

# INSO Summer School 2020, Osaka-Tsukuba

## (Summer Lectures in 2020 on Nanotechnology/Nanoscience)

On-demand lectures during August 1<sup>st</sup> and 15<sup>th</sup>. On-live test during August 24<sup>th</sup> and 28<sup>th</sup>

Let's participate in the original graduate-level lectures on nano-science and nano-engineering given by three lecturers from top foreign universities!

The Institute for NanoScience Design, Osaka University will hold the INSD Summer School 2020 on Nanoscience and Nanotechnology 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 Osaka. 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 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. The summer school is aimed at fostering international young talent on nanoscience and nanoengineering. This program is shared with the University of Tsukuba by connecting these university students. The lecture documents and recorded lectures will be uploaded on URL: <http://www.insd.osaka-u.ac.jp/nano/>.

■**Lecturers:** This year the following four lecturers will offer three topics, two from Osaka and one from Tsukuba.

Osaka University: Prof. Masashi Watanabe (Dept. Mater. Sci. & Eng., Lehigh University, USA),

Prof. Marie D'angelo (Institute for NanoSciences of Paris, Sorbonne University, France)

University of Tsukuba: Prof. Etienne Gheeraert and Prof. Henri Mariette (University of Grenoble-Alpes, France).

\*Schedule and abstracts of lectures are shown on the reverse side.

■**Access point available for the final test on ZOOM, if desired:** (Toyonaka Campus, capacity: 40) R.N. 305, INSD Seminar Room, 3<sup>rd</sup> floor of Interdisciplinary Research Building; (Suita Campus, capacity 12) R.N. F390, INSD Satellite Room, 3<sup>rd</sup> floor of the first research building of Institute of Scientific and Industrial Research.

■**Applicants:** Although the priority is given to graduate-school students who take "Graduate Minor Program or Graduate Program for Advanced Interdisciplinary Studies for Education, Research and Training on Nanoscience and Nanotechnology" (hereafter, nano-program) and "Interactive Material Science Cadet Program", there is plenty of room for other domestic and foreign graduate and undergraduate students and staff members to be welcome. Homework exercises and final test (student presentation) will be imposed on graduate students who desire credits. The participants are requested to reply to short questions given for each lecture for the evidence of the viewing.

■**Maximum number of topics and units of credit:** One unit of credit for "International Exchange Lecture on Nanoscience and Nano-engineering B or C" is given to graduate students who complete a series of lectures on one topic. Graduate students can take up to two units of credit. Especially, foreign students desiring to take the nano-program, but being not good at Japanese, are requested to complete these two topics in order to transfer two units of credit to the otherwise required module, "Nanotechnology Career-up Lectures for Social, Legal, Ethical Relationship".

■**Deadline and method of application:** Deadline is Thursday July 30<sup>th</sup>. Send the following information either in Japanese or in English to the INSD staff who is in charge. E-mail address: nano-program@insd.osaka-u.ac.jp  
Students: full name, student registration code, affiliation (graduate school/school, department, D/M/B, school year, affiliated research laboratory), E-mail address, specify whether one takes nanoprogram or not, chosen lecturer's name(s).

The students will receive the information how to access to the website for the lecture documents and recorded lectures.

## ■ Lecture Schedule (about 90 minutes per lecture)

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

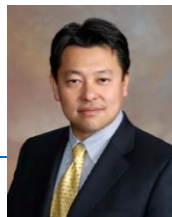
## ■ Lecturers, and Titles and Abstracts of Lectures

### Lectures from Osaka

#### 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

### Lectures from Tsukuba

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

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

(Université Grenoble Alpes, France 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

## ■ Organized by the Institute for Nanoscience Design (INSD), Osaka University

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