

POSTECH Newsletter

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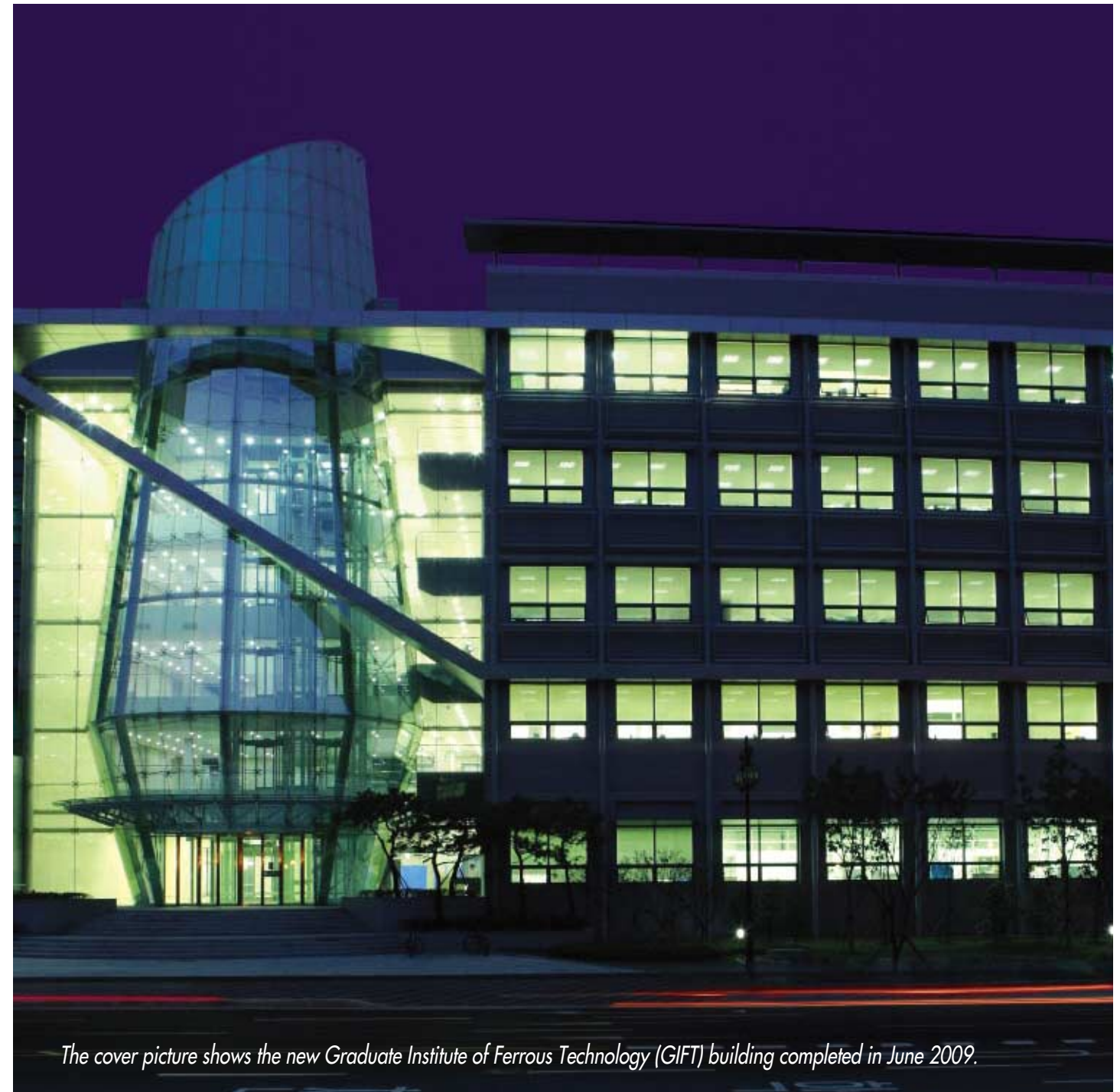
Pohang University of Science and Technology
International Relations Office
San 31, Hyoja-dong, Nam-gu, Pohang 790-784, Korea

Tel: +82-54-279-3681~3686

Fax: +82-54-279-3590

iao@postech.ac.kr

www.postech.ac.kr



The cover picture shows the new Graduate Institute of Ferrous Technology (GIFT) building completed in June 2009.

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The POSTECH Newsletter is published quarterly by the International Relations Office to provide University news and information on academic and research achievements of POSTECH members. To receive a free copy of the POSTECH Newsletter, please write to us or visit us online at www.postech.ac.kr

Contact:

International Relations Office
Pohang University of Science and Technology
San 31, Hyoja-dong, Nam-gu
Pohang 790-784, Republic of Korea
Tel: +82-54-279-3681~3686
Fax: +82-54-279-3590
iao@postech.ac.kr
www.postech.ac.kr

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Tel: +82-2-521-0725

Fluorescent Sensor for Mercury Detection Developed

Professor Kyo Han Ahn (Department of Chemistry) and his team, in a joint research with a Yonsei University group, have developed a new probe for mercury that can be used for imaging organs in living organisms.

Mercury is a highly toxic and widespread pollutant, but the existing fluorescence probes for it mostly detected only its inorganic forms. The element is commonly found in organic forms which are much more toxic than inorganic mercury as their lipophilicity allows them to cross biological membranes. Consequently, new ways of detecting organic mercury species, particularly in organisms, was of crucial importance.

The research team has developed a structurally simple probe which reacts with both organic and inorganic mercury to give a fluorescent product. The probe was used to monitor methylmercury species in mammalian cells and zebrafish organs incubated with methylmercury.

While existing probes for inorganic mercury used heteroatomic ligands, Professor Ahn's group took a

different approach, making a conceptual advance: inspiration was taken from the field of oxymercuration reactions, in which alkenes, unsaturated hydrocarbons, when met with mercury, react to water.

Professor Ahn said the probe could be vital to the study of organic mercury poisoning in living species. "Now we have a molecular probe that can be used for studying and tracing the notoriously toxic methylmercury in living species. By using the probe, we may study the distribution and fate of methylmercury in organisms," he explained.

Professor Ahn also added that the next step was to develop a probe that is more discriminating. "One of the most challenging issues in mercury sensing is to discriminate methylmercury from inorganic mercury," said Professor Ahn. "We do not have such a molecular probe yet but we are working on it."

The findings were published in the Royal Society of Chemistry's *Chemical Communications*, and highlighted in *Chemical Biology* and other magazines.

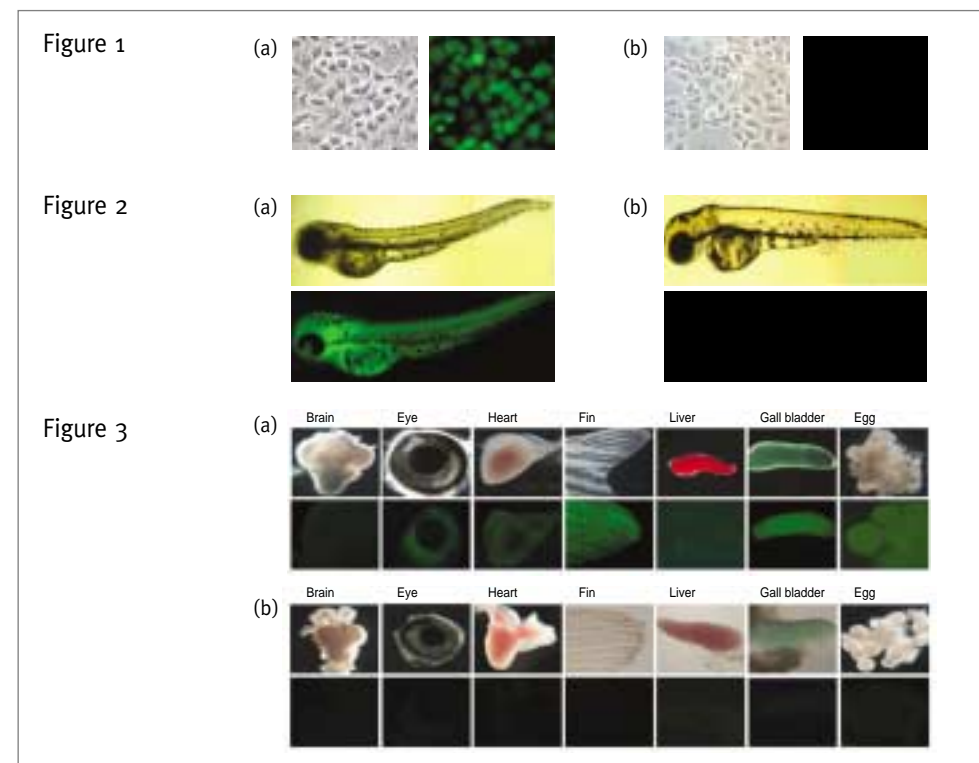


Professor Kyo Han Ahn

Department of Chemistry

Tel: +82-54-279-2105

Fax: +82-54-279-3399

E-mail: ahn@postech.ac.kr

Figures 1 and 2: Cells and organisms incubated with 50 μ M probe (0.5% CH₃CN) and 300 μ M CH₃HgCl. (a) Images of A549 cells treated with probe in the presence and (b) absence of CH₃HgCl. (c) Three-day-old zebrafish treated with probe in the presence and (d) absence of CH₃HgCl.

