

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

Three lectures: Live-hybrid (on site and on line)

Open during **July 15 and August 8**

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

R³ Institute for Newly-Emerging Science Design, University of Osaka, opens the INSO 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 get 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 R³ center.

URL: <http://www.insd.osaka-u.ac.jp/>

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

University of Osaka:

Dr. Michel Sliwa

(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, INSO 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 Nanoscience 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 INSO 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 (Mon)	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 Lille University, 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
- Development 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.

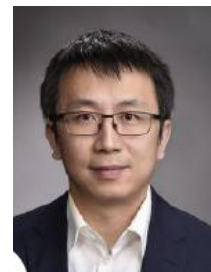
Lectures from Tsukuba

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



R³ Institute for Newly-Emerging Science Design (INSD), University of Osaka

Nano-program Office :

R.N.303, 3rd floor of I Toyonaka Co-Creation Building A at Toyonaka Campus,
Phone: 06-6850-6398

E-mail: nano-program_2@office.osaka-u.ac.jp
Website: <http://www.insd.osaka-u.ac.jp>

INSO 夏の学校 2025, Osaka-Tsukuba

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大阪大学エマージングサイエンスデザイン R³ センターでは、毎年、海外のトップ大学で行われている大学院レベルのナノ理工学関連の基礎および最先端技術の講義を英語で直接聴講できる INSO 夏の学校を開講しています。今年度は海外から講師をお招きし 1 テーマあたり 7～8 コマで 7 月 15 日から 8 月 8 日までの間で 3 テーマの講義（2 テーマ阪大、1 テーマ筑波大）を実施します。原則として 3 テーマとも各学生による発表形式の最終試験はいずれも海外講師参加の下に、“対面” およびライブ・ハイブリッド生中継で行う予定です。

本企画は、国際性に富んだナノ理工学若手人材の育成を目的としており、ナノテクキャリアアップ特論と同様に TIA（つくばイノベーションアリーナ）連携大学院の筑波大学大学院数理物質科学研究科との共催で開催します。最終試験は大阪大学と筑波大学の学生が合同で参加します。講義資料と録画された講義はパスワード付の電子ファイルとしてホームページ上で提供されます。URL: <http://www.inso.osaka-u.ac.jp>

今年は、阪大側の講師は来日し豊中キャンパス豊中共創棟 A（旧 文理融合棟）で“対面”で講義を行います。この 2 コースへの阪大からの参加者は豊中共創棟 A で直接聴講されることを強くお勧めします。

■ 講師：（講義の詳細は次ページに掲載）

大阪大学： Dr. Michel Sliwa
(Institut Polytechnique de Paris, France)

Dr. Tristan Cren
(Institut des NanoSciences de Paris and Sorbonne University, France)

筑波大学： Prof. Shuai Wei
(Aarhus University, Denmark)

■ 講義場所： 豊中キャンパス 豊中共創棟 A 3階305号室（セミナー室）（およびライブ生中継）

■ 受講対象者： ナノ高度学際教育研究訓練プログラム高度副プログラム、副専攻プログラム（ナノプログラム）とカデットプログラム、卓越大学院、オナーズプログラムの大学院学生を優先しますが、その他の留学生を含む大学院生、学部生、研究生、教職員の聴講も歓迎します。単位を希望する大学院生には、毎回の短い質問に対する出席レポートなどが課される場合があります。

■ 受講テーマ数と単位認定： 受講テーマ数は制限しませんが、単位認定に関して院生は 2 テーマまで認め、いずれか 1 テーマ履修で国際ナノ理工学特論 B 又は C（大学院 1 単位）が授与されます。なお、ナノテクキャリアアップ特論の履修が語学上困難な留学生で、高度副プログラム履修希望者には申告により本講義単位との振替え制度があります。詳しくはナノプログラム事務局に問い合わせてください。

■ 申し込み方法： 単位を希望する場合は講師毎に下記の期日までに nano-program_2@office.osaka-u.ac.jp宛に次の項目を明記して申し込んで下さい。受講生には講義資料、講義へのアクセス方法をお知らせします。

氏名、学籍コード、所属（研究科・学部、専攻・分野・学科、D/M/B、学年、所属研究室）、メールアドレス、現在ナノプログラム（修士・博士を含む）受講の有無、カデット・卓越大学院・オナーズプログラム受講の有無、希望テーマの講師名

登録締切 Prof. Shuai Wei: 7 月 11 日（金）
Dr. Michel Sliwa and Dr. Tristan Cren: 7 月 22 日（火）

■ 講義日程 (about 90 minutes per one lecture)

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Dr. Tristan Cren	Live-hybrid (on site and online)	
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■ 講師と講義内容

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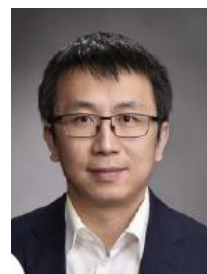
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問い合わせ先

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