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Fricker, Ronald D. Jr.

Fricker, R.D., Jr. (2008). Looking for a Few Good...Statisticians: Being a Government Statistician at the Naval Postgraduate School, *Amstat News*, August.

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Looking for a Few Good ... Statisticians

Being a Government Statistician at the Naval Postgraduate School

Ronald D. Fricker Jr.



Fricker

To me, the term “government statistician” immediately brings to mind someone working at the U.S. Census Bureau. Or perhaps someone affiliated with a federal health agency, such as the National Center for Health Statistics. What it does not bring to mind is someone working in the Department of Defense (DoD), even though, as an associate professor in the Operations Research Department of

the Naval Postgraduate School (NPS), I am such a statistician.

There are a number of reasons “statistician” is not generally associated with “DoD,” but a big one is that most applied mathematical disciplines are grouped under the rubric of “operations research” in DoD. As my own department defines it, operations research is “... the development and application of mathematical models, statistical analyses, simulations, analytical reasoning, and common sense to the understanding and improvement of real-world operations.” Hence, though I am a statistician by training and in practice, I am an associate professor of operations research in the DoD and at NPS.

What Is the Naval Postgraduate School?

Located in Monterey, California, NPS was founded almost 100 years ago as a graduate school in marine engineering. The institution now has four graduate schools and, in addition to traditional engineering sciences, students may study operational and information sciences, information security, modeling and simulation, space systems, business and public policy, civil-military relations, stabilization and reconstruction, and regional studies.

In many ways, my position here at NPS is just like that at any other university. But, in other ways, it is quite different. The differences stem from NPS’ mission: To provide relevant and unique advanced education and research programs in order to increase the combat effectiveness of the U.S. and Allied armed forces and to enhance the security of the United States.

The resident student body is predominantly active duty U.S. military officers (approximately 1,500 at any given time) drawn from all military services. But, it also includes approximately 300 foreign military officers from more than 50 countries and a small but growing contingent of civilians. We also have a large distance learning program, with more than 1,000 students located all over the world. Most of our students are enrolled in master’s degree programs, though PhD programs are growing. For example, the



Naval Postgraduate School, Monterey, California
Courtesy of <http://cisr.nps.navy.mil/WECS6/images/campus.jpg>

Department of Homeland Security has just begun sponsoring a PhD program in operations research.

One distinguishing feature of NPS is that the majority of students are working military professionals. On those days when they don’t wear their uniforms, they look pretty much like students anywhere else—but they’re not. Our students fly jets and pilot ships and submarines. They’re military acquisition specialists and logisticians and engineers. In our homeland security program, they’re police chiefs and fire chiefs. Prior to coming to NPS, many deployed to dangerous places, and, after completing their education at NPS, many will deploy back to those dangerous places.

Not only are NPS students highly self-motivated—by definition, they’re all leaders and professionals in their chosen occupations—but they are actually judged in their careers by their level of success at NPS. For them, failure in their graduate education is not an option, and students work as hard and as long as they have to in order to succeed in class. And talk about polite—how many of your students routinely call you “sir” or “ma’am”?

In addition, because promotion in the military is entirely from within, we have the pleasure of watching our students advance into positions of significant responsibility. For example, the current chair of the Joint Chiefs of Staff, Adm. Michael G. Mullen, is an NPS operations research graduate. Indeed, as Jerry Brown, a professor and colleague (who was Mullen’s linear programming instructor), likes to say, “Take good care of your students. They deserve it, and eventually you’ll be working for one of them.”

“Broadly speaking, I have three main jobs: teaching, thesis advising, and research and publishing. In this regard, there is little divergence from the usual academic environment. The differences are in the details.”

What Does an NPS Professor Do?

My responsibilities as an NPS faculty member are very similar to those at other universities. Broadly speaking, I have three main jobs: teaching, thesis advising, and research and publishing. In this regard, there is little divergence from the usual academic environment. The differences are in the details.

So, what are those differences? One is that NPS operates year-round on a quarterly system. As working professionals, our students do not have the luxury of taking the summer off, thus neither does NPS. We have new students starting and graduating every quarter. In fact, our quarters essentially run back-to-back, with one quarter ending on a Friday and the new quarter starting on the following Monday.

