

## Premedical Course

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### Japanese

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Ikuko Noro, Associate Professor

#### General Summary

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

A survey was performed to investigate simulated situations: 1) the overall effects of comprehensibility of informed consent documents on patient outcomes; 2) whether or not, and in what ways, affective verbal expressions that moderate patient anxiety and demonstrate partnership or concern are likely to affect patient outcomes; and 3) in what ways patient outcomes may be seen to be correlated. (Publications 1)

##### *Effects of the sex of physicians on medical communication*

To assess how the sex of medical students affect the communication styles of medical students and simulated patients, medical interviews, as part of the objective structured clinical examination, performed by 82 (53 male, 29 female) fourth-year medical students at Nagoya University School of Medicine were analyzed with the Roter Method of Interaction Process Analysis System. (Publications 2)

#### Publications

**Noro I, Muramoto T.** Correlation of comprehensibility of informed consent documents with and without affective verbal expressions and measured patient outcomes: a survey on students. (in Japanese). *Nippon Hoken Iryo kodo Kagakkai Nenpo* 2009; **24**: 102-16.

**Noro I, Abe K, Ban N.** Effects of medical students' gender on communication during OSCE medical interviews (in Japanese). *Igaku Kyoiku Jpn* 2010; **41**: 1-6.

#### Reviews and Books

**Ishikawa H, Abe K, Noro I, Takayama T.** Functional Approach to Medical Communication Study (in Japanese). In: Fujisaki K, Hashimoto H, editors. Multiple Approaches to Empirical study on Medical Communication. Tokyo: Shinoharashuppanshinsha; 2009. p. 53-82.

## Social Science (Law)

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Ryuichi Ozawa, Professor

#### General Summary

Problems of constitutional law in present-day Japan.

## Research Activities

I address the problem of constitutional law in present-day Japan, especially pacifism, parliamentary democracy, public finance, right of free speech, and the judicial system. I participate in the “Unequal Society and Safety Net” working party and “Structural Change of Publics” working party of the Legal Committee of the Science Council of Japan.

## Publications

**Ozawa R.** Memories of War as ideal base of Pacifism (in Japanese). In: Urata I, Shimizu M, Miwa T, editors. *Heiwa to Kenpou no Genzai*. Tokyo:

Nishida-Shoten; 2009. p.179-99.

**Ozawa R.** On Japanese Law School (in Japanese). *Nihon no Kagakusha* 2009; **44**: 4-9.

## Human Science

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Fukuyama Takao, *Professor*

## General Summary

The study of Western philosophy and ethics.

## Research Activities

### *An Acceptance of Others*

Contemporary philosophers, for example, Martin Buber, Emmanuel Levinas, Viktor Emil Frankl, and Erich Fromm, contributed new concepts of human relations. They commonly insisted on the passivity of human kind. They criticized the isolation of the self, which Descartes certified, while that self is a cause of narcissism or egoism. Rather, the philosophers offered the self that is embedded in the human relations, and they made anew many rewarding ideas.

## Publications

**Fukuyama T.** The relation between Philosophy and Spirituality: “Acceptance of the Other” and

its’ thinkers (in Japanese). *Igaku Rinri to Tetsugaku* 2009; **6**: 28-31.

## 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 the Celys and the Stonors in the fifteenth century. Ohara also continued an investigation of how to make useful digital images and XML files of fifteenth century manuscripts, especially of the *Stonor Letters*. The results of this investigation were discussed in papers read at an international conference.

Fujii analyzed the linguistic similarities between English and Japanese which facilitate learning. He also studied the relationship between reading comprehension skills and testing methods. In addition, he developed self-study materials based on the analysis of question items found in the Test of English for International Communication.

### Research Activities

Ohara presented a paper at a session titled “The Rhetoric of Genre” of the International Medieval Congress 2009 held at the University of Leeds in the United Kingdom. In this historical-sociolinguistic study of the *Stonor Letters*, Ohara focused on the usages of auxiliaries and showed how they are different. Ohara visited the National Archive in Britain and studied the *Stonor Letters*. Making use of the results of the study, Ohara continued his research of the graphemes of the letters of the Stonors.

