2014 List of potential supervisors who are open to accepting international students through the Intellectual Exchange and Innovation Program (IEI Program)

When you contact with an IGSES professor listed below for asking the possibility to supervise you, please send an e-mail with a subject of “Inquiry about a prospective supervisor in IEI Program” to avoid your mail being classified as spam.

**Department of Applied Science for Electronics and Materials**

<table>
<thead>
<tr>
<th>Prof. Kiichi Hamamoto</th>
<th><a href="mailto:hamamoto@asem.kyushu-u.ac.jp">hamamoto@asem.kyushu-u.ac.jp</a></th>
<th><a href="http://www.asem.kyushu-u.ac.jp/ep/ep02/jp/">www.asem.kyushu-u.ac.jp/ep/ep02/jp/</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research fields:</td>
<td>Opto-electronics, optical communication, and optical sensing</td>
<td></td>
</tr>
<tr>
<td>Key words:</td>
<td>Optical communication, space division multiplexing, multi-mode, laser diode, optical switch, mode-converter, MMI, waveguide, optical sensing, breath sensing, infrared absorption, cavity ring down, high-mesa waveguide</td>
<td></td>
</tr>
<tr>
<td>Potential research themes:</td>
<td>1. Compact breath-sensing system</td>
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<td></td>
<td>2. High modulation speed laser diode</td>
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<td></td>
<td>3. Optical switch for future low power consumption optical router</td>
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<td></td>
<td>4. Multi-mode light source for space division multiplexing</td>
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<tr>
<td>Required knowledge and skills:</td>
<td>Electro-magnetic theory, Fourier analysis, Computer programming</td>
<td></td>
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</tbody>
</table>

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

<table>
<thead>
<tr>
<th>Assoc. Prof. Kungen Teii</th>
<th><a href="mailto:teii@asem.kyushu-u.ac.jp">teii@asem.kyushu-u.ac.jp</a></th>
<th>hyoka.ofc.kyushu-u.ac.jp/search/details/K001514/english.html</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research fields:</td>
<td>Plasma Engineering, Non-organic Materials, Electronic and Biomedical Devices</td>
<td></td>
</tr>
<tr>
<td>Key words:</td>
<td>Electrical and electronic materials, Ultrahard materials, Biomaterials, Power devices, Doping, Plasma processing, Reactive plasmas, Diamond, Nano-carbon, Boron nitride, Silicon carbide, Semiconductor processing, High-temperature device, Mass spectrometry, Electrostatic probe, Electron emitter, Cutting tool</td>
<td></td>
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<tr>
<td>Potential research themes:</td>
<td>1. Materials production and characterization of semiconductor films and biomedical coatings</td>
<td></td>
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<td></td>
<td>2. Vapor phase synthesis of diamond, nano-carbon, boron nitride, and silicon carbide films</td>
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<td></td>
<td>3. Investigation of reactive plasma with mass spectrometry, probe methods, and optical methods</td>
<td></td>
</tr>
<tr>
<td>Required knowledge and skills:</td>
<td>Fundamental knowledge of solid state physics and/or physical chemistry</td>
<td></td>
</tr>
</tbody>
</table>

The contact with this professor prior to the submission of the application form is preferable. Without the contact prior to the submission, the professor will assess the possibility to accept an applicant based on the submitted application documents.

<table>
<thead>
<tr>
<th>Prof. Jun-ichiro Hayashi</th>
<th><a href="mailto:junichiro_hayashi@cm.kyushu-u.ac.jp">junichiro_hayashi@cm.kyushu-u.ac.jp</a></th>
<th><a href="http://www.carbonres.com">www.carbonres.com</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research fields:</td>
<td>Chemical Reaction Engineering</td>
<td></td>
</tr>
<tr>
<td>Key words:</td>
<td>Carbon resources, biomass, lignite, coal, thermochemical conversion, catalysis, pyrolysis, gasification, upgrading, detailed chemical kinetics and modeling, computational fluid dynamics, reactor simulation and design</td>
<td></td>
</tr>
<tr>
<td>Potential research themes:</td>
<td>1. Pyrolysis, gasification, combustion and carbonization of biomass and fossils for producing syngas, chemicals and material.</td>
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<td></td>
<td>2. Detailed chemical kinetic analysis, modeling and simulation of thermochemical conversion of carbon resources, and reactor/process design</td>
<td></td>
</tr>
<tr>
<td>Required knowledge and skills:</td>
<td>Fundamental knowledge of chemical engineering or chemical reaction engineering</td>
<td></td>
</tr>
</tbody>
</table>

