GoNERI offers a new direction for nuclear energy education in Japan

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GoNERI offers a new direction for nuclear energy education in Japan

BY RICK MICHAL

What is billed as a first-of-a-kind program for post-graduate and doctoral nuclear energy education is being offered by the University of Tokyo (UT). The program, known as GoNERI (Global Centers of Excellence Program on Nuclear Education and Research Initiative), uses a systematic method in its teaching and incorporates liberal arts with social and technical subjects as they relate to the use of nuclear technology. GoNERI, which was introduced at UT last year, is not a separate series of classes within the university’s Department of Nuclear Engineering and Management, but is a new teaching direction that encompasses that department and other university branches.

GoNERI is the brainchild of a UT team led by Yoshiaki Oka, a professor in the Department of Nuclear Engineering and Management and UT’s Graduate School of Engineering. Oka explained that mankind has had an increasing effect on the environment through greenhouse gas emissions, and that nuclear power can be used to reduce emissions. GoNERI’s goal, then, is to cultivate students who understand the connection between energy production, society, and the environment.

Students who participate in GoNERI will be ready to move into the nuclear industry’s workforce equipped with certain capabilities, according to Oka. They will be prepared to study nuclear energy’s regulatory system, identify problems, and find solutions; will have the necessary expertise to serve in policy-making roles; and will be able to communicate with the public on the social aspects of nuclear power. “We will prepare next-generation researchers to grasp the perspectives of complicated and divergent fields of nuclear energy,” he said.

The program’s research projects and educational focuses are “well rounded,” Oka stressed, in that they involve subjects that are tied to the use of nuclear technology, such as protecting the global environment, supplying safe and stable nuclear energy, and applying radiation for healthy, productive, and prosperous lives.

By employing a new approach, GoNERI aims to fill the gaps that exist in traditional programs, where students learn about nuclear power engineering but may be lacking in their knowledge and understanding of human and social sciences. “If we want to seek new development of nuclear power, we cannot avoid this problem,” said Satoru Tanaka, a nuclear engineering professor at UT and a leader in the development of GoNERI.

Oka added that efforts continue in honing GoNERI, mainly in the fields of humanities and sciences. Specialists in humanities are working on promoting the program, while professors and researchers primarily from the humanities and sociology fields have been employed in GoNERI’s education courses and research programs. In addition, dozens of people from the nuclear industry, research institutions, and the Japan Atomic Energy Agency have cooperated with GoNERI in various ways.

GoNERI was created under Japan’s Global Centers of Excellence (COE) program, which was established in 2002 by the Japanese government. According to the Japan Society for the Promotion of Science, COE provides funding to elevate the international competitiveness of Japanese universities. Through the funding, COE seeks to strengthen and enhance the education and research functions of graduate schools and to foster highly creative young researchers who will go on to become world leaders in research in their respective fields.

The GoNERI program was approved as a COE initiative in June 2008, and it received funding for its establishment in September. Besides GoNERI, COE programs have been established at UT for life sciences, materials sciences, electrical and electronic engineering, humanities, and interdisciplinary areas.

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Collaborative activities across the ocean

During its inaugural year in 2008, the University of Tokyo’s GoNERI program had an active relationship with the University of California at Berkeley, as follows:

**Nuclear Technology and Society—Needs for the Next Generation**

The joint international workshop, held January 6–9, 2008, at UC–Berkeley, hosted 13 UT faculty members along with researchers from the United States.

**UC–Berkeley Forums and Workshops**

GoNERI and UC–Berkeley collaborate to hold forums and workshops at UC–Berkeley to address the key issues for sustainable nuclear energy in the future. The second forum, on sustainability, safety, and security of nuclear technology, was held June 12–13. The third forum is planned for this year, with the title “Nonproliferation in the Global Nuclear Renaissance.”

**Advanced Summer School on Radiation Detection and Measurement**

About 50 participants listened to 19 lecturers during this session held July 21–25 at UC–Berkeley.

**GoNERI International Symposium**

The symposium, held on October 10 at UT, included lectures on experiences in nuclear education and research, as well as a panel discussion on nuclear education in universities. Jasmina Vujic and Joonhong Ahn, professors at UC–Berkeley, were invited speakers.

The two universities last year also held a symposium and workshop at Berkeley on general issues concerning nuclear power, designed to help doctoral students plan their future careers (see sidebar). Exchange programs that followed the symposium included an international summer school on radiation detection and measurement, which was held mainly for faculty members from the two universities. Also, an Asia-Pacific forum on the sustainability, safety, and security of nuclear technology was held in June, hosted and organized by UC–Berkeley, cosponsored by UT, and financially and administratively supported by GoNERI, among other institutions. The third Asia-Pacific forum will be held in Berkeley in June, with a focus on nonproliferation in civilian nuclear energy. UT will again participate as a cosponsor.

Other activities include classes at UC–Berkeley that are transmitted online weekly to the GoNERI project office in Japan; UC–Berkeley Nuclear Engineering Colloquia

Weekly sessions held at UC–Berkeley are broadcast to UT using video-conferencing devices. The sessions are now provided as a course with units in the UT graduate program. Researchers from around the world are invited to give technical presentations. On November 3, Prof. Ying Chen of UT was invited to give a talk on the computational study of defects in ceramic fuels.

**Joint Seminars on Reactor Physics and Thermal Hydraulics**

The first meeting of the monthly joint seminars on the subject was held on November 6. The seminars consist of three-way video-conferencing that connects UC–Berkeley and UT’s Tokyo and Tokai campuses. Participants include professors Yoshiaki Oka, Ehud Greenspan, Per Peterson, Jasmina Vujic, and post-doctoral and graduate students from the three locations.

**Seminars on Social Science for the Nuclear Fuel Cycle and Radioactive Waste Disposal**

This series of seminars with invited lecturers from Japan and the United States is held twice a month by use of video-conferencing devices to connect UT and UC–Berkeley. The goal is to construct a social science educational program for nuclear engineering graduate students.

**Liaison Office at UC–Berkeley**

A GoNERI liaison office has been established within UC–Berkeley’s Nuclear Engineering Department. Young researchers from UT serve there as UT representatives in the management of collaborative activities.

UT reciprocates by offering online information to UC–Berkeley. Also, online seminars on radioactive waste issues are held regularly and include the participation of faculty members and researchers in the field of nuclear energy sociology. A goal of UC–Berkeley is to establish a nuclear research institute similar to GoNERI.

The spread of GoNERI is not stopping at the West Coast. Exchange programs with other universities in the United States, France, South Korea, and the United Kingdom have already begun, and jointly organized symposia and workshops have been established with China’s Tsinghua University, Shanghai Jiao Tong University, and Xi’an Jiaotong University.