THE *NUCLEAR NEWS* INTERVIEW

Mary Lou Dunzik-Gougar: Idaho's 2 + 2 Scholars Program

A new university program brings nuclear engineering students together to work at INL's Advanced Test Reactor, Hot Fuel Examination Facility, and other facilities.

Mary Lou Dunzik-Gougar, assistant professor of nuclear engineering at Idaho State University (ISU), is in charge of a new initiative called the 2 + 2 Scholars Program. The program brings together nuclear engineering undergraduate students from three Idaho universities—ISU, the University of Idaho (UI), and Boise State University—to spend their junior and senior years in Idaho Falls, attending classes at University Place (a joint campus of ISU and UI) while working as interns at the Department of Energy's Idaho National Laboratory (INL). Scholarship funds are provided by the Areva Group and the DOE.

Dunzik-Gougar, who is also an affiliate staff scientist at INL, has been at ISU for about two years and has worked at INL and its predecessor, Argonne National Laboratory–West, for eight years as an employee and a graduate student. She talked with Rick Michal, *NN* Senior Editor, about the 2 + 2 program.

Dunzik-Gougar: The program "grooms undergraduate students for careers in nuclear engineering."

What is the 2 + 2 Scholars Program?

It is a program that grooms undergraduate students for careers in nuclear engineering. The very first class, consisting of junior-level nuclear engineering students from ISU, Boise State, and UI, started with this year's fall term and is now under way. The way the program works is that the students spend their final two years in Idaho Falls, attending classes at University Place while working as interns at INL. At the end of the program, the students receive their degrees from ISU.

How many students are participating in the program?

The first 2 + 2 class has six students—four from ISU, one from Boise State, and one from UI. We strive to give them special opportunities by allowing them to work closely with INL researchers, using some of INL's state-of-the-art facilities.

The program got its name because it is aimed at students as they enter into their junior year, which is when nuclear-specific courses normally start. So, for the first two years of university life, the students take their general engineering courses, which are pretty much the same at all three Idaho universities. That's the first "2" in the name. Then, for their second two years—the junior and senior years—the students come to live and work in Idaho Falls, where most of INL's facilities are located. That would be the second "2." The main ISU campus is located about an hour away in Pocatello, so it's a relocation not just for students from Boise State and UI, which is located in Moscow, Idaho, but for ISU students, too. We want the program to be like a small family—we do everything possible here in Idaho Falls, where we have access to INL's expertise and facilities.

How does the 2 + 2 program differ from a traditional nuclear engineering program?

The basic education, the course content, for a nuclear engineering B.S. program will be the same for students at any university in the United States. The 2 + 2 program offers unique opportunities beyond the core of the curriculum. The students are provided financial support, as well as special elective courses according to the expertise at INL, field trips to INL and other regional facilities, and a six-month practicum experience working on projects—incorporating the required senior design project—at INL.

What sort of scholarship is involved for the students?

Scholarship funds, totaling $90 000, have been provided by the Areva Group and the DOE. For this first year, Areva provided $50 000, to which the DOE added $40 000 through its industry matching grant pro-

gram. Areva has also committed to providing the program with $50 000 per year for a total of five years.

Students directly receive at least 70 percent of this funding through the payment of ISU tuition and fees, a book allowance, a monthly stipend, and support for professional development activities such as ANS meeting attendance.

Does the program have a five-year goal?

Yes, it does. The goal is to have an incoming class of 12 students every year. This incoming class, consisting of 12 juniors, would follow the class of 12 seniors already in the program, for a total of 24 students in the program each year. That is our initial goal, but I can see the program extending to multiples of 24, if there is such an interest from students. At the same time, however, we don't want to lose that "small group" support environment that we're trying to foster because, let's face it, nuclear engineering is not an easy subject.

What are the fields of research in the program?

