# Department of Marine Science

# and Biological Engineering

# Homepage : <u>http://bio.inha.ac.kr</u>, <u>http://ocean.inha.ac.kr</u>

# \* Biological Engineering & Biopharmaceuticals

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## \* Oceanography & Biological and Fishery Oceanography

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### 1. Introduction :

Department of Marine Science and Biological Engineering was established to provide the nextgeneration leaders with creativity and to develop proper technologies in the field of marine science and biotechnology, in order to solve the various human-related necessity and problems such as marine biotechnology, fisheries, bioactive compounds, pharmaceuticals and nutraceuticals, health food; exhaustion of food and resources, curing diseases, and sustaining environmental condition. Recently, this fusion graduate program has been selected and supported by Brain Korea 21 (BK21) project of Korea Research Foundation. BK21 is a project for the improvement of an educated society of the 21st century by supporting students in Master's and PhD degree course and post-graduate researchers. This graduate program is newly organized for the practical education and research developments in all marine science and biotechnological areas including marine technology, white biotechnology, genomics, proteomics, and systems biotechnology.

### 2. Major :

- 1) Biological Engineering
- 2) Biopharmaceuticals
- 3) Oceanography
- 4) Biological and Fishery Oceanography

### 3. Faculty Members

# (1) Biological Engineering & Biopharmaceuticals

### 1) Koo, Yoon-Mo (구윤모)

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- \* Educational Background :
  - Ph. D : Chemical engineering / Purdue Univ. / U.S.A.
  - M.S. : Chemical engineering / KAIST / Korea
- \* Research Area : Bioprocess Engineering, Bioseparation and Purification,
  - Biomass Conversion, Simulated Moving Bed Chromatography, Ionic Liquids
- \* Academic Works :
  - Ngoc Lan Mai, Kihun Ahn, Yoon-Mo Koo, "Methods for recovery of ionic liquids—A review", Process Biochemistry, 49, 872-881 (2014).
  - Ngoc Lan Mai and Yoon-Mo Koo, "Quantitative prediction of lipase reaction in ionic liquids by QSAR using COSMO-RS molecular descriptors", Biochemical Engineering Journal, 87, 33-40 (2014).
  - Ho Shin Kim, Sung Ho Ha, Latsavongsakda Sethaphong, Yoon-Mo Koo and Yaroslava G. Yingling, "The Relationship Between Enhanced Enzyme Activity and Structural Dynamics in Ionic Liquids: a Combined Computational and Experimental Study", Physical Chemistry Chemical Physics, DOI: 10.1039/C3CP52516C, 16, 2944-2953 (2014).

#### 2) Kim, Eun-Ki (김은기)

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- \* Educational Background :
  - Ph. D : Biotechnology / Georgia Institute of Technology / U.S.A.
  - M.S. : Biotechnology / Seoul National Univ. / Korea
- \* Research Area : Functional Cosmetics, Skin Bioactive Material,

BioChip for HTS, Antimicrobial Compound

- \* Academic Works :
  - Construction of Protein Chip to Detect Binding of Mitf Protein (Microphthalmia Transcription Factor) and E-box DNA, *Appl.Biochem.Biotech.*(2008), 151,273-282
  - -Depigmentation of melanocyte by (2z-8z) matricaria methyl ester isolated from Erigeron Brevisca, *Biol.Pharm.Bull.* (2009)
  - -Enhanced Biodegradaion of Hydrocarbons in Soil by Microbial biosurfactants , *Appl.Biochem.Biotech* (2009)

#### 3) Kim, Dong-II (김동일)

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- \* Educational Background :
  - Ph. D : Biochemical Engineering / Rutgers The State Univ. of New Jersey / U.S.A.
  - M.S. : Biochemical Engineering / M.I.T. / U.S.A.
- \* Research Area : Plant Cell Cultures, Transgenic Plant Cell Cultures
  - Plant-made Pharmaceuticals (PMPs), Secondary Metabolites
  - Animal Cell Cultures, Tissue Engineering, Cell Therapy,
  - Adult Stem Cell Cultures, Bioreactor, Microbioreactor
- \* Academic Works :
  - "Bioreactor engineering using disposable technology for enhanced production of hCTLA4Ig in transgenic rice cell cultures", *Biotechnol. Bioeng.*, 110(9), 2412-2424 (2013).
- "Assessment of long-term cryopreservation for production of hCTLA4Ig in transgenic rice

cell suspension cultures", Enzyme Microb. Technol., 53, 216-222 (2013).