Figure 3: (a) Images of zebrafish organs treated with 200 μ M of CH₃HgCl and 50 mM of probe 1 (top: microscopic images, bottom: fluorescence images) (b) Images of zebrafish organs treated with 50 μ M of probe 1 in the absence of external CH₃HgCl (top: microscopic images, bottom: fluorescence images).

Bio-Artificial Muscle Closer to Commercialization



Professor Moonhor Ree

Department of Chemistry
Tel: +82-54-279-2120
Fax: +82-54-279-3399
E-mail: ree@postech.ac.kr

Professor Moonhor Ree (Department of Chemistry) and his group, in a joint research with a Hanyang University team (Professor Seon Jeong Kim), have succeeded in identifying the operational mechanism for a “fullerene-DNA hybrid molecular machine” through the use of the synchrotron radiation source of Pohang Accelerator Laboratory (PAL) at POSTECH.

The DNA not only stores and preserves the genes, but when combined with nano materials that possess various functions, it can generate three dimensional nano structures that allow for control.

The DNA samples used in the study were known to generate mutations of contraction and relaxation under acidic or basic conditions, but the exact structure and operational mechanism had remained unknown.

The research team developed a “fullerene-DNA hybrid molecular machine” by incorporating fullerene, which is made of carbon atoms and shaped like a football, at both ends of a DNA. The three dimensional structure of the molecular machine, as well as the role of the fullerene in the mechanism, were successfully identified by solution small-angle X-ray scattering with synchrotron radiation source at the 4C1 beamline of PAL, generating a breakthrough in the area of DNA nano devices.

In the biotechnology sphere, there is a keen competition for the development of molecular machines that create bio-artificial muscle systems using the operational mechanism of the human DNA.

The research team commented that “research on molecular machines still remains in the early phase of nanotechnology, world-wide,” and added that “the study will not only accelerate the commercialization of fullerene-DNA hybrid molecular machines but also contribute to the research on bio-industry, development of new drugs, and nanotechnology.”

The results of the study were published in the March 3 online issue of *Advanced Materials* (2009, vol. 21, 1907-1910).

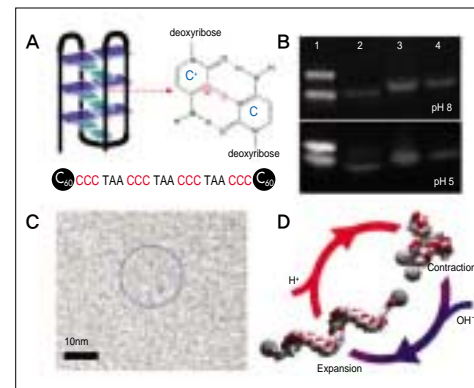


Figure 1.

(A) Schematic diagram of C_{60} and i-motif DNA. The C:C hemiprotonated base pairs are the “building blocks” for quadruplex formation. The contraction is induced by the folding of the 21-base oligonucleotides that contain six C:C hemiprotonated base pairs at pH = 5. (B) PAGE analysis (15% native gel) of the transformation of i-motif DNA, the C_{60} /i-motif DNA hybrid molecular machine, and C_{60} /i-motif mixture at pH = 8 and pH = 5. Key: Lane 1 = 20 mer and 30 mer as a single-stranded DNA size markers, Lane 2 = i-motif DNA, Lane 3 = C_{60} /i-motif DNA hybrid, and Lane 4 = equimolar mixture of C_{60} and i-motif DNA. All experiments were performed at room temperature in Tris buffer (pH = 8) and MES buffer (pH = 5). (C) Cryo-TEM images of a C_{60} /i-motif DNA hybrid at pH = 8 in a 150 mM sodium phosphate buffer solution. (D) Representative models of a molecular machine hybridized on two end-sides (5' and 3') of the i-motif DNA with a carboxyl functionalized C_{60} , and the working switching cycle between contraction (i-motif DNA) and expansion (random coil DNA) driven by protons in the absence of fuel DNA. The oxygen, carbon, nitrogen, and phosphorus atoms in the atomic models are denoted by red, white, blue, and orange, respectively.

Novel Brush Polymers Developed as Biomaterials

Professor Moonhor Ree (Department of Chemistry) and his research group, in a joint research with a Dongguk University Medical School team (Professor Heesoo Kim), successfully synthesized new brush polymers. The newly developed brush polymers are suitable for use in biomedical applications including medical devices and biosensors that require biocompatibility and the reduced possibility of post-operative infection.

Because cell membranes play an important role protecting the material inside the cell and maintaining the structure and function of the cell, studies on polymer materials that mimic membranes have received significant attention.

In the study, Professor Ree's team reported new brush polymers with various numbers of bristle ends incorporating phosphorylcholine (PC) moieties, which in thin films have self-assembled nanostructures and cell-membrane-mimicking surfaces.

The bristles in the novel brush polymers have a strong tendency to self-assemble, allowing for the polymers to have three phases depending on the temperature regime. Further, the brush polymers in thin films demonstrate to have a molecular multi-bilayer structure up to 55°C with stable PC-rich surfaces that successfully mimic cell membrane surfaces.

The brush polymers exhibit excellent water wettability and water sorption while retaining the remarkable molecular multi-bilayer structure, thus having hydrophilic surfaces. Also, the novel multi-bilayer structured films repel fibrinogen molecules and blood platelets from their surfaces, at the same time having bactericidal effects. Moreover, the brush polymer films are found to provide comfortable surface environments for the successful anchoring and growth of human cells (for example, HEp-2 cells), and to exhibit excellent biocompatibility in mice.

The structural analysis of the thin films was carried out by using grazing-incidence X-ray scattering (GIXS) with synchrotron radiation sources at the Pohang Light Source on POSTECH campus.

The self-assembly structures, properties, and biocompatibility of the newly developed brush polymers are expected to contribute to the development of side effect-free coating materials for artificial organs or medical devices.

The study achievements were introduced in the April 4 online edition of *Advanced Functional Materials* (2009, vol. 19, 1631-1644).

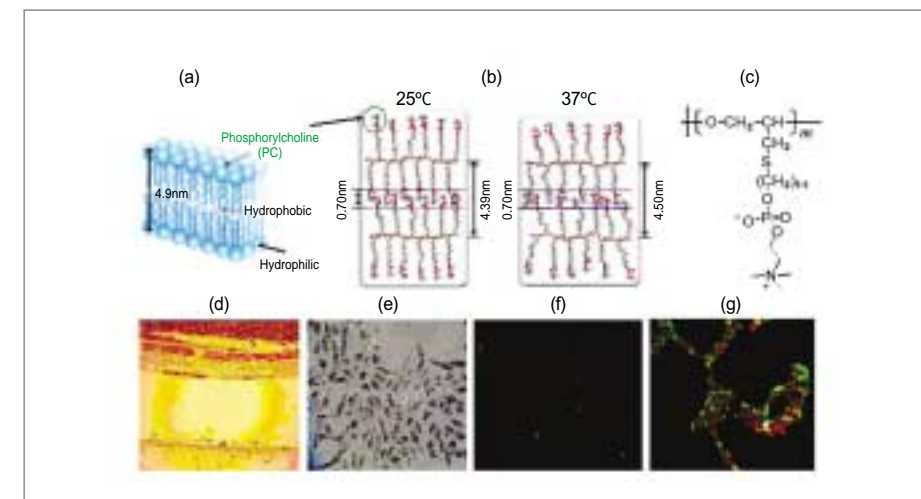


Figure 1.