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

<table>
<thead>
<tr>
<th>Assoc. Prof. Koyo Norinaga</th>
<th><a href="mailto:norinaga@cm.kyushu-u.ac.jp">norinaga@cm.kyushu-u.ac.jp</a></th>
<th><a href="http://www.cm.kyushu-u.ac.jp/hayashi/kn/norinaga_eng.html">www.cm.kyushu-u.ac.jp/hayashi/kn/norinaga_eng.html</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Research fields:</td>
<td>Thermochemical conversion of carbon resources such as coal, oil, natural gas, and biomass.</td>
<td></td>
</tr>
<tr>
<td>Key words:</td>
<td>Chemical engineering, Reaction kinetics, Computational fluid dynamics (CFD), Coal and biomass gasification, Combustion, Pyrolysis, Kinetic modeling and simulation, Reactor and process design, High temperature materials such as C/C and SiC/SiC composites</td>
<td></td>
</tr>
</tbody>
</table>

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.
### Prof. Hiroshi Nakashima
nakasima@astec.kyushu-u.ac.jp  www.astec.kyushu-u.ac.jp/nakasima/naka_home.htm

**Research fields:** Physics and technology of semiconductor devices

**Key words:** CMOS, MOSFET, gate stack engineering, channel engineering, source/drain engineering, interface engineering, defect engineering, optoelectronics, metal/semiconductor contact, pn junction, MOS capacitor, Ge, SiGe, Si, SiC

**Potential research themes:**
1. Research & development of Si/Ge CMOS devices
   - Gate stack, channel, and source/drain engineering
   - Interface and defects engineering
2. Research & development of Ge optoelectronics
3. Research & development of SiC device for high temperature operation

**Required knowledge and skills:** Fundamental knowledge of semiconductor physics and devices.

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### Assoc. Prof. Tsuyoshi Yoshitake
yoshitake@asem.kyushu-u.ac.jp  http://www.asem.kyushu-u.ac.jp/qq/qq01/index-j.htm


**Key words:** thin film growth, photovoltaics, photodiodes, Fe-Si heterostructures, nanocrystalline diamond, semiconducting iron disilicides, heteroepitaxy, sputtering, coaxial arc plasma deposition, pulsed laser deposition

**Potential research themes:**
1. Development of new spintronics devices based on Fe-Si materials
2. Fabrication of semiconducting iron disilicides thin films by sputtering and their application to photovoltaics
3. Fabrication of nanocrystalline diamond films by physical vapor depositions and their application to photovoltaics and hard coating

**Required knowledge and skills:** Fundamental knowledge of electronics or materials

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### Prof. Michitaka Ohtaki
ohtaki@kyudai.jp  www.mm.kyushu-u.ac.jp/lab_02/

**Research Fields** Inorganic materials science, Physical chemistry, Energy-oriented materials chemistry

**Key words:** Oxide thermoelectric materials, Thermoelectric conversion, Functional oxide ceramics, Energy conversion materials, Photocatalysis, Low-dimensional nanomaterials, Self-assembly, Organic-inorganic hybrids

**Potential research themes:**
1. Development of oxide thermoelectric materials with unconventional crystal structure.
2. Electronic, optical, and magnetic properties of low-dimensional nanomaterials synthesized by using self-assembly molecular template.

**Required knowledge and skills:** None

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### Prof. Minoru Nishida
nishida@asem.kyushu-u.ac.jp  www.asem.kyushu-u.ac.jp/of/of01/index.html

**Research fields:** Phase transformations in metals and alloys, Microstructural characterization of crystalline materials

**Key words:** Martensitic transformation, Shape memory and superelastic alloys, Ferromagnetic shape memory alloys, Transmission electron microscopy, Scanning electron microscopy, In-situ observations

**Potential research themes:**
1. Crystallographic and morphological characterization of martensitic transformation in metals and alloys
2. Research and development of shape memory and superelastic alloys
3. Research and development of Ti-based structural and functional alloys

**Required knowledge and skills:** Fundamental knowledge of phase transformation in metals and alloys

**Fundamental knowledge of crystallography and diffraction theory
Skills of basic metallurgical experiments**

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The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.
Assoc. Prof. Hiroki Ago  
ago@cm.kyushu-u.ac.jp  www.nano.cm.kyushu-u.ac.jp/ago
Research fields: Science and Technology of carbon nanomaterials and low-dimensional materials
Key words: Graphene, inorganic nanosheets, metal dichalcogenides, carbon nanotubes, chemical vapor deposition, crystal growth, field-effect transistors, flexible electronics
Potential research themes: Develop new growth methods of new nanomaterials, such as graphene, 2D atomic sheets (metal dichalcogenides, h-BN), and carbon nanotubes. Based on these materials, we study physical/chemical properties and develop unique electronic devices, such as field-effect transistors and flexible devices.
Required knowledge and skills: Fundamental knowledge of chemistry, physics, and materials science.

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Department of Molecular and Material Sciences

Prof. Seigi Mizuno  
mizuno.seigi@kyudai.jp  www.mm.kyushu-u.ac.jp/lab_01/surface/home/surfaceE.html
Research fields: Surface Science, Nanoscience
Key words: Surface structure determination, Growth of surface materials, Fabrication of atomically sharpened tips, Low-energy electron diffraction, Scanning tunneling microscopy, Field ion microscopy
Required knowledge and skills: Fundamental knowledge of surface science or solid state physics.
The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents. However, applicants can contact directly with the professor by email to ask for an invitation letter.