 "Pancreatic islet-like clusters from periosterum-derived progenitor cells", *Biotechnol. Bioprocess Eng.*, 18, 1116-1121 (2013).

#### 4) So, Jae-Seong (소재성)

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- \* Educational Background :
  - Ph. D : Molecular biology / Univ. of Tennessee / U.S.A.
  - M.S. : Microbiology / Univ. of Florida / U.S.A.
- \* Research Area : Microbial Eco-engineering, Biofertilizer, Bioconcrete, Bioplastic
- \* Academic Works :
  - Bioremediation of Cd by Microbially Induced Calcite Precipitation, *Appl Biochem Biotechnol*, In Press (2014).
  - Microbially Induced Calcite Precipitation-based Sequestration of Strontium by Sporosarcina pasteurii WJ-2, Appl Biochem Biotechnol, In Press (2014).
  - Antibacterial Characteristics of Lotus-Type Porous Copper, Hindawi Publishing Corporation, http://dx.doi.org/10.1155/2013/608350, (2013).
  - Effects of Different Calcium Salts on Calcium Carbonate Crystal Formation by Sporosarcina pasteurii KCTC 3558, BIOTECHNOLOGY AND BIOPROCESS ENGINEERING, 18, 903–908, 2013.
  - Antibiotic Resistance of *Shewanella putrefaciens* Isolated from Shellfish Collected from the West Sea in Korea, *MARINE POLLUTION BULLETIN*, 76, 85–88 (2013).
  - Chrysanthemum zawadskii var. latilobum Extract Inhibits the Production of Nitric Oxide and PGE2 through inducible Nitric Oxide Synthase(iNOS), *BIOTECHNOLOGY AND BIOPROCESS ENGINEERING*, 18, 501–506, (2013).

#### 5) Yun, Hyun Shik (윤현식)

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- \* Educational Background :

- Ph. D : Chemical engineering / Univ. of California, Irvine / U.S.A.
- M.S. : Chemical engineering / Univ. of Akron / U.S.A.
- \* Research Area : Metabolic Engineering, Bioenergy, Biorefinery, Industrial Microbial Biotechnology, Yeast Biotechnology
- \* Academic Works :
  - Optimization of Pretreatment and Saccharification for the Production of Bioethanol from Water Hyacinth by Saccharomyces cerevisiae, Biopro. Biosys. Eng. 35, 35-41 (2012)
  - Effect of Expression of Genes in the Sphingolipid Synthesis Pathway on the Biosynthesis of Ceramide in Saccharomyces cerevisiae, J. Microbiol. Biotechnol. 20, 356–362 (2010)
  - Improvement of Fatty Acid Biosynthesis by Engineered Recombinant Escherichia coli, Biotechnol. Biopro. Eng. 16(4), 706-713 (2011)

#### 6) Lee, Choul-Gyun (이철균)

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- \* Educational Background :
  - Ph. D : Chemical Engineering / Univ. of Michigan, Ann Arbor / U.S.A.
  - M.S. : Chemical Technology (Biotechnology) / Seoul National Univ. / Korea
- \* Research Area :
  - Microalgal Biotechnology (bioactive compounds and photobioreactors)
  - Biodiesel and CO<sub>2</sub> Sequestration by Microalgae (Leader of National Marine Bioenergy R&D Consortium)
  - Bioinformatics and Systems biology for microalgae
  - Omics for microalgae (proteomics/genomics/metabolomics)
- \* Academic Works :
  - Hai-Linh Tran, Seong-Joo Hong, and Choul-Gyun Lee, Evaluation of Extraction Methods for Recovery of Fatty Acids from *Botryococcus braunii* LB572 and *Synechocystis* sp. PCC6803, *Biotechnol. Bioprocess Eng.* 14(3):187-192, 2009
  - In Soo Suh, Hyun-Na Joo, and Choul-Gyun Lee, A novel double-layered photobioreactor for simultaneous *Haematococcus pluvialis* cell growth and astaxanthin accumulation, *J. Biotechnol.* 125(4):540-546, 2006
  - Z-Hun Kim, Sun-Hyung Kim, Ho-Sang Lee, and Choul-Gyun Lee, Enhanced production of

astaxanthin by flashing light using *Haematococcus pluvialis*, *Enzyme Microb. Technol.*, 39(3):414-419, 2006

