



2021

ATOM

*Science and Technology
for the Global Environment*

Graduate Major in

**Nuclear
Engineering**

Tokyo Institute of Technology

Effective use of nuclear energy and radiation to benefit society

How should nuclear energy be used in the future? How can radiation, which is already used for cancer treatments, be used more effectively? In order to answer this question, the Graduate Major in Nuclear Engineering provides students of systematically learning and conducting research on nuclear engineering, its use, radiation, and the science involved.

Becoming a leader who supports the development of nuclear technology that harmonizes with the environment and society

In the Master's Program, we aim to cultivate researchers and engineers who have advanced specialized knowledge of nuclear engineering, have a sense of social responsibility regarding research, development, and utilization of nuclear engineering, have international communication skills, and who support the development of safe nuclear technology that harmonizes with society and the environment.

In the Doctoral Program, we aim to cultivate individuals who have advanced specialized knowledge of nuclear engineering, have a sense of social responsibility regarding the research, development, and utilization of nuclear technology, are successful international leaders, and who pioneer new fields.

International Graduate Programs

Our institute provides the following programs for students from abroad, who wish to study in Graduate Schools to pursue a Master's or Doctor's degree. Since lectures and seminars are given in English, it is not essential to master the Japanese language beforehand. However, students are advised to learn Japanese, attending a couple of Japanese classes per week on a regular basis, for further enrichment. Our Department offers lectures and seminars listed on the next page, although students are allowed and also requested to take credits from other department.

For further details, please refer to the following website: http://www.titech.ac.jp/english/graduate_school/international/international_graduate/

Each applicant is required to directly contact the prospective academic advisor of his/her preference. Before sending the application to the Admission Division, the applicant should obtain the consent of a faculty member who will agree to become his/her academic advisor, in the event that he/she passes the entrance examination.

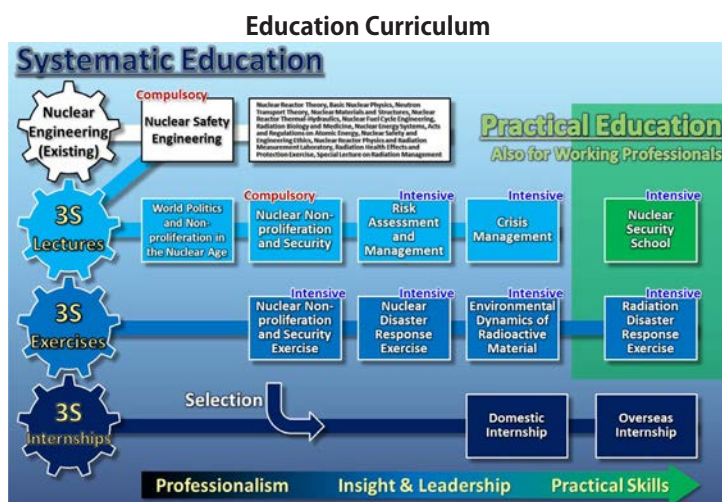
International Graduate Program (C)

Master's Program and Doctoral Program are offered and there are two periods of enrollment; the Spring program (enrollment in April), and the Autumn program (enrollment in October). Students who are living abroad at the time of application should apply to Overseas Application and those living in Japan at the time of application should apply to Domestic Application. Note that the deadline is different for Overseas Application and that for Domestic Application.

The Nuclear Regulation Human Resource Development Program

(ANSET: Advanced Nuclear 3S Education and Training) www.ne.titech.ac.jp/kiseijinzai

The key challenges such as large-scale nuclear disaster, nuclear terrorism, and nuclear proliferation should be tackled globally in a cooperative fashion, based on lessons learned from the TEPCO Fukushima nuclear accident. This program aims to foster the next generation of leaders who will be capable of grasping nuclear security and safeguards, and taking the lead in 3S (nuclear safety, security, and safeguards) with insight. This program provides students with a systematic curriculum (3S Lectures, 3S Exercises, and 3S Internships), which educates them in 3S professionalism, insight and leadership, and practical skills, based on the existing nuclear engineering program. The curriculum is systemized to organically integrate collaborative relationships of 3S, and provide more practical hands-on exercises to meet social needs and urgency of nuclear security as well. This program is targeted at not only students specialized in nuclear engineering, but also students in other fields, including part-time students.