Assoc. Prof. Takeshi Nakagawa  
nakagawa.takeshi.174@m.kyushu-u.ac.jp  www.mm.kyushu-u.ac.jp/lab_01/surface/home/surfaceE.html
Research fields: Surface and thin film science
Key words: Low dimensional nano structure, Magnetism (high coercivity, anisotropy), Magnetic Microscope, Photoelectron, Scanning tunneling microscope, Low energy electron diffraction, Synchrotron radiation
Potential research themes: 1. Novel magnetic, electronic properties of nano structures 2. Instrumental development based on photoemission
Required knowledge and skills: Successful candidate should have a background with at least one of the following fields: Solid state physics (chemistry), Inorganic chemistry, Physical chemistry
Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Prof. Yasutake Teraoka  
Teraoka.yasutake.329@m.kyushu-u.ac.jp
Research fields: Functional Inorganic Materials, Environmental Catalysis, Physical and Inorganic Chemistry
Key words: Environmental catalysis, Automotive exhaust treatment, VOC abatement, Gas separation, Nano-materials, Synchrotron radiation techniques (XAFS, SAXS)
Required knowledge and skills: 1. Fundamental knowledge of chemistry especially of physical, inorganic and catalytic chemistry 2. Skills of basic chemical experiments and instrumental analysis
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

Assoc. Prof. Maiko Nishibori  
m-nishibori@mm.kyushu-u.ac.jp
Research fields: Functional Inorganic Materials, Analysis by synchrotron radiation
Key words: functional materials, ceramics, processing and fabrication of ceramics materials and devices, synchrotron radiation, X-ray absorption fine structure, sensors, environmental technology
The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.
<table>
<thead>
<tr>
<th>Professor Name</th>
<th>Email</th>
<th>Website</th>
<th>Research Fields</th>
<th>Key Words</th>
<th>Potential Research Themes</th>
<th>Required Knowledge and Skills</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof. Hideharu Nakashima</td>
<td><a href="mailto:nakashima.hideharu.792@m.kyushu-u.ac.jp">nakashima.hideharu.792@m.kyushu-u.ac.jp</a></td>
<td><a href="http://www.mm.kyushu-u.ac.jp/lab_05/index.html">www.mm.kyushu-u.ac.jp/lab_05/index.html</a></td>
<td>Structural Materials Science</td>
<td>High-temperature deformation mechanism of crystalline materials; Grain boundary structure in crystalline materials and their mechanical properties; Crystal orientation analysis and applications for structural materials</td>
<td>Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assoc. Prof. Satoshi Hata</td>
<td><a href="mailto:hata.satoshi.207@m.kyushu-u.ac.jp">hata.satoshi.207@m.kyushu-u.ac.jp</a></td>
<td><a href="http://www.mm.kyushu-u.ac.jp/lab_05/index.html">www.mm.kyushu-u.ac.jp/lab_05/index.html</a></td>
<td>Metal Materials Science</td>
<td>Microscopic analysis on structural material and superconducting material by transmission electron microscopy; Electron tomography</td>
<td>Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prof. Akira Harata</td>
<td><a href="mailto:harata@mm.kyushu-u.ac.jp">harata@mm.kyushu-u.ac.jp</a></td>
<td><a href="http://www.mm.kyushu-u.ac.jp/lab_07">www.mm.kyushu-u.ac.jp/lab_07</a></td>
<td>Analytical chemistry and physical chemistry</td>
<td>Analytical chemistry, physical chemistry, laser chemistry, synchrotron radiation chemistry, and their applications to methodology for ultrasensitive and high performance analysis.</td>
<td>The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prof. Kazuo Arakawa</td>
<td><a href="mailto:k.arakawa@riam.kyushu-u.ac.jp">k.arakawa@riam.kyushu-u.ac.jp</a></td>
<td><a href="http://www.riam.kyushu-u.ac.jp/fracture/ARAKAWA_group/indexA-j.htm">www.riam.kyushu-u.ac.jp/fracture/ARAKAWA_group/indexA-j.htm</a></td>
<td>New materials &amp; structures, Renewable energies, Wind &amp; ocean energies, Large-scale offshore floating platforms, Wind-lens turbines</td>
<td>Lightweight &amp; high-strength materials, Composite materials, Carbon fiber reinforced plastic (CFRP), Manufacturing process, Vacuum assisted resin transfer molding (VaRTM), Material properties, Novel CFRP joints</td>
<td>Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prof. Mitsuru Shindo</td>
<td><a href="mailto:shindo@cm.kyushu-u.ac.jp">shindo@cm.kyushu-u.ac.jp</a></td>
<td><a href="http://www.cm.kyushu-u.ac.jp/dv01/contents/english.html">www.cm.kyushu-u.ac.jp/dv01/contents/english.html</a></td>
<td>Organic Chemistry</td>
<td>Synthetic organic chemistry; Total synthesis of bioactive natural products, New synthetic reactions, Chemical biology</td>
<td>The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assoc. Prof. Yoshiaki Takahashi</td>
<td><a href="mailto:ytak@mm.kyushu-u.ac.jp">ytak@mm.kyushu-u.ac.jp</a></td>
<td><a href="http://www.mm.kyushu-u.ac.jp/lab_06/ENGLISH.html">www.mm.kyushu-u.ac.jp/lab_06/ENGLISH.html</a></td>
<td>Basic physical properties of polymers, Rheological properties of soft matter</td>
<td>natural polymers, model synthetic polymers, molecular characterization, hierarchical structure viscoelastic properties</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Prof. Masaya Miyazaki**  
miyazaki.masaya.284@m.kyushu-u.ac.jp  
http://www.mm.kyushu-u.ac.jp/english/lab_13.html  