### 7) Kim, Eung-Soo (김응수)

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- \* Educational Background :
  - Ph. D : Microbiology & Biotechnology / Univ. of Minnesota / U.S.A.
  - M.S. : Biochemistry / Iowa State Univ. / U.S.A.
- \* Research Area : Microbial Molecular Biotechnology

Actinomycetes Synthetic Biology

Genome and Metabolic Engineering for Polyketide Drug-lead Development Omics-driven Microbial Strain Improvement

\* Academic Works :

Identification of a Cyclosporine-Specific P450 Hydroxylase Gene through Targeted Cytochrome
 P450 Complement (CYPome) Disruption in *Sebekia benihana*. Applied and Environmental
 Microbiology 79(7):2253-2262. 2013.

- Structural Analysis and Biosynthetic Engineering of a Solubility-improved and Less-hemolytic Nystatin-like Polyene in *Pseudonocardi*a *autotrophica*. Applied Microbiology and Biotechnology 95(1):157-168. 2012.

- Identification and Characterization of *wblA*-dependent *tmcT* Regulation during Tautomycetin Biosynthesis in *Streptomyces* sp.CK4412. Biotechnology Advances. 30(1):202-209. 2012.

- Transcriptome Analysis of an Antibiotic Down-regulator Mutant and Synergistic Actinorhodin Stimulation via Disruption of a Precursor Flux-regulator in *Streptomyces coelicolor*. Applied and Environmental Microbiology. 77(5):1872-1877. 2011.

 Biochemical and Structural Characterization of the Tautomycetin Thioesterase: Analysis of a Stereoselective Polyketide Hydrolase. Angewandte Chemie International Edition. 49(33):5726-30.
 2010.

### 8) Soonjo Kwon (권순조)

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\* Educational Background :

Ph. D.: Chemical Eng. & Materials Science / Univ. of California, Irvine/ U.S.A.
Postdoc.: Bioengineering / Univ. of California, San Diego/U.S.A.

\* Research Area: Tissue Engineering(lung, vocal fold, skin) and Regerative Medicine, Micro Biomechanics, Health Risk Assessment, Viable alternative micro-biomechanics model to human and animal tissue/organ

\* Academic Works :

 Evaluation of Cytotoxicity and Hypoxic Effect of Nitroimidazole Embedded Nanoparticles , JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY. 2015. 15:1-7.

 Role of Gap Junction Communication in Hepatocyte/Fibroblast Co-cultures: Implications for Hepatic Tissue Engineering, BIOTECHNOLOGY AND BIOPROCESS ENGINEERING. 2015.
 20:358-385.

 In Vivo Imaging of Nitric Oxide by Magnetic Resonance Imaging Techniques, Journal of Nanomaterials.2014. http://dx.doi.org/10.1155/2014/523646

Effects of Multi-Walled Carbon Nanotube Reinforced Collagen Scaffolds on the Osteogenic
 Differentiation of Mesenchymal Stem Cells, Journal of Nanomaterials. 2013.

http://dx.doi.org/10.1155/2013/904083

 Electromechanical strain sensing using polycarbonate-impregnated carbon nanotube-graphene nanoplatelet hybrid composite sheets, Composite Science and Technology. 2013. 89:1-9

 Multi-Walled Carbon Nanotube-induced Inflammatory Response and Oxidative Stress in a Dynamic Cell Growth Environment. Journal of Biological Engineering. 2012. 6:22H

 Length-dependent Effect of Single-walled Carbon Nanotube Exposure in a Dynamic Cell Growth Environment of Human Airway Epithelial Cells. Journal of Exposure Science & Environmental Epidemiology. 2013. 23(1)101-8

Viable Alternatives to In Vivo Tests to Evaluate the Toxicity of Engineered Carbon Nanotubes.
 Journal of Environmental Health Sciences. 2012. 38(1):1-7

Effect of Exposure Conditions on SWCNT-induced Inflammatory Response in Human Alveolar
 Epithelial Cells. Toxicology in Vitro. 2011. 25:1153-1160

- Effects of Diesel Particulate Matters on Inflammatory Responses in Static and Dynamic Culture of Human Alveolar Epithelial Cells. Toxicology Letters. 2011. 200:124-131.

- Ultrasonic Differentiation of normal versus malignant breast epithelial cells in monolayer cultures. J Acoust Soc Am 2010. 128(5): EL229-EL235.

