

## Premedical Course

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### Japanese

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Ikuko Noro, Associate Professor

#### General Summary

*Suitability of informed consent documents for patients written in Japanese*

1. The necessity of studying the suitability of informed consent documents for patients written in Japanese was analyzed.
2. A survey was performed to study lay comprehension of readability assessment and feeling of ease with informed consent documents. A total of 363 laypersons, who were not engaged in any medical field, answered a comprehension test and assessed the document after reading it.

#### Research Activities

*Medical interview in Japanese*

1. A textbook to analyze medical conversation with the Roter Interactional Analysis System, a method widely used in Western countries, was published.
2. A book written in English on the relationship between medical conversation and patient outcomes was translated into Japanese.

#### Publications

**Noro I, Nakazato Y.** The necessity to study suitability of informed consent documents for patients written in Japanese. *Ars Linguistica* 2007; **14**: 73-82.

#### Reviews

**Noro I, Abe K, Ishikawa H.** The Roter method of interaction process analysis system (RIAS). Nagoya: Sankeisha; 2007.

## Social Science (Law)

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Ryuichi Ozawa, Professor

#### General Summary

Problems of constitutional law in present-day Japan.

#### Research Activities

I am examining issues related to constitutional law in present-day Japan, especially

pacifism, parliamentary democracy, the welfare state, the right of free speech, and the judicial system. I reported at a seminar entitled “Unequal Society and Constitutional Law” at the Unequal Society and Safety-Net working party of the Legal Committee of the Science Council of Japan.

### Publications

**Ozawa R.** Argument over article 9 reformation of Japanese constitution, past and present. *J Jpn Sci* 2007; **42**: 36-41.

**Ozawa R.** Démocratie représentative et gouvernement d'opinion, Vllème Séminaire Franco-Japonais de droit public, Université Montpellier I C.E.R.C.O.P Université Strasbourg III Institut de Recherche Carée de Malberg, Novembre 2007,

pp.91-95.

**Ozawa R.** The right of collective defence in post war. In: Rekishi-Kyouikusha-Kyougikai editor. *Annals of historic education and sociologic education*. Tokyo: Sanseidou; 2007. p. 56-66.

**Ozawa R.** Issues over the Japanese constitution. *Hibakusha problem Rev* 2007; **12**: 1-15.

## Human Science

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Takao Fukuyama, *Professor*

### General Summary

The study of modern German philosophy and ethics.

### Research Activities

I have been working with other Japanese scholars of philosophy to prepare a Japanese translation of Jurgen Habermas's anthology, *between Naturalism and Religion*, which is to be published in 2009. I worked on the chapter “Religious Tolerance as a Pacemaker of Cultural Rights.” Jurgen Habermas is a leader of the Frankfurt School, which was founded 1924 and studies the relations of the economy, culture, and the individual in a comprehensive program, called “critical theory.” Habermas recently published *Facticity and Validity*, in which he searches for the ethics of discussion in the constitutional state and emphasizes the importance of solidarity in democracy.

## English

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Osamu Ohara, *Professor*

Tetsuro Fujii, *Associate Professor*

### General Summary

*English audiovisual education and the history of the English language (Ohara)*

*English language communication and education: material analysis and development (Fujii)*

Ohara continued his study of graphology and morphology in the letters of Margaret Paston and the Celys in the fifteenth century. Ohara also continued a study of how to make useful digital images and XML files of fifteenth century manuscripts, especially of the *Cely Letters*. The results of this investigation were discussed in papers presented at a 2 international conferences.

Fujii took an active research approach to find ways of making college English learners autonomous. He designed a vocabulary-building program that makes students learn and use 2,000 basic-level words and accesses their continual vocabulary development. He also created an extensive reading program that motivates learners to read 1 English book a week from a selected library, exposing learners to a variety of topics and having them write book reports.

### Research Activities

Ohara presented a paper at a session entitled “It’s the Little Things that Count” at the International Medieval Congress 2007 held at the University of Leeds in the United Kingdom. In this historical sociolinguistic study of the *Cely Letters*, Ohara focused on the usages of auxiliaries and showed how they differ. Ohara also read a paper at the 20th anniversary meeting of the Text Encoding Initiative Consortium at the University of Maryland. In this paper, Ohara focused on whether an electronic text of the letters of Margaret Paston compiled on the basis of the Text Encoding Initiative P5 guidelines can have a useful structure for graphological study and whether it is appropriate to change this kind of text into a more machine-readable one at the cost of complexity and nonlinearity.

Fujii reported on the evaluation and application of his research in a presentation entitled “Designing an Extensive Reading and Vocabulary Building Program” at the 46<sup>th</sup> national convention of the Japan Association of College English Teachers in Hiroshima, in September 2007.

