Topics for 2019 Research Internships – Okayama University –
Last Edition: September 2018

Pour obtenir la fiche détaillée correspondant à chaque stage, contacter : B. Chenevier - Okayama University - bernard-chenevier@cc.okayama-u.ac.jp

NB: As the industrial network is excellent around Okayama, it is also possible to apply for Internship in the industrial sector –

Additional internship periods are also possible in other areas in Japan, in fields related with aeronautics and/or energy, robotics, computer science...).This has to be investigated long in advance

MATERIAL SCIENCES

Prf. Goto
I - Study on electronic properties of graphene and two-dimensional materials – new quantum physics platforms

Prf. Mitsudo
I - Ladder-type Thienoacenes and Applications for Field Effect Transistors
II- Novel S-shaped Thienoacenes and Applications for Field Effect Transistors

Prf. Ohkubo
I - Development of new routes for the synthesis of metal-oxide nanoparticles using micro- and mesoporous carbon structures
II- Elucidation of surplus adsorption mechanism of anions onto microporous carbon structures

Prf. Yokoya:
I - Understanding physical properties for enhancing functionality by using advanced electron spectroscopy methods
II- Development of high-resolution photoelectron holography and its application to heavily doped diamond.

Prf. Kiwa:
I - Imaging catalytic reactions of metals by using a THz chemical microscopy method
II- Non-destructive evaluation of architectures using low-frequency magnetic fields

Prf. Nishina:
I - Fabrication of graphene-based lubricant
II - Exfoliation of graphite to graphene
III - Production of High-performance catalyst with graphene oxide support

Prf. Teranishi:
I - Synthesizing cathode materials with excellent high-rate capability for Li ion batteries
II - Towards enhanced microwave tunability of ferroelectric oxides
III- Developing stabilized ZrO_2-based fast oxygen ion conductors for SOFCs

Prf. Ishikawa:
I - Development of plasmonic metamaterials for energy-harvesting applications
II - Exploring 2D material physics and devices for high-performance optoelectronics/plasmonics applications

Prf. Nanba
I - Title 1 – Development of new waste treatment processes:
** chemical recycling of valuable elements and
** removal of hazardous elements
II - Title 2 – Optical computers: development of non-linear optical glass and glass-ceramics by using heavy-metal oxides – Structural analysis and crystallization behavior of heavy-metal oxide glasses -
III- Title 3 – Energy saving in lighting: clarification of photo-luminescent mechanisms in SnO-ZnO-P2O5 glasses – Relation between local structure of Sn ions and fluorescent property -

Prf. Kameshima
I - Development of new environmental purification materials based on inorganic layered materials
II - New medicine intercalated layered double hydroxides for drug-delivery system

Prf. Fujii/Takada:

I - Micro/nano-structures and color tones of hematite nano- particles produced by iron oxide sediments of microbial origin for beautiful red pigments

Prf. Nishihara:
I - Development of Synthetic Organic Reactions Catalyzed by Organometallic Complexes and the Application to Functional Materials

Prf. Iwasaki:
I - Direct carbon–sulfur bond formation catalyzed by transition-metal complexes
II - Synthesis of polycyclic aromatic hydrocarbons by palladium-catalyzed annulation
III- Regio - and stereoselective addition reactions to unsaturated compounds catalyzed by transition-metal complexes

Prf. Takeyasu:
I - Thermal deformations of anisotropic gold nanoparticles
II - Plasmonic surface for photo-assisted chemical reactions
III - Development of chemical methods for Surface-Enhanced Raman Spectroscopy (SERS)

Prf. Suzuki:
I - Investigation of peculiar crystallization of some chiral metal complexes
II - Synthesis and characterization of manganese cluster compounds for artificial photosynthesis

Prf. Tsuruta:
I - Materials simulations---Ab initio, molecular dynamics, hybrid quantum/classical simulation
II - Design and development of acoustic devices for energy harvesting --- Phononic crystal, acoustic metamaterials/diode

Prf. Tanaka H. + Matsumoto M.:
I - Computer simulations of melting and freezing processes of ice and aqueous materials
II - Statistical mechanics analysis of phase equilibria and critical phenomena in molecular systems

