

## Lecturer Profile

(last updated: May 21, 2009)

### **SATO Yoshimichi, Professor, Graduate School of Arts and Letters**

Lecture (1) "Agent-based Model of Inequality"

Week 1, Tue July 28, 10:00-12:00

#### **Research Interests**

Sociology

Social Stratification Research

Study of Social Change

Study of Trust

#### **Honors and Awards**

2008 Book Award for Scholarly Excellence, Ministry of Culture, Sports and Tourism.

#### **Outline of the Lecture**

Most of the previous studies of social stratification and inequality explain inequality among people by their family backgrounds such as parents' occupation and education. In contrast, this lecture shows how inequality emerges among relatively homogeneous population.

### **AKITA, JIRO, Professor, Graduate School of Economics and Management**

Lecture (2) "The Economics of Emission Trading"

Week 1, Tue July 28, 13:30-15:30

#### **Research Interests**

Macroeconomics

Monetary Economics

Environmental Economics

#### **Outline of the Lecture**

The Economics of Emissions Trading and the Kyoto Mechanisms

The lecture provides the basics of Environmental Economics that underlie the Kyoto

Mechanism including Emissions Trading introduced by the Kyoto Protocol (1997). A brief summary of the Protocol and the Mechanisms is followed by an introduction to the basic “equimarginal principle”. The principle is first derived from the problem of minimizing the cost of achieving a fixed total emissions abatement, as well as from the problem of emissions reduction maximization given the total emissions cost. Then the intuition behind the principle is explained in conjunction with its application to environmental economic policy strategies such as emissions trading, carbon taxes.

**NAKAZAWA Masataka, Distinguished Professor, Research Institute of  
Electrical Communication**

Lecture (3) “Advanced Optical Communication Technology for Global Network”

Week 1, Wed July 29, 10:00-12:00

**Biography**

After receiving Ph. D. degree from the Tokyo Institute of Technology in 1980, Dr. Nakazawa joined the Ibaraki Electrical Communication Laboratory of Nippon Telegraph and Telephone public corporation (NTT), where he has been engaged in research on soliton transmission, EDFAs, and Terabit/s OTDM transmission. He was a visiting scientist at MIT in 1984. He became the first NTT distinguished researcher in 1994 and a Fellow in 1999. In 2001, he became a professor at Tohoku University and is recently promoted to a Distinguished Professor. He was the president of Electronics Society of IEICE 2006 and is now the Board member of Optical Society of America.

**Research Interests**

High-speed optical transmission including optical solitons

Coherent multi-level transmission using frequency stabilized lasers

Femtosecond pulse generation

Rare-earth-doped optical fiber amplifiers and their applications

**Honors and Awards**

Excellent Paper Award for Optics from Japan Society of Applied Physics, Mar. 1985

Sakurai Memorial Award from OITDA, Nov. 1989

Electronics Letters Premium Award from IEE (U.K.), Oct. 1990

Excellent Paper Award from Japan Society of Applied Physics, Oct. 1991

OSA Fellow Award, Jun. 1992

Outstanding Invention Award from Minister of Science and Technology Agency, Apr.

1993

Achievement Award from IEICE of Japan , May 1994

IEICE Paper Award, May 1994

IEEE Fellow Award, Jan. 1995

Achievement Award from IEICE of Japan, May 1996

Outstanding Research Award from Ministry of Science and Technology Agency, Apr. 1997

IEICE Paper Award, May 1998

IEICE Paper Award, May 2000

IEEE Daniel E. Noble Award, Feb. 2002

erbium-doped fiber amplifiers (EDFA)

IEICE Inose Award, May 2002

27th Inoue Harushige Award from Japan Science and Technology Agency, 2002

72th Hattori Hokou Award, 2002

35th Ichimura Industrial Award, 2003

R. W. Wood Prize from Optical Society of America, 2005

Tore Science and Technology Award, 2006

Thomson Scientific Laureate, 2006

He also received outstanding patent awards (Special Class) in 1994 and 2000 from NTT for the optical time domain reflectometer, and NTT Outstanding R&D Awards in 1989 and 1993 for the development of the EDFA and soliton transmission, respectively.

### **Outline of the Lecture**

Global communication network is based on an optical fiber technology which consists of laser diodes, optical fibers, optical amplifiers, and photo detectors. I describe recent progress on optical communication starting from basic principles of optical communication. I also talk about the cutting edge of the advanced optical communication such as Terabit/s TDM transmission using ultra-short optical pulses and multi-level coherent transmission using frequency-stabilized lasers.