## German

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Yoshiaki Shirasaki, *Associate Professor*

### General Summary

#### *German language*

I have continued educational activities for medical students and nursing students for the purpose of verbal and nonverbal communication. These activities are also connected with the aim of the development of moral and philosophical ability in the field of intercultural relationships. The numbers of activities per year were 120 for medical and 60 for nursing students.

#### *Swiss literature in the 19th century*

I have continued a collaborative study of modern Swiss literature (with the Researching Society for the Helveticum). This study is necessarily related to the preceding study of literary realism but also concerns the modern Swiss-German problem as an aspect of the expression of the German language.

#### *Schiller study*

Friedrich Schiller has been regarded merely as a representative poet of German classicism or as a typical dramatist of German idealism. I intend to show his versatility by using a comparative method that would clarify his various influences upon European literature and political history.

#### *Noh and German literature*

Noh, a traditional theatre form in Japan with a consistent style and high artistry, includes a general character that is understood in the West. Noh is traditionally discussed in relationship with modern European theatres, and Paul Claudel and Yeats have also produced some great works that show Eastern influences. However, in addition to direct connections, the forms of both noh theatres and Baroque theatre can be identified in German literature, such as the works of Brecht and Hofmannsthal. Here, I intend to clarify the relationship between Noh and Baroque theatre through structural comparison.

## Mathematics

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Kanji Suzuki, *Professor*

### General Summary

#### *Mathematical Education*

At regular meetings of the Mathematics Education Society of Japan, we have proposed several improvements in the methods for teaching mathematics. The contents are as

follows.

1. The arrangement and summation of the methods of teaching calculus, which we have recently published.
2. Some proposals in fields other than calculus included: 1) that in general linear groups, the continuity of inverse operations may be introduced explicitly rather than implicitly by a brief inequality, and 2) in the Chinese remainder theorem appearing in elementary integer theory, the solution of a system of congruence equations may be obtained automatically without difficulty.

### Research Activities

1. We provided a new proof of Taylor's theorem in 2001. Using this proof, we can develop a theory of differential calculus, separately from integral calculus.
2. For example, in solving the system of congruent equations  $X \equiv 2 \pmod{3}$ ,  $X \equiv 3 \pmod{5}$ ,  $X \equiv 2 \pmod{7}$ , we have shown an automatic algorithm leading to the solution  $X \equiv 23 \pmod{105}$ . Consequently, students may easily learn the whole theory of congruent expressions with the first order.

### Publications

**Suzuki K.** Improvements on teaching methods of calculus, I (in Japanese). Tokyo: Summer Workshop of Mathematics Education Society of Japan; 2007, 7.

**Suzuki K.** Chinese remainder theorem: teaching by an automatic algorithm (in Japanese).

Tokyo: Mathematics Education Society of Japan (a special edition); 2007, 9.

**Suzuki K.** A brief inequality: on the continuity of inverse matrices (in Japanese). Tokyo: Mathematics Education Society of Japan (a special edition); 2008, 3.

## Physics

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Koichi Satoh, *Professor*

Katsumi Kasono, *Assistant Professor*

### General Summary

Dipalmitoylphosphatidylcholine (DPPC) membranes have been studied from several points of view, including formation, liquid crystals, phase transitions, interaction with ions, and optical characteristics.

### Research Activities

#### *Ripple phase of the DPPC membrane*

We have analyzed previously published articles about the ripple phase and have found that our analysis of recent research on the dielectric behavior of DPPC vesicles at phase transitions supports our model of the ripple phase.

*Monte Carlo simulations of the  $q=10,20$  Potts models*

We have performed cluster update simulations to study systems with the first-order phase transition. We obtained transition temperatures, energies, and order parameters that were consistent with theoretical predictions.

## Chemistry

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Tomoyoshi Takahashi, *Professor*

Chikao Hashimoto, *Associate Professor*

### General Summary

The research works of our laboratory are focused on the synthesis of biologically active compounds and the modification of synthetic reactions.

### Research Activities

*Reaction of  $\alpha$ -halo ketone with 2-aminothiol*

We previously reported a new type of condensation between  $\alpha$ -bromosteroidal ketones and 2-aminothiol which leads to  $\alpha$ -ketospirothiazolidine derivatives. In the resulting product, the oxo group migrated to the position originally occupied by the bromine atom. Moreover, to clarify the generality of migration for the oxo group, the reaction of cyclic and acyclic  $\alpha$ -haloalkanones with aminothiol yielded the corresponding thiazolidine derivatives. In addition, we found that the use of microwaves improves yields and shortens the reaction time.

