

INSO Summer School 2024, Osaka-Tsukuba (Summer Lectures in 2024 on Nanotechnology/Nanoscience)

Three lectures: Live-hybrid (on site and on line)
Open during July 12 and August 1
Live final exam. (student presentation) at the end

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

R³ Institute for Newly-Emerging Science Design, Osaka University, opens the INSO Summer School 2024 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 12th and August 1st, 2024. In principle, lectures will be given as a live-hybrid (on site face-to-face and on line) 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 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, however, two lecturers in Osaka University will give lectures in person at Toyonaka campus. We strongly recommend all the students from Osaka University get the lectures at the site (Interdisciplinary Research Building 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.

Osaka University:

Prof. Albert M. (Fred) Brouwer

(Van't Hoff Institute for Molecular Sciences, University of Amsterdam, the Netherlands)

Prof. Brandon Mitchell

(Department of Physics and Engineering, West Chester University, USA)

University of Tsukuba:

Dr. Nathanaelle Schneider

(CNRS Senior Researcher, Institut Photovoltaïque d'Ile-de-France, France)

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

■ **Lecture Room:** (Toyonaka Campus) R.N. 305, INSO Seminar Room, 3rd floor of 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@insd.osaka-u.ac.jp**

Registration deadline: **Prof. Brouwer and Prof. Mitchell: Monday, July 17th and Dr. Schneider : Friday, July 8th**

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 one lecture)

Prof. Albert M. Brouwer	Live-hybrid (on site and on line)	Lectures from Osaka
Prof. Brandon Mitchell	Live-hybrid (on site and on line)	
Dr. Nathanaelle Schneider	Live-hybrid (on site and on line)	Lectures from Tsukuba

Time/date	7/18 (Thu)	7/19 (Fri)	7/22 (Mon)	7/23 (Tue)	7/24 (Wed)	7/25 (Thu)	7/26 (Fri)	7/29 (Mon)	7/30 (Tue)	7/31 (Wed)	8/1 (Thu)
10:45-12:19				1	3	5	7	1	3	5	7
13:30-15:04				2	4	6	8	2	4	6	8

Lecturer	Time/Date	7/12 (Fri)	7/15 (Mon)	7/16 (Tue)	7/17 (Wed)	7/19 (Fri)	7/22 (Mon)	7/24 (Wed)
Dr. Nathanaelle Schneider	13:45-15:19	1	3	4	6	7	8	Oral exam
	15:45-17:19	2		5				

(Students attending the lecture of Prof. Brouwer can join the oral exam after finishing the lecture of him on 24th, July.)

■ Lecturers, and Titles and Abstracts of Lectures

Lectures from Osaka

Light & Nanoscience: Extreme Ultraviolet Photolithography & Fluorescence Microscopy and Contact Mechanics

Prof. Albert M. (Fred) Brouwer

(Van't Hoff Institute for Molecular Sciences, University of Amsterdam, the Netherlands)



Extreme Ultraviolet Photolithography

- optical lithography
- molecules and light: basic principles of (photo)chemistry
- chemistry of UV photoresists
- experimental techniques for chemistry in thin films
- chemistry of EUV photoresists

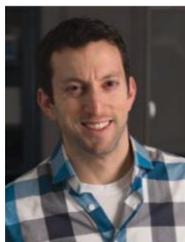
Fluorescence microscopy and contact mechanics

- imaging mechanical contact with fluorescent molecular rotors
- imaging dynamics and forces in contacts

Fundamentals of Nanomaterials and Applications in Quantum Information Engineering

Prof. Brandon Mitchell

(Department of Physics and Engineering, West Chester University, USA)



Fundamentals of Nanomaterials

- what are nanomaterials and why are they important?
- properties of nanomaterials and how to "see" them.

Introduction to Quantum Information

- nonclassical light, qubits, and the quantum erasure (theory)
- quantum gates, entanglement, and quantum teleportation
- quantum algorithms (e.g., Deutsch-Jozsa Algorithm)

Quantum Optics and Nanophotonics

- creating single photon sources
- characterizing single photon sources (quantum erasure)

Lectures from Tsukuba

Material Science for Energy Conversion

Dr. Nathanaelle Schneider

(CNRS Senior Researcher, Institut Photovoltaïque d'Ile-de-France, France)



General introduction on Energy and Energy conversion

Theoretical and application aspects of materials for Energy conversion

Basics of material fabrication and characterization

PV conversion

Solar fuels and H₂ production

Life cycle analysis, sustainability, stability and degradation of materials

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

Nano-program Office :

R.N.303, 3rd floor of Interdisciplinary Research Building at Toyonaka Campus,

Phone: 06-6850-6398

E-mail: nano-program@insd.osaka-u.ac.jp

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

INSO 夏の学校 2024, Osaka-Tsukuba (Summer Lectures in 2024 on Nanotechnology/Nanoscience)

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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12日から8月1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。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います。

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>

今年度は、阪大側の講師は来日し、豊中キャンパス文理融合棟で“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、文理融合棟で直接聴講されることを、強くおすすめします。

■ 講師： (講義の詳細は次ページに掲載)

大阪大学： **Prof. Albert M. (Fred) Brouwer**

(Van't Hoff Institute for Molecular Sciences, University of Amsterdam, the Netherlands)

Prof. Brandon Mitchell

(Department of Physics and Engineering, West Chester University, USA)

筑波大学： **Dr. Nathanaelle Schneider**

(CNRS Senior Researcher, Institut Photovoltaïque d'Ile-de-France, France)

■ 講義場所： 豊中キャンパス 文理融合型研究棟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お問い合わせください。

■ 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@insd.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。

学生：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 **Dr. Nathanaelle Schneider**: 7月8日、

Prof. Albert M. Brouwer and Prof. Brandon Mitchell, : 7月17日

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

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(Prof. Brouwer の講義も受講する学生は 7 月 24 日の Oral exam には、Prof. Brouwer の講義終了後に参加下さい。)

■ 講師と講義内容

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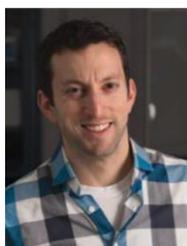
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問い合わせ先

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