(a) Phospholipid bilayer structure of human cell membrane; (b) Molecularly multi-bilayer of novel brush polymer in thin film, providing phosphorylcholine rich surface like human cell membrane; (c) Poly(oxy(11-phosphorylcholineundecylthiomethyl)ethylene), novel brush polymer

developed by Prof. Ree's group; (d) Excellent biocompatibility in mice; (e) Excellent anchor and growth of human cells on the films of novel brush polymer; (f) *Staphylococcus epidermidis* (an infectious bacterium) adhered onto the brush polymer films but all were killed; (g) *Pseudomonas aeruginosa* (an infectious bacterium) adhered on

brush polymer films as the first adhered layer and then all killed but new groups of the bacteria adhered on top of the dead bacteria and survived, indicating that the bacterium has the ability to survive in the harshest environments.

Subtle Facial Expression Recognition Becomes Practicable



Professor Daejin Kim

Department of Computer Science and Engineering

Tel: +82-54-279-2249

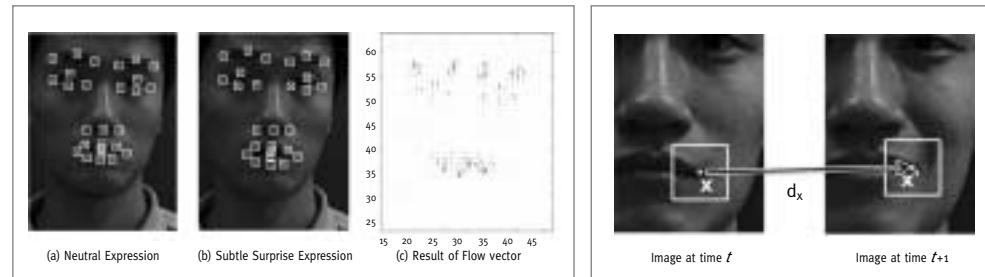
Fax: +82-54-279-2299

E-mail: dkim@postech.ac.kr

In the Steven Spielberg movie *A.I.*, robots not only resemble humans in looks but read their facial expressions, reacting accordingly. With the new technology developed by Professor Daejin Kim (Department of Computer Science and Engineering) and his group, the movie may soon become reality.

Automatic expression analysis is difficult because people's faces vary so much. Existing software could effectively recognize only extreme expressions, which is not particularly helpful in real-life situations. But the system developed by Professor Kim's team recognizes even slight facial movements.

The technology, which automatically reads on people joy, anger, sadness and surprise, the 4 primary facial expressions, uses motion magnification which converts subtle expressions into exaggerated expressions.



Professor Kim's group programmed software to identify 27 facial feature points, such as the eight points around the mouth and three around the nostrils, and to track how each point moved in a sequence of images for each facial expression. The system then exaggerates the movements in each sequence, generating extreme facial expressions which existing software can identify.

In tests in which 80 subtle expressions of neutral, happy or angry feelings were exaggerated in this way, the system judged them correctly 88% of the time.

The team has used the technique to allow a robot with a human-like face to read and mimic a person's subtle expressions. They also hope to install the software on digital cameras and camera phones, says Professor Kim, so the devices can do things like automatically take a picture when the subject smiles.

When applied to human sensing, the technique could also be used in areas including biometric information system, smart home control, rehabilitation and health services, human machine interaction, and secretarial services. The primary goal is to apply and utilize the technology to advance the quality of life for the elderly and disabled.

The research is jointly conducted with Professor Takeo Kanade's group of the Robotics Institute at Carnegie Mellon University, with the financial support of the Korean Ministry of Education, Science and Technology.

Thermosensory Neurons Control Lifespan of Ectotherms

A study revealed that thermosensory neurons of ectotherms affect lifespan at warm temperature by changing the activity of a steroid-signaling pathway that regulates longevity.

Professor Seung-Jae Lee (Department of Life Science, School of Interdisciplinary Bioscience and Bioengineering, Division of IT Convergence Engineering) and his team, in collaboration with University of California, San Francisco, discovered that thermosensory neurons of *C. elegans* (*Caenorhabditis elegans*), an ectotherm, actively regulates the temperature dependence of lifespan.



Glowing *C. elegans*

Many ectotherms, including *C. elegans*, have shorter lifespan at high temperature than at low temperature. This is generally attributed to the effect of temperature on metabolic rates: at 25°C, the "rate of living" is accelerated because of the increased rate of chemical reactions including growth and digestion, and the *C. elegans* ages more quickly and has a shorter lifespan than at the temperature of 15°C.

Professor Lee found through his research that without the thermosensory neurons, the lifespan of the *C. elegans* is much shorter, and that the thermosensory neurons influence lifespan at high temperature by changing the activities of the steroid-signaling pathway.

The research group concluded that this thermosensory system allows *C. elegans* to reduce the effect that warm temperature would otherwise have on processes that affect aging, something that warm-blooded animals do by controlling temperature itself.

Professor Lee explained that the thermosensory system of *C. elegans* "controls the aging to progress at a normal rate even at a high temperature," and that the study indicates that ectotherms regulate their lifespan by controlling their physical response to high temperature.

Professor Cynthia Kenyon of University of California, San Francisco, who collaborated in the research, evaluated the results to be "an outstanding achievement that would rewrite the chapter on ectotherms in high school biology textbooks."

Professor Lee's research is to be supported by the Korean Ministry of Education, Science and Technology's World Class University program, continuing to use the *C. elegans* to identify genes that regulate the aging process, and their operational processes.

The results of the study were published in *Current Biology* Volume 19, Number 9.



Professor Seung-Jae Lee

Department of Life Science
School of Interdisciplinary Bioscience
and Bioengineering
Division of IT Convergence Engineering

Tel: +82-54-279-2351

Fax: +82-54-279-2199

E-mail: seungjaelee@postech.ac.kr

Nanoscale Photonic Circuit Near Development



Professor Moon-Ho Jo

Department of Materials Science and Engineering

Tel: +82-54-279-2158

Fax: +82-54-279-2399

E-mail: mhjo@postech.ac.kr

Professor Moon-Ho Jo (Department of Materials Science and Engineering) and his group, in a joint study with a Harvard University team, have materialized a new all-electrical surface plasmon polaritons (SPPs) detection technique based on the near-field coupling between guided plasmons and a nanowire field-effect transistor.

Photonic circuits can be much faster than their electronic counterparts, but it is difficult to miniaturize them below the optical wavelength scale. Nanoscale photonic circuits based on SPPs are a promising solution to this problem because they can localize light below the diffraction limit. However, there is a general trade-off between the localization of an SPP and the efficiency with which it can be detected with conventional far-field optics.

The new detectors developed by Professor Jo's research group are both nanoscale and highly efficient (~0.1 electrons per plasmon), and a plasmonic gating effect can be used to amplify the signal even higher (up to 50 electrons per plasmon). The researchers used the technique to electrically detect the Plasmon emission from an individual colloidal quantum dot coupled to an SPP wavelength.

These results may open up several directions for further research. New on-chip optical sensing applications may be enabled. The achievement also marks a key step towards 'dark' optoplasmonic nanocircuits in which SPPs can be generated, manipulated and detected without involving far-field radiation.

The plasmon-detection sensitivity could be improved by using a nanoscale avalanche photodiode as the SPP detector, potentially enabling efficient electrical detection of individual plasmons. Electrical plasmon detectors could lead to new applications for optical sensing without collection optics, including the measurement of plasmon states in which coupling to the far-field is suppressed by symmetry. Finally, the strong near-field coupling between single-plasmon emitters and plasmonic nanocircuits could lead to completely new capabilities that are not available with conventional photonics, such as nonlinear switches, single-photon transistors and quantum non-demolition detectors.

The study results were published in the May 24 online edition of *Nature Physics*.