*Synthesis of  $N$ -protected peptide acids using amino acid-alkaline earth metal salts*

The protection of a carboxyl group by a metal ion saves the time for the incorporation and removal of the protecting group and prevents side reactions caused by the use of esters. The synthesis of  $N$ -protected peptide acids in organic solvents using alkaline earth metal-carboxylate salts of an amino acid was investigated. We found that the amino acid-Ca carboxylate salts are the most effective of the carboxylate salts of amino acids tested for coupling with Boc-amino acid active esters in organic solvents, such as dimethylformamide and dimethylsulfoxide.

### Publications

**Matsushita M<sup>1</sup>, Takahashi T, Utsukihara T<sup>1</sup>, Shimizu Y<sup>1</sup>, Jansen RJ<sup>1</sup>, Horiuchi CA<sup>1</sup> (<sup>1</sup>Rikkyo Univ).** Reaction of  $\alpha$ -halo-ketone with 2-aminothiol: a new synthesis of thiazolidines with the oxo group migrated to the original position occupied halogen atom. *Tetrahedron* 2007; **63**: 8932–8.

**Itoh K<sup>1</sup>, Utsukihara T<sup>2</sup>, Funayama K<sup>2</sup>, Sakamaki H<sup>1</sup> (<sup>1</sup>Nihon Univ), Kanamori M<sup>2</sup>, Takahashi T,**

**Saitoh Y<sup>2</sup>, Matsushita M<sup>2</sup>, He L<sup>2</sup>, Hashimoto C, Sugiyama T (Kyoto Univ), Horiuchi, C A<sup>2</sup> (<sup>2</sup>Rikkyo Univ).** Reaction of  $\alpha,\beta$ -unsaturated ketones using cerium (IV) sulfate tetrahydrate in acetic acid. *Appl Organometal Chem* 2007; **21**: 1029–32.

**Hashimoto C, Takeguchi K<sup>1</sup>, Kodomari M<sup>1</sup> (<sup>1</sup>Shibaura Inst Techo).** Synthesis of  $N$ -protected peptide acids using alkaline and alka-

line earth metals-carboxylate salts of amino acids. *Peptide Sci* 2007; 179-82.

### Reviews and Books

**Hashimoto C.** Gel chromatography. Isolation of cholesterol and separation-identification of phospholipid from egg yolk. Isolation of albu-

min from the white of an egg and its identification by electrophoresis. (in Japanese). In: Takahashi T, Shairyoza E (Nihon Univ), Tanaka M (Nihon Med Univ), Yamakura F (Juntendo Univ), editors. *Seimeikagaku notameno Kagakujiken*. Tokyo: Tokyogyogaku Sha; 2007. p.160-7, 168-76, 181-92.

## Biology

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Osamu Terasaka, *Professor*

Rie Hiratsuka, *Assistant Professor*

### General Summary

The main research subject of our laboratory is the reproductive system of seed plants. Our research is focused on the relation between pollen tube growth and the programmed cell death of pollen tube conducting tissue.

### Research Activities

*Distribution of molecules involved in angiospermous pollen tube elongation in the nucellus of gymnosperms*

Angiospermous pollen tubes growing into the styles are supplied with carbohydrates and glycoproteins, such as pectins and arabinogalactan proteins (AGPs), from stylar tissue as factors of nutrition, adhesion, or guidance. In this study, we analyzed the localization of starch granules, pectins, and AGPs in the nucellus of *Ginkgo biloba* L., *Cryptomeria japonica* D. Don, *Chamaecyparis pisifera* (Sieb. & Zucc.) Endlicher, *Platycladus orientalis* (L.) Franco, *Pinus densiflora* Sieb. & Zucc., and *Ephedra sinica* Stapf to clarify the role of nucellar tissue in pollen tube elongation.

We found that starch granules were widely distributed throughout the whole nucellus of *P. orientalis* and *E. sinica* but not at all in *C. pisifera* or *G. biloba*. In *P. densiflora*, starch granules accumulated in the nucellar cells around the tube tip but were markedly decreased in the nucellar cells through which the pollen tube passed. In *C. japonica*, starch granules were located only in the mid-zone of the nucellus.

Esterified pectins were located in the cell walls and extracellular matrix within the nucellus of all materials. The pectins drastically increased during programmed cell death of nucellar cells in response to pollen tube elongation in *P. densiflora*.

AGPs were present in the cell wall and extracellular matrix of the whole nucellus in *C. japonica*, *C. pisifera*, *P. orientalis*, and *P. densiflora*. In *P. orientalis* and *P. densiflora*, AGPs were abundant in the nucellar cells around the pollen tube.

These findings suggest that the molecules that are involved in angiospermous pollen tube elongation are also present in the nucellus of gymnosperms and that their distribution pattern varies among species.