| Research fields: | Microfluidics, Micro process engineering, Analytical biochemistry  
| Key words: | Microreactor, Micro total analysis system, Enzymatic processing, Bioassays  
| Potential research themes: | Research & development of microfluidic reactor for material processing or microfluidic chip for protein analysis  
| Required knowledge and skills: | Fundamental knowledge of microfluidics, organic chemistry and/or biochemistry are desired  

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

**Assoc. Prof. Arihiro Kano**  
kano@ms.ifoc.kyushu-u.ac.jp  
www.cm.kyushu-u.ac.jp/dv01/dmstj.html  

| Research Fields: | Molecular Cell Biology, Material Biology  
| Key worlds: | Biological active substance, Cell immunology, Cancer or Tumor, Apoptosis, Peptide  
| Potential research themes: | 1. Exploration of middle molecular mass substances for immunological regulation  
| Required knowledge and skills: | Motivation and Intention  

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

**Prof. Shiyoshi Yokoyama**  
s_yokoyama@cm.kyushu-u.ac.jp  
www.cm.kyushu-u.ac.jp/dv15/Yokoyama_Labo.html  

| Research Fields: | Polymer photonics, optical device, optical communications  
| Key worlds: | Polymer, nonlinear optics, electro-optics, waveguide, optical modulator, optical switching, optical sensing, silicon, silicon nitride, telecommunication, high-bandwidth,  
| Potential research themes: | 1. Polymer waveguide device for modulator and switching  
| 2. Synthesis of optical polymers  
| 3. Polymer and silicon hybrid waveguide  
| Required knowledge and skills: | Fundamental knowledge of chemistry and physics  

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

**Department of Advanced Energy Engineering Science**

**Prof. Masayoshi Tanaka**  
mytanaka@aees.kyushu-u.ac.jp  
plasma.kyushu-u.ca.jp (in Japanese)  

| Research fields: | Plasma Physics  
| Key words: | Fundamental Plasma Physics, Nonlinear Phenomena, Structure formation in Plasma, Flow Visualization, Wave Particle Interaction  
| Potential research themes: | 1. Plasma Flow and Angular Momentum Conservation  
| 2. Interaction of Plasma and Neutral Particles  
| Required knowledge and skills: | 1. Fundamental knowledge of physics (Electrodynamics, Hydrodynamics, Statistical Physics)  
| 2. Computer programming (for example C, FORTRAN)  

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

**Assoc. Prof. Nobuya Hayashi**  
hayashin@aees.kyushu-u.ac.jp  
appl.aees.kyushu-u.ac.jp/index.html  

| Research fields: | Plasma engineering, Plasma medicine, Plasma biology  
| Key words: | Atmospheric discharge, Low-pressure plasma, Plasma sterilizer, Sterilization of agricultural product, Growth enhancement of plant, Plasma - cell interaction, Toxic gas decomposition  
| Potential research themes: | 1. Development of medical sterilizer using oxygen RF plasma  
| 2. Growth enhancement of plants by oxygen plasma irradiation  
| 3. Inactivation of molds on fruits using atmospheric discharge  
| Required knowledge and skills: | 1. Fundamental knowledge of plasma  
| 2. Fundamental knowledge of electronics  
| 3. Some interest in biology  

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Key words: Fusion Reactor, Tritium Fuel Cycle, Hydrogen Isotope Separation, Nuclear Reactor Engineering, Chemical Engineering Process using adsorption, absorption, distillation, permeation and so on.

