INSD Summer School 2021, Osaka-Tsukuba
(Summer Lectures in 2021 on Nanotechnology/Nanoscience)

On-demand lectures during July 19th and August 16th.

Live guidance at the beginning and live final test at the end.

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

The Institute for NanoScience Design, Osaka University will hold the INSD Summer School 2021 on Nanoscience and Nanotechnology with the combination of on-demand and 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 2021 is composed of three topics of lectures that are chosen from our archives recorded in 2018 and 2019. Each set of recorded lectures of seven or eight times will be uploaded on the INSD website for about two weeks during July 19th and August 16th. 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 guidance at the beginning, the office hour and the final test of student presentation will be given as live style with the participation of the lecturers abroad. The ZOOM or Webex 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 second page.

■**Access point available for the final test on ZOOM, if desired:** (Toyonaka Campus, capacity: 40) R.N. 305, INSD Seminar Room, 3rd floor of Interdisciplinary Research Building; (Suita Campus, capacity 12) R.N. F390, INSD Satellite Room, 3rd 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 Nano-science 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 depends on the lecturers. 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
Registration deadline Prof. Etienne and Gheeraert: July 18th. Prof. Watanabe and Prof. D'angelo: July 25th
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).
You will receive the information how to access to the website for the lecture documents and recorded lectures.

■Lecture Schedule (about 90 minutes per lecture)

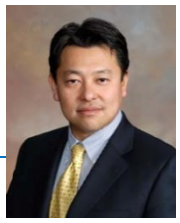
Lecturers	Guidance (live)	During July 27 - August 16 (on demand recorded lectures) After viewing each lecture, reply to short questions given in each lecture								Final Test and Office Hour (live)
Prof. Masashi Watanabe	July 27 10 - 11am	1	2	3	4	5	6	7	*	August 19 & 20 10 - 11:30 am
Prof, Marie D'angelo	July 27 4 - 5pm	1	2	3	4	5	6	7		August 26 4 - 5:30 pm

* Office Hour (live) August 10 10 - 11 am To be asked to attend

Lecturers	Guidance	During July 19 - 31 (on demand recorded lectures) After viewing each lecture, reply to short questions given in each lecture								Final Test and Office Hour (live) during August 5 & 6
Prof. Etienne Gheeraert & Prof. Henri Mariette	To be announced	1	2	3	4	5	6	7	8	To be announced

■Lecturers, and Titles and Abstracts of Lectures

Lectures from Osaka

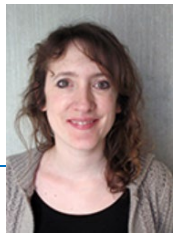


Transmission Electron Microscopy -Fundamental Principle and Applications to Materials Science

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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