Doughnut-Shaped Polymer Nano Structure Developed

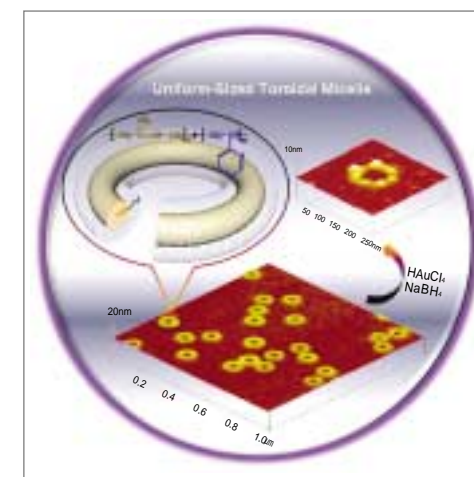
Professor Taihyun Chang (Department of Chemistry) and his group have developed toroidal micelles of uniform size from diblock copolymers.

Block copolymers can spontaneously self-assemble in a selective solvent to form micelles of various morphologies such as spherical micelles, cylindrical micelles, and vesicles. Recently, the variety of micellar shapes have been expanded to unconventional forms including toroids, tubes, disks, helices, and other complex forms.

Although the toroid-shaped micelles have been reported earlier, the applicability of the toroid structure had been low due to the difficulty in achieving uniformity in size despite the simplicity in shape. All the doughnut-shaped micelles reported to date were practically ring closure products of rod-shaped micelles, thus their sizes are not uniform.

Professor Chang's team succeeded in developing pure toroidal micelles of high uniformity in shape and size using block copolymer with a block of low glass transition temperature in a selective solvent. The micelle can retain its doughnut-shaped structure and size in solution over several months, appearing to be a thermodynamically stable structure. The doughnut-shaped micelle, realized utilizing the phenomenon of block copolymer self assembly, is stable enough to be used as a template to grow metal nanoparticles.

The nanosized toroidal objects have great potential for practical applications. With the stable and well-defined structure, the doughnut-shaped micelles are expected to serve as a model system to study their properties, as well as being a promising candidate for a nanotemplate in the evolving field of nanoscience and nanotechnology.



The results of the study were presented as VIP and cover paper in *Angewandte Chemie* Volume 48, Issue 25, and introduced as well in the Research Highlights of *Nature* Volume 459.



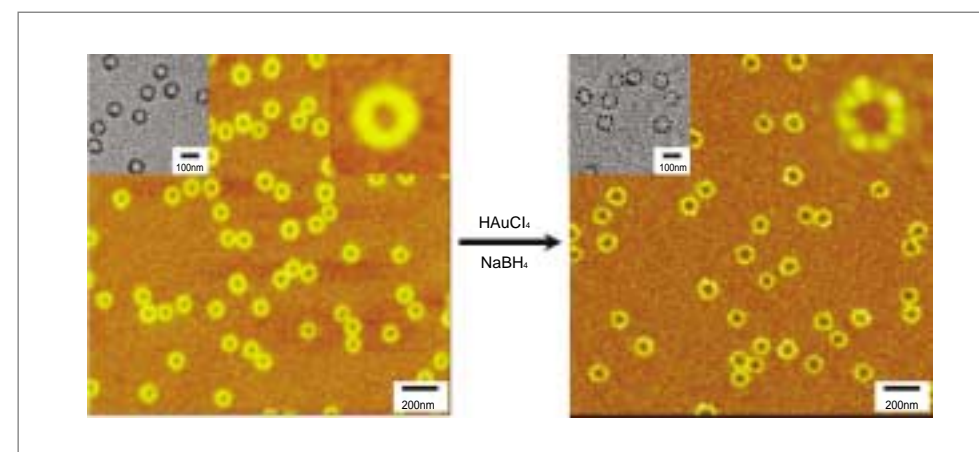
Professor Taihyun Chang

Department of Chemistry

Tel: +82-54-279-2109

Fax: +82-54-279-3399

E-mail: tc@postech.ac.kr



H₂ Adsorbing Synthetic Small-Pore Zeolite Discovered



Professor Suk Bong Hong

School of Environmental Science and Engineering

Tel: +82-54-279-2284

Fax: +82-54-279-8299

E-mail: sbhong@postech.ac.kr

Professor Suk Bong Hong (School of Environmental Science and Engineering) and his research group have discovered that PST-1 (POSTECH number 1), the newly named synthetic small-pore zeolite molecular structure, selectively adsorbs hydrogen.

The zeolites' ability to discriminate between molecules of different sizes and shapes has long been recognized. However, examples of selective adsorption of the smallest gases in zeolites are scarce.

PST-1, the synthetic small-pore zeolite with the natrolite topology and a potassium gallosilicate composition, was discovered to adsorb only the smallest gases, thus allowing discrimination from slightly larger molecules, and furthermore, to be selective for hydrogen over helium, despite the smaller size of the latter.

The research has been watched closely, because PST-1, which dehydrates easily at low temperature (60°C) and stably maintains its structure at high temperature (800°C), suggests the possibility of its utilization as the first selective separation material for the small gas molecules such as hydrogen and helium. The PST-1 zeolite is also expected to be used in effective discrimination of carbon dioxide, the primary greenhouse gas.

The pre-existing method used for hydrogen separation requires a temperature above 300°C, or removes impurities rather than adsorb hydrogen, so the synthesis of PST-1 is expected to propel development of more economical and selective manufacturing process for high purity hydrogen, explained Professor Hong.

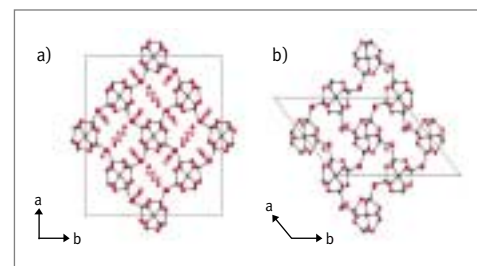


Figure 1. Structures of a) hydrated and b) dehydrated forms of PST-1. Si/Ga gray, O red, K pink.

An international patent application process is ongoing for the technology, with the anticipation that the high purity hydrogen production and carbon dioxide dissociation using the unique discriminative quality of PST-1 is to become pivotal technology in the environmental and energy industries.

The research results were introduced in *Angewandte Chemie* Volume 48, Issue 36.

Genes for Mad Cow Disease Spotted

Mad cow disease made headlines in the early 2000s when 4.4 million cattle in the United Kingdom alone were killed as a precaution against it. Now, there may be a way to not only trace the disease in its incubation period but also medically treat it.

Professor Daehee Hwang (School of Interdisciplinary Bioscience and Bioengineering) and his group, in collaboration with the Institute for Systems Biology (ISB), the McLaughlin Research Institute, the University of California, San Francisco, the Allen Brain Institute, and the European Bioinformatics Institute, have spotted a set of genes that go haywire in mice infected with a form of mad cow disease.

The research group infected 5 different kinds of mice with 2 types of prion extracted from sheep and cattle, and took 30 million measurements from the brains of the infected mice, and used high-powered statistical and computer models to separate signal from noise. They were able to narrow it down to 7,400 genes - about one-third of the mouse genome - that were

affected by the misfolded prions, which was again narrowed down to 333 "core" genes that were perturbed.

Researchers looked at the genes at 10 different time points, and noted which genes were altered for weeks before symptoms showed up. Some of these genes make proteins that are secreted into the blood, which could make for a relatively practical new diagnostic test, they said.

The system developed through this study can be applied to the study of other intractable diseases including cancers, degenerative brain diseases, autoimmune diseases, and infections, making possible the discrimination of the core genes in the development and progress of the diseases, Professor Hwang commented.

The findings were published online in the March 24 online issue of *Molecular Systems Biology*.



Professor Daehee Hwang

School of Interdisciplinary Bioscience and Bioengineering

Tel: +82-54-279-2393

Fax: +82-54-279-8409

E-mail: dhhwang@postech.ac.kr

Puzzles of Interdimensional Crossover Solved

Professor Hyun-Woo Lee (Department of Physics) discovered, in a joint study with a Seoul National University team, the phenomenon that takes place in a dimensionality crossover in ferromagnetic nanowires.

