



## TIA GRADUATE SCHOOL SUMMER OPEN FESTIVAL 2018

# Summer Lecture in 2018 for Nanoscience/Nanotechnology Recruitment of Participants

The Graduate School of Pure and Applied Sciences, University of Tsukuba and Institute for NanoScience Design, Osaka University will jointly hold the Summer Lecture in 2018 for Nanoscience/Nanotechnology as part of the development of human resources. Lectures will be relayed by TV conference system between Tsukuba and Osaka. We are looking forward to your participation.

**Dates** July 30 to August 10, 2018 (10 days: No lecture on 4<sup>th</sup>Sat., 5<sup>th</sup>Sun. )

**Venues** B0110, Laboratory of Advanced Research, University of Tsukuba,  
Suita Campus and Toyonaka Campus, Osaka University

- Lecturers**
1. Prof. Marie D'angelo (Institut des Nanosciences de Paris, Sorbonne Université/UMR 7588 du CNRS)  
"Introduction to Photoemission using Synchrotron Radiation" [Offered from Osaka]
  3. Assistant Prof. Venkatesha Rama Hathwar (Center for materials Crystallography, University of Tsukuba)  
"X-ray Scattering and Electron Density Analysis: Methodology and Applications" [Offered from Tsukuba]
  4. Prof. Etienne Gheeraert, Prof. Henri Mariette (Institut Néel, CNRS and University of Grenoble Alpes, France)  
"Semiconductor Physics and Engineering, Doping, Defect, Optical Properties" [Offered from Tsukuba]

**Targeted Participants** Graduate students and professionals interested in Nanotechnology and Nanoscience

**Note:** With a recommendation letter from your academic adviser, college seniors and students of technical colleges can attend this course.

**Number of Positions** Around 30 people (10-days attendance in principle)

**Selection Process** Registration form screening (In case of oversubscription, we will give priority to graduate students) **Note:** After the application deadline, a participation confirmation will be sent to all participants by e-mail.

**Tuition Fee** Free

### Travel Expenses

■ **For students not from the University of Tsukuba:** Support for Travel expenses, and some assistance for accommodation fee; As assistance for accommodation, you can stay at accommodation of University of Tsukuba. However numbers are limited, and the first-come, first-served basis. If you would like to make a reservation, please check the box of the Registration form. If you stay at another hotels, a part of accommodation fee (about 3,000yen) will be provided later.

■ **Others :** No assistance for travel expenses or accommodation fee, \*By your own expenses, you can stay at accommodation of University of Tsukuba, it depends on the room availability. If you would like to make a reservation, please check the box in the Registration form.

**Note:** Young researchers from CUPAL\* can be provided the same assistance as students above.

\*Summer lectures are also held as the program of Nanotech Career-up Alliance (CUPAL) which is "The construction project for the consortium of the fostering science and technology personnel" subsidized by Ministry of Education, Young researchers from CUPAL Alliance can be provided the assistance from this project. Refer to the following site for the details of CUPAL: <https://nanotechcupal.jp/>

### How to Apply

Access the URL ([https://tia-edu.jp/summer\\_fes2018/](https://tia-edu.jp/summer_fes2018/)), and click the "Summer Lecture in 2018".

From the "Application", "Click Here", you can access to the application form, please fill in and submit the form.

**Application Deadline: July.9<sup>th</sup>. 2018**



## Approval of Credits

### Graduate Students from outside of the University of Tsukuba

University of Tsukuba approves the class subjects (1 credit each) of this Summer School as in the regular curriculum of Graduate program; for this reason, the graduate students who wish to acquire the credits can take the classes as Exchange Students by obtaining permission from both their university and University of Tsukuba. If e-mail notice of participation confirmation received and would like to acquire the credits of the class subject, refer to the web page, "Acquire the credits".

### Graduate Students of University of Tsukuba

The students who received e-mail notice of participate confirmation and would like to acquire the credits, register class subjects in TWINS by your major field. The credits will be included as completion of requirements of Graduate program\*.

\*In Doctoral course, only the students of Nanoscience/Nanotechnology major, can acquire the credits.

Classes and Lecturers	Majors	Nano-science and Nano-technology	Applied Physics	Materials Science	Physics
Advanced Nanotechnology I Prof. Marie D'angelo		02BQ207	01BF291	01BG089	01BC306
Advanced Nanotechnology III Dr. Venkatesha Rama Hathwar		02BQ208	01BF293	01BG091	01BC308
Advanced Nanotechnology IV Prof. Henri Mariette, Prof. Etienne Gheeraert		02BQ209	01BF294	01BG092	01BC309