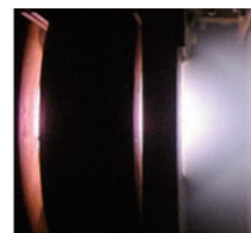
The Nuclear Engineering graduate major spans five departments in three schools: Mechanical Engineering(MECH), Electrical and Electronic Engineering(EE), Materials Science and Engineering(MAT), Chemical Science and Engineering(CAP), and Transdisciplinary Science and Engineering(TSE). In addition to fundamental science and engineering studies, students focus on the study and research of nuclear energy and radiation utilization while seeking solutions to environmental and social problems.

In the following professor information, the belonging of each professor is written such as <MECH, TSE>, in case of the professor belongs to MECH as a primary school and TSE as a secondary school.

Assoc. Prof. Hiroshi AKATSUKA hakatsuk@lane.iir.titech.ac.jp +81-3-5734-3379 Room: N1-413 <EE, TSE>



We are studying fundamentals of low-temperature plasmas. Even high-temperature plasmas in core of thermonuclear fusion reactors become colder near the reactor wall. We must understand them from comprehensive viewpoints, e.g., electric and electronic engineering, atomic and molecular physics, physical chemistry, rarefied gas dynamics, etc. They also have cross-disciplinary area with environmental science of atmosphere or ionosphere, or even with astronautics as thrusters for electric propulsion. In short, we study fundamentals of plasmas in scientifically interdisciplinary fields. The photo shows a supersonic plasma jet in a rarefied gas wind tunnel of my lab.

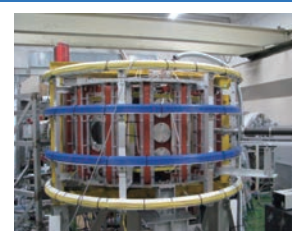


Akatsuka Lab.

Prof. Shunji IIO siio@lane.iir.titech.ac.jp +81-3-5734-3377 Room: N2-424 <TSE>



We study energy sources which should be utilized this century taking into account the global environmental issues. We will investigate socially acceptable fusion reactors chiefly by studying basics for the development of magnetically confined fusion reactors, experiments on small tokamaks, evaluation of hybrid reactors for nuclear transmutation, and R&D of laser diagnostics. The picture on the right-hand side shows a small tokamak device we have constructed to demonstrate the effects of helical fields on the positional stability of plasmas.



Iio Lab.

Prof. Masako IKEGAMI maike@ne.titech.ac.jp +81-3-5734-2667 Room: W9-902 <INNOVATION,TSE>



Dr. Ikegami is a professor of Department of Innovation Science at School of Environment and Society, being co-affiliated with the Nuclear Engineering Program to teach and research on social scientific issues of nuclear security, nuclear non-proliferation/disarmament, and nuclear/energy policy analysis. Nuclear technology and materials are of dual-use by nature as the application of nuclear energy initially derives from the Manhattan Project. Hence, basic knowledge of nuclear security is crucial for all students interested in nuclear engineering, just as major nuclear laboratories have security-related research centers and programs worldwide.

Ikegami Lab.

Prof. Yoshiyuki OGURI yoguri@lane.iir.titech.ac.jp +81-3-5734-3071 Room: N2-626 <EE, TSE>



Currently the following studies are available for graduate students: 1) interaction experiments between heavy-ion beams and dense plasma targets related to heavy-ion inertial confinement fusion and high energy-density physics studies, 2) development of accelerator-based trace-element analytical techniques for environmental sciences, and 3) medical application of ion-induced quasi-monochromatic X-rays. The photograph shows the 1.6-MV electrostatic heavy-ion tandem accelerator being utilized for these experimental studies.

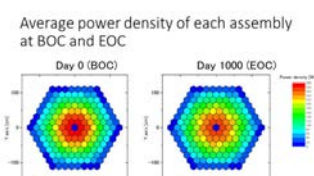


Oguri Lab.

Prof. Toru OBARA E-mai: tobara@lane.iir.titech.ac.jp +81-3-5734-2380 Room: N1-208 <TSE>



We are performing the study of innovative nuclear systems for future energy supply and the study of criticality safety in the fuel debris removal in the decommissioning of Fukushima Daiichi Nuclear Power Station. In the innovative nuclear systems study, we are studying the concept of nuclear reactors for the next generation which can satisfy the future needs. In the criticality safety study, we are studying the effective measures to avoid the accident in the decommissioning. The studies are performed using the high-performance servers in our lab. and the supercomputer of the institute.