Potential research themes:
1. Fusion fuel cycle including processes of hydrogen isotope injection, burning, exhaust, storage, isotopic separation and permeation
2. Modeling of tritium mass transfer in liquid blankets of Li-BeF\(_2\) molten salt, Li-Pb eutectic alloy or liquid Li
3. Hydrogen production using fission or fusion energy

Required knowledge and skills:
1. Fundamental knowledge of chemical engineering or unit operation related with separation, adsorption or absorption process
2. Computer programming (for example C, FORTRAN)

Applications who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Although #1 is preferable, #2 is acceptable.
Prof. Kazuaki Hanada
hanada@triam.kyushu-u.ac.jp  www.triam.kyushu-u.ac.jp/hanadalabo/en/index.html

Research fields:  Nuclear Fusion research, Plasma Physics, RF technology
Key words:  Steady State operation of tokamak, Spherical tokamak, Current drive and plasma heating, Plasma diagnostics, Plasma wall interaction, heat and particle balance in long duration discharges

Potential research themes:
1. Current drive and plasma heating with high power microwave sources
2. Plasma wall interaction for steady-state operation on QUEST
3. Development of plasma diagnostics

Required knowledge and skills:
1. Fundamental knowledge of plasma physics
2. Computer programming (for example FORTRAN. MATLAB)

Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

Prof. Akihide Fujisawa
fujisawa@triam.kyushu-u.ac.jp  www.triam.kyushu-u.ac.jp/fujisawaken/

Research fields:  Plasma physics and plasma turbulence
Key words:  Plasma Turbulence, Experiment, Liner cylindrical magnetized plasma, toroidal magnetized plasma, Computed tomography for plasma turbulence, non-perturbed advanced diagnostics, advanced analysis for nonlinearity

Potential research themes:
1. Linear magnetized plasma experiments for understanding multi-scale nonlinear couplings in plasma turbulence
2. Toroidal magnetized plasma experiments for understanding topological effects in plasma turbulence

Required knowledge and skills:
1. Fundamental knowledge of plasma physics and turbulence
2. Computer programming (for example C, FORTRAN. MATLAB)

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Assoc. Prof. Yoshihiko Nagashima
nagashima@triam.kyushu-u.ac.jp  www.triam.kyushu-u.ac.jp/fujisawaken/index.html

Research fields:  Plasma Physics and Turbulence (experimental)
Key words:  Plasma turbulence, Plasma Turbulence, Nonlinear Analysis, Basic Experiment, Tokamak Experiment, Langmuir probe, Spectroscopic Measurement

Potential research themes:
1. Numerical Analysis of tomographic reconstruction
2. Langmuir probe experiment

Required knowledge and skills:
1. Fundamental knowledge of plasma physics, fluid mechanics, thermodynamics, statistical mechanics, electromagnetism, and physical mathematics
2. Computer programming (for example C, FORTRAN. MATLAB)

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Prof. Hideki Zushi / Assoc. Prof. Hiroshi Idei
zushi@triam.kyushu-u.ac.jp / idei@triam.kyushu-u.ac.jp  www.triam.kyushu-u.ac.jp/

Research fields:  Nuclear Fusion Plasma Research, Wave Plasma Interaction, Plasma Wall Interaction
Key words:  Spherical Tokamak, Electron Cyclotron / Bernstein Wave Heating and Current Drive, Recycling, CW plasma discharge

Potential research themes:
- “Micro-meso-macro hierarchy structure” in hot plasma and macroscopic controllability of plasma performance
  - Self-organization of the plasma confinement structure
  - Interrelation of hierarchy structure and interference
  - Advanced spectroscopy for plasma diagnostics
- “Phase Space Engineering” by resonant interaction between waves and electrons
  - Acceleration of electrons by phasing electro-magnetic waves and control of current generation and sustainment
  - Development of high power microwave technology
  - Advanced RF technology for plasma diagnostics
- Active control of Circulation of fuelled Hydrogen in fusion device
  - Elementaries processes of atomic H in materials thermally loaded by hot plasma
- Active control of complex time constants of H release from and retention into materials, especially thin film on the surface

Required knowledge and skills:
1. Fundamental Physics, particularly Electromagnetics
2. Computer programming (for example C, FORTRAN. MATLAB)

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.
Assoc. Prof. Naohiro Kasuya  

**Research fields:** Plasma physics, Fusion science, Numerical simulation  

**Key words:** Plasma turbulence, Turbulent transport in magnetized plasmas, Toroidal plasma, Drift wave instability, Fluid simulation, Structural formation and bifurcation, Numerical diagnostic  

**Required knowledge and skills:**  
1. Fundamental knowledge of plasma physics  
2. Computer programming (for example C, FORTRAN, MATLAB)  

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Prof. Kazuo Nakamura  

**Research fields:** Plasma Control, Fiber Optics, Power Electronics  

**Key words:** Spherical tokamak, Plasma equilibrium, Plasma shape reconstruction, Cauchy Condition Surface method, Generalized cross validation, Reflective memory, Faraday rotation, Sagnac interferometer, Diamagnetic effect, Sensorless measurement, Matrix converter, Space vector, Quaternion, IGBT, FPGA, HDL  

**Potential research themes:**  
1. ST (Spherical Tokamak) plasma shape reconstruction from magnetic sensor signals by CCS (Cauchy Condition Surface) method with SVD ( Singular Value Decomposition) regarding eddy current in conducting material around plasma.  
2. Diamagnetic measurement of plasma energy by fiber optics (Sagnac interferometer) based on Faraday rotation of electromagnetic wave.  
3. Vertical position stabilization of non-circular cross-section plasma with power supply based on power electronics (matrix converter).  