The research group discovered that as the width of the nanowire decreased, the magnetic domain wall dynamics changed from elastic creep in two dimensions to a particle-like stochastic behavior in one dimension. They concluded that, applying finite-size scaling, all their experimental data in one and two dimensions, including the crossover regime, collapse onto a single curve, signaling universality at the criticality transition.

At around 300nm of the nanowire width, the crossover to the one dimensional regime occurred, and at 150nm, critical properties disappeared. The transition threshold is revealed to be determined solely by the ratio between the wire width and the length of the magnetic domain walls that move together. The study indicates that the cobalt iron alloy is two dimensional at 500nm or wider, and one dimensional at 150nm or narrower.

The phenomenon had been broadly discussed only in hypotheses, and never been observed experimentally. Professor Lee's group reported, for the first time, the experimental verification of new statistical scaling criticality in one dimension and also explained the new scaling behavior theoretically. Universality exists at the criticality transition, manifesting gradual crossover behavior between dimensions at about a few hundred nanometers.

These results provide a step forward to a new scaling criticality for nanometer-sized physical structures, as yet much less examined, which are fundamental building blocks of emerging nanoscience and nanotechnologies, and are expected to widely contribute to the related industry at large.

The results of the study were introduced in *Nature* Volume 458.



Professor Hyun-Woo Lee

Department of Physics

Tel: +82-54-279-2092

Fax: +82-54-279-3099

E-mail: hwl@postech.ac.kr

First POSTECH Fellows Selected



Professor
Bumman Kim

Professor Bumman Kim of the Department of Electronic and Electrical Engineering and Professor Gynheung An of the Department of Life Science have been selected as the first POSTECH Fellows on March 24th.

The fellowship was newly established and enacted to promote education and research by POSTECH faculty. Tenured faculty members, whose total number reaches 159, are eligible candidates for the fellowship and its various supports and benefits including a special bonus and extended tenure up to age 70.

Candidates are nominated with Department recommendations, and the applications are reviewed by the Personnel Committee, after which the selection is finalized by the approval of the Board of Directors.

Professor Kim and Professor An are both representative faculty of POSTECH and internationally acclaimed scholars. The two Professors' pioneering work in ultrahigh frequency circuit and plant biology, respectively, has made a great contribution in raising the world standard in their fields of expertise.

Professor Chong Soo Lee Elected Member of European Academy of Sciences



Professor Chong Soo Lee of the Department of Materials Science and Engineering has been elected as the first Korean Member of the European Academy of Sciences (EAS).

EAS Membership is evaluated purely based on merit, and the Members' 63 nationalities include China, France, Germany, Japan, and the United States, but no Korean had ever joined the organization before Professor Lee.

Professor Lee has devoted the last 30 years to research on titanium alloy, which has a wide range of applications from space and aeronautics to articles of daily use. Especially, his distinguished research accomplishments on α/β titanium, which takes up over 50% of all titanium alloy needs, is known to have influenced his joining the Academy.

The EAS was established in Belgium in 2003 with the mission of promoting science and technology for social and economic development. Among the 650 members are some of the world's preeminent figures including Nobel Laureate Professor Peter Doherty, the first Taiwanese Nobel Laureate Professor Yuan Tseh Lee, and 63 other Nobel Laureates and Fields Medalists.

POSTECH Student Awarded at 2009 UCSD Data Mining Contest



Mr. Jung Min Yoon of the Department of Computer Science and Engineering won the 3rd place in the Graduate Division of the 2009 University of California San Diego (UCSD) Data Mining Contest.

The UCSD Data Mining Contest is an annual international competition hosted by UCSD and sponsored by FICO, the creator of the most widely known type of credit score. Since its establishment in 2004, undergraduate and graduate students from all over the world have competed in the 2-month long competition in 4 different categories of varied difficulties. This year's competition was on maximization of anomaly detection in the e-commerce data sets, and the total participating teams counted 301 that represented 134 universities from 31 countries.

Mr. Yoon, who studies with Professor Seungjin Choi at POSTECH, competed and won the 3rd place in the 'Hard Task' category which required analysis of 50,000 data.

Former President Chan-Mo Park Honored with University of Maryland Alumnus Award



From left: Dr. Chan-Mo Park and President Dan Mote of the University of Maryland
Photograph by Lisa Helfert

Dr. Chan-Mo Park, Professor Emeritus of POSTECH Department of Computer Science and Engineering and former President of POSTECH, currently serving as President of the National Research Foundation, was awarded the International Alumnus Award by the University of Maryland Alumni Association.

The Award is presented to an international alumnus of the University of Maryland, who has provided significant leadership and made distinctive contribution in a country's educational, cultural, social, and/or economic development.

The Alumni Association has highly appraised Dr. Park's contribution toward Korea's scientific advancement, especially in the field of information technology. Also recognized was his leadership, while serving as President of POSTECH, in innovating Korea's education and research through principles of selection and concentration, interdisciplinary research, and pursuit for globalization. Dr. Park's current service in establishing and realizing Korea's scientific policies was also considered significant.

The award ceremony was held on April 18th at the University of Maryland, College Park, and Dr. Park received the award along with the recipients of the President's Distinguished Alumnus Award, the Outstanding Young Alumnus Award, the Tyser Gottwals Award, the Humanitarian Award, and the Honorary Membership.

Professor Kwang Soo Kim Becomes First Korean Member of IAQMS



Professor Kwang Soo Kim of the Department of Chemistry has been elected as the first Korean Member of the International Academy of Quantum Molecular Science (IAQMS), which is regarded as the 'World Molecular Science Hall of Fame'.

Professor Kim is an internationally renowned scholar whose expertise lies in the field of molecular electronics. He has published over 290 journal articles in internationally acclaimed academic journals such as *Nature* and *Science*, and his papers have been cited over 10,000 times. Professor Kim's research focuses on designing and developing functional materials and devices by identifying molecular recognition and self-assembly phenomena through molecular forces.

Especially noted in evaluation process for the Academy Membership were Professor Kim's accomplishments in theoretical/computational development and innovative use of advanced quantum chemical methodologies in investigating functional molecular systems, nanomaterials, and nanodevices.

Since its establishment in France in 1967, IAQMS chooses its Members only among the most prominent molecular scientists of the world, selection regarded the highest honor among quantum and theoretical chemists. Some of the distinguished past Members of IAQMS include Louis Victor de Brogile and Linus C. Pauling. Currently, 95 Members are registered, who include Nobel Laureates Roald Hoffmann and Rudolph A. Marcus.

Audio Engineering Society Awards Professor Jong-Hoon Oh



Professor Jong-Hoon Oh of the POSTECH Technology Innovation & Management (TIM) Graduate Program won the Board of Governors Award given by the Audio Engineering Society (AES).

AES held its 126th academic conference in Munich, Germany on May 7th through 9th. The award ceremony took place on the first day of the conference, and Professor Oh was one of the 9 recipients of the Board of Governors Award.

Professor Oh hosted the first official AES academic conference in Asia in 2006, as well as a follow-up conference in 2008. In recognition of his academic leadership, active engagement in and continued contributions to the Society, he was selected for the 2009 Board of Governors Award.

Professor Oh earned his doctoral degree from Korea Advanced Institute of Science and Technology (KAIST) and joined POSTECH faculty in 1986. In 2000, he developed world's first Digital-to-Digital Converter (DDC) chips, which digitally amplify pulse audio signals, and established PULSUS Technology.

PULSUS Technology maintains its position as world's top seller of full digital audio processor, taking 30% international and 90% domestic market share in the home theater business.

AES, based in New York City, has about 100,000 members throughout the world, and is a leading association for professionals and students in audio industry, exercising strong international influence in setting international standard for formats for audio compression, broadcasting, and recording.

PLUS Takes Third Place at DEF CON 17



POSTECH student club PLUS won the 3rd place at DEF CON 17 Capture the Flag (DEF CON 17 CTF), the world's foremost international hacking contest.

After passing the preliminary rounds held in June with 4th rank, PLUS flew to Las Vegas, U.S., to enter the final round that lasted for 3 days from July 31st to August 2nd. The team had a difficult time adjusting to the new environment and struggled on the 1st day of the contest, but all members committed themselves to give their best which eventually paid off with the 3rd place after the U.S. and the French teams.