Obara Lab.

Assoc. Prof. Tatsuya KATABUCHI buchi@lane.iir.titech.ac.jp +81-3-5734-3378 Room: N1-311 <TSE>



Study on Neutron Capture Reaction: We measure neutron capture cross sections for development of nuclear transmutation systems and study of nucleosynthesis. Measurements are performed in LANE and the Japan Proton Accelerator Research Complex (J-PARC).

Development of an Imaging System for Online Dosimetry in Boron Neutron Capture Therapy: We are developing an imaging system for dosimetry during treatment in boron neutron capture therapy. This system allows for evaluating the absorbed dose of a patient online, thereby improving determination of irradiation parameters and evaluation of treatment efficacy.

Katabuchi

Prof. Yukitaka KATO yukitaka@lane.iir.titech.ac.jp +81-3-5734-2967 Room: N1-302 <CAP, TSE>



Contribution on energy saving and global environment protection through development of innovative and efficient energy conversion and storage technologies for nuclear, renewable and unused energies is the main theme of our laboratory. Thermochemical energy storage and conversion technologies for efficient utilization of thermal energy, hydrogen and other energy carriers, are examined in studies. Chemical heat pump, hydrogen production and system, and carbon recycling energy system are discussed experimentally. The photo shows a lab.-scale apparatus of Magnesium oxide/Water Chemical Heat Pump.

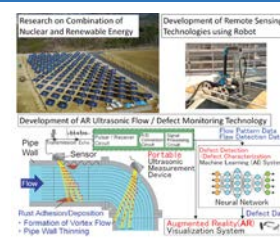


Kato Lab.

Assoc. Prof. Hiroshige KIKURA kikura@lane.iir.titech.ac.jp +81-3-5734-3058 Room: N2-225 <MECH, TSE>



We are conducting research on reactor safety improvement and advancement based on process control, measurement, and diagnostic technologies for light water reactors, fast reactors, and future reactors. Recently, we are building a new academic discipline, "Revitalizics" for reconstruction of the disaster areas lost by the Great East Japan Earthquake and nuclear disaster, and are researching on the combination of nuclear energy and renewable energy, and developing remote sensing technology using robots, and developing advanced nuclear thermo-hydraulic measurement technology such as the AR ultrasonic flow / defect monitoring technology for onsite AI plant diagnosis (right figure).



Kikura Lab.

Prof. Yoshinao KOBAYASHI yokobayashi@lane.iir.titech.ac.jp +81-3-5734-3075 Room: N2-328 <MAT>



Our goal is to ensure the safety of nuclear reactor all through its service time with possible severe accident and decommission process by developing the metallic materials having high reliability and soundness. In addition, to assess the access root to the fuel debris for its removal in Fukushima Dai-ichi nuclear power plant, damage and collapse behavior of structural metals in the reactor core should be well understood. Stable finalization of fuel debris is also of great significance. For these purposes, control and reduction of impurities in materials are studied as well as reaction between fuel debris and stainless steel as reactor core materials. The photo shows an electric resistance furnace with MoSi₂ heating element which realize high temperature beyond 1600°C.



Kobayashi Lab.

Assoc. Prof. Masatoshi kondo kondo.masatoshi@lane.iir.titech.ac.jp +81-3-5734-3065 Room: N2-226 <MECH, TSE>



Liquid metals (Li, Pb, Sn, Ga, Pb-Li, Sn-Li and Pb-Bi) and molten salts (Flinak and Flibe) have excellent nuclear characteristics and thermal properties as a tritium breeder of fusion reactors and/or a coolant of generation IV nuclear reactors. We develop high-purity liquid alloys and molten salts, and investigate their thermal properties and chemical characteristics. We also develop some liquid metal loops to investigate the heat transfer, the mass transfer and the material compatibility of the high temperature fluids.

(A right photograph shows liquid metal Pb, which is candidate coolant of fast reactors.)



Kondo Lab.

