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# Newsletter

Academy for Global Nuclear Safety and Security Agent

## ~Outline of the Academy for Global Nuclear Safety and Security Agent~

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\*U-ATOM (Unique Atom)

At the Academy for Global Nuclear Safety and Security Agent, we have a unique new nuclear education program featuring a full boarding system. We have named this program U-ATOM, combining the letter u (from “unique”) with “atom.”

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### ● Message from the Program Coordinator (Head of the Academy)

We have started a new program for leading graduate schools called “Global Nuclear Safety and Security Agent,” with the unique features of a full boarding system and a curriculum that combines education in liberal arts and engineering.

While the coming of peak oil is projected, energy consumption in emerging countries is skyrocketing. Securing a stable and long-term energy supply is an urgent task for all of us, and many countries are seeking an increased share of nuclear and renewable energy sources. Japan has been on the cutting edge of world-class research, development and utilization of nuclear energy. Nevertheless, we face new challenges:

- On September 11, 2001, a large-scale disaster resulting from an international terrorist attack occurred in the United States. Nuclear power plants were among the intended targets.
- In July 2008, the G8 Hokkaido Toyako Summit in Japan highlighted the importance of 3S (safety, security and safeguards) associated with the use of nuclear energy. Japan declared that it would take a leading role in pursuing better 3Ss.
- In April 2010, during a nuclear security summit held in Washington, Japan stated its intention to set up a support center that would promote global nuclear security.
- On March 11, 2011, the Great East Japan Earthquake and subsequent Tsunami triggered a severe and large-scale nuclear accident at the Fukushima Daiichi Nuclear Power Station.

Even given those challenges, the global community recognizes that nuclear energy must play an essential role in sustainable development. Further, Japan has a unique role to fulfill: recover from the Fukushima accident, learn from it, and contribute to the safe operation of the nuclear power plants in the world.

The Tokyo Institute of Technology (Titech) thinks Japan may suffer from a shortage of human re-



sources to fulfill the above tasks, so it is an imperative for Titech, by fully utilizing its resources, to educate students so that they may take a leading role globally in public sectors, academia and industry in the use of nuclear energy.

Titech recognizes the challenges before us that we need to tackle through human resource development in this educational program. The challenge is to control threats that may arise from the use of nuclear energy—such as nuclear proliferation, nuclear terrorism, large-scale nuclear disaster resulting radiation exposure to the public—primarily in the field of nuclear safety and security.

Tackling these challenges and finding solutions will contribute to the well-being of humankind by building a safer and more peaceful world. We will train students to serve global nuclear safety/security professionals with the communication skills and social literacy to become international leaders in this field.

Those selected will join a full boarding program at the center called the “Global Nuclear Safety and Security Agent Dojo,” living and learning together with supervisors, who will also serve as their mentors. They will not only care about their students but also help them to become leading global professionals through stimulating discussions.

## ● Outline of the Academy

To train applicants to become world-class leaders in industry, the public sector and academia in the field of nuclear energy both domestically and internationally, we offer a balanced, systematic and high-level education in both coursework and research mentoring. The structure of the program is as follows:

### 1) First-Year Student Course System with Laboratory Rotations (currently offered)

The approximately thirty students enrolling in the master course will not join a particular laboratory for the first six months. Instead, they will enter either the Nuclear Power Engineering course or the Nuclear Science and Engineering course.

- During this period, students will study the basics of nuclear engineering and the approach to subsequent coursework. They will rotate an average of three times among various laboratories to understand world-class state-of-the-art research activities in those laboratories.



### 2) Entering the Full Boarding System “Global Nuclear Energy Safety and Security Dojo” (new)

Six months after enrollment in the master’s degree program, each of students will be allowed to become members of a specific laboratory. At the same time, about fifteen students every year are selected and allowed to become members of the Global Nuclear Energy Safety and Security Dojo (“Dojo” from here on) program.

- At the Dojo, students are expected to live in a dormitory with other students and their supervisors, and are given opportunities to discuss various issues related to but not limited to their coursework and learn from each other. Each of the students will also be responsible for writing a master’s thesis under the supervision of their respective laboratory instructors. Students are expected to think about the implications and societal value of their research results.



### 3) Second-step selection for elevated education

Six students who have completed the master’s program in the “Global Nuclear Energy Safety and Security Dojo” are eligible for further study in the doctoral course. The selection of these six will be made at the end of the master’s course.

In the doctoral course, students will continue study through

coursework, do internships both in and outside of Japan, and carry out thesis research at the laboratory. Those who have completed the course and produced an acceptable doctoral thesis receive a doctoral degree, and are expected to follow the career path to become global leaders after graduation.

### 4) Credits from coursework

Students must earn a total of 50 or more credits from the compulsory subjects shown below during their master’s and doctoral courses.