**Required knowledge and skills:**  
1. Required knowledge about electricity and magnetism  
2. Required skill of computer programming in some language (for example C, FORTRAN, MATLAB, Igor, HDL, Mathematica, Maple)  
3. Preferable background knowledge on plasma physics  

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

**Department of Energy and Environmental Engineering**

Prof. Toshiyuki Aoki  

**Research fields:** Compressible Fluid Dynamics, Aeroacoustics  

**Key words:** Wind-tunnel experiments, Supersonic nozzle, Compressible flow, Jets, Compression wave, Shock wave, Nonlinear effects of propagating wave, Mechanics of flow-induced sound, Numerical simulation  

**Potential research themes:**  
1. Nonlinear effects on a propagating compression wave in a high-speed railway tunnel  
2. Characteristics of shock-containing jet from supersonic nozzle  
3. Development of noise-reduction device for high-speed train and automobile  

**Required knowledge and skills:**  
1. Fundamental knowledge of compressible gas flow  
2. Computer programming (for example C, Fortran, LabVIEW)  

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Assoc. Prof. Taro Handa  

**Research fields:** Laser-aided fluid diagnostics  

**Key words:** Laser-induced fluorescence, Molecular tagging velocimetry, Pressure sensitive paint, Compressible fluid dynamics  

**Potential research themes:** Wind tunnel experiments using laser-aided diagnostic systems  

**Required knowledge and skills:**  
1. Fundamental knowledge of optics  
2. Fundamental knowledge of spectroscopy  
3. Fundamental knowledge of gas dynamics  
4. Computer programming  

Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.
Prof. Koji Takasaki
takasaki@ence.kyushu-u.ac.jp  takaken.ddo.jp/e_home.htm
Research fields: Marine engine combustion and marine fuel
Key words: Marine diesel, Marine gas engine, Low grade fuel, EEDI
Required knowledge and skills: 1. High level knowledge on combustion 2. Computer programming for combustion modeling and CFD
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

Prof. Jun Tanimoto
Tanimoto@cm.kyushu-u.ac.jp  ktlabo.cm.kyushu-u.ac.jp/
Research fields: Urban Climatology, Building Physics, Social Physics, Complex Science
Key words: Wind-tunnel experiments, Visualization by PIV, Large Eddy Simulation, Building simulation, Stochastic prediction of utility demand, Evolutionary game theory, Traffic flow analysis, Multi-Agent Simulation (MAS), Epidemic model
Required knowledge and skills: 1. Basic knowledge on physics and mathematics 2. Fundamental knowledge of turbulent flow 3. Computer programming (for example C, FORTRAN. MATLAB): NOT a skill to use software
The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Assoc. Prof. Kazuhide Ito
ito@kyudai.jp  www.phe-kyudai.jp
Research fields: Environmental Engineering, Public Health Engineering
Key words: Indoor Environment, CFD, Numerical Simulation, Computer Simulated Person, Exposure Analysis, HVAC
Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Assoc. Prof. Takahiko Miyazaki
mtmiyazak@kyudai.jp  www.cm.kyushu-u.ac.jp/dv10/Koyama_lab/index_e.html
Research fields: Thermal Engineering, Air-conditioning and Refrigeration
Key words: Adsorption heat pump, Desiccant air conditioning, Adsorption equilibrium, Dynamic simulation, thermodynamic cycle analysis, Heat and mass transfer, Energy system analysis
Potential research themes: 1. Study on adsorption kinetics of heat pump refrigerants on chemically treaded activated carbons 2. Heat and mass transfer analysis of adsorption heat exchanges
Required knowledge and skills: Fundamental knowledge of thermodynamics and heat transfer
Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.

Associate Prof. Hiroshi Tajima
 tasima@ence.kyushu-u.ac.jp  takaken.ddo.jp/e_home.htm
Research Field: Spray Simulation, Engine Combustion Process, Fuel Modelling, Flow Visualization
Key words: Large diesel engine, Large gas engine, RCCI, PCCI, KIVA, CHEMKIN, FIRE, PIV, Laser-based optics
Required knowledge and skills: 1. Fundamental knowledge of turbulent flow, combustion modeling 2. Computer programming for 3D-CFD in Fortran
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.
### Prof. Naoki Hirose

**hirose@riam.kyushu-u.ac.jp**  
[www.riam.kyushu-u.ac.jp/omg/index.html.en](http://www.riam.kyushu-u.ac.jp/omg/index.html.en)

**Research fields:** Physical Oceanography, Atmosphere-Ocean Interaction

**Key words:** Numerical modeling, Data assimilation, East Asian marginal seas

**Required knowledge and skills:**  
1. Mathematics, Physics, Fluid dynamics  
2. Computer programming (such as Fortran or Matlab)

**Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.**

### Prof. Nobuhiro Matsunaga

**matunaga@esst.kyushu-u.ac.jp**  

**Research fields:** Environmental fluid dynamics

**Key words:** Environmental fluid dynamics, Turbulent phenomena, Coastal environments, Urban atmospheric environments, Heat island, Water quality in coastal region, Material circulation in coastal region, Environments of seabed materials.

