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# 2017 ICI DISTINGUISHED VISITING SPEAKER

## Professor Kenichiro Itami

Institute of Transformative Bio-Molecules
Nagoya University, Japan

Distinguished Lectureship Series Sponsored by:

### Research Lecture #1

Title: “Making structurally uniform nanocarbons and a new form of carbon”
Date: Wednesday, September 20, 2017
Time: 3:00 PM
Place: EEEL 161

### Research Lecture #2

Title: “C-H activation meets plant biology and chronobiology”
Date: Friday, September 22, 2017
Time: 3:00 PM
Place: ICT 121

# About Professor Itami

## Biographical Sketch

Kenichiro Itami is Professor, Department of Chemistry, Graduate School of Science at Nagoya University, Japan, Director for the Institute of Transformative Bio-Molecules (WPI-ITbM) and Research Director of the prestigious Exploratory Research for Advanced Technology (ERATO) research funding program. Professor Itami received his Ph. D. in 1998 and began his academic career at Kyoto University. In 2005, he moved to Nagoya University as an Associate Professor and then to full professor in 2008. H-index 56; 291 publications (11,035 citations as of July 28, 2017)

## Research Interests

The Itami group has pioneered a general synthesis platform for a range of functional molecules including molecular nanocarbons, π-conjugated organic materials, pharmaceuticals, and small molecules for plant biology and chronobiology. The uniqueness of their approach is seen from the fact that most of the game-changing functional molecules that they have created were rapidly synthesized or discovered by their unique and powerful C-H activation catalysts and reactions.

The Itami group has focused on addressing some of the grand challenges in the chemistry of arene-assembled molecules. Their endeavors have led to significant contributions in the following areas: (i) the development of new catalysts for C-H activation/coupling; (ii) the rapid synthesis of pharmaceuticals and natural products; (iii) the discovery of new synthetic bio-molecules particularly for plant biology and chronobiology; (iv) the development of optoelectronic π-materials; (v) the controlled bottom-up synthesis of nanocarbons such as carbon nanotubes, graphene nanoribbons, and three-dimensional nanocarbons.

## Awards and Honours

*2018* - The Guthikonda Lecturer, Stanford University; The Roland K. Pettit Centennial Lecturer, University of Texas, Austin. *2017* - The Chunichi Cultural Award; The Bristol-Myers Squibb Lecture, University of California, Berkeley; The Yomiuri Techno Forum Gold Medal Prize; The SYNLETT Best Paper Award 2016, Thieme. *2016* - The Holger Erdtman Lecture, KTH, Sweden; The Nagase Prize; Treat B. Johnson Lecture, Yale University; Ta-Shue Chou Lectureship Award, Academia Sinica. *2015* - R. C. Fuson Visiting Professor, University of Illinois at Urbana-Champaign; Arthur C. Cope Scholar Award, American Chemical Society; Swiss Chemical Society Lectureship Award. *2014* - Nankai University Lectureship Award; The Aldrich Lectureship Award, Emory University; The JSPS Prize. *2013* - Novartis Chemistry Lectureship Award; Mukaiyama Award; Asian Rising Star Award, Asian Chemical Congress. *2012* - Fellow of the Royal Society of Chemistry, UK; German Innovation Award "Gottfried Wagener Prize 2012"; Novartis-MIT Lectureship Award, MIT, USA. *2011* - ACP Lectureship Award, China; ACP Lectureship Award, Malaysia; Nozoe Memorial Award for Young Organic Chemists. *2008* - Merck-Banyu Lectureship Award. *2007* - Banyu Young Chemist Award; 2006 - Minister's Award for Distinguished Young Scientists (MEXT). *2005* Mitsui Chemicals Catalysis Science Award of Encouragement; The Chemical Society of Japan Award for Distinguished Young Chemists. *2004* - Thieme Journals Award; *2000* - Nissan Chemical Industries Award in Synthetic Organic Chemistry, Japan.

## Research Lecture #1

Wednesday, September 20, 2017 | 3 PM | EEEL 161
Title: "Making structurally uniform nanocarbons and a new form of carbon"

**Abstract #1:**
Nanocarbons conduct electricity, absorb and emit light, and exhibit interesting magnetic properties. Spherical fullerenes, cylindrical carbon nanotubes and sheet-like graphenes are representative forms of nanocarbons, and theoretical simulations have predicted a number of exotic three-dimensional nanocarbon structures. At present, however, synthetic routes to nanocarbons mainly lead to mixtures of molecules with a range of different structures and properties, which cannot be easily separated or refined into pure forms. Some researchers believe it is impossible to synthesise these materials in a precise manner. Obtaining "pure" nanocarbons is a great challenge in the field of nanocarbon science, and the construction of structurally uniform nanocarbons –ideally as single molecules– is crucial for the development of functional materials in nanotechnology, electronics, optics, and biomedical applications. In this talk, our organic chemistry approach toward making structurally uniform nanocarbons and a new form of carbon, with a focus on the power of C-H activation, will be presented.

**Keywords:** molecular nanocarbons; carbon nanotubes; carbon nanobelts; nanographenes; graphene nanoribbons; 3D warped nanographenes; C-H activation; stimuli-responsible materials; organic electronics

## Research Lecture #2

Friday, September 22, 2017 | 3 PM | ICT 121
Title: "C-H activation meets plant biology and chronobiology"

**Abstract #2:**
Our group has focused on catalyst-enabling synthetic chemistry with broad directions, including applications in pharmaceuticals, plant/animal chemical biology, π-conjugated materials, and molecular nanocarbons. In this talk, I will describe the overview and some of our recently developed C-H activation catalysts and reactions. We have demonstrated the power of C-H activation in the discovery of new small molecules for exploring biology and beyond. Particular focus will be placed on our exciting interdisciplinary research conducted at the Institute of Transformative Bio-Molecules (ITbM) in Nagoya University, where we aim at developing game-changing molecules and molecular technology for plant biology, chronobiology, and live imaging. By using our original rapid molecule-assembling catalysts, a number of lead compounds were rapidly discovered. In this talk, I will describe the overview of ITbM and our exciting on-going collaborative projects merging synthetic chemistry, plant biology, animal biology, computational chemistry, and live imaging.

**Keywords:** C-H activation; catalysis; plant biology; chronobiology; pharmaceuticals; agrochemicals

## Event Sponsors

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