Since establishment in 1992, PLUS has been regarded as one of the leading network security student clubs in Korea. Two PLUS members competed in the 2006 DEF CON contest as members of an allied team which ranked 6th place, and the club also won Codegate 2008, the first international hacking contest held in Korea.

The 3rd place at the DEF CON CTF is the highest rank earned by a Korean team. Mr. Joonho Jang, the Chair of PLUS, commented that the members were happy with the results, and that they would work toward their next goal of winning the 1st place.

POSTECH Team Wins SSTD Best Paper Award



Professor Hee-Kap Ahn

A joint research team led by Professor Hee-Kap Ahn and Professor Seung-won Hwang of the Department of Computer Science and Engineering was awarded the Best Paper Award at the 2009 International Symposium on Spatial and Temporal Databases (SSTD), the esteemed biannual international academic symposium in the field of spatio-temporal data management.

At the 11th SSTD held in Aalborg, Denmark, the POSTECH team of Professor Ahn, Professor Hwang and Mr. Won Bin Sohn and Mr. Moo Woong Lee, both graduate students of the Department of Computer Science and Engineering, was awarded the honor for their paper titled, 'Spatial Skyline Queries: An Efficient Geometric Algorithm'.

The winning paper drew attention for pointing out the flaws of the existing research works on spatial skyline query, which is used for analyzing spatial data for preference analysis. The paper also included a proposal for a sounder algorithm that can effectively substitute the existing one.

The group commented that the algorithm proposed in their study demonstrated both accuracy and significant performance improvement, which led to the award. The results were made possible through joint research between two separate fields of computer theory and database, and are expected to encourage further collaboration in the related fields.



Professor Seung-won Hwang

POSTECH Team Awarded at World Haptics Conference 2009

A joint research group comprised of graduate students of POSTECH Departments of Computer Science and Engineering and Electronic and Electrical Engineering won the Best Student Paper Award at the World Haptics Conference 2009, held in Salt Lake City, in spring 2009.

Mr. In Lee and Mr. Inwook Hwang of the Haptics and Virtual Reality Laboratory, led by Professor Seungmoon Choi of the Department of Computer Science and Engineering, and Mr. Kyung-Lyong Han and Mr. Oh Kyu Choi of the Robotics & Automation Laboratory, under the tutelage of Professor Jin Soo Lee of the Department of Electronic and Electrical Engineering, worked together on the paper titled, 'System Improvements in Mobile Haptic Interface', which was awarded the highest honor at the world's foremost academic conference in the haptics field.



From left: Mr. Oh Kyu Choi, Mr. Kyung-Lyong Han, Mr. In Lee, and Mr. Inwook Hwang

The winning work focused on improved transmission functions of mobile haptic interface. The judging committee highly evaluated the team's accomplishment which enabled transmission of tactile information in addition to existing visual and auditory information in a large-scale virtual environment. The results may lead to original technology that can reproduce tactile information in the virtual environment.

The research has been ongoing for three years, sponsored by the Korea Science and Engineering Foundation for three years.

President Baik Speaks at US-Korea Conference 2009

The 2009 US-Korea Conference on Science, Technology, and Entrepreneurship (UKC) was held at the Raleigh Convention Center in North Carolina,

U.S., between July 16th and 19th, and POSTECH President Sunggi Baik was invited to be the plenary speaker.



President Baik's speech was on 'Roles and Challenges of Research Universities as the Core of Knowledge Clusters', through which he emphasized the responsibilities of research universities to lead establishment and prosperity of knowledge clusters, and introduced POSTECH's case.

UKC is an annual conference hosted by the Korean Federation of Science and Technology Societies (KOFST) and the Korean-American Scientists and Engineers Association (KSEA). The goal of the conference is to bring together internationally acclaimed scientists and scholars from Korea and U.S. to highlight the current and future trend of the world technology, as well as promote science and technology exchange and support between the two countries.

The 3-day conference was attended by close to 900 scientists from Korea and U.S., and President Baik, Vice Minister of Education, Science and Technology Joong-hyun Kim, and former Minister of Science and Technology Woo-shik Kim were among the distinguished participants.

GIFT Building Completed

POSTECH Graduate Institute of Ferrous Technology (GIFT), the world's only educational institute specializing in steel related research, now has a new building of its own. The opening ceremony was held on June 30th, with many key members of the University and high-profile guests including the Mayor of Pohang present.

The construction took 16 months to complete, and a total of 4.45 billion KRW was invested to build the 7-story building with 2 underground levels and 11 specialized labs, taking up approximately 24,980m².

GIFT research teams are made up of a distinguished scholar, a number of regular faculties and students, and to reflect this unique composition, the GIFT building is designed in such a way that communication within and between laboratory groups is maximized. And the building's environment-friendly, energy-efficient, and safety-oriented design adds to the uniqueness of the construction.



"The design of the GIFT building is based on 'openness' and 'easy approach', and its external appearance, which utilized images of blast furnace and anvil, would help make the public feel more familiar with ferrous related research," said Professor Hae-Geon Lee, Dean of GIFT.

President Baik commented that "POSTECH will make a contribution toward making POSCO the world leader in iron and steel production by linking GIFT to POSCO's strategic long-term goals to secure technological competitiveness and create original technologies." He also added that "I am certain that the construction of the new GIFT building will make a radical contribution in strengthening Korea's steel industry, as well as raising the bar for technology innovation."

Ocean Science and Technology Institute to be Established

In order to lead Korea's marine research and to foster outstanding researchers, POSTECH is establishing a graduate school of ocean science and technology in Uljin, whose locale and general research conditions are befitting.

North Gyeongsang Province, Uljin Goon, and POSTECH will jointly establish POSTECH Ocean Science and Technology Institute, offering M.S., Ph.D., and M.S.-Ph.D. Integrated Programs, planning to accept the first students for the academic year 2011-2012. The opening of the Institute will take place at the end of 2009 with the official approval for establishment by Ministry of Education, Science and Technology.

Foundational curriculums will mostly be taught at POSTECH, and students will perform further study and research at the Uljin campus. The Institute will take many measures for world-class education and research, requiring its students to complete a minimum of 6-month joint research with overseas research institutes and a research voyage.

Also, an interdisciplinary research system that converge marine science, engineering, and technology is underway for focused research on marine energy, environment, and resources. Marine Energy Research Center, which will also be founded in conjunction with the interdisciplinary research system, and 40-ton and 200-ton research ships are also under construction, with operation aimed for 2012. A total budget of 154.5 billion KRW will be

invested into the establishment of the Institute and the Research Center, over the period of 10 years.

Coupled with Korea's 'National Strategic Ocean Business,' establishment of POSTECH Ocean Science and Technology Institute is expected to make a big contribution to advancement of Korea's marine research level. Additionally, utilization of POSTECH's first-rate educational infrastructure will produce outstanding marine research professionals with solid understanding in science and engineering.

POSTECH has appointed Professor Koo Kim of the School of Earth and Environmental Sciences at Seoul National University as the Head of the Institute, planning to proactively seek and recruit more faculty members and students.

POSTECH and SK Energy Join Hands for Green Energy Development

POSTECH and SK Energy established a partnership to develop green energy, one of the key growth engines of Korea's future.

POSTECH and SK Energy Institute of Technology signed an MOU for research exchange to encourage energy related research collaboration between the two organizations. Through the new agreement, both parties will engage in joint research on green energy resources such as solar cell, biomass, and fuel cell, as well as share the research tools and facilities.

The new alliance was celebrated with a two-day seminar on "New Technologies for Green Energy". POSTECH Department of Chemical Engineering faculty, including Professors Jong Shik Chung,

Jinwoo Lee, and Suk Bong Hong, and executive board members and researchers of SK Energy Institute of Technology, including Director In Ho Cho and Dr. Dong Hyun Lee, were among the presenters.

CEP Sang-Hoon Park of SK Energy P&T commented that the newly formed partnership between the globally recognized leader of the catalyst and process technology and the world class research-oriented university would surely provide a firm and promising support for energy technology development in Korea's future.