Inhibition of Mammalian Target of Rapamycin Induces Phenotypic Reversion in Three Dimensional Cultures of Malignant Breast Epithelial Cells. Journal of Biomedical Science and
 Engineering. 2010. 3:476-483

Antimicrobial Effect of Silver-impregnated Cellulose: Potential for Antimicrobial Therapy.
 Journal of Biological Engineering. 2009. 3:20-28

Interplay between Cytokine-induced and Cyclic Equibiaxial Elongation-induced Nitric Oxide
 Production and Metalloproteases Expression in Human Alveolar Epithelial Cells. Cellular and
 Molecular Bioengineering. 2009. 2(4):615–624

#### 9) Jeon, Tae-Joon (전태준)

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- \* Research Area :
- · Biophysics Lipid Bilayer Membranes, Ion Channel Studies
- · Nanobiotechnology Liposomes/Vesosomes, Artificial Cells, Aquaporin
- · Biosensors/Biochips Molecular Diagnosis, Cells/Tissues on a Chip
- \* Academic Works :
  - "Investigation of Ion Channel Activities of Gramicidin A in the Presence of Ionic Liquids Using Model Cell Membranes", *Scientific Reports*, 5:11935 (2015)
  - "Synthetic anion transporters that bear a terminal ethynyl group" *Chemical Communications*, 51: 9339-9342 (2015)
  - "Chromatic Biosensor for Detection of Phosphinothricin Acetyltransferase (PAT) using Polydiacetylene Vesicles Encapsulated within Automatically Generated Immunohydrogel Beads", *Analytical Chemistry*, 87(4):2072-8 (2015)
  - "Automated lipid membrane formation using a PDMS film for ion channel measurements" *Analytical Chemistry*, 86(18):8910–5 (2014)
  - "A nanoporous membrane-based impedimetric immunosensor for label-free detection of pathogenic bacteria in whole milk" *Biosensors and Bioelectronics*, 44:210-5 (2013)

#### 10) Shin, Hwa Sung (신화성)

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- Ph. D : Chemical engineering / University of California, Irvine/ U.S.A.

Chemical engineering / University of Michigan/ U.S.A.

\* Research Area : Bio MEMS device design, Bio process simulation, Bio process optimization
\* Academic Works :

 Analytical studies of Jacobson's necessary condition for fed-batch singular control optimization, KOREAN JOURNAL OF CHEMICAL ENGINEERING, , pp886~889, 2011.

- Compartmental microfluidic culture system of embryonic stem cell-derived neurons, DIFFERENTIATION, 80, ppS26~S27, 2010.

- Statistical analysis of heterogeneous motility of embryonic stem cells under a microfluidic flow, DIFFERENTIATION, 80, ppS22, 2010.

- Comparative investigation of aged human mesenchymal stem cells on defined selfassembled monolayer (SAM) surfaces, DIFFERENTIATION, 80, ppS22~S22, 2010.

- The dependence of enhanced lysosomal activity on the cellular aging of bovine aortic endothelial cells, MOLECULAR AND CELLULAR BIOCHEMISTRY, 340권 1-2호, pp175~178, 2010.

- Kinetic and thermodynamic analyses of adhesion of a peptide, Trp-Lys-Tyr-Met-Val-D-Met (WKYMVm), and human formyl peptide receptor (hFPR), BIOTECHNOLOGY LETTERS, 32권 6호, pp773~779, 2010.

- Multifunctional Hybrid Fabrics with Thermally Stable Superhydrophobicity, ADVANCED MATERIALS, 22권 19호, pp2138~2141, 2010.

- Compartmental culture of embryonic stem cell-derived neurons in microfluidic devices for use in axonal biology, BIOTECHNOLOGY LETTERS, 32권 8호, pp1063~1070, 2010.

- Robust Superhydrophobic Mats based on Electrospun Crystalline Nanofibers Combined with a Silane Precursor, ACS APPLIED MATERIALS & INTERFACES, 2권 3호, pp658~662, 2010.

 Bacterial hydrogen production in recombinant Escherichia coli harboring a HupSL hydrogenase isolated from Rhodobacter sphaeroides under anaerobic dark culture, INTERNATIONAL JOURNAL OF HYDROGEN ENERGY, 35, pp1112~1116, 2010.