Fujii presented a paper about the lexical and syntactical commonalities between English and Japanese at a conference of the Association for Japanese and English Language and Culture at Meiji University in June 2009. He also presented about the influence of test formats on reading subskills, related to vocabulary, syntax, and inference, at the 35<sup>th</sup> annual meeting of the Japan Society of English Language Education held at Tottori University in August 2009. In addition, Fujii compiled 3 vocabulary textbooks for second-language learners, based on teaching theories and research findings on vocabulary usage on the Test of English for International Communication.

### Reviews and Books

**Fujii T.** Learn by solving: TOEIC TEST English Words 2260 (in Japanese). Tokyo: Kirihara Publishing; 2009.

**Fujii T, Miyano T (Kansai Gaidai Coll).** Ultimate vocabulary lite for TOEIC TEST score 500 (in

Japanese). Tokyo: Goken Publishing; 2009.

**Fujii T, Miyano T (Kansai Gaidai Coll).** Ultimate vocabulary lite for TOEIC TEST score 600 (in Japanese). Tokyo: Goken Publishing; 2009.

## German

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Yoshiaki Shirasaki, *Professor*

### General Summary

1. I have continued educational activities for the purpose of verbal and nonverbal communication. These activities are also connected with the aim of the development of moral and philosophical ability of the field of intercultural relationships.
2. I have also continued a large translation of Wilhelm Dilthey. This Translation has the following aim, that the so many fields like ontology, epistemology, metaphysics, religious philosophy and aesthetic etc. at once in one view unify.

### Publications

**Miyashita K, Shirasaki Y.** Die Entstehung des modernen Geisteswissenschaften. Wilhelm Dilth-

ey Saemtliche Werke Bd, 7. Tokyo: The University Press of Hosei; 2009. p.943.

## Mathematics

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Katsuya Yokoi, *Professor*

Hiroshi Shiraishi, *Assistant Professor*

### General Summary

1. To study dimension theory and topological dynamics.
2. To consider the asymptotic behavior of estimators of optimal portfolios when the return processes are various stochastic processes.

### Research Activities

1. For  $n \geq 1$ , given an  $n$ -dimensional locally  $(n-1)$ -connected compact space  $X$  and a finite Borel measure  $\mu$  without atoms at isolated points, we have proven that for a generic (in the uniform metric) continuous map  $f: X \rightarrow X$ , the set of points that are chain recurrent under  $f$  has  $\mu$ -measure zero.
2. When financial returns are supposed to be vector-valued non-Gaussian stationary processes, optimal portfolios for general utility function depend on their higher-order cumulants. Assuming that the concerned optimal portfolio depends on the mean, variance, and third-order cumulants of the return process, the asymptotic distribution of a sample version estimator of the optimal portfolio is derived.

## Publications

**Yokoi K.** The size of the chain recurrent set for generic maps on an  $n$ -dimensional locally  $(n-1)$ -connected compact space. *Colloquium Mathematicum* 2010; **119**: 229–36.

**Shiraishi H, Taniguchi M (Waseda Univ).** Statistical estimation of optimal portfolios depending on higher order cumulants. *Annales De L'I.S.U. P* 2009; **53**: 3–18.

## Physics

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Koichi Satoh, *Professor*

Katsumi Kasono, *Assistant Professor*

### General Summary

1. Dipalmitoylphosphatidylcholine (DPPC) membranes have been studied from several points of view, including form formation, liquid crystal, phase transitions, interaction with ions, and optical characteristics.
2. Phase transitions, critical phenomena, interacting many-body systems, and computer simulation.

### Research Activities

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

The ripple phase of the DPPC membrane is assumed to be caused by about 20% fluid lipids in the gel phase. This assumption explains consistently both the surface charge density of multilamellar vesicles and the dielectric increment of unilamellar vesicles during the ripple phase.

#### *Monte Carlo simulations of the $q=10$ Potts model*

We have performed cluster update simulations to study systems with the first-order phase transition. We calculated latent heat and magnetization. The results were consistent with the theoretical prediction to 5 digits.