From left: Mr. Sang-Hoon Park, CEP, SK Energy P&T, and Professor Jin Soo Lee, Dean of Academic Affairs, POSTECH

He added that the new academy-industry partnership would bring increased momentum to green energy development.

POSTECH and UNSW Hold a Joint Workshop

POSTECH and University of New South Wales (UNSW) held a joint workshop on energy and materials at POSCO International Center on June 25th. Both universities are regarded as representative research-oriented universities of Korea and Australia, and are renowned for their outstanding research in the field of energy and materials science.

The workshop was attended by many accomplish-

ed scholars of the two universities, including POSTECH Vice President Jae Sung Lee, UNSW School of Chemical Sciences and Engineering Head Robert Burford, Professor Bruno de Cooman of POSTECH Graduate Institute of Ferrous Technology (GIFT), and Professor Michael Ferry of UNSW School of Materials Science and Engineering.

The joint workshop focused on the three broad categories of iron & steel making technologies,

green energy, and nano materials for energy.

POSTECH Vice President Lee explained that the purpose of the workshop was to have an in-depth discussion on low carbon green development, the key growth engine of the future. Vice President Lee added that he hoped the joint workshop would serve as an opportunity for the two universities to collaborate in national scale research projects in the energy and materials field in the near future.

Open Access Based International Journal Published

Interdisciplinary Bio Central (IBC), an open access based international e-journal, published its first issue on March 31st. IBC is founded by collaborative efforts of Korea Research Institute of Bioscience & Biotechnology (KRIBB), National Core Research Center (NCRC), and Biology Research Information Center (BRIC). The new e-journal will feature academic papers in the field of interdisciplinary biosciences and bioengineering.

Under Creative Commons Attribution License (CCAL), open access based journals allow readers to access their contents for free, and authors retain copyright for their materials in the journal.

Besides the Open Access Policy, the new journal employs other new concepts such as Open Peer Review Policy (pre-peer review system and post-publication public peer review system), Fast 7-day Publication System, etc.

The editors of the journal are comprised of many distinguished domestic and international scholars. Notably, Professor Per-Olof Berggren of Karolinska Institute, who is a member of the Nobel Committee, and Professor Leroy Hood and Professor David J. Galas of Institute for Systems Biology, two of the most prominent academic figures in the field of systems biology, will serve as honorary editors.

Professor Hong Gil Nam, Founding Editor in Chief of the IBC Journal, who is Chairman of the School of Interdisciplinary Bioscience and Bioengineering (I-BIO) at POSTECH, commented that "IBC Journal will suggest a new way for domestic scientists to take an active role in overcoming the existing orders of science communication, as well as contribute to the development of science in a non-submissive environment, by serving as the starting point to build an open arena for academic exchanges."

To improve the existing ways in which copyrights are transferred from the author to the publishing company upon publication of the work, some international scientific circles are already operating CCAL based Open Access international journals.

On the web, CCAL is seen as a web culture, and its spirit of 'free, open participation and sharing of information' is spreading through the realm of science and technology as "Science Commons Culture."

Music Celebrated at POSTECH



"Nan-Se Geum Music Festival," the 7-day musical event with Maestro Nan-Se Geum, took place at POSTECH between July 18th and 24th. Maestro Geum and the Euro-Asian Philharmonic Orchestra visited POSTECH to give special music classes and 3 concerts for POSTECH students and the local community.

Participating students received lessons from internationally recognized musicians such as Leif A. T. Pedersen, 1st clarinetist of the Oslo Philharmonic Orchestra, and other musicians of the Gyeonggi Provincial Philharmonic Orchestra and the Euro-Asian Philharmonic Orchestra. Participants were also given a chance to perform

with the musicians through the 3 concerts given during the festival.

For an exclusively science and engineering research-oriented university to host this type of musical event, which is normally held for dedicated music students, is considered unconventional and exceptional. Through the festival, POSTECH students were given a privilege to learn from some of the world's finest musicians and perform alongside them.

Maestro Geum is the foremost contributor in popularization of classical music in Korea, and his latest effort, which can be best summarized as 'harmony between intellect and art', is drawing much attention.

POSTECH plans to continue hosting and promoting art related events in an effort to rouse artistic refinement and sensibility among Postechians.

POSTECH Outreach Program for Young Students

A new program is launched at POSTECH to search for and nurture talented students in less privileged circumstances. This special program was open to 2nd and 3rd year high school students from farming and fishing villages and low income families, who display special aptitude in mathematics and science.

All participation costs for the 4-week program, including boarding, books, etc., were provided by the University, and selected students tutored by POSTECH faculty and students. Also, a number of successful students are to be given special

consideration for admission, should they choose to apply to POSTECH.

A total of 40 students were chosen out of roughly 500 applicants, some of whom visited by the admission officers for an interview.

The University also gave Special Guest Lecture Series for the students to develop vision as future scientists and engineers. The program included various extracurricular activities such as 'Creativity Development Project', etc.

"POSTECH will continue to strive to develop and provide variety of programs to search for students with great potential, and foster and realize their visions," commented Professor Moo-Hwan Kim, Dean of Admissions.

Global Leaders as Mentors for POSTECH Students

On June 1st, POSTECH announced operation of a new program called 'POSTECH Mentorship Program.' Through this program, POSTECH will invite many high-profile Koreans from wide array of fields, and connect them with POSTECH students for 1-to-1 mentorship. No other Korean higher education institute has invited number of mentors all at once, who have no ties to the university.

The new mentorship program will select students with exceptional leadership and foster their talents as well as expand their horizons. All participating students are to work with mentors of their choice.

The mentors will serve as Role Models and provide mentorship for their students for 10-month period via e-mail, phone calls, personal interviews, etc.

The mentors include some of Korea's most prominent social figures including Maestro Nan-Se Geum of the Euro-Asian Philharmonic Orchestra, Mr. Pil-ho Song, CEO and Publisher of the JoongAng Daily, Mr. Young-Doo Yoon, CEO of Asiana Airlines, and 10 others representing diverse spectrums of Korean society.

Students selected as mentees will be mentored regularly, and also participate in special education

sessions by POSTECH Leadership Center, designed to help with vision setting, global manner, role modeling, and other areas that are pivotal in self-development.

Ms. Bora Kang, one of the mentees, said, "Leaders had good mentors. I've been searching for a mentor who could be my role model. The mentorship program provided me with exactly what I was looking for, and I'm very excited to have Korea's leaders as my mentors whom I can look up to."

24th POSTECH Mathematics Competition for High School Students

On July 30th, the 24th POSTECH Mathematics Competition was held. This year, unlike previous contests, the University did not limit the number of participants, and the total number of high school contestants marked 2,300. Since there is no participant limit, POSTECH modified its award system accordingly: Grand Prize was added and number of prize winners increased from 100 to 300 as well.

Winners will be given advantages should they apply for admission at POSTECH: Grand Prize winner will

be given scholarship of 15 million KRW over 4 years, and Gold and Silver Medalists will also be given scholarships accordingly. All winners will be given special consideration in application review, and automatically qualified to attend POSTECH Creativity Lecture Series.

"The purpose of POSTECH Mathematics Competition is to find talented young mathematicians who can grow to be Fields Medalists in 20 years," said Professor Sungsub Choi, who was the Head of the Examination Committee of this year's contest.

Separate programs were prepared for the parents who visited POSTECH with the participating students, and students were given an opportunity to learn about the University through various information sessions and events.

A Positively POSTECH Summer

Callum Chalk

Department of Physics
University of Oxford



As I step out of the airport in Seoul, disorientated and jet-lagged, I am immediately welcomed, swept up and guided onto my bus by a couple of strangers: this encounter gives me my first taste of the incredible warmth with which foreigners are treated, everywhere in this country. I couldn't help but complete the rest of the trip to Pohang in eager anticipation. I haven't been disappointed.

Originally from Edinburgh, Scotland, and about to start the fourth year of my degree in Physics at the University of Oxford, I have come to POSTECH

for a work placement organised by the International Association for the Exchange of Students for Technical Experience (IAESTE). I am now in my final week of the 10 week internship in the Multiferroic Thin Films & Solar Cells Laboratory, part of the Department of Materials Science and Engineering. I must admit that what seemed to be a very long period of time when I planned this placement back in April has gone by far too quickly. I have met so many great people and seen so many wonderful places that there has really been no time to pause - so much so, in fact, that most of my vacation work for Oxford is still sitting on my shelves untouched!

