ESEP-G 2023 List of Host Laboratories (June 26 - August 4, 2023)

No.	Department	Title	Host Professor	Research Topic & Research Description	Special academic conditions required for research					Campus	Lab website
					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	Online		
1	Architecture	Professor	NOGUCHI Takafumi	The followings will be implemented for the research on CO2 capture by concrete. 1) Experimental works of acceleration of concrete carbonation, i.e. gas-solid carbonation and wet carbonation 2) Chemical analyses of carbonated phases in concrete using X-ray diffraction, thermogravimetric analysis, microscopy observation, etc. 3) Physical analyses of carbonated concrete using X-ray computed tomography, nitrogen absorption, water vapor absorption, etc. 4) Experimental works on mechanical properties such as strength and modulus of elasticity of carbonated concrete	It is desirable that the applicant has various knowledge of cement and concrete that are becoming a savior of curbing global warming. Carbonation process in concrete was a phenomenon to be suppressed so far but it should be accelerated unless the carbonation leads to corrosion of steel in concrete. Applicants should have knowledge of CO2 emission and resource circulation in cement and concrete field, carbonation mechanism of concrete and required performance of concrete. Applicants should have an experience of experimental works using cement and concrete.	Graduate student	It is preferred that students have an experience to make cement mortar or cement concrete.	None	No	Hongo	https://moonshot-c4s.jp/en/
2	Mechanical Engineering	Professor	SHIOMI Junichiro	Thermoelectric material/device, droplet wetting, or materials informatics (material x data)	Basic skills in programming or experience in experiments of heat transfer/fluid dynamics.	Mechanical engineering, physics, Materials science, or Data science.	Any problem solving experience using computation or experiments.		No	Hongo	http://www.phonon.t.u-tokyo.ac.jp/?lang=en
3	Mechanical Engineering	Professor	TAKAGI Shu	Topic: Numerical Simulation of Dispersed Multiphase Flows In this study, numerical simulations of rising bubbles will be conducted. Application of this study is related to water purification system using aeration tank and also related to the deep ocean mining technology using air lift pump. Using the simulated data, the trainee is expected to visualize the flows and analyze them.	Fundamental Fluid Mechanics, Vector Analysis, Differential Equation	Graduate student is preferred.	If you have experiences of writing some programs in some projects, it is preferable, but not necessarily.		No	Hongo	https://www.fel.t.u-tokyo.ac.jp/index_en.html
4	Mechanical Engineering	Professor	DAIGUJI Hirofumi	We work on energy and transport phenomena. We are aiming to advance diverse energy technologies for energy-saving systems by scrutinizing physical phenomena such as chemical reactions, phase changes and micro/nanoscale heat and mass transfer.	None	Basic courses in mechanical engineering such as thermodynamics and fluid mechanics	Project experience is not required.		Available	Hongo	http://www.thml.t.u-tokyo.ac.jp/en/index.html

5	Systems Innovation	Professor/ Lecturer	TAKAHASHI Jun/ WAN Yi	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 *When you choose this laboratory on T-cens, please choose "WAN Yi" for supervisor.	Mechanics of materials Strength of materials	Mechanics of materials Strength of materials	Composite material Carbon fiber reinforced plastics		Available	Hongo	http://j-t.o.oo7.jp/index-e.html
6	Systems Innovation	Professor	KOSHIZUKA Seiichi	Trainees 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, rain water infiltration in a car, droplet behavior, mixing process, flooding, tsunami, etc.	Experience of computer programming using C or other languages. Knowledge of basics of fluid dynamics or solid dynamics.				Available	Hongo	http://mps.q.t.u-tokyo.ac.jp/lab/
7	Systems Innovation	Associate Professor	KANNO Taro	1) Simulation or experimental study on team cognitive behavior (e.g. communication analysis; exploring performance indicators; team behavior tracking; multimodal data analysis) 2) Others (if requested, related to human-centric systems design, operation, and management)	Intermediate JAVA and/or Python programming skill for the topics related to simulation and data analysis	Preferable but not limited to human factors, cognitive engineering, resilience engineering, industrial management and engineering			No	Hongo	http://www.tkanno.net/
8	Aeronautics and Astronautics	Associate Professor	IMAMURA Taro	Aerodynamic simulation around an airfoil using Computational Fluid Dynamics: We will provide you our in-house CFD program called UTCart for research purpose. The participant will be able to use the code, and analyse the flow field including the compressibility effect.	Windows Microsoft Office, Programming experience (python, if possible)	Fluid dynamics, Aircraft Dynamics	Any project related to aircraft designing would be beneficial		No	Hongo	http://park.itc.u-tokyo.ac.jp/rinoielab/english/index.html
9	Electrical Engineering & Information Systems	Professor	NAKANO Yoshiaki	Semiconductor optoelectronic materials, devices, and circuits Description: Compound semiconductor material and device technologies for semiconductor lasers, optical modulators/switches, photonic integrated circuits, high efficiency solar cells, and solar fuels are studied.	None	Basic study on optics and semiconductor physics	None		No	Hongo / Komaba	http://www.ee.t.u-tokyo.ac.jp/~nakano/lab/e_index.html
10	Electrical Engineering & Information Systems	Associate professor	Le Duc Anh	At Anh Lab, we aim to integrate dissimilar material systems utilizing our unique capability of epitaxial growth of thin film heterostructures using molecular beam epitaxy (MBE) and device nano-fabrication. The ongoing research topics include semiconductor spintronics, superconductor/ferromagnetic semiconductor hybrid strucutres, new topological materials, and oxide-based electronics.	Basic knowledge of solid state physics, semiconductor physics and devices are required.	Electrical Engineering, Applied Physics, or Material Science	Any experience in crystal growth, electronic device fabrication and measurements would be beneficial.	The candidate must have adequate ability to communicate and conduct team-work in either English or Japanese.	No	Hongo	https://www.anh-lab.com/