Prf. Kadota
I - Synthetic Study of Biologically Active Natural Organic Compounds

Prf. Nohara
I - Exploration of Novel Superconducting Materials: synthesis/characterization of molybdenum-based compounds exhibiting structural quantum criticality
NB: Specific financial support can be available for Ph-D students
II - Ultra-high Efficiency Thermoelectric Materials for Harvesting Waste Heat: synthesis/characterization of molybdenum-based compounds
NB: Specific financial support can be available for Ph-D students

Prf. Kobayashi
I - Synthesis and study on electronic properties of low-dimensional materials – Superconductivity and transport properties

Prf. Kaneta
I - Paper-based analytical high-sensitivity devices for low-cost and on-site chemical analysis
II - Optical chromatography: manipulation of particles, droplets, and vesicles by using optical forces.
III - Capillary Electrophoresis for bioanalysis

Prf. Zheng
I - Topological superconductors for quantum computers: study of superconductivity using Nuclear Magnetic Resonance/Nuclear Quadrupole Resonance

Prf. Kubozono
I - Superconductivity in carrier doped two-dimensional layered materials
II - Pressure-driven superconductivity in in topological insulators and Weyl semimetals.
III - 2D layered organic / inorganic materials for transistor applications

TOTAL: 47

CATALYSIS

Prf. Kano - Jun:
I - Catalysis assisted by new composite metal / ferroelectric oxide nanoparticles
II - Investigations of nano-structure in metal-ferroelectric interface

TOTAL: 2

BIO and/or INTERFACES with MATERIAL SCIENCES

Prf. Satoh:
I - Finding innovative medicines for organ regeneration

Prf. Tamura:
I - Genetic Engineering - Tagging Selenoenzymes and use in bio-electrodes for fuel-cells

Prf. Kiwa:
I - Study of label free immune assays by using THz chemical microscopy

Prf. Ishikawa:
I - Development of plasmonic metamaterials for bio-chemical sensing applications

Prf. Takeyasu:
I - Development of chemical methods for Surface-Enhanced Raman Spectroscopy (SERS)

Prfs. Matsumoto, Okada and Satoshi-Hara
I - Bioengineering systems for tissue manipulation in vitro
II - Developing new Bioinspired Materials

Prf. Imamura
I - Protein adsorption: understanding and control of protein adsorption onto a metal surface
II - Enzymatic cleaning of protein-foulings on metal surface: controlling the surface electric potential to improve cleaning power
III - Physical Chemistry of an amorphous sugar matrix for pharmaceutical and food applications
IV - Pharmaceutical drug delivery: amorphous sugar-based solid dispersion of water-insoluble drugs
V - Solid state dispersion of nano-particles in an amorphous sugar matrix for prolonged storage

TOTAL: 12

MEDICAL BIOLOGY/CHEMISTRY

Prf. Udono:
I - Reprogramming of energy metabolism in tumor microenvironment shapes anti-tumor immunity
II - Genome-engineered approach for dissection of roles of molecular chaperones involved in antigen processing/presentation to T cells

Prf. Takarada:
I - Molecular Biology: In-Vivo analysis of the molecular biological features of mesenchymal stem cells

Prf. Takeuchi
I - Social recognition in fishes and applications to human psychological disorders: Investigation of molecular basis underlying female mating preference for familiar mates in medaka fish.
II - Social recognition in fishes: searching genes required for social recognition in medaka fish

Prf. Yoshii
I - Investigation of circadian rythms under different environmental conditions in the fruit fly, Drosophila melanogaster
II - Manipulation of circadian pacemaker neurons using the GAL4-UAS system in the fruit fly, Drosophila melanogaster

TOTAL: 7

BIO – chemistry, PLANT Biology

Prf. Hirayama:
I - Understanding the Quality Control System for Plant Mitochondrial mRNA
II- Precise Measuring Plant Hormones using LC/Mass spectrometry.

