

INSD Summer School 2019, Osaka-Tsukuba

(Summer Lectures in 2019 on Nanotechnology/Nanoscience)

Tuesday, July 23rd - Monday, August 5th except on Saturday, August 3rd and Sundays

Let's participate in the original graduate-level lectures on nanoscience and nanoengineering delivered live by three lecturers from top foreign universities!

The Institute for NanoScience Design, Osaka University will invite foreign lecturers from abroad and hold the INSD summer school 2019 on nanoscience and technology, composed of three topics of lectures that are usually taught in topmost foreign universities. The summer school is aimed at fostering international young talent on nanoscience and nanoengineering. This program is shared with University of Tsukuba and connects three campuses, Toyonaka, Suita, and Tsukuba, via video conferencing systems. The lecture documents will be uploaded on URL: <http://www.insd.osaka-u.ac.jp/nano/>.

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

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

Prof. Remco Havenith (Zernike Institute, University of Groningen, the Netherlands)

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

*Schedule and abstracts of lectures are on the reverse side. Pay attention to the change of the order and time of each topics.

■**Lecture rooms:** (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. Prof. M. Watanabe and Prof. Havenith will give lectures at Toyonaka.

■**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 and final exam/student presentation may be imposed on those students who desire credits. The attendants are requested to reply to some questionnaire which would be helpful in improving the summer school.

■**Maximum number of topics and units of credit:** One unit of credit for "International Exchange Lecture on Nano-science and Nanoengineering B or C" is given to those 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 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 Friday July 19th. 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

On-site registration is also possible for those who do not desire credits.

Students: full name, 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), place of attendance (Toyonaka/Suita).

Other members: full name, affiliation (institution, affiliated research laboratory, position), E-mail address, chosen lecturer's name(s), place of attendance (Toyonaka/Suita).

*If one cannot attend some classes during the series of lectures, please specify the date of absence.

■**Lecture Schedule (94 minutes per lecture)**

Time/Date	7/23 Tue	7/24 Wed	7/25 Thu	7/26 Fri	7/27 Sat	7/29 Mon	7/30 Tue	7/31 Wed	8/1 Thu	8/2 Fri	8/5 Mon
9:00-10:34											
10:45-12:19											test
13:15-14:49											
15:00-16:34											

- Prof. Masashi Watanabe
- Prof. Remco Havenith
- Prof. Etienne Gheeraert
& Prof. Henri Mariette

■ Lecturers, and Titles and Abstracts of Lectures

Lectures from Toyonaka, 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

Quantum Chemistry and its Application

Prof. Remco Havenith

(Zernike Institute, University of Groningen, the Netherlands)



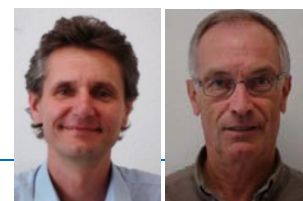
- Basic principles of molecular quantum chemistry
- Methods of molecular quantum chemistry
- Hartree-Fock theory, post Hartree-Fock methods, and density functional theory
- Calculation of molecular properties
- Modeling electronic properties of crystalline solids

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

Basic of Computational Materials Science: Role of First-principles Density Functional Theory in Materials Design

Asst. Prof. Mukesh Kumar

(School of Physics & Materials Science, Thapar Institute of Engineering Technology, India)

- Computational materials science for solving materials related problems
- Different mathematical models for investigating problems at multiple length and time scales
- Evolution of material structures which effectively control material properties
- Specific applications and also design of advanced materials for new applications
- First-principles density functional theory (DFT) for atomistic simulations
- Computational physics for solving materials science problems

CANCELED

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

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E-mail: nano-program@insd.osaka-u.ac.jp, Website: <http://www.insd.osaka-u.ac.jp/nano/>