ESEP-G 2020 List of Host Laboratories

As of November 8, 2019

The program period for all laboratories in 2020 will be June 8 to July 17.

	Department	Title	Host Professor	Research Topic & Research Description	Special academic conditions required for research				Campus
					1) Prerequisite knowledge and/or special skills and level of proficiency	2) Required academic background	3) Academic or research project experiences beneficial during selection process	4) Other conditions	
1	Civil Engineering	Associate Professor	Di SU	Bridge Engineering, Structural Dynamics http://bridge.t.u-tokyo.ac.jp/index_e.html	Structural mechanics and dynamics, basic programming knowledge	Civil Engineering	None	undergraduate and graduate students	Hongo
2	Mechanical Engineering/ Bioengineering	Professor Associate Professor	Mamoru MITSUISHI and Kanako HARADA	Microsurgical robots: participant(s) will join one of our projects and study surgical robotic design, control, or simulation. The detailed topic will be determined considering the preference, experience and ability of each participant. http://www.nml.t.u-tokyo.ac.jp/en/research-e.html	Programming in C++	Mechanical Engineering or Computer Science	Robotics Image processing	undergraduate and graduate students	Hongo
3	Mechanical Engineering	Distinguished Professor	Shigeo MARUYAMA	The research topic is Synthesis of hetero nanotubes for solar cells. We will study the synthesis of novel hetero nanotubes such as BN nanotubes and MoS2 nanotubes concentrically grown on single-walled carbon nanotubes. The characterization and application in solar cells would be explored. http://www.photon.t.u-tokyo.ac.jp/index.html	Basic knowledge of chemistry, physics, materials and engineering	Graduate level in chemistry, physics, materials, or mechanical engineering	Experience in characterization of nano-materials using SEM, TEM, Raman, PL and absorption spectroscopy are preferred.	undergraduate and graduate students	Hongo

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4	Mechanical Engineering	Professor	Yuji SUZUKI	"Laser diagnostics of flame to wall interaction" The wall effect is crucial for various combustors including internal combustion engines. However, especially, the knowledge on the wall chemical effect, by which the intermediate species in the flame are destructed through the surface reaction on the wall surface, is limited. In this topic, planar laser induced fluorecence will be used to characterize the wall chemical effect in a combustor. http://www.mesl.t.u-tokyo.ac.jp/	basic skill in programing optional: combustion phenomena reaction kinetics	Mechanical engineering Chemical engineering	Laser-based measurement or Experiments related to heat transfer or Gas chromatography	graduate students	Hongo
5	Mechanical Engineering	Professor	Junichiro SHIOMI	Thermal energy engineering: Computational design or experimental improvement of thermoelectric materials or devices http://www.phonon.t.u-tokyo.ac.jp/?lang=en	Basic skills in programming or heat transfer experiments.	Mechanical Engineering, Physics, Materials Engineering, or Electrical Engineering	Any problem solving experience using computation or measurements	undergraduate and graduate students	Hongo
6	Precision Engineering	Professor	Masanori KUNIEDA	Study on micromachining by electrochemical machining and electrical discharge machining http://www.edm.t.u-tokyo.ac.jp/wpKunieda/	Anyone who is interested in material processing technologies is welcome.	Anyone who is interested in micromachining, materials processing technologies, manufacturing, production engineering, etc. is welcome.	Micro-machining in many cases involves multi-physics phnomena. Any students who have fundamental knowledge about physics, mechanical engineering, materials, electrochemistry, and electrical engineering, etc. are welcome.	undergraduate and graduate students	Hongo

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7	Precision Engineering	Professor	Yasuhiko JIMBO	Research Topic:Modeling bilogical system on a chip Research Description: We will model a biological system on a chip with microfabrication techniques, and evaluate functional interaction by electrical recording. (e.g. sympathetic innervation on cardiomyocytes, connection between cerebral cortex and hippocampus) http://neuron.t.u-tokyo.ac.jp/?page_id=231	Anyone who is interested in biological system or microfabrication technologies is welcome.	Not strictly required but better to have biomedical engineering or biological background.	Any project related to biological system would be beneficial.	graduate students	Hongo
8	Systems Innovation	Professor	Jun TAKAHASHI	Advanced Composite Material Technology for Future Society - CFRTP for the Future Transportation Society - Innovative Simulation Technology for New Services - Hybrid Materials for Improving Social Resilience http://j-t.o.oo7.jp/research-e.html	Mechanics of materials Strength of materials	Mechanics of materials Strength of materials	Composite material Carbon fiber reinforced plastics	undergraduate and graduate students	Hongo
9	Systems Innovation	Professor	Seiichi KOSHIZUKA	Students will participate in the research activities in the ongoing projects in Koshizuka- Shibata Laboratory. The projects are of computer simulation and computer graphics using particle methods: for example, fluid dynamics, solid dynamics, flow in a mixing tank, rain water infiltration in a car, flooding, tsunami, etc. http://mps.q.t.u-tokyo.ac.jp/lab/	Experience of computer programming using C or other languages. Knowledge of basics of fluid dynamics.	None	None	undergraduate and graduate students	Hongo
10	Aeronautics and Astronautics	Associate Professor	Taro IMAMURA	Aerodynamic flow analysis around aero-components of an aircraft using in-house computational fluid dynamics program, UTCart. http://park.itc.u-tokyo.ac.jp/rinoielab/english/index.html	Windows OS Microsoft Word, Excel, Powerpoint python	Fluid dynamics (incompressible, compressible) Computer science	Aircraft Dynamics Aircraft Designing	undergraduate and graduate students Interest in aeronautics	Hongo