Assoc. Prof. Hiroshi SAGARA sagara@lane.iir.titech.ac.jp +81-3-5734-3074 Room: N2-321 <TSE>



We are pursuing studies on robust nuclear energy system against threats to safety, security and non-proliferation, by system designing. Accident-torrent fuel for inherent safety and security, and proliferation resistance of nuclear energy system for security and non-proliferation are one of our targets of researches. Non-destructive assay technology R&D are also being performed to quantify the nuclear material inside fuel debris by passive γ measurement, cooperating with Japan Atomic Energy Agency, aiming to be applied for safe& secure decommissioning of Fukushima Daiichi Nuclear Power Station. User interface development between environmental dynamics and decision making is performed for effective evacuation planning.

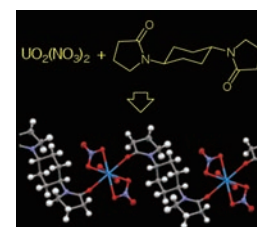


Sagara Lab.

Assoc. Prof. Koichiro TAKAO ktakao@lane.iir.titech.ac.jp +81-3-5734-2968 Room: N1-205 <CAP, TSE>



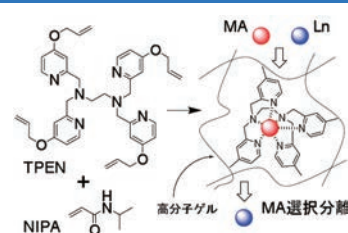
To guarantee feasibility and sustainability of nuclear energy system, it is important to understand coordination and solution chemistry of actinides and fission products, which are highly relevant to the nuclear fuel cycle. Main focus of this lab is understanding of fundamental chemistry of these metal ions in depth as well as exploring applicability of ionic liquids and microwave technology to develop bases of (1) fuel reprocessing and treatment of radioactive wastes, (2) effective use of depleted/recovered uranium, and (3) decontamination process for retrieval from Fukushima accident. Figure shows a 1-dimensional chain structure of uranyl nitrate complex bridged by uranium-selective precipitant.



Takao Lab.

Prof. Kenji TAKESHITA takeshita@lane.iir.titech.ac.jp +81-3-5734-3845 Room: N1-456 <TSE>

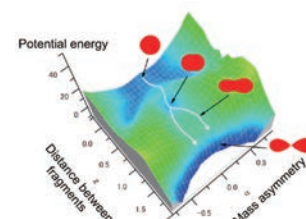

For stable energy supply and establishment of a sustainable low-emission society, we are studying new resource-conservation and recycling technologies based on chemical engineering and materials engineering. Especially, we focus on the development of nuclear fuel cycle technologies required in the future FBR age, such as the removal of minor actinides, heat-generated elements (Cs, Sr) and platinum-group metals from HLW, the stable vitrification of HLW and the LCA analysis of fuel cycle. These advanced technologies will be realized in the near future and contribute greatly to the establishment of sustainable industrial society.



Takeshita Lab.

Prof. Satoshi CHIBA chiba.satoshi@lane.iir.titech.ac.jp +81-3-5734-3066 Room: N1-307 <TSE>

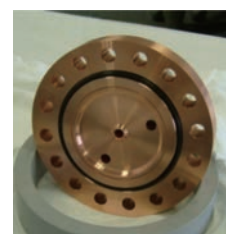

We study nuclear reactions as a fundamental process underlying nuclear energy. Neutron-induced reaction is the source of energy in nuclear reactors, while it serves as origin of elements such as Uranium and Thorium in the cosmos. Understanding of nuclear reactions is, therefore, basis for safe usage of nuclear energy as well as comprehending nature itself. Theoretical and computational studies are the main research style, but we have a close connection with JAEA for sophisticated experimental activities involving fissionable nuclei.



Chiba Lab.

Prof. Noriyasu HAYASHIZAKI nhayashi@lane.iir.titech.ac.jp +81-3-5734-3055 Room: N2-673 <TSE>

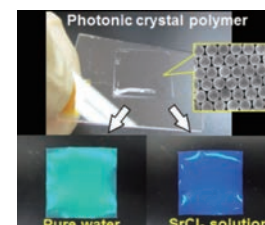

We study charged particle beams such as ion and electron, particle accelerators and their new applications. Beam and electromagnetic simulations, 3D-CAD design, high precision manufacturing by introducing CAE/CAM and experiments are carried out for fundamental, or solution-oriented issues. The topics of under investigation are a Boron Neutron Capture Therapy (BNCT) irradiation system, a positron accelerator (photograph) for fine material analysis and an electron accelerator for sterilization. We will respond for social needs through the developments of these technologies.