I had two main aims in taking up this placement: professional and personal. Firstly, I wanted to gain experience of working in a real scientific environment to help inform my future career choices, and secondly, perhaps more importantly, I had a great desire to explore a Far Eastern culture. Never having travelled outside of Europe, I was hungry to experience a culture entirely different from my own - to try and get to grips with practices and a way of life which seem so unfamiliar when viewed through Western eyes.

It would be impossible to do justice to such a rich and ancient culture in an article of this length; however I feel I should give a small taste of some of the elements which for me contributed to an intriguing, and entirely foreign, experience. First off is the food: the spiciness took a little getting used to (well worth it!) and the dinnertime habits were interesting for their unfamiliarity - sitting on the floor, eating with chopsticks, cooking the food on the table in front of you and a button to call the waiter (an ingenious invention!). There are many social differences as well, from the simple act of counting a person's age differently, to the strong sense of social hierarchy among Koreans, strange to me who comes from a land of irreverence. Other smaller things include the sensory overload of the city centre at night time, the unique style of television and music, and the enviable practice

of always accompanying drinking with eating - delicious *anju* makes this a very pleasant experience!

As I knew that I would only be staying here a short while, I tried to make the most of my weekend breaks from work by getting out to see more of the country. Some of the highlights for me include visits to Buddhist temples, a fascinating experience for someone such as myself, largely ignorant of the religion, and long hikes in the mountains - the forested mountains leaning above rice fields, a view which for me characterises the landscape, gives the countryside an incredibly lush appearance which is a pleasure to walk through. I have found travelling around to be both cheap and easy with a punctual and comfortable transport system - we definitely have some lessons to learn in this respect back home!

Having spoken a bit on my impressions of Korea as a whole, I should move on to life here at POSTECH. It is a joy to arrive here as an international student: one is immediately led through the welcoming and sympathetic doors of the Dormitory for International Cultural Exchange (DICE) where everyone is in the same situation and is eager to help with any problems you may have. It is a great relief to be able to discuss the ups and downs of the (frequent) cultural/linguistic misunderstandings with others who share the same foreign perspective. On top of this, there are not only international students, but also local Korean students living in the dorm (though required to speak English), which makes it easy to avoid the otherwise inevitable isolation which can often be difficult to break out of for foreigners who do not speak the language. Personally, I had another happy circumstance to prevent this from happening: I was welcomed wholeheartedly by my lab mates, even playing football together regularly (soccer, in American English). By helping me whenever I had a problem, they helped make my placement the success it has been.

Along with the international dormitory, there are also regular events organised by the International Relations Office (IRO) which all together makes it a very easy task to meet people and make great friends. Within a week of my arrival here I had

attended a Korean movie night, an organised outing to Gyeongju, and a barbecue night in the POSCO International Centre, all organised by the IRO - I quickly met a good crowd of people with whom I've been continuing to have fun throughout my stay.

The only thing that I regret slightly is the extent to which I have been unable to learn much of the Korean language. I arrived here having learned a few basic expressions and a bit of the grammar, able to pronounce the characters. However, the lack of a language course over the summer months while I was here stalled these plans. Another thing which hindered them turned out actually to be positive, however: the fact that everywhere in POSTECH, the level of English spoken is very good - I certainly feel spoilt having this as my mother tongue. In the end, I do not believe that my lack of language has harmed my experience here very much at all.

With my time at POSTECH nearing its conclusion, I find myself with a strange mix of feelings: on the one hand I am naturally looking forward to returning home to friends and family, yet on the other, I feel that in my short time here, I have managed to make another home for myself. I will greatly miss the vibrant life here, eating out without breaking the bank, and sharing conversations and cultures over a glass of beer and a plate of squid. I look forward to a chance to come back.



Like a Dream

Cao To Linh, Ph.D. ('09)

Department of Industrial and Management Engineering

The time to say goodbye to POSTECH has come. My friends keep asking me about my feelings at this moment, but it is hard for me to answer outright because I have many mixed emotions. I have been here for 7 years pursuing my Ph.D. degree, a time long enough to have transformed me from a stranger to one truly familiar with the local culture, food, and language. POSTECH has become my second home, where I have so many friends - my lab mates, my POSTECH International Football Club (PIFC) friends, international friends, and some staff members - and also many fond memories.



Cao To Linh (Third from right)

There is an empty feeling that grows inside of me when I realize I must leave POSTECH. On the other hand, after living for so long away from my homeland, I am anxious and excited to return. I often dreamt of the day when I would go back to Vietnam and indulge in delicious Vietnamese cuisine, see my friends, travel around the country, and maybe even start a business of my own. Oh, what a great feeling that is!

Seven years passed by like the wind, and along with it came many everlasting memories, which come back to me vividly like a movie montage. I still remember the time I first arrived at POSTECH. Even though I had heard about POSTECH before, I was astonished and impressed by the modernity, size, and architectural organization of the university. I couldn't believe that a university of this size contained only about 3,000 students. It is uncommon to see large groups of students walking on the campus, except in the dining halls at peak hours. All the facilities are state of the art and sufficient for students to carry out research. As others have said, POSTECH was the ideal research hub.

At the beginning of my stay, I was like a fish out of water. Everything was so new for me including the weather, food, study environment, traffic, etc. I had to adapt to eating hot foods, walking up the hill and the 78 steps to my lab, standing



outside in the chilly air in the winter, listening to people around me speak a strange language, and sharing my dormitory room with another student. It was not easy at the time but now they have become unforgettable experiences of mine.

During my stay at POSTECH, I had the chance to visit many places in Korea. In fact, my favorite was visiting friends at other universities and experiencing their living and study environment. All the universities that I visited had their own beauty and culture. We would often hang out together or enjoy sport activities to release stress. At each place I visited, I always tried the local special foods. Exploring culture through cuisine is one of my favorite hobbies. I have found that Korean foods are quite copious and quintessential. Despite often being spicy, I love many of the foods, including kimchi, samkyupsal, bibimbap, etc., because of their tastiness and healthiness.

You may notice that my memory is full of food and traveling, but is it really too much to enjoy relaxing at POSTECH? I would say it is completely not true. I came to Korea to study, and most of my time was dedicated to doing research, like other students. One difference in the education system in Korea that I had never experienced before was laboratory. Laboratory (Lab for short)

is a group of people pursuing certain branches of research under the management of one or sometimes more professors. There is no such unit in the Vietnamese university system. This Korean education system is very dynamic and active and it gives more authority and freedom to the professor to carry out research as well as to connect with companies. Frankly, for a guy like me with a background in business, the study in the lab was quite demanding. However, gradually I found the lab setting to be very helpful because one can receive valuable advice from the lab mates. I was happy to work with my lab mates and also with the generous and smart professor. They were very kind-hearted and diligent in studying. Through this article, I would like to thank Professor Yushin Hong for his tireless support throughout my research.

In addition to the professional knowledge, I have learned other valuable things from Korean people. The most valuable of which is diligence. I could see it expressed in everyone from the taxi drivers to the students, and all the people around me. It may very well be the main driving force for the development of Korea. I also experienced friendliness and kindness. When you ask a Korean how to get somewhere, they often not only answer you graciously until they are sure that you understand the way, but actually take

you to the place you want to go. One time my friends and I were in downtown Daegu at midnight and we couldn't find a motel. We saw a man driving slowly with his small dog to feel the breeze, and asked him where to find a motel. Our level of Korean, at that time, was very poor and the man was unfamiliar with English. But, when he captured the word "motel", he knew what we were looking for and drove us for about 20 minutes until we finally found a reasonable motel to stay at for the night. This behavior greatly impressed me, and it made me think differently about Korean people, who often seem to have a glacial facial expression to foreigners.

A new stage of life with many challenges is awaiting me in Vietnam. However, with the knowledge and experiences I have gained at POSTECH, I believe that I will overcome these difficulties to succeed in my career. Once I said I was proud to be a Postechian, and I will always keep that feeling in the bottom of my heart.

Anyong, POSTECH. Anyong, my dear friends. I wish you the best luck! I will miss you so much!