INSD Summer School 2025, Osaka-Tsukuba
(Summer Lectures in 2025 on Nanotechnology/Nanoscience)

Three lectures: Live-hybrid (on site and on line)
during July 15 and August 8

Let's participate in the graduate-level lectures on nanoscience and nanotechnology by top foreign scientists!

R^3 Institute for Newly-Emerging Science Design, University of Osaka, opens the INSD Summer School 2025 on Nanoscience and Nanotechnology, where three lectures are provided by live-hybrid and on-demand styles. This summer school is aimed for fostering international young talent on nanoscience and nanotechnology. Each set of lectures is composed of seven or eight classes during July 15th and August 8th, 2025. In principle, lectures will be given as a live-hybrid (on site face-to-face and online) style. However, students can access to the on-demand style lectures in case that they cannot attend. These students should finish to view a series of lectures during the specified period and are requested, just after each lecture, to submit the answer to the short question raised during each of lectures to ensure the attendance. Final examination of all the three lectures will be, in principle, executed as the live-hybrid style with the participation of the lecturers. ZOOM or Webex system will be used for hybrid and on-demand lectures. In this year, two lecturers in University of Osaka will give lectures in person at Toyonaka campus. We strongly recommend all the students from University of Osaka to participate in the lectures at the site (Toyonaka Co-Creation Building A at Toyonaka Campus).
The lecture documents and recorded lectures will be uploaded at the homepage of R^3 center.
URL: http://www.insd.osaka-u.ac.jp/

■ **Lecturers:** Following lecturers will offer three topics.

University of Osaka:	**Dr. Michel Sliwa**
	(Ecole Polytechnique and Institut Polytechnique de Paris, France)
	Dr. Tristan Cren
	(Institut des NanoSciences de Paris and Sorbonne University, France)
University of Tsukuba:	**Prof. Shuai Wei**
	(Aarhus University, Denmark)

Schedule and abstracts of lectures are shown on the second page.

■ **Lecture Room:** (Toyonaka Campus) R.N. 305, INSD Seminar Room, 3rd floor of Toyonaka Co-Creation Building A (Old Name: Interdisciplinary Research Building).
■ **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), "Interactive Material Science Cadet Program", "Multidisciplinary PhD Program for Quantum Beam", and "Honors Program in Science, Engineering and Informatics", 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 need credits. They are also requested to reply to short questions in case of on-demand lectures 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 get 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_2@office.osaka-u.ac.jp.**
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).
Registration deadline: July 11th for Prof. Shuai Wei, July 22nd for Dr. Michel Sliwa and Dr. Tristan Cren

You will receive the information on how to access to the website for the lecture documents and recorded lectures.

■Lecture Schedule (about 90 minutes per one lecture)

	Dr. Michel Sliwa	Live-hybrid (on site and online)	Lectures from Osaka
	Dr. Tristan Cren	Live-hybrid (on site and online)	
	Prof. Shuai Wei	Live-hybrid (on site and on line)	Lectures from Tsukuba

Dr. Tristan Cren (7/28 – 7/31) and Dr. Michel Sliwa (8/4-8/8)

Time/date	7/28 (Mon)	7/29 (Tue)	7/30 (Wed)	7/31 (Thu)		8/4 (Mon)	8/5 (Tue)	8/6 (Wed)	8/7 (Thu)	8/8 (Fri)
10:45-12:19	1	3	5	7			2	4	6	8
13:30-15:04	2	4	6	8		1	3	5	7	

Prof. Shuai Wei (7/15 – 7/18)

Time/Date	7/15 (Tue)	7/16 (Wed)	7/17 (Thu)	7/18 (Fri)
8:45-11:25				7, 8
12:25-15:00	1, 2	3, 4	5, 6	

Lecture time for Prof. S. Wei is different from others.

■Lecturers, Titles and Abstracts of Lectures

Lectures from Osaka

Light & Nanoscience: Fabrication, Manipulation and Characterization

Dr. Michel Sliwa

(Ecole Polytechnique and Institut Polytechnique de Paris, France)

-Introduction to light in nanoscience: history and applications
-Fabrication of nanoparticles and nanostructures with unique photonics properties
-Basic physical properties and characterization
-Light interaction with nano-objects: quantum mechanical effect and plasmonics.
-Advanced characterization: nanoimaging and ultrafast photodynamics
-Example of new nanotechnologies for photocatalysis, photonics materials, bio-technology, bio-imaging.

Probing Matter Atom by Atom: A Comprehensive Lecture Series on Scanning Tunneling Microscopy

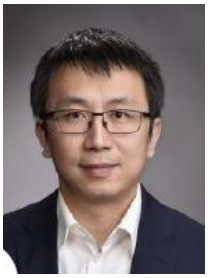
Dr. Tristan Cren

(Institut des NanoSciences de Paris and Sorbonne University, France)

−Historical context and foundational quantum tunneling principles behind Scanning Tunneling Microscopy (STM).
-Operational modes, topographic mapping and spectroscopic measurements of STM.
-Role of STM in probing electronic properties of materials, with an emphasis on spectroscopic studies of superconductors and the extraction of local density of states.
-Advanced methodologies such as quasiparticle interference imaging, inelastic electron tunneling spectroscopy (IETS), and spin-polarized STM.
-Recent breakthroughs in radio-frequency STM, enabling spin resonance experiments with unprecedented spatial resolution.

Lectures from Tsukuba

Amorphous Materials and Novel X-ray Scattering Methods for Disordered Structures



Prof. Shuai Wei

(Aarhus University, Denmark)

-The basics of amorphous materials and glass sciences
-Synthesis of amorphous materials and concept of glass forming and crystallization
-Thermodynamic and kinetic properties
-Synchrotron X-ray scattering for characterizing disordered structures
-X-ray free electron lasers for characterizing ultrafast and non-equilibrium processes
-Examples of applications of novel amorphous materials such as phase-change materials and amorphous metals

R^3 Institute for Newly-Emerging Science Design (INSD), University of Osaka

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