Hayashizaki Lab.

Assoc. Prof. Takehiko Tsukahara ptsuka@lane.iir.titech.ac.jp +81-3-5734-3067 Room: N1-203 <CAP, TSE>

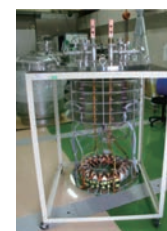

Nuclear waste management plays an important role for reducing radioactive wastes. We have investigated "simple and environmentally-friendly nuclear chemical system" using functional nanomaterials including photonic crystal, fluorescent reagents, stimuli-responsive polymers, supercritical fluids, and micro/nano chemical chip. This system makes it possible to reduce/separate/recycle radionuclides such as (actinides, rare-earth metals) from radioactive wastes, and to detect quickly and highly efficiency radionuclides at trace amounts of sample. Applications to decommissioning and nuclear medicine are also studying. A right photograph shows Sr ion sensing using photonic crystal polymer.



Tsukahara Lab.

Assoc. Prof. Hiroaki TSUTSUI htsutsui@lane.iir.titech.ac.jp +81-3-5734-3465 Room: N2-422 <TSE>

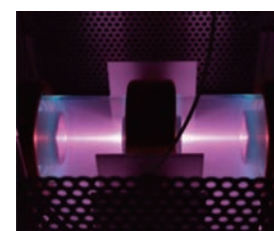

Both a nuclear fusion which generates energies and a superconducting magnetic energy storage system which stores energies are studied. We theoretically derived an optimum coil with a strong magnetic field based on the virial theorem which represents the relation of magnetic energy and stress. A small fusion device and a superconducting coil were designed and constructed, and their efficiencies were demonstrated. Equilibrium, stability and confinement of plasmas are also studied by numerical calculations and theoretical models. A right photograph shows a superconducting magnet which demonstrated the virial theorem.



Tsutsui Lab.

Assoc. Prof. Jun HASEGAWA jhasegawa@lane.iir.titech.ac.jp +81-3-5734-3070 Room: N1-305 <TSE>


Our research lab covers research topics ranging from generation and control of various quantum beams (ions, clusters, neutrons, and photons) to applications of those quantum beams for the energy crisis and safe and secure societies. R&Ds on efficient generation of a giant cluster beam, which is expected as a next-generation quantum beam, a compact neutron source for explosive detection or non-destructive inspection technologies, and high-power beam sources for inertial confinement fusion energy are vigorously promoted. The figure shows an inertial electrostatic confinement (IEC) neutron source.

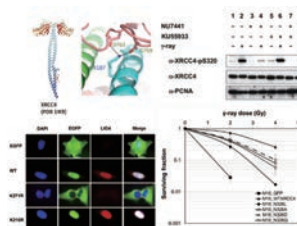


Hasegawa Lab.

Assoc. Prof. Yoshihisa MATSUMOTO yoshim@lane.iir.titech.ac.jp +81-3-5734-3703 Room: N1-210 <TSE>



Radiation exerts its biological effects by generating various types of damages on DNA, among which DNA double-strand breaks (DSBs) are considered most critical. We are seeking to elucidate the molecular mechanisms of the recognition and repair of DNA DSBs through the integration of various cell and molecular biological techniques (Examples on right). Application of these mechanism will provide us with a novel approach to predict and/or control radiosensitivity and will lead to the improvement of cancer radiation therapy.

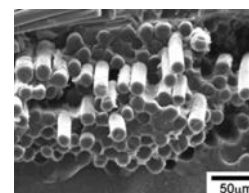


Matsumoto Lab.

Assoc. Prof. Katsumi YOSHIDA k-yoshida@lane.iir.titech.ac.jp +81-3-5734-2960 Room: N2-221 <MAT>



Ceramics have been recognized as attractive materials used in severe environment because they show excellent properties such as heat resistance, corrosion resistance, thermal stability and excellent wear resistance. Therefore, ceramics have been expected to be key materials for nuclear and fusion applications, environment and energy fields, and aerospace industries. In order to apply ceramic materials for these applications, their properties and functions corresponding to these applications must be improved in addition to their reliability as structural parts. Based on microstructure control in nano-, micro- and macro-scales, we have been developing high-performance advanced ceramic materials used in severe environment. Figure shows the SEM micrograph of the microstructure of the ceramic-based fiber-reinforced composite.