We're trying to build an emphasis in Idaho on fuel cycle, but there are many areas of interest, such as space nuclear power, nuclear nonproliferation, energy policy and systems studies, fuel cycle chemistry and radiochemistry, and energy and the environment. The students work in areas that are of interest to them, but involve activities that are going on right now at INL.

Will the program involve hands-on activities using some of INL's facilities?

Yes, depending on what a student may be working on. One of our students is currently doing computer modeling for the DOE's Advanced Fuel Cycle Initiative, and another is working at the Advanced Test Reactor. Other students may work at INL's Hot Fuel Examination Facility, Fuel Conditioning Facility, or Remote Analytical Laboratory and Analytical Chemistry Laboratory.

Who works with the students during the program?

A variety of people do. We have instructors who are experts at the lab or are from the universities. The students get a wide range of experience in the classroom.

How did the program get started?

In 2003, the Idaho State Board of Education approved the establishment of ISU's Institute for Nuclear Science and Engineering. The institute, which is directed by Michael Lineberry, was created to encompass all things nuclear at ISU and to promote and facilitate collaboration with INL. The institute was designed to go beyond the traditional limitations of a college in order to avoid what I'll call "departmental inertia." We needed to be able to say that there are things happening in the Physics Department, in the College of Engineering, and in Biology and Medicine that are all very exciting and relevant to nuclear, and that there is an opportunity to pull them all together and manage the momentum and the collaborations with INL.

The idea was for the institute to span not only across colleges at ISU, but also across all three state universities—ISU, Boise State, and UI. All three universities have since signed a memorandum of understanding and are working together so that most things nuclear are promoted through the institute. UI offers expertise in mechanical and chemical engineering aspects of nuclear. Boise State focuses on energy policy issues and on nuclear materials. ISU contributes through its expertise in the more traditional areas of nuclear engineering and nuclear physics. It's a great combination that works to collaborate with INL. We can use what INL has, and in turn, INL gets to use our facilities. So, it's mutually beneficial.

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The idea for the 2 + 2 program actually occurred at a meeting of all three universities' vice presidents for research. Students in their junior and senior years would spend their time interning at INL. This was kicked off in 2004, when the Idaho State Board of Education approved a bachelor of science degree in nuclear engineering. Before that, the state of Idaho didn't have a nuclear engineering bachelor's degree, but rather an ABET-accredited interdisciplinary degree with a nuclear emphasis at ISU. With this new degree program in the state, and the new mission of INL to become the nation's center for nuclear technology, all the ducks were in a row to set up an initiative like 2 + 2.

The program attracts students from the three Idaho universities, but only ISU awards degrees upon graduation, is that right?

That is correct. It really has been somewhat unprecedented to have such cooperation among universities. Boise State and UI are actually encouraging their students to apply for this program. When they graduate, their degrees will say Idaho State University. It was a huge buy-in by the other schools to let us take some of their students, and it told us they believe strongly in the program. In fact, those universities let us come in to recruit their students.

Ideally, we would like to have a joint degree in place. In other words, students transferring from UI would have the names of both UI and ISU on the degree, and the equivalent for Boise State transfer students. That idea should soon be going to the Idaho State Board of Education for approval.

How do students get into the program?

There is an application process. Students are evaluated according to their grade point average, courses completed, statement of interest in the nuclear field, and letters of reference that address not only their academic performance but the type of person they are. The number of students accepted into the program this first year was limited to six by the funding available.

Do students who don't make it into the program feel somehow left out of the whole nuclear engineering education process?

That's a good question. I can tell you that I had the opportunity to be a final judge on deciding who got into the program. I had to notify not only the students who were accepted, but also those who weren't. My impression is that they were very understanding of why they weren't chosen. Some of them applied in the hopes that perhaps there wouldn't be enough people for the open positions and they might have a chance to get in. For example, some didn't meet the minimum requirements for the GPA. I want to point out, however, that there are a lot of things going on for all nuclear engineering students, even those not in the 2 + 2 program. For example, at ISU we have an active ANS student section, and we all take field trips and so on. All of those extra things that we're doing for the 2 + 2 students have been opened to the other students as well, so that everyone benefits. It's really a "nobody loses" situation.