**SATA Noriko, Associate Professor, Graduate School of Engineering**

Lecture (5) "Environmental Issues and Fuel Cell"

Week 1, Thu July 30, 10:00-12:00

### **Research Interests**

Physical properties I (Solid State Physics)

Inorganic material/physical properties

### **Outline of the Lecture**

Outline of the present environmental issues related to our energy consumption will be introduced and the principle and the recent progress of fuel cell technology will be discussed especially on Solid Oxide Fuel Cells.

**OHNISHI, Hitoshi, Professor, Graduate School of Law**

Lecture (6) "Globalization and Nationalism"

Week 1, Fri July 31, 10:00-12:00

### **Research Interests**

International Politics

### **Outline of the Lecture**

In recent years, advancing globalization has revealed that lifestyles and values are being shared more and more on a global scale as mutual dependence among people of countries becomes stronger. Throughout the world after the Cold War was concluded, on the other hand, ethnocentric nationalism appears to have grown within each country. Namely, the influence of political powers that advocate the rejection of immigrants, foreign workers and other ethnic groups began to spread within many countries. Violent immigrant/foreigner rejection movements, ethnic conflicts, and even genocides are now occurring. More than a few countries began to pursue more and more foreign policies that depended on the threat—and exercise—of their own military power. And it is indeed a remarkable trend that hostility against people of other countries, including even their neighbors, is gaining strength.

The major purpose of this lecture is to find out how and why such ethnocentric nationalism comes to take place in each country, and to identify how this is linked to social change brought about by globalization.

**ZHAO Dapeng, Professor, Graduate School of Science**

Lecture (7) "Earthquakes and Earth's Interior Structure"

Week 1, Fri July 31, 13:30-15:30

### **Research Interests**

Earthquake seismology; Seismic tomography; Earth structure and dynamics;  
Deep structure and origin of volcanoes; Physics of earthquakes;  
Structure and dynamics of subduction zones; Hotspots and mantle plumes.

### **Honors and Awards**

1983.10 Outstanding Student Award, Beijing University, China.  
1986-1991 Monbusho Scholarship, Ministry of Education and Science, Japan.  
1992.5 Texaco Research Award, California Institute of Technology, USA.

### **Outline of the Lecture**

The state-of-the-art of earthquake seismology, volcanology and imaging of the Earth's interior will be introduced. The current status of prediction of earthquakes and volcanic eruptions will also be mentioned. Many beautiful color figures will be shown, and so the lecture is easy to understand.

**NAKATA, Toshihiko, Professor, Graduate School of Engineering**

Lecture (8) "Energy and Society"  
Week 2, Mon August 3, 10:00-12:00

### **Research Interests**

Environmental impact assessment/environmental policy (Environmental Preservation)  
Social system engineering/safety system  
Energy studies (Energy Science in General)  
Design of energy systems based on thermal engineering  
Energy-economic models and its application  
Design for renewable energy systems

### **Honors and Awards**

2006 Japan Institute of Energy, Poster Award  
2005 Best Paper Award of the Japan Institute of Energy  
2000 ASME/IGTI Best Paper Award  
1997-1998 Fulbright Scholar, Lawrence Livermore National Laboratory, USA

### **Outline of the Lecture**

The class focuses on fundamental energy resource, conversion technologies, and consumption. It includes systems approach for designing low carbon society having variety of renewable resources, and application of management science for engineers.

**KAWASAKI, Masashi, Professor, WPI Advanced Institute for Materials Research**

Lecture (9) "Basic Physics and New Electronics Based on Emerging Oxide Semiconductors"

Week 2, Mon August 3, 13:30-15:30

### **Research Interests**

Functional material chemistry  
Applied physical properties/crystal engineering  
Electron/electric material engineering  
ZnO Ultraviolet Lasers  
Combinatorial Solid State Electronics  
Crystal Engineering of Ceramics

### **Honors and Awards**

2008 Chemical Society of Japan Award for Creative Work  
2007 Yamazaki-Teiichi Prize  
2005 IBM Japan Prize

### **Outline of the Lecture**

The lecture consists of two part; one is to understand basic physics of semiconductors and another is current topic of research on oxide semiconductors. For the former, electrons in hydrogen atom, chemical bond and band structure will be explained. Then optical processes in semiconductor and pn junction are introduces. For the latter, the advantage of ZnO over other conventional semiconductors will be explained and the success in making liht emitting diode will be introduced.