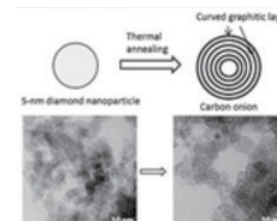


Yoshida Lab.

Assist. Prof. Anna GUBAREVICH gubarevich.anna@lane.iir.titech.ac.jp +81-3-5734-2960 Room: N2-221 <MAT>



I have been studying formation of various carbon nanostructures, especially related to nanodiamonds, and their application in such fields as solid lubrication, electromagnetic shielding, supercapacitors, and thermal nanofluids on base of ionic liquids. My recent interests include research on novel methods of synthesis of nanolayered ternary carbides and 2D carbide structures.

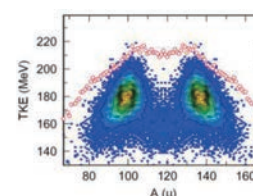


Gubarevich

Assist. Prof. Chikako ISHIZUKA chikako@lane.iir.titech.ac.jp +81-3-5734-2955 Room: N2-358 <TSE>



Our goal is improvement of nuclear data by elucidation of nuclear fission mechanism. Nuclear fission of actinides is the most fundamental phenomenon for nuclear power system. However, there are some open questions on fission mechanism in this region, e.g. the transition of mass peak structure and the incident energy dependence of neutron multiplicity. These information on fission products and neutrons directly affects the safety of nuclear facilities and evaluation of decommission process, as the input nuclear data. Therefore we have developed theoretical models by collaborating with scientists to predict fission products as accurate as possible. Right figure shows the mass dependence of the total kinetic energy based on the 4D-Langevin model.



Ishizuka

Assist. Prof. Tetsuo SAWADA tetsuo@lane.iir.titech.ac.jp +81-3-5734-3062 Room: N1-409 <MECH>



We "visualize" of the problems lying in the utilization of nuclear energy in the society of nuclear power. We are developing the methodology for solving the problems with practice. After the sixty years of the nuclear research in Japan, it came out institutional fatigue in various aspects. Now we should aim to re-build of the "nuclear research paradigm". Specifically, the re-inspection of the nuclear energy from the multi-value point of view, the structure analysis of the Genshiryoku-mura (nuclear village), the dialogue beyond the dichotomy of promoting vs. opposite of nuclear power, education at junior high and high school on radiation and nuclear.



Sawada

Assist. Prof. Mikio SHIMADA mshimada@lane.iir.titech.ac.jp +81-3-5734-3703 Room: N1-211 <TSE>



Genome stability is maintained by many molecular mechanisms such as DNA repair, cell cycle checkpoint, centrosome maintenance and apoptosis. Defect of these mechanisms cause radiation high sensitivity, developmental failure and cancer development. We are studying molecular mechanisms of radiation high sensitivity inherited diseases. Our goal is to elucidate the relationship between disease and molecular mechanisms. Picture shows biochemical experimental room to analyze DNA and protein.

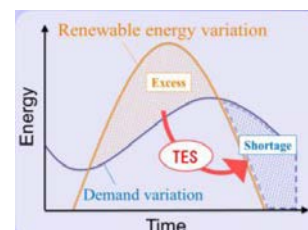


Shimada

Assist.Prof. Hiroki TAKASU takasu.h@lane.iir.titech.ac.jp +81-3-5734-3865 Room:N2-327 <CSE>



Utilization of high-temperature thermal energy is being discussed to solve a global energy and environmental issues in various fields such as high-efficiency power generation, nuclear hydrogen production, other industrial processes, etc. A thermochemical energy storage is seen as key technology for these applications from viewpoints of efficient energy storage/transfer performance. We are developing suitable high-temperature thermochemical energy materials and its system which could be coupled with high-temperature gas-cooled reactors to improve efficiency of power generation.



Takasu

Assist.Prof. Hideharu TAKAHASHI htakahashi@lane.iir.titech.ac.jp +81-3-5734-2377 Room: N2-227 <MECH>



We are engaged in research on nuclear thermal-hydraulics for improvement of safety and advancement of nuclear reactors, decommissioning of nuclear facilities, waste treatment and disposal, decontamination, reconstruction of Fukushima, etc. Especially, for the decommissioning of Fukushima Daiichi Nuclear Power Plant, recently, we are developing telemetry system using robot for flow field measurement and characterization of the debris with the researchers in the department of mechanical engineering and outside of the institute. In addition, we are also studying renewable energy such as solar heat utilization and solar power generation. The right photograph shows a test facility for thermal-hydraulics test and telemetry test.