**Potential research themes:**  
1. Urban heat island in Fukuoka metropolitan area.  
2. Environments of water quality and seabed materials in Isahaya Bay.

**Required knowledge and skills:**  
1. Fundamental knowledge of fluid dynamics  
2. Simulation ability with computer programming FORTRAN  
3. Analysis ability of water quality and seabed materials

**The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.**

### Assoc. Prof. Yuji Sugihara

**sugihara@esst.kyushu-u.ac.jp**  

**Research fields:** Hydraulic Engineering, Environmental Fluid Dynamics

**Key words:** Air-sea interaction, Wind wave, Oceanic whitecap, Turbulent open-channel flow, Turbulence modeling, Direct numerical simulation

**Required knowledge and skills:**  
1. Computer programming with FORTRAN  
2. Fundamental knowledge of turbulence dynamics

**Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.**

### Assoc. Prof. Makoto Okamura

**okamura@riam.kyushu-u.ac.jp**  
[www.riam.kyushu-u.ac.jp/fluid/index-e.html](http://www.riam.kyushu-u.ac.jp/fluid/index-e.html)

**Research fields:** Fluid Physics

**Key words:** Water wave

**Potential research themes:**  
1. Large amplitude of short-crested water waves  
2. Large amplitude of standing water waves

**Required knowledge and skills:** Computer programming (FORTRAN)

**The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.**

### Prof. Hajime Okamoto

**okamoto@riam.kyushu-u.ac.jp**  
[www.riam.kyushu-u.ac.jp/gfd/](http://www.riam.kyushu-u.ac.jp/gfd/)

**Research fields:** Atmospheric science, Satellite remote sensing of clouds and aerosols, non-spherical particle scattering, multiple scattering

**Key words:** Remote sensing, Satellite, Cloud microphysics, Aerosols, Radiation, Climate, light scattering, radar backscattering, lidar, multiple scattering process, Doppler

**Potential research themes:**  
1. Global analysis of cloud microphysics, water vapor and aerosols by active remote sensing from space  
2. Physical properties of low-level clouds by cloud radar and lidar  
3. Development of new type of ground-based lidar  
4. Development of algorithms for remote sensing of clouds

**Required knowledge and skills:**  
1. Fundamental knowledge of physics and mathematics  
2. Computer programming (FORTRAN)

**Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.**
**Prof. Changhong Hu**  
hu@riam.kyushu-u.ac.jp  www.riam.kyushu-u.ac.jp/ship/indexe.html  
Department: Earth System Science and Technology  
Research fields: Marine Renewable Energy Engineering, Computational Fluid Dynamics  
Key words: Floating offshore wind turbine, Wave energy converter, Ocean current energy converter, Numerical simulation, Wave tank experiment  
Potential research themes:  
1. Hydrodynamic analysis of floating offshore wind turbine  
2. Development of novel numerical method for fluid-structure interaction simulation  
Required knowledge and skills:  
1. Fundamental knowledge of fluid mechanics  
2. Computer programming experience  
The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

**Assoc. Prof. Osama Eljamal**  
eljamal@esst.kyushu-u.ac.jp  osama-eljamal@kyudai.jp  www.esst.kyushu-u.ac.jp/~gsd/index.html  
Research Fields: Environmental Engineering  
Key words: Modeling of reactive solute transport in porous media; Modeling of Groundwater and remediation of groundwater; Water and wastewater treatment; Water distribution systems; Sustainable water resources management; Nanotechnology for Water and Wastewater Treatment  
Potential research themes:  
1. Iron Nanoparticles for Water and Wastewater Treatment  
2. Modeling of reactive solute transport in porous media  
Required knowledge and Skills:  
1. Fundamental knowledge of Environmental Engineering  
2. Fundamental knowledge of Chemical  
3. Computer programming (MATLAB)  
The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

**Assoc. Prof. Kaoru Ichikawa**  
ichikawa@riam.kyushu-u.ac.jp  www.esst.kyushu-u.ac.jp/~dmp/  
Research fields: Physical Oceanography, Satellite Oceanography  
Key words: Satellite Altimetry, Sea Surface Dynamic Height, Global Navigation Satellite System, Oceanographic Radar, Sea Surface Current, internal tides, giant squid.  
Potential research themes:  
1. Coastal sea surface height measurements by GNSS  
2. Observation of the Kuroshio by oceanographic radars  
Required knowledge and skills:  
1. Fundamental knowledge of geofluid dynamics  
2. Basic skills for programming (e.g. Fortran, C, Matlab)  
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

**Prof. Atsuhiko Isobe**  
aisobe@riam.kyushu-u.ac.jp  mepl1.riam.kyushu-u.ac.jp  
Research fields: Physical Oceanography, Atmosphere-Ocean Interaction, Marine plastic debris  
Key words: Numerical modeling, Field observation, East Asian marginal seas, coastal waters  
Required knowledge and skills:  
1. Mathematics, Physics, Fluid dynamics  
2. Computer programming (such as Fortran)  
Applicants who want to be supervised by this professor MUST contact directly with the professor by email to ask for an invitation letter.  