## Chemistry

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Takashi Okano, *Professor*

Chikao Hashimoto, *Associate Professor*

### General Summary

The research of this laboratory is focused on synthesis-oriented organic chemistry, including the synthesis of bioactive compounds and fluorine-containing materials, the development of new methods for peptide synthesis, and the computer-assisted analysis of materials and synthetic reactions.

## Research Activities

### *Molecular design of gadolinium (III) sugar ball complexes for highly sensitive magnetic resonance imaging agents*

Gadolinium (III) heterocyclic complexes are used as the magnetic resonance imaging agents because of the high spin multiplicity to catalyze spin-spin relaxation of excited water protons. Modification of the heterocyclic ligands with gluconic acid moieties improves imaging sensitivity and allows smaller doses of toxic imaging agents. We performed computational analysis of the mechanism of spin relaxation by the Gd (III) complex. Density functional theory calculation revealed that the ligand exchange on  $Gd^{3+}$  ion occurs via a concerted process similar to the  $S_{N2}$  reaction of organic compounds with a low energy barrier.

### *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 needed to incorporate and remove the protecting group and prevents side reactions caused by the use of esters. The syntheses of *N*-protected peptide acids in organic solvents using alkaline earth metal-carboxylate salts of an amino acid were investigated. The amino acid-Ca carboxylate salts were found to be the most effective of the carboxylate salts of amino acids tested for coupling with Boc-amino acid active esters in organic solvents, such as *N,N*-dimethylformamide and dimethylsulfoxide.

## Review

**Okano T.** Design and fabrication of functional self-assembled monolayer materials (in Japanese). *Kagaku Kogyo* 2009; **60**: 441-6.

## 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 now focused on the relation between pollen tube growth and the programmed cell death of pollen tube conducting tissue.

## Research Activities

### *In vivo* pollen tube growth of *Chamaecyparis pisifera*.

1. Nucellar cell death in response to pollen tube elongation

In *C. pisifera*, the pollen tube grew intermittently for approximately 2 months through nucellar tissue toward the female gametophyte. After germination, the pollen tube grew

for 1 to 3 weeks and formed multiple branches. Growth then ceased for approximately 1.5 months, and only a single branch of multiple branches began to grow again, showing rapid elongation. The single branch grew approximately 300  $\mu\text{m}$  and conveys sperm cells toward the female gametophyte. In the region up to about 100  $\mu\text{m}$  from the nucellar apex, vacuoles in the nucellar cells displayed high internal electron density and contained various vesicles and organelles. The nucellar cells adjacent to the pollen tube underwent cell death with DNA fragmentation. These results suggested that autophagy occurred in the region up to about 100  $\mu\text{m}$  from the nucellar apex and that substances accumulated in the vacuoles were released into the extracellular matrix (ECM) with nucellar cell death. The substances might be reused as a source of nutrients during pollen tube growth.

## 2. Distribution of molecules involved in angiospermous pollen tube elongation in the nucellus

Arabinogalactan proteins (AGPs) and pectins in the styles of angiosperms support pollen tube growth. In this study, distributions of pectin, AGPs and pectinases in the pollen tube and nucellus of *C. pisifera* were investigated using an antibody (JIM5) that recognizes unesterified pectins, an antibody (JIM7) that recognizes methyl-esterified pectins, an antibody (JIM13) that recognizes AGPs, and antibodies (Cry j 1 and Cry j 2) that recognize pectinases. Unesterified pectins and methyl-esterified pectins were distributed in cell walls and the ECM throughout the nucellus. Cry j 1 was widely distributed throughout the whole nucellus, whereas pollen tube walls were devoid of signal. Cry j 2 was located mainly in the pollen tube walls. These findings suggest that Cry j 1 is secreted mainly by nucellar cells, that Cry j 2 is secreted by pollen tubes, and that both enzymes facilitate the growth of the pollen tubes by degrading the pectins of the cell wall and the ECM. AGPs, which, in tobacco, are secreted in the ECM from transmitting tissue and are thought to form a nutrient source for pollen tube, were distributed in cell walls and the ECM in the region up to about 100  $\mu\text{m}$  from the nucellar apex. We presumed that AGPs in the nucellus of *C. pisifera* play a similar role as they do in tobacco.