoon!).

In the ten years I've been here, two people have failed to get tenure in the department. Both were for insufficient research.

Eva Oberdorster, Southern Methodist University

For Tenure-Track faculty at SMU, six years is the minimum time period for tenure. Six years following is the minimum time period for promotion to Full Professor. Teaching is one factor in tenure: it really can't help you, but it can hurt you. If teaching evaluations are poor, then tenure can be (and has been) denied. Same with promotion. Tenure is based on grant $$, publications (2/year minimum); successful graduate students in lab; service to Department and University.

Although I don't have tenure, I am a "Senior Lecturer", which means in effect I have been here long enough to be a permanent part of the faculty. My promotion happened during my 6th year, and was based on faculty observing my teaching, Departmental needs, and student evaluations. The latter is interesting: One can always drive up student evaluation scores by making the class easy and fun. Luckily I have a mentor here who agrees that we should have certain rigorous standards, so when my students say that it's a tough course, I do not get marked down. It is always good to have senior faculty member as a mentor to guide you through your Institutions varied unwritten rules!

Gregory Hall, United States Coast Guard Academy

Tenure does not apply to the military faculty. The Rotating Military Faculty are only here for 4 years, and the Permanent Military Faculty are involuntarily retired if they are not promoted at any particular rank. Those permanent faculty who are promoted on time are involuntarily retired at 30 total years of military service (typically age 51 or so).

Undergraduate Research

Slide 16 (9) – How is undergraduate research supported at your college? What are the expectations for you to perform research with undergraduates? How do you structure the research experience for undergraduates?

Joshua Gray, United States Coast Guard Academy

I integrate students into my ongoing research programs. An ideal model would be to have junior and senior level students working together, with the junior student picking up the reigns of the project their senior year. In reality, our students have significant time burdens that prevent them from participating more than 3-5 hours per week in the laboratory. This forces me to be patient with student research (a PCR from cells to results might take 3-4 weeks, walking them through the process of RNA preparation, etc.)

Typically I have students do very simple experiments at first using a plate reader until they become good at pipetting. I then graduate them to more and more expensive experiments. My goal is to make them exceptionally good at one or two techniques, building their confidence and capability in the lab with basic things such as molarity calculations, pipetting, identifying problems with data, etc. I treat them as technicians at first, gradually educating them on the project they are working on, providing papers to read and encouraging them to find their own. By spring break of senior year, the laboratory work is done and we work on writing a poster and preparing a talk. My best students apply for the SOT undergraduate education award and present their research at the SOT (thanks SOT for funding three students over the past five years). Sometime after they graduate, typically a year or so, I write up the paper of their work and give them coauthorship. If the work isn't finished, the next crop of students finishes the work. Because my students serve in the Coast Guard for five years after graduating, graduate school happens later.

Eli Hestermann, Furman University

My ideal model is to get students as underclassmen and pair them with a more experienced student to learn techniques (tissue culture, nucleic acid and protein isolation and quantification, qPCR, Westerns, ChIP depending on the specific project) for the first year and then move them into an independent project in following year(s). That hasn't always worked out due to the nature of student interests. Unlike others who have responded, I'm happy to take premeds who are just looking for a brief experience and can tailor the project accordingly. Since getting tenure I'm more hands-off in the lab, interacting with the students more like a PI would with grad students and letting them make mistakes and design their own projects and experiments. Every piece of data that comes out of my group was collected by my students.

Better-funded labs may have techs and/or post-docs, although because the institution sells itself on personal faculty interaction with the students it's frowned upon to have the students working only with them.

Our students can do research for credit, and writing a journal-quality senior thesis is one avenue to fulfilling a major graduation requirement.

Each faculty member has separate research space, although this came about only with the renovation of our science facilities 5 years ago. Prior to that we had to carve space out of teaching labs.

Eva Oberdorster, Southern Methodist University

At SMU, we integrate students into ongoing research programs. We try to recruit them in their sophomore year, so that by their senior year they can be productive. There are some students who use the research to 'resume pad' for Medical School and contact us late in their junior year for a 1- 2- month experience. This is not productive for us, and an extremely frustrating experience for students who are used to a more fast-paced environment (like volunteering in an ER or shadowing a physician, for example). We do have a Research course, so students can enroll in that (after they have worked in a lab, usually for a small stipend). Students are expected to give a Department-wide research seminar at the end of the Research course. Most students choose the stipend option—SMU provides the stipend to a limited # of students each year.

We have 200+ students in Intro Bio, but graduate about 45 BS/BA Biology Majors each year. Of those, probably 5-10 have worked in our labs. Maybe up to 3 or 4 others have worked in labs at UT Southwestern (the Med School down the road).

I integrate research into my two upper-level lab courses as noted above.

Gregory Hall, United States Coast Guard Academy

I integrate students into my own research interests and projects. I can only afford time for one or two students at a time, so I can tailor each project to their interests and abilities, and I just do not select students whose interests do not align with my own.

We have our students assigned to a 3 credit course, and it allows us to have the registrar schedule that time into their day. Without that system we could never compete for their time.

Slide 19 (10) – What sources of funding do you have access to?

Joshua Gray, United States Coast Guard Academy

We did not have a grants office until last month due to federal law, etc. etc. Most professors are funded through external collaboration. In the past I was a named collaborator on an NIH bridge award and American Diabetes Association grants. My current funding is as a named collaborator on a R01 from NIH.

I have found that working with a PI at another institution is ideal. I spend my summers working in their laboratory, writing and doing the majority of my research. I bring back projects for undergrads to work on during the academic year. Sometimes these projects are risky, but the labor is free and we try to minimize the cost. Even failed projects are valuable for undergraduates, so high risk/high reward has been my model. My collaborator has animal model systems, expensive equipment (confocal), and time. I am cheaper than a post-doc (only costing two months salary per year), provide lots of labor in the form of undergraduate students, and can write better than a post-doc, helping to augment the PI's own output of papers. It is a mutually beneficial relationship.

We also receive significant funding at the end of each fiscal year from the greater Coast Guard and compete for the money internally.

Eli Hestermann, Furman University

Students can receive a summer stipend through a university endowed program, although >half my students are typically funded by external grants, which pay better. My own summer salary and supplies have come from a personal R-15 as well as NIH and NSF money that come to the institution through statewide INBRE and RII grants. These last are competitive, but not nearly as much so as single-investigator awards. Then again, the money isn't as good. Until quite recently it was taboo here to buy out of teaching, but this is changing as some awards require more time and funding has become scarcer.

Like others, I've also had success collaborating with friends at research universities.

Eva Oberdorster, Southern Methodist University

The Tenure/Tenure track faculty are on extramural grants. When those dry up, there's a Departmental slush fund that gets used to carry you over until the next funding cycle. But that only lasts one year. After that, you either get a grant or increase your teaching load back up to 6 hours. We have several Tenured faculty who no longer do extramurally-funded research, and teach and do service (someone has to sit on all those Committees!). We have various undergrad research scholarships that pay both a stipend and small supply fee. (SMU has an enormous endowment.)

Gregory Hall, United States Coast Guard Academy

We historically have received funding from many sources, including the Coast Guard's Research and Development Center, but we are in a time of transition with our new grants office.

As the Chemistry Dept Head, I also put aside money each year to help fund labs of rotating military faculty and new professors who have not had an opportunity to compete for a grant.