



## TIA GRADUATE SCHOOL SUMMER OPEN FESTIVAL 2020

# Summer Lecture in 2020 for Nanoscience/Nanotechnology Recruitment of Participants

Degree Programs in Pure and Applied Sciences, University of Tsukuba and Institute for NanoScience Design, Osaka University will jointly hold the Summer Lecture in 2020 for Nanoscience/Nanotechnology as part of the development of human resources. Lectures will be conducted with the combination of on-demand and on-live styles, since this year the movement restrictions caused by the COVID-19 prevent us to invite foreign lecturers abroad to Tsukuba. The Summer School 2020 is composed of three topics of lectures that are chosen from our archives recorded in 2018 and 2019. The recorded lectures of seven or eight times will be uploaded on the INSD website during August 1<sup>st</sup> and 15<sup>th</sup>. During this period, participating students should finish to view a series of lectures on-demand style and each time soon after viewing each lecture, send their answer to short questions for the evidence of viewing.

The lecture documents will be uploaded on URL: <http://www.insd.osaka-u.ac.jp/nano/>  
and URL: <https://tia-edu.jp/summerlec2020/>

The final test will be given as on-live style of student presentation with the participation of the lecturers abroad. The ZOOM system will be used for the final presentation. We are looking forward to your participation.

**Dates** ■ **Viewing Period of the recorded lectures** : August 1st to August 15th , 2020 (15 days)

■ **The final test Period**: August 24th to August 28th, 2020

**Venues** With the combination of on-demand and on-live styles.

**Lecturers**

- Prof. Masashi Watanabe “Transmission Electron Microscopy–Fundamental Principle and Applications to Materials Science” (Dept. of Mater. Sci. & Eng., Lehigh University, USA).
- Prof. Marie D’angelo “Introduction to Photoelectron Spectroscopy and Synchrotron Radiation” (Institute for Nanosciences of Paris, Sorbonne University, France)
- Prof. Etienne Gheeraert and Prof. Henri Mariette “Semiconductor Physics and Engineering, Doping, Defect, Optical Properties, (University Grenoble–Alpes and University of 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 ( View all lectures in principle)

**Selection Process** Registration form screening (In case of oversubscription, we will give priority to graduate students) **Note:** After the application deadline(July 30 Thu.), a participation confirmation will be sent to all participants by e-mail (~July 31 Fri.).

**Tuition Fee** Free

### How to Apply

Please write the following in an email and send it to the e-mail address below.

①Full name②Affiliation③Grade④Your academic adviser

E-mail: [tia-edu@un.tsukuba.ac.jp](mailto:tia-edu@un.tsukuba.ac.jp).

**Application Deadline: July. 30. 2020**



## Approval of Credits

### Graduate Students of University of Tsukuba

The students who received e-mail notice of participation 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. \*For later period of graduate program (Docotor' s 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 <b>Prof. Masashi Watanabe</b>	02BQ207	01BF291	01BG089	01BC306
Advanced Nanotechnology II <b>Prof. Marie D'angelo</b>	02BQ210	01BF292	01BG090	01BC307
Advanced Nanotechnology III <b>Prof. Etienne Gheeraert and Prof. Henri Mariette</b>	02BQ208	01BF293	01BG091	01BC308

### Schedule from Registration to the last day

Date	Items
July 30 Thu.	Application deadline
~July 31 Fri.	An e-mail notice of participation confirmation will be sent from applicants.
August 7 Fri.	<b>TWINS Input due date</b> (Only for students of University of Tsukuba)
August 1st Sat.- August 15th Sat.	Viewing Period of the recorded lectures
August 24th Mon.- August 28th Fri.	<b>The final test Period</b> (The final test will be given as on-live style of student presentation ) *We will inform each student of the test schedule and how to access ZOOM etc. at a later date.

### Contact Information

University of Tsukuba, Tsukuba Innovation Arena Promotion Office  
 tia-edu@un.tsukuba.ac.jp Tel. 029-853-4028  
<http://tia-edu.jp>

## Lecture Schedule

	Advanced Nanotechnology I <b>Prof. Masashi Watanabe</b>
	Advanced Nanotechnology II <b>Prof. Marie D'angelo</b>
	Advanced Nanotechnology III <b>Prof. Henri Mariette, Prof. Etienne Gheeraert</b>

Lecturers	During August 1-15 (on demand recorded lectures) After viewing each lecture, reply to short questions given in each lecture								During August 24-28 (on live ZOOM) Date and time to be fixed later.		
	Prof. Masashi Watanabe	1	2	3	4	5	6	7		test	
Prof. Marie D'angelo	1	2	3	4	5	6	7			test	
Prof. Etienne Gheeraert & Prof. Henri Mariette	1	2	3	4	5	6	7	8			test

※ about 90 minutes per lecture

## Abstract

### Transmission Electron Microscopy - Fundamental Principle and Applications to Materials Science

#### Prof Masashi Watanabe

(Dept. of Mater. Sci. & Eng., Lehigh University, USA)

- Basic concepts of TEM instrumentation
- Electron scattering and diffraction
- Image formation in TEM
- Analysis in TEM
- Advanced topics and applications of TEM



### Introduction to Photoelectron Spectroscopy and Synchrotron Radiation

#### Prof. Marie D'angelo

(Institute for NanoSciences of Paris, Sorbonne University, France)

- Generalities & technical aspects of photoemission
- Interaction Hamiltonian & transition probability
- Transitions from localized states: core level photoemission
- Band dispersion: Angle-Resolved Photoemission
- X-ray production: comparison of X-ray tubes, synchrotron radiation and Free Electron Laser
- Basics and theory of synchrotron radiation
- New developments in photoemission: time-resolved and near ambient pressure photoemission



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

#### Prof. Etienne Gheeraert and Prof. Henri Mariette

(Université Grenoble Alpes and University of Tsukuba)

- Introduction to the various semiconductor materials and general concepts
- Semiconductor doping by diffusion
- Semiconductor doping by ion implantation
- Basic phenomena in semiconductor optics
- Elementary electronic devices