## Schedule from Registration to the last day

Date	Items
9 <sup>th</sup> July	Application deadline *Who wish for Exchange students should apply before the deadline of documents. Refer to the following blank as details.
29 <sup>th</sup> June	Deadline for the request document to University of Tsukuba for Exchange Students. (Only for Graduate students out side of University of Tsukuba)
10 <sup>th</sup> July *Who wish to attend as Exchange Student can get confirmation e-mail before the deadline.	An e-mail notice of participation confirmation will be sent from applicants. If you are a confirmed participant, you will have the information as below: ① T W I N S subjects enrollment info (Only for Graduate students of University of Tsukuba) ② Application Form for transportation and accommodation support (Only for students) ※You pay first and we will make it up according to the RECEIPT you submit to us. ③ *Application Form for Exchange Students (Only for Graduate students out side of University of Tsukuba)
10 <sup>th</sup> August	TWINS Input due date (Only for students of University of Tsukuba) *You can input Advanced Nanotechnology III from 20 <sup>th</sup> July.
30 <sup>th</sup> July	Lectures begin
4 <sup>th</sup> 5 <sup>th</sup> August	No lectures
10 <sup>th</sup> August	Application deadline for transportation and accommodation fee support(Only for students). ※You pay first and we will make it up according to the RECEIPT you submit to us.

## Contact Information

University of Tsukuba, Tsukuba Innovation Arena Promotion Office  
tia-edu@un.tsukuba.ac.jp Tel. 029-853-8389  
<http://tia-edu.jp>

## Lecture Schedule

Advanced Nanotechnology I <b>Prof. Marie D'angelo</b>
Advanced Nanotechnology III <b>Asistant Prof. Venkatesha Rama Hathwar</b>
Advanced Nanotechnology IV <b>Prof. Henri Mariette, Prof. Etienne Gheeraert</b>

Time\Date	7/30	7/31	8/1	8/2	8/3	8/4	8/5	8/6	8/7	8/8	8/9	8/10		
9:00-10:34						OFF OFF	OFF OFF				※	/		
10:45-12:19														
13:15-14:49														
15:00-16:34														

※ Extra day as final exam

Welcome Party ※For participants at University of Tsukuba

Details to be announced later .

Abstract ※Program contents might be changed which please be noted.

### Introduction to Photoemission using Synchrotron Radiation

【配信：大阪大学】

#### Prof. Marie D'angelo

(Institut des Nanosciences de Paris, Sorbonne Université / UMR 7588 du CNRS)

1. Generalities and technical aspects of photoemission
2. Theoretical aspects: interaction Hamiltonian and transition probability
3. Transitions from localized states: core level photoemission
4. Band dispersion: Angle-Resolved Photoemission
5. X-ray production: comparison of X-ray tubes, synchrotron radiation and Free Electron Laser
6. Basics and theory of synchrotron radiation
7. New developments in photoemission: time-resolved and near ambient pressure photoemission



### X-ray Scattering and Electron Density Analysis: Methodology and Applications

【配信：筑波大学】

#### Asistant Prof. Venkatesha Rama Hathwar

(Center for materials Crystallography, University of Tsukuba)

X-ray diffraction is the most reliable method for the accurate determination of atomic positions in crystalline materials. A precise knowledge of electron density distributions obtained using high resolution X-ray data provides vital information about the chemical and physical properties of a material. The electron density analysis has been evolved into a dynamic research area over the years and now routinely applied in the field of chemistry, physics, material science and biology. In my lecture course, I will be describing background of X-ray scattering and electron density analysis with a special focus on recent applications in understanding the structure-property relationships.



### Semiconductor Physics and Engineering, Doping, Defect, Optical Properties

【配信：筑波大学】

#### Prof. Henri Mariette & Prof. Etienne Gheeraert

(Institut Néel, CNRS /University of Grenoble-Alpes, France)

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| <ol style="list-style-type: none"> <li>1. Introduction to the various semiconductor materials and general concepts<br/>*Si, Ge, III-V, II-VI *Direct/Indirect gaps *Binaries versus alloys<br/>*Perturbations in semiconductors: the envelope function approach</li> <li>2. Semiconductor doping by diffusion<br/>*Shallow electronic states *Solid state diffusion *Deep defects, formation and migration energy *Semiconductor doping with diffusion</li> <li>3. Peculiarities of wide bandgap semiconductors.<br/>*Doping asymmetry: origins and solutions *The case of GaN *Other examples</li> </ol> | <ol style="list-style-type: none"> <li>4. Semiconductor doping by ion implantation<br/>*Ion-matter interaction, implantation profile *Defects production and annealing *Transient Enhanced Diffusion (TED)</li> <li>5. Basic phenomena in semiconductor optics.<br/>*Carrier and exciton recombination processes *From weak to strong coupling *low dimensionnalities (quantum wells, wires, dots)<br/>*Experimental technics</li> <li>6. Elementary electronic devices<br/>*Pn diode, Schottky diode *MOS transistor, MESFET</li> </ol> |
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