**SAITO Riichiro, Professor, Graduate School of Science**

Lecture (10) "Welcome to Carbon Nanotube Science"

### Research Interests

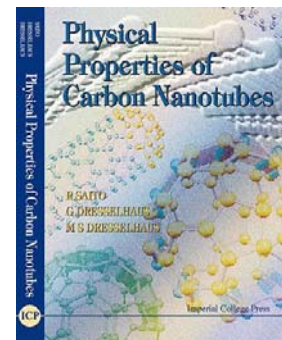
Carbon-Nanotube & Fullerene (Theory)  
Optical properties of solid  
Computational Physics  
Solid State Physics, Condensed Matter Theory



R. Saito

### Books

“Physical Properties of Carbon Nanotubes”, by R. Saito, G. Dresselhaus, M.S Dresselhaus, Imperial College Press, London (1998)

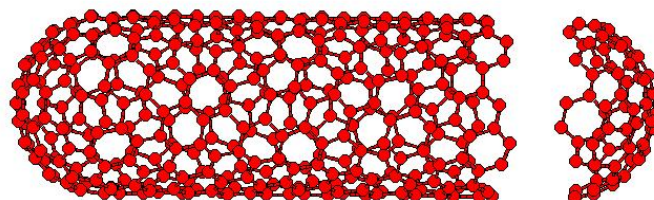


### Honors and Awards

The Japan Carbon Award for Innovative Research (2008.7.17)  
Hsun Lee Research Award (2006) IMR, China.  
Japan IBM Science Prize (Physics) (1999)

### Outline of the Lecture

Carbon nanotube is a roll-up graphite atomic sheet into a cylinder. Since the diameter of nanotube is in nano-meter size, many scientists investigate nanotube for 20 years up to now for many applications and physics. The subject of talk consists of (1) why nano-science is useful? (2) what is the secret of pentagonal rings of carbon atoms. (3) What are nanotubes and fullerenes? (4) How can we use these materials? Welcome to carbon nanotube science!



(10,5) semiconductor single wall carbon nanotube whose diameter is 1nm.

TANIGUCHI Shoji, Professor, Graduate School of Engineering/ Graduate  
School of Environmental Studies

Lecture (11) "The Role of Social Sciences, Economics and Engineering for the  
Solution of Environmental Issues."  
Week 2, Thu August 6, 10:00-12:00

### **Research Interests**

Environmental Technologies using electromagnetic forces  
Removal of inclusion particles from liquid metal using electromagnetic force  
Separation of metal wastes using moving magnetic field  
Improvement of reaction efficiency of metals using electromagnetic stirring with rotation and moving field  
Fundamental studies on microwave processing of BF slags  
Fundamental studies on separation process using high magnetic field  
Environmental Technologies by analysis of particle behaviors in liquid  
Behavior of suspended particles in turbulent shear flow for the purpose of purifying waste water  
Removal of suspended particles in liquid by air bubbling  
Coagulation of dust particles in steel making process and recycling of zinc  
Design of environmentally friendly materials fabrication processes  
Fabrication of Al based functionally graded materials using electromagnetic forces  
Efficient wet etching process of Cu film for electronic circuit  
Fabrication of (Al-alloy)/Al<sub>2</sub>O<sub>3</sub> composite materials using Al scrap

### **Honors and Awards**

Guest Professor: University of Science and Technology Beijing (2000-2002)  
Advisor Professor: Chongqing University (1999-2001)

### **Outline of the Lecture**

We are facing a crisis of global environmental issues like global warming. The lecturer would like to make clear the responsibilities of the present economic system and industrial structure. As the common purpose of the economics and engineering should be to make people happy, we should establish environment-friendly economics and industries.

### **Research Interests**

A) Tissue engineering and regenerative medicine for corneal diseases

1. Development of tissue-engineered epithelial cell sheet comprising autologous oral mucosal epithelium for ocular surface regeneration reconstruction
2. Development of corneal endothelial tissue engineering
3. Development of artificial corneal stroma

B) Epithelial stem cell biology:

1. Study on Pluripotent stem cell and tissue stem cell
2. Analyses of stem cell niche and identification of cell surface marker for epithelial stem cells

C) Molecular biology of the cornea

1. Compiling gene expression profile of human corneal and conjunctival epithelium
2. Cloning human keratin 12 cDNA and genomic DNA
3. Molecular genetics of corneal dystrophy

D) Identification of gene responsible Meesman corneal dystrophy (keratin 12) and macular corneal dystrophy (CHST6)

### **Honors and Awards**

Alcon Award 2005

### **Outline of the Lecture**

Regenerative medicine using stem cells is now expected to be a next-generation medical treatment for various intractable disorders.

We are currently developing a novel technology of regenerative medicine for cornea.