Takahashi

Assist. Prof. Kazushi TERADA k.terada@ne.titech.ac.jp +81-3-5734-5948 Room:B1・B2-A 403 <TSE>



• **Radiation safety management**

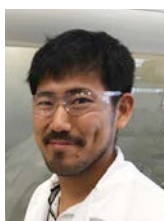
I'm engaged in safety management and education on radioisotopes and radiation generators at Tokyo Tech.

• **Study on nuclear data**

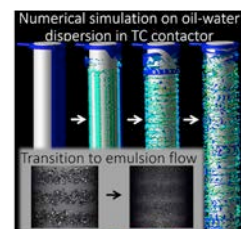
Accurate neutron nuclear data on minor actinides and long-lived fission products are required for the R&D of innovative nuclear systems. I strive for accuracy improvement of these nuclear data through experiments performed with Pelletron accelerator in Tokyo Tech and the Japan Proton Accelerator Research Complex (J-PARC).

Terada

Assist.Prof. Masahiko NAKASE m.nakase@lane.iir.titech.ac.jp +81-3-5734-3846 Room:N1-404 <TSE>



Separation science is a fundamental body of knowledge important in many situations such as treatment of spent nuclear fuel, remediation of contaminated environment and recovery of reusable precious metals from electronic waste. By understanding separation science from both chemistry and mechanical engineering, I aim to solve difficult problems in the world. I am developing ligands and adsorbents for MA/Ln separation, separation equipment and separation processes. Synthetic organic chemistry, coordination and complex chemistries, chemical reactor design, numerical fluid dynamics are utilized in my research.



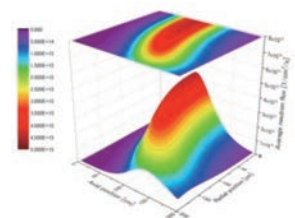
Nakase

Assist. Prof. Jun NISHIYAMA jun-nishiyama@lane.iir.titech.ac.jp +81-3-5734-3849 Room: N1-257 <TSE>



Design Study of CANDLE burn-up Reactors with Passive Safety

The CANDLE burn-up reactor is an innovative nuclear reactor with sustainability, safety, economy, and proliferation resistance. The methods to construct the initial core from natural uranium fuels with accelerator neutron source have been performed. To evaluate and improve safety, we investigate passive safety system and inherent safety features for the CANDLE reactor.



Nishiyama

Assist. Prof. Shintaro YASUI yasui@lane.iir.titech.ac.jp TEL:+81-3-5734-2906 Room:N2-324 <MAT>



We have investigated energy materials and related devices in our life. An electric energy is demanded more than ever due to not only electric devices but also electric vehicles and system kitchens. We must improve the energy materials which are "tool" of energy harvester and storage. We invent novel materials from the basic science point of view, open the new world we have never seen before.

(Right picture) A deposition of LiCoO₂ cathode thin film by pulsed laser deposition.

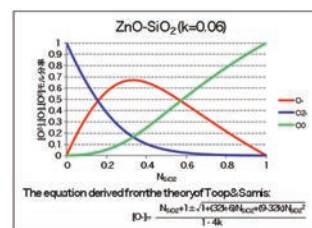


Yasui

Visiting Prof. Hideyuki FUNASAKA (ATOX Co., Ltd.) funasaka.hideyuki@ne.titech.ac.jp TEL:+81-29-282-1126 <TSE>



The study of glass matrix for vitrified waste in advanced fuel cycle. It is necessary to develop the glass matrix with excellent environmental properties for high-level vitrified waste in advanced fuel cycle. As first step, the purpose of this study is to elucidate the relation between the structure and the redox reaction of metal ion in glass. By focusing on the basic reaction of oxygen states in glass ($O_0 + O_2^- \rightarrow 2O^-$), we aim to elucidate the reaction between those kinds of oxygen and FPs in metallic ion with the results of NMR and EXAFS.