III- Understanding the Plant Gene Function using Liverwort

Prf. Mori
I - Plant hormone network modeling for water stress management of crops

Prf. Moriya:
I - Systems biology of cellular systems using budding yeast as a model eukaryote

Prf. Noutoshi:
I - Molecular characterization of immunity mechanism of Brachypodium distachyon against leaf sheath blight
II- Identification of target protein of imprimatin D, an immune-priming chemical
III- Characterization of basal defense in Brachypodium distachyon

Prf. Takeda T.
Elucidating membrane remodelling mechanisms in health and disease
I - Membrane fission mechanisms by Dynamin coupled with GTP hydrolysis,
II - Pathogenic mechanisms of central nuclear myopathy (CNM) and Charcot-Marie-Tooth disease (CMT) caused by defects of BAR domain proteins and Dynamin,
III - Cancer cell invasion and migration controlled by Dynamin GTPase, and
IV- Membrane remodelling mechanisms in cytokinesis.

TOTAL: 12

WATER - ENVIRONMENT- SOCIAL Concerns

Prf. Maeda
I - Analysis of groundwater contamination with inorganic nitrogen by using stable isotopes and microbial technologies
II- How to reduce greenhouse gas emissions from soil amended with organic matter?

Prf. Ubukata:
Changing Communities and Communal sphere in Japan: International Perspectives
I - Resource and property management
II - Caring elderly people and children.
III - Disaster mitigation: Japan is a model country in the field of disaster-resilient societies. Social approaches

Prf. Shuku:
Powerful tools for civil engineering and environmental problems:
I - Development of numerical simulation codes for geotechnical engineering and hydraulics and their application to practical problems in civil engineering
II - Parameter identification and parameter sensitivity analysis for numerical simulations based on data assimilation
III - Statistical modeling for time-series data observed in civil engineering: applications to wind fields, ground settlement etc)
IV - Reliability-based analysis, Life-Cycle-Cost analysis and risk analysis for hydraulic and geotechnical infrastructures, decision making in design of infrastructures

Prf. Yamakawa:
Kriging assessment of environmental systems:
I – Time dependence of Chlorophyll concentrations at the surface of the Gulf of Finland
II – CO_2 storage: Estimations of deep geological boundaries by using seismic horizons
III – Analysis of air polluting particle distribution around a medium size city in Japan: Okayama

TOTAL: 12

COMPUTER SCIENCE

Prf. Nogami
I - Elliptic curve cryptography

Prf. Kusaka
I - Information embedding
II - Highly reliable communication: error detection methods

Prf. Yücel
I - Navigation for social robotics
II - Cross-correlations between gestures and engagement in interaction
III - The Interplay between Basic Human Visual Attention Mechanisms
IV- Task estimation from activity logs

Prf. Yamauchi
I - Operating system security and mandatory access control systems
II - Malware and malicious traffic analysis
III - Android smartphone security

Prf. Ohta/Niitsuma
I - Neural-Network-Based Web Application

Prf. Takahashi (Norikazu)
I - Distributed Algorithms for Multi-Agent Networks
II - Fast Algorithms for Nonnegative Matrix Factorization

TOTAL: 13

MECHANICAL ENGINEERING – THERMAL ENGINEERING

Prf. Tomita
I - Three-dimensional CFD simulation of gas flow and combustion in cylinder of a dual fuel gas engine

TOTAL: 1

ELECTRONICS – SIGNAL PROCESSING

Prf. Iokibe
I - Modeling and Simulation of Side-Channel Attacks to Cryptographic Devices
II - Countermeasures for Electromagnetic Information Leakage from Cryptographic Modules
III - Testing Methods to Evaluate Cryptographic Devices in Vulnerability to Side-Channel Attacks

TOTAL: 3

HIGH-ENERGY PHYSICS

Prf. Sakuda
Analysis of:
I - Gadolinium neutron capture and application to neutrino physics
II- Gamma-rays from giant resonance of ^{12}C and ^{16}O and its application to supernova physics
III- Cosmic Microwave Background (CMB)

Prf. Ishino
I - Cosmic Microwave Background Polarization Analysis
II- Development of Superconducting Radiation Detectors: frequency-domain multiplexing readout systems

Prf. Koshio
I - Gado
II- Rays
III- Cosmic

TOTAL: 5

GRAND TOTAL > 100