Now, while the institution does not take a summer break, as a member of the tenure/tenure-track faculty, I do have teaching breaks. The nominal teaching load is four classes per year, which currently means I teach two classes every other quarter. Those quarters when I am not teaching are devoted to research and publishing, much like faculty at other universities, though my research is often focused on national security problems and issues.

Because our students come to NPS with a background in their military professions and as professionals in their own right, they bring to the classroom a desire for relevancy in their education. As another of my colleagues, Sam Buttrey, likes to say, the usual statistics class lecture starts by describing a methodology, proceeds to developing its theoretical properties, and then concludes with an application example. At NPS, we start with the example—preferably one tied to a military application or problem—because our students first want to know why something is important and then what it applies to.

A significant deviation from the practice at many civilian universities is that I don't have teaching assistants. The government does not pay NPS students to be teaching assistants; it pays them to attend class and complete their degrees. Hence, in my classes, I personally give every lecture, proctor every exam, and grade every homework assignment and test. On the other hand, class sizes are capped at a maximum of 25 students, so I get to spend more time with individual students.

My teaching venue is also broader than the local classroom. Not only do I teach a variety of distance learning classes, but I also have the opportunity to travel to teach various short courses. For example, I go to the Naval War College each year to teach part of a course on analysis for the warfare commander. Similarly, I recently returned from the Marine Corps base in Quantico, Virginia, where I taught a five-day short course on survey research methods.

In my distance learning classes, I use a wide range of technology to teach. Many of these classes are taught via video tele-education (i.e., two-way television), where I often have as many as 10 sites with students located from Maine to the Pentagon to San Diego. I've also taught "asynchronous" courses, in which my lectures are recorded and made available via the internet. In such courses, I've had students as far away as Guam, and even a few

at sea. In fact, I've held "office hours" by phone with a student on an aircraft carrier in which I could hear planes landing on the flight deck.

What Is Defense Research?

While the uninitiated often think of defense research as that directly related to warfare, it is significantly broader. The DoD is a large and diverse organization, with all the management problems, issues, and challenges that come with a large organization—and then some. As such, there are many interesting research problems, of which only a small subset are directly related to warfare.

For example, I'm currently working with a thesis student to understand how the Marine Corps can improve its data systems for measuring civilian employee workplace injuries (and hence mitigate such injuries). I'm also working with another thesis student to model nurse staffing at a military hospital. In the past, I have worked with thesis students on problems such as assessing the effects of "individual augmentation" deployment on retention of Navy personnel and modeling the flow of enlisted Marines up through the ranks.

My personal research interests are related to biosurveillance and survey research methods. With respect to biosurveillance, I'm developing spatio-temporal methods that can be used to detect a disease outbreak (or bioterrorist attack) quickly, yet within tolerable false positive rates, and by first responders to identify the location and spread of the outbreak or attack. The connection here is less to traditional military roles and missions—though DoD does have biosurveillance systems—and more to homeland security. In terms of survey research methods, I'm interested in understanding how traditional survey techniques (i.e., sampling, instrument design, and fielding methods) should be modified to most effectively conduct electronic (mainly web-based) surveys. The connection to the military is that I'm also interested in how such methods should be modified to maximize response rates in military populations.

Oh, and speaking of research, did I mention data? For some of the defense research problems I have worked on, I've been awash in data. For example, on the project assessing the effects of individual augmentation, we used the electronic personnel files of everyone who had been in the Navy for the past decade—almost 900,000 longitudinal records and 4.5 gigabytes of data! Such massive data sets, while a blessedly rich source of information, can sometimes be a curse. Simply transmitting, handling, and manipulating them can be a challenge. And they frequently raise interesting philosophical questions such as "Am I dealing with a sample or a population?" that sometimes do not have a clear answer. Nonetheless, how often do you have access to such data?

So, that's a short synopsis of one type of "government statistician": a professor at the Naval Postgraduate School. If any of this sounded interesting, I would be remiss in not mentioning that we're hiring. Or perhaps I should say, "We're looking for a few good ... ummm ... statisticians." See www.nps.edu/Academics/GSOIS/or/recruiting.htm for details. ■