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11	Electrical Engineering and Information Systems/ Electrical and Electronic Engineering	Professor	Yoshiaki NAKANO	Semiconductor optoelectronic materials, devices, and circuits Description: Compound semiconductor material and device technologies for semiconductor lasers, optical modulators/switches, photonic integrated circuits, and high efficiency solar cells are studied. http://www.ee.t.u-tokyo.ac.jp/~nakano/lab/e_index.html	None	Basic study on optics and semiconductor physics	None	undergraduate and graduate students	Hongo, Komaba
12	Materials Engineering	Professor Lecturer	Yukihiro SHIMOGAKI and Takeshi MOMOSE	"Thin film deposition and characterization for device applications." Nitride semiconductor (GaN/AlN), metallic films (Cu, Ni, Ru, Co), ceramic thin films (AlN, TiN, BN) will be synthesized by Chemical Vapor Deposition (CVD), Atomic Layer Deposition (ALD), or Supercritical Fluid Deposition (SCFD). The chemical bonding states of these materials will be analyzed by XPS (X-ray photo-electron spectroscopy. The surface structure will be observed by AFM (Atomic Force Microscopy), and their crystal structure will be discussed based on XRD (X-ray diffraction) measurements. http://www.dpe.mm.t.u-tokyo.ac.jp/index_e.html	Special knowledge/skills are not required.	Basics of solid state physics and chemistry are required.	If the applicant has experiences on operating vacuum equipment and knows about the characterization of solid materials, it will be appreciated.	undergraduate and graduate students	Hongo
13	Materials Engineering	Professor	Kazuki MORITA	Thermodynamics and/or physical properties on molten oxides. High temperature physical chemistry on iron and steel making. Development of purification process of solar grade silicon via metallurgical route. http://wood3.t.u-tokyo.ac.jp/index.php/home_en	Knowledge of Chemical Thermodynamics and Kinetics related to Materials Processing	Materials Science	None	undergraduate and graduate students	Hongo

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14	Materials Engineering	Professor	Satoshi WATANABE	Development of interatomic potentials for molecular dynamics simulations via machine-learning: This project aims at establishing methodology to construct interatomic potentials for molecular dynamics (MD simulations using neural network. Examples of specific tasks are improvement of algorithm, improvement of training data sampling, training of neural network potential (including its performance test), and obtaining training data. http://cello.t.u-tokyo.ac.jp/index.php?id=7	None	Basic knowledge on solid state physics or materials science. Specifically, on atom dynamics in solids.	Molecular dynamics simulation; Python programming; machine learning; numerial analysis	undergraduate and graduate students	Hongo
15	Materials Engineering	Associate Professor	Hirotaka EJIMA	Our research topic is bioinspired materials. Recently, we've developed a rapid and simple coating method based on the one-step assembly of metal-polyphenol network (MPN, Science, 2013, 341, 154–157.). Purpose of this project is to engineer cells and extracellular vesicles' surface by using the MPN coating. http://biomacro.t.u-tokyo.ac.jp/indexen.html	The basic knowledge on chemistry and biology.	Not strictly required but better to have chemistry or biochemistry or materials science background.	None	undergraduate and graduate students	Hongo
16	Materials Engineering	Professor	Keiichi EDAGAWA	Physical properties of quasicrystals: sample preparation by arc-melting and annealing, sample characterization by X-ray, TEM, etc., and physical property measurements http://www.edalabo.iis.u-tokyo.ac.jp/	Basic knowledge of materials science	Materials science, Solid state physics	Experiments related to materials science	graduate students	Komaba (Institute of Industrial Science)
17	Bioengineering /Precision Engineering	Lecturer	Keiichi NAKAGAWA	1) Ultrafast imaging: we will build an optical system and perform imaging of ultrafast plasma dynamics in laser processing. 2) Biophotonics: we will develop a new photoacoustic method to guide visible light into deep brain site. 3) Mechanobiology: we will conduct the biological experiment to understand acoustic interaction with cells. http://www.bmpe.t.u-tokyo.ac.jp/en/index.html https://sites.google.com/site/keinakagawa6	None	None	Optical engineering, and Physics (for topic 1), Brain Science (for topic 2), Cell Biology (for topic 3)	undergraduate and graduate students	Hongo

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18	Nuclear Engineering and Management/ Systems Innovation	Professor	Hiroaki ABE	Nuclear materials related fundamental science Irradiation effects in metallic materials Electron microscopic observations Mechanical property measurements http://www.tokai.t.u-tokyo.ac.jp/hit/index_e.html	Materials science Interests in nuclear engineering	Materials science	Experiences and safety knowledge in handling chemical solutions	undergraduate and graduate students Two times experiments are scheduled in Tokai (Ibaraki). The accommodation fee (about 4,000 yen) in Tokai should be paid from the stipend.	Hongo, Tokai
19	Nuclear Engineering and Management	Professor	Yasumasa FUJII	Nuclear Energy Systems Analysis under Long-term Uncertainty Mathematical programming techniques, such as stochastic dynamic programming, are applied to evaluate the long term optimal development path of energy systems including radioactive waste management for nuclear power generation. http://www.esl.t.u-tokyo.ac.jp/index-e.html	Nuclear power generation, Nuclear materials and nuclear fuels, Radioactive waste manegement, Programming of Matlab and C language	Nuclear Enegineering, Engineering and Society, Enrionmental Sustainability in Engineering	Project experience in analyzing sustainability of nuclear energy system including radioactive waste management is desirable. Should have solid understanding of relationship between nuclear industry and surrounding communities as well as general society.	graduate students Modern knowledge of nuclear policy & nuclear waste policy is desired.	Hongo