JAEA Funasaka

Visiting Prof. Shinichi KOYAMA (JAEA) koyama.shinichi@jaea.go.jp +81-246-35-7856 <TSE>

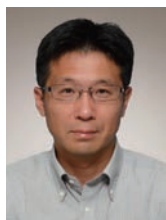


Analytical technique and chemical separation method of actinides and fission products included in spent nuclear fuels are studied at post-irradiation examination facilities. The transmutation of these separated element or nuclide using nuclear reactor, treatment for the disposal of waste, and the utilization as a nuclear rare metal will be proposed and evaluated. (Photo: Globe-box type ICP mass spectrometer)

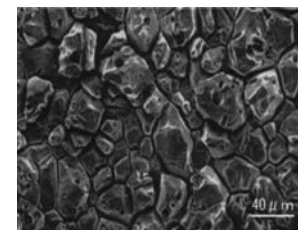


JAEA Koyama

Visiting Assoc. Prof. Masayuki TAKEUCHI (JAEA) takeuchi.masayuki@jaea.go.jp +81-29-282-1111 <TSE>



Development of reprocessing equipments is an important issue for advanced fuel cycle. In the development, a corrosion behavior in nitric acid should be carefully considered to maintain the containment because they include some media with high radioactivity. Even stainless steels, which are common corrosion-resistant materials, suffer severe intergranular corrosion attack in nitric acid with strong oxidant as shown in the photo. Back-end is a key technology in the fuel cycle to solve the critical problem on radioactive waste. We aim the construction of advanced reprocessing system through the development of equipments.

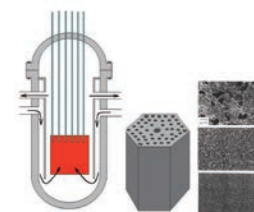


JAEA Takeuchi

Visiting Prof. Masahiro ISHIHARA (JAEA) ishihara.masahiro@jaea.go.jp +81-29-266-7300 <TSE>



Our study on material properties of graphite and ceramics based on the microstructure is a very important research from the view point of the high-performance material development as well as understanding of material irradiation behavior for advanced reactors, such as high-temperature gas-cooled reactors. Several material models considering the microstructure, such as grains and voids, are proposed for the quantitative understanding of the macroscopic properties. The irradiation behavior of the materials based on the microstructure change is also being studied by both experimental and analytical approaches.

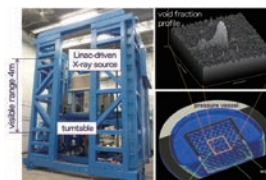


JAEA Ishihara

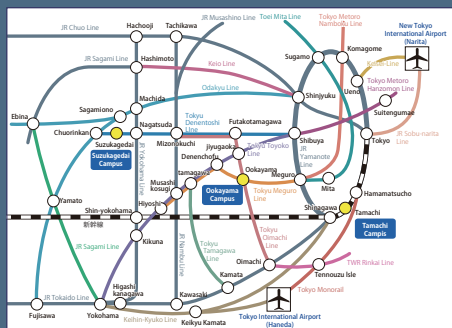
Visiting Prof. Masahiro FURUYA (CRIEPI) furuya.mae@m.titech.ac.jp +81-3-3480-2111 <TSE>



We have been investigating the transient and accident events for nuclear reactor safety on the basis of heat and mass transfer engineering. We devise sensors and analytical instruments to quantify flow dynamics and reaction fields. We derive mechanistic models from the acquired experimental database to implement numerical simulations for the better understanding of the phenomena. The right photo shows accelerator-driven X-ray CT system. It can visualize the boiling two-phase flow along full-height fuel bundle in a high pressure and temperature vessel, for instance. We develop the mechanistic models for numerical simulations, which include transient and severe accident codes for the plant scale accidents, subchannel analysis for flow structure in a bundle, and computational multi-fluid dynamics (CMFD) analysis for general issues.



CRIEPI Furuya



Please do not hesitate to contact any faculty staff of your research interest. For general information, e.g., regarding admission, please contact the head or office of the department.

2-12-1-N1-8 Ookayama, Meguro-ku, Tokyo 152-8550, Japan
Graduate Major in Nuclear Engineering,
Tokyo Institute of Technology
Department Office: TEL: +81-3-5734-3054, FAX: +81-3-5734-2959

© 2019 by Graduate Major in Nuclear Engineering,
Tokyo Institute of Technology (Tokyo Tech)
All rights reserved