- Proline reduces the binding of transcriptional regulator ArgR to upstream of argB in Corynebacterium glutamicum, APPLIED MICROBIOLOGY AND BIOTECHNOLOGY, 86, pp235~242, 2010.

- Shear Stress Effect on Transfection of Neurons Cultured in Microfluidic Devices, JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY, 9권 12호, pp7330~7335, 2009.

### 11) Huh, Yun Suk (허윤석)

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- \* Educational Background :
  - Ph. D : Department of Chemical & Biomolecular engineering/ KAIST / Korea

- M.S.: Departement of Chemical Engineering / Chungnam National University / Korea

\* Research Area : •

Optofluidic device for biomolecular detection (Surface enhanced Raman scattering, Surface Plasmon resonance, photonic crystal)

- Carbon based nanostructuring electrode development
- AFM based Raman spectroscopy
- · CNT/Graphene applications for biomedical sensing (Electrochemical detection)
- Development of High-performance Energy Storage Materials Manufacturing
- \* Academic Works :

-"Oil extraction by aminoparticle-based H2O2 activation via wet microalgae harvesting", RSC Adv., 2013, 3, 12802

-"Lipid extractions from docosahexaenoic acid (DHA)-rich and oleaginous Chlorella sp. biomasses by organic-nanoclays", Bioresource Technology, 2013, 137, 74

-"Enhanced Pseudocapacitance of Ionic Liquid/Cobalt Hydroxide Nanohybrids", ACS Nano, 2013, 7(3), 2453

-"Hydrogen-Induced Morphotropic Phase Transformation of Single-Crystalline Vanadium Dioxide Nanobeams", Nano Letters, 2013, 13(4), 1822

-"3D Macroporous Graphene Frameworks for Supercapacitors with High Energy and Power Densities", ACS Nano, 2012, 6, 4020

# (2) Oceanography & Biological and Fishery Oceanography

#### 1) Hong, Jae-Sang (홍재상)

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\* Educational Background :

- Ph. D : Oceanography / Aix-Marseille 2, France

- M.S. : Marine ecology / Aix-Marseille 2, France

\* Research Area :

- Tidal Flat Ecology

- The Estuarine and Coastal Benthic Community Ecology with Emphasis on Environmental Disturbance in Korean Waters

- Coastal Wetland Restoration Ecology

- Natural History and Diversity of Benthic Macrofauna in Korean Coastal Waters \* Academic Works :

- The genus Eudorella (Crustacea:Cumacea) from the Yellow Sea, with description of a new species / journal of the marine Biological Association of the United Kingdom, 79, pp. 445-457, 1999.

- Changes on productivity associated with four introduced species: ecosystem transformation of a "pristine" estuary. Marine Ecology Process Series, 311:203~215, 2006.

- Tadal Flat of KOREA / DAIWONSA, 1998

- Genus-specific commensalism of the galeommatoid bivalve Koreamya arcuata (A. Adams, 1856) associated with lingulid brachiopods, MOLLUSCAN RESEARCH, 31권 2호, pp95~105, 2011.

- Environmental quality of Korean coasts as determined by modified Shannon-Wiener evenness proportion., ENVIRONMENTAL MONITORING AND ASSESSMENT, 170권 1-4호, pp141~157, 2010.

- Congener comparison of native (Zostera marina) and introduced (Z. japonica) eelgrass at multiple scales within a Pacific Northwest estuary, BIOLOGICAL INVASIONS, 12권 6호, pp1773~1789, 2010.

- Environmental quality of Korean coasts as determined by modified Shannon-Wiener evenness proportion, ENVIRONMENTAL MONITORING AND ASSESSMENT, , pp, 2009.

- Congener comparison of native (Zostera marina) and introduced (Z. japonica) eelgrass at multiple scales within a Pacific Northwest estuary, BIOLOGICAL INVASIONS, , pp. 2009.

- Marinobacterium marisflavi sp. nov., Isolated from a Costal Seawater, CURRENT MICROBIOLOGY, 58, pp511~515, 2009.

- Mytilid mussels: global habitat engineers in coastal sediments, HELGOLAND MARINE RESEARCH, 63, pp47~58, 2009.

- Koreamya arcuata (A. Adams, 1856) gen. nov. (Galeommatoidea: Montacutidae), a commensal bivalve associated with the inarticulate brachiopod Lingula anatina., JOURNAL OF CONCHOLOGY, 39권 6호, pp669~679, 2009.