11	Materials Engineering	Professor	WATANABE Satoshi	Molecular dynamics simulations using interatomic potentials constructed via machine-learning: This project aims at understanding atomic processes such as diffution and crystallization by molecular dynamics simulations with interatomic potentials constructed via machine-learning (specifically, neural network). Specific tasks may include assesment and improvement of interatomic potentials, and analysis of simulation results using advanced methodology such as persistent homology.	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		Available	Hongo	http://cello.t.u-tokyo.ac.jp/index.php?id=7
12	Materials Engineering	Associate Professor	EJIMA Hirotaka	Bioinspired Materials (Bioinspired Underwater Adhesives, Interface Engineering using Metal-Phenolic Networks, etc.)	The basic knowledge on one of the following; materials science, chemistry and biology.	Not strictly required but better to have materials science, chemistry or biology background.	None		No	Hongo	http://biomacro.t.u-tokyo.ac.jp/indexen.html
13	Materials Engineering	Associate Professor	MATSUURA Hiroyuki	1) Physical chemistry of non-metallic particle formation during solidification of steel: Experimental research to elucidate the precipitation mechanism of compounds and behavior of dissolved impurities in molten iron 2) Development of novel pyrometallurgical process for zinc: Electrochemical approach for purification of molten ZnCl2	Interest and basic knowledge for pyrometallurgy Interest for conducting lab-scale experiments	Interest and fundamental knowledge for chemical thermodynamics and electrochemistry	Better for having experiences of chemical analyses and use of SEM (not mandatory)		No	Hongo	http://www.pyro.t.u-tokyo.ac.jp/result/
14	Chemical System Engineering	Professor	TAKANABE Kazuhiro	Electrocatalysis for energy conversion Investigation on developing electrocatalyst materials will be conducted. The works involve practical experiments in laboratory, related to materials synthesis, characterization, and catalytic testings.	Basic knowledge in the field of chemistry, chemical engineering, and/or materials science. Safetry training is required before entering the lab. The chemical lab skill and knowledge is preferred.	Chemistry; Chemical Engineering; Materials Science	Fundamental knowledge of chemistry, chemical engineering, and materials science		No	Hongo	https://www.catec.t.u-tokyo.ac.jp/
15	Bioengineering/ Precision Engineering	Lecturer	NAKAGAWA Keiichi	1) Ultrafast imaging: you will capture the electron and phonon dynamics in picosecond timescales to analyze light-matter interaction during laser processing. 2) Biophotonics: you will develop a new method to produce acoustic waves inside the body to manipulate the photons' behavior for optical biotechnologies. 3) Biophysics: you will investigate the interactions between physical energies (photon and phonon) and biological cells/tissues to control the functions of our body.	None	Optical engineering, but not required at the time of application. After the selection, I will suggest the study field and provide some materials to study this field depending on the student's interests and background.	None		No	Hongo	Group website: http://www.bmpe.t.u-tokyo.ac.jp/en/index.html Personal website: https://sites.google.com/site/keinakagawa6