What are the requirements for being accepted into the program?

The minimum requirements are a GPA of 3.0 and completion of the basic sophomore-level courses of an engineering cur-

riculum. These courses include differential equations, engineering physics, statics, dynamics, and chemistry. Beyond this, we look for evidence of self-discipline, strong motivation, and hard work.

What about research at INL—do students not in 2 + 2 get to participate in that?

INL, like many other national labs, has opportunities for students, for faculty, and for visiting scientists. The most popular and the biggest program is its summer internship program. Students come for a 10-week period in the summer, and they are paired up with a scientist or engineer to work on a project. Any student who applies is eligible to be selected as an intern. Even before the 2 + 2 program started, I was helping place students from ISU and really any student who contacted me. I would do that for students from Penn State, the University of Wisconsin, and other schools. I consider it part of my job to help place students at INL.

What the 2 + 2 students will do is a bit beyond what a regular intern experiences. We track down positions for them to start in the summer, the same as for a regular intern. The 2 + 2 experience is different because those students work together on projects, unlike a regular intern working on one project. Together the 2 + 2 students work on something that's a little bit above what the average project would be, in that we want this to be something that might possibly be published for a professional or technical meeting. In addition, the 2 + 2 students will stay at INL beyond the normal 10-week period for regular interns and will continue working part-time into the fall semester of their senior year. Also, 2 + 2 students will bring other engineering students on board during the fall semester to use their INL projects for senior design project efforts.

Is the 2 + 2 program strictly Idaho-focused, or could universities from other states get in? Could similar programs be set up at other universities working in conjunction with other national labs across the country?

I think there is great potential for this idea. There is no reason it can't be expanded beyond Idaho to regional schools, or even to other schools in the country that are interested in the program. Funding would be the biggest issue in order to support those students coming to the program.

With INL's new focus to become a national center for nuclear technology development, one of the groups it collaborates with on research is the Idaho University Consortium, made up of the three Idaho universities we've talked about. There is also research collaboration with the National University Consortium (NUC), which includes the Massachusetts Institute of Technology, Oregon State University, North Carolina State University, Ohio State University, and the University of New Mexico. If the 2 + 2 program in Idaho were to accept a student from a university outside the state, it would be logical to look first to one of the NUC schools. In an ideal situation, we would have one of the program's 12 students coming from MIT, for example. That student, like the other students, would participate for two years in the program and finish his or her degree in Idaho Falls. The 2 + 2 program is something we would like to see spread. We're starting something that we hope will work, and it seems to be doing well. We hope there will be a lot more programs like this because we do need more nuclear engineers and more innovative programs like this.

What about worldwide participation?

There is no restriction on foreign students' participating in the program. There probably will be slight differences in what we can and cannot do with respect to INL appointments for foreign students, but that's just the reality of working at a national lab in the heightened security atmosphere that we live in today.

Was there a real need for the 2 + 2 program?

Yes, definitely. Some students may have the perception that nuclear is a dying field. Those of us in the field realize it's not true, of course, but for young people thinking about careers, they don't want to get into something that they think is dying. So, we wanted to "beef up" the field such that we can show them all the new and exciting things that are going on. We are hoping the 2 + 2 program does just that. NN

Correction

Because of a production error, the last line of the article "So, what's up with education and R&D?" in the November issue of *Nuclear News* (page 34) was inadvertently omitted. The final paragraph should have read:

> Lineberry said that the IUC and the NUC will work to engage other universities in the United States and around the world in recognizing INL and CAES as a focal point in the advancement of education in nuclear science and technology. "The universities are poised to play a role in INL's research," he said. "All of this is still very much in the growing stage, but the universities surely want to be active in the research, not only with their faculty but with graduate students."