**Assoc. Prof. Toshihiko Takemura**  
toshi@riam.kyushu-u.ac.jp  sprintars.riam.kyushu-u.ac.jp/toshi/  
Research Fields: Meteorology, Atmospheric Environment  
Key words: aerosol, climate change, numerical model  
Potential research themes:  
Numerical simulation of global distributions of aerosols and their effects on climate system  
Required knowledge and skills:  
1. Fundamental knowledge of meteorology  
2. Computer programming (FORTRAN)  
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

**Assoc. Prof. Masahiko Nakamura**  
naka@riam.kyushu-u.ac.jp  
Research Fields: Ocean Engineering  
Key words: Underwater vehicle, Floating structure, Dynamics, Control  
Potential research themes:  
1. Dynamics and Control of Underwater Vehicle and Towed Vehicle  
2. Dynamic Positioning System for Floating Structure  
Required knowledge and skills:  
1. Fundamental knowledge of fluid mechanics  
2. Computer programming (for example C, MATLAB)  
Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.
Prof. Tohru Hada  

hada@esst.kyushu-u.ac.jp  www.esst.kyushu-u.ac.jp/~space/index_e.html

Research Fields: Space Plasma Physics, Space Environmental Fluid Dynamics

Key worlds: Space plasma waves, Collisionless shocks, Acceleration and transport of cosmic rays, Development of spacecraft data analysis techniques, Modeling of next generation plasma thrusters, Space plasma computer simulations, Space weather

Potential research themes:
1. Nonlinear waves and turbulence in the solar wind
2. Structure of collisionless shocks in space and astro-plasma environment
3. Acceleration and transport of cosmic rays (energetic particles)
4. Issues related to space weather

Required knowledge and skills:
1. Fundamental knowledge of plasma physics
2. Experience in fortran programming is a plus, but not required.

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Associate Prof. Masaru Yamamoto  
yamakatu@riam.kyushu-u.ac.jp  www.riam.kyushu-u.ac.jp/gfd/index-e.html

Research Fields: Planetary Meteorology, Atmospheric dynamics

Key worlds: Atmospheric modeling, Geophysical fluid dynamics, Planetary atmosphere

Required knowledge and skills:
1. Fundamental knowledge of fluid dynamics
2. Computer programming (FORTRAN)

Only applicants recommended by a researcher who is acquainted with this professor will be considered for the acceptance as Ph.D candidates.

Prof. Shigeo Yoshida  
yoshidas@riam.kyushu-u.ac.jp  www.riam.kyushu-u.ac.jp/ship/indexe.html

Research Fields: Wind energy, Wind farm, Wind turbine, Floating wind turbine, Dynamics and control

Key worlds: Aero/hydro-elastic-servo modeling, Control, Load mitigation, Wake, Fatigue

Potential research themes:
1. Blade flutter and its control.
2. Wind/tidal farm fatigue analysis and layout optimization.
3. Wind/tidal turbine modeling and load mitigation by control.

Required knowledge and skills:
1. Fundamental knowledge of fluid dynamics
2. Computer programming (ex. MATLAB, C, FORTRAN)

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Assoc. Prof. Tomoharu Senju  

senju@riam.kyushu-u.ac.jp  www.riam.kyushu-u.ac.jp/ocd/index-j.htm

Research Fields: Physical Oceanography, Geophysical Fluid Dynamics

Key worlds: East Asian marginal Seas, Deep and intermediate circulation, Water properties, Water mass formation, Field Observation, Climate Variability and Change, Coastal processes

Potential research themes:
1. Formation and circulation of the deep and intermediate waters in the Japan Sea.
2. Impacts of climate variability on adjacent seas of Japan.

Required knowledge and skills:
1. Fundamental knowledge of fluid dynamics
2. Computer programming with FORTRAN

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.

Prof. Yoshinobu Wakata  
wakata@riam.kyushu-u.ac.jp  www.esst.kyushu-u.ac.jp/%7Edmp/index-e.html

Research Fields: Ocean turbulence, Air-sea interaction

Key worlds: Turbulence, Large Eddy Simulation, Ocean tides, Ocean dynamics

Potential research themes:
1. Numerical simulation of ocean turbulence
2. Modeling of air-sea interaction

Required knowledge and skills:
1. Fundamental knowledge of turbulent flow
2. Computer programming (for example, FORTRAN, MATLAB)

The contact with this professor prior to the submission of the application form is not required. The professor will assess the possibility to accept an applicant based on the submitted application documents.