- Dojo Subjects (new)
- Basic and Specific Courses in Nuclear Engineering (currently offered)
- Social/Communication Courses (currently offered)
- Nuclear Safety/Security Courses (new: practical training)
  - ▶ Fieldwork in measuring environmental radiation
  - ▶ Simulations of severe nuclear reactor accidents
  - ▶ Science of the behavior of radioactive material in the environment
  - ▶ Nuclear security training
- High-Level International Liberal Arts (new)
  - ▶ International politics, international law, economy, history, philosophy, art, culture, English, and French
- Internship Subjects (new)
  - ▶ Domestic internship (six months)
  - ▶ Overseas internship (one year)
- Volunteer activities (new)

In addition to the above, there will be science cafés, Dojo lectures by domestic and international experts, international seminars on nuclear safety and security, and international symposiums.

In summary, this program:

- a) Is intended to contribute to human resource development, ultimately for the well-being of humankind by building a safer and more peaceful world, and
- b) Offers students an educational program that will help them become global safety/security professionals having social literacy who can act globally to build a safe, more peaceful world. They are expected to find career paths not only domestically (such as in government, the police, the coast guard, and nuclear power facilities), but also internationally, such as in the IAEA.

To this end, students in this program are expected to take part in this new full boarding system and acquire knowledge not only in basic and specific science and engineering, but also expertise in nuclear safety and security, high-level global liberal arts (politics, history, arts, culture, two foreign languages) and other areas. Through our domestic and international internship programs and life at the Dojo, we hope students will learn to become global leaders with distinguished professional competence and social literacy.

For more than half a century since its establishment in 1957, the Department of Nuclear Engineering of Titech has continuously provided a comprehensive educational program in nuclear engineering. We are among the world’s top facilities in resources for nuclear education. The faculty members in this department, as a team, are determined to educate students to become global leaders in the industry, government and academia.

## ● “Dojo for Global Nuclear Safety & Security” Inauguration Ceremony

An inauguration ceremony and reception were held to celebrate the launch of the Dojo for Global Nuclear Safety and Security Academy on October 1, 2012. The event took place at the Media Hall, one of the Plaza Heisei meeting facilities at the Tokyo International Exchange Center.

Dojo master Prof. Masayuki Igashira opened the event, followed by a speech from the head of the Academy, Prof. Masaki Saito, who after emphasizing the importance of decorum awarded permits (Dojo entrance permits) to all eight students. Mr. Hiroshi Matsusaka, head of the Division for Development of University program at the Higher Education Department of MEXT (the Ministry of Education, Culture, Sports, Science and Technology) then offered words of encouragement and spoke of his expectations for the Academy and the students. President Yoshinao Mishima of Titech also passed on words of inspiration, mentioning his strong connections with nuclear power and that our institute must be the top in nuclear safety

and security education and human resource training. Prof. Kikuo Kishimoto, dean of the Faculty of Engineering, also expressed his expectations for the program to produce new leaders, referring to the lack of leadership training in Japan in postwar education.

Ms. Michiko Suzuki, the executive director of the Student Exchange Department at JASSO (Japan Student Services Organization), also offered advice on making the best out of life at the Dojo, situated in the Tokyo International Exchange Center where over 340 students and researchers from 70 countries and regions form a community.

At the reception following the ceremony, Executive Vice President Toshio Maruyama of Titech spoke on “the ideal leadership created after achievement both in study and martial arts.” The inauguration ceremony launching the Dojo for Global Nuclear Safety and Security closed in a relaxed atmosphere with a speech by vice master of the Dojo, Mr. Masaki Ozawa.



“Dojo for Global Nuclear Safety & Security” Inauguration Ceremony

## ● Supervisors/Project Professors/Administrative Staff

The Academy is managed under the president at the top, with Prof. Kishimoto, dean of the Faculty of Engineering, as the person in charge, and Prof. Masaki Saito as the

head of the Academy. Students are also instructed and supported by 16 professors in the Nuclear Engineering Department, project professors and administrative staff.

### ➤ Program Supervisors

Person in Charge of the Program	Kikuo Kishimoto (mechanics of material, fracture mechanics, computational dynamics)			
Program Coordinator	Masaki Saito (nuclear safety engineering)			
Supervisors	Masayuki Igashira (nuclear physics/nuclear data)	Kenji Takehisa (nuclear chemical engineering)		
	Yasuhisa Ikeda (nuclear fuel cycle)	Yukitaka Kato (ion beam application engineering)		
	Masaki Ozawa (nuclear fuel cycle)	Shunji Iio (fusion, laser engineering)		
	Toyohiko Yano (nuclear materials science and engineering)	Hiroshi Akatsuka (plasma science and technology)		
	Minoru Takahashi (nuclear thermal engineering)	Yoshihisa Matsumoto (molecular radiation biology)		
	Hiroshige Kikura (nuclear safety/thermal fluid engineering)	Satoshi Chiba (nuclear reaction, nuclear data)		
	Jun Onoe (nanomaterials science)	Takehiko Tsukahara (micro/nano analytical chemistry)		
	Noriyosu Hayashizaki (accelerator engineering)			





➤ Project Professors

**Prof. Tomohiro TANIGUCHI**

**Field of expertise:** Nuclear energy and international relations, international organizations, comprehensive security



1. With new nationalism emerging even as we see progress in globalization, my course will promote a comprehensive understanding of world affairs in relation to nuclear power from political, economic, industrial, social, cultural and geopolitical points of view.
2. Students will obtain practical leadership skills through actual work on creating international consensus—which is the core of the international framework—and in relation to international organizations.
3. Students will create theories for the practical use of nuclear energy and international relations through case studies and debates.

**Prof. Yoshihiro NISHIWAKI**

**Field of expertise:** Policymaking for science and technology



Nuclear power naturally holds the potential for great danger. To deal with this aspect, legal controls to ensure safety are a must. Since this technology can also be used for military purposes, international conventions are needed as well. Nuclear power has the potential to cause severe accidents with cross-border impact. Based on my experience in developing Japan's severe accident measures at the Agency for Natural Resources and Energy, studying inspection methods at the Nuclear and Industrial Safety Agency, and my experiences at the NRC in the United States and contributions to the Nuclear Regulatory Commission Establishment Act, I will contribute to education in the field of international nuclear law.

**Prof. Hideo NAGASAKA**

**Field of expertise:** Safety research related to thermal-hydraulic power for light-water reactors



Very few young engineers have been working on safety of light water reactors over the last two decades. This program aims to train global leaders on this issue in the hope that we can pass along technological expertise on light water reactor safety to the next generation. Since this program emphasizes the importance of coursework to ensure quality, I will take advantage of my long experience in light water reactor safety research to realize the program's concepts.

**Associate Prof. Chi Young HAN**

**Field of expertise:** reactor physics, nuclear fuel cycle physics (nuclear transmutation, nonproliferation)



Global education has already become of dominant importance in the globalized world. There are different perceptions in dealing with issues. Currently, the most important global issues of nuclear global issues. Currently, the most important global issues of nuclear power are safety and security including non-proliferation. Their viewpoint and importance depend on the political and economic development of countries. I would like to encourage students to have international partnerships for more advanced nuclear technologies, which will facilitate the global nuclear safety and security.

**Prof. Shizuyo KUSUMI**

**Field of expertise:** Radiation protection, radiation epidemiology, internal medicine



Protecting humans and the environment from radiation means ensuring the safety of nuclear power. Using my experience in atomic bomb survivor studies, Chernobyl accident investigation, survey on residents living in the vicinity of the former Semipalatinsk nuclear test site, studies on nuclear power plant workers and experience in accident response at the Fukushima Daiichi Nuclear Power Station, my course is intended to send out trained personnel with knowledge and practical skills on radiation protection, nuclear disaster prevention, radiation emergency medicine, and other areas.

**Associate Prof. Kyoko OBA**

**Field of expertise:** Engineering ethics, nuclear sociology



My expertise is in teaching ethics to engineers engaged in the use of nuclear power technology, but the accident at the Fukushima Daiichi Nuclear Power Station had posed a question about my own ethics and charged my consciousness in this area. Many organizations have been conducting investigations into this accident, but now is the time when we need to tackle the truly important but difficult task of transforming organizational culture (the continuous cycle of PDCA, i.e. plan, do, check, and action). It's a great pleasure for me to be a part of the team that will train the next generation of professionals who will take a leading role in the nuclear community.

**Prof. Akira OMOTO**

**Field of expertise:** Nuclear energy policies, nuclear power and risk management



The foundation for the use of nuclear energy rests on a wide spectrum of expertise in engineering and social literacy. Its use requires professionals who can make correct decisions. Through my experience at the IAEA and elsewhere, I hope to train researchers and professionals with international mindsets, social literacy and communication skills as well as technical expertise, so that they may work to establish world-class best practices and standards through their leadership.

➤ Administrative Staff

Support management of the Academy.



- Ryoko Abe
- Michiko Fukuzawa
- Haruka Watanabe
- Tsubura Aso
- Emiko Sakurai
- Kayoko Hishimi
- Tomoko Katsura

**Event Announcements**

We are scheduling an international seminar on nuclear safety—operated by students from the Academy's Dojo—sometime in mid-February 2013. Details will be announced on our webpage, [www.titech.ac.jp/u-atom](http://www.titech.ac.jp/u-atom).

~Editor's Note~

Thank you for reading volume 1 of our U-ATOM Newsletter. Since this is our first issue, we determined to focus on outline of the program, including its objectives. Please look forward to our report on the program's upcoming activities. The next issue is scheduled for release in February 2013.

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