- Pathology survey of the short-neck clam Ruditapes philippinarum occurring on sandy tidal flats along the coast of Ariake Bay, Kyushu, Japan, JOURNAL OF INVERTEBRATE PATHOLOGY, 99, pp212~219, 2008.

- Koreamya arcuata (A. Adams, 1856) gen. nov. (Galeommatoidea; Montacutidae), a commensal bivalve associated with the inarticulated brachiopod Lingula anatina, JOURNAL OF CONCHOLOGY, 39권 6호, pp137~147, 2008.

- The Saemangeum reclamation project in South Korea threatens to extinguish an unique mollusk, ectosymbiotic bivalve species attached to the shell of Lingula anatina, PLANKTON AND BENTHOS RESEARCH, 2(1), pp70~75, 2007.

- Hypoxia and benthic community recovery in Korean coastal waters, MARINE POLLUTION BULLETIN, 52, pp1517~1526, 2006.

- Heavy Metal Contasmination in the Sediment and its Effect on the Occurrence of the Most Dominant Bivalve, Riditapes philippinarum, on the Tidal Flats of Ariake Bay in Kumamoto Prefecture, the West Coast of Kyushu, Japan, BENTHOS RESEARCH, 58(2), pp121~130, 2003.

- Trophic importance of benthic microalgae of macrozoobenthos in coastal bay systems in Korea ; dual stable C and N isotope analyses, MARINE ECOLOGY-PROGRESS SERIES, 259, pp79~92, 2003.

#### 2) Park, Yong-Chul (박용철)

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  - M.S. : Oceanography / Seoul National University / South Korea
- \* Research Area : Seawater Organic matter analysis , Marine pollution
- \* Academic Works

- Distribution and Hydrodynamic Model of the Keumdong oil spill in Kwangyang Bay,

Korea/Environment International, vol 26, pp. 457-463, 2001

- Geochemistry of Dissolved Uranium and its Distribution along the Salinity Gradient in the Han River Estuary, Korea/ The Yellow Sea, vol 8, pp. 24-28, 2002

- Characteristics of Organic Carbon and Apparent Oxygen Utilization in the NE Pacific KODOS Area, OCEAN AND POLAR RESEARCH, vo. 27(1), pp.1-13, 2005.

Nutrient loading and its impact on the coastal environment: Kyeonggi Bay, Korea, THE
 YELLOW SEA, Vol.6, pp73~76, 2000.

- Interstitial nutrient profiles as an indicator for sediment health: a comparative study between the sediments from North Harbor and the outside of Lake Shihwa, in Kyunggi Bay, Yellow Sea, THE YELLOW SEA, Vol.6, pp82~87, 2000.

- Characteristics of microbial abundances in hypoxic water of brackish Lake Shihwa, Journal of the Korean Society of Oceanography, Vol. 34, No. 4, pp236~240, 1999.

#### 3) Han, Kyung-Nam (한경남)

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\* Educational Background :

- Ph. D : Marine Aquaculture / Kyushu University / Japan

- M.S. : Oceanography / Inha University / Korea
- \* Research Area : Fish seed production, Fish ecology, Fish physiology
- \* Academic Works :

- Kim, J.-H., Hans, U.-D., **Han, K.-N**. 2012. Biomonitoring of the river pufferfish Takifugu obscurus in aquaculture at different rearing density using stress-related genes. Aquaculture Research (Published online).

- Jung, S.-Y., Dahms, H.-U., Lee, W.-O., Kim, J.-H., **Han, K.-N**. 2012. Salinity changes in the anadromous river pufferfish Takifugu obscures mediate gene regulation. Aquaculture. (Revision)

- Kim, J.-H., Jeon, H.-J., Baek, J.-M., **Han, K.-N**., Dahms, H.-U. 2012. EDCs-induced glucocorticoid receptor related genes expression of the river pufferfish, Takifugu obscures. Aquaculture Research. (Published online)

- Kim, J.-H., Kim, S.-J., Hwang, D.-S., **Han, K.-N**., Lee, J.-S. 2012. The complete mitochondrial genome of the anadromous river pufferfish Takifugu obscures (Tetraodontiformes, Tetraodontidae) and DNA barcoding for species identification. J. Fish Biol. (Revision).

- Kim, J.-H., Rhee, J.-S., Dahms, H.-U., Lee, Y.-M., Han, K.-N., Lee, J.-S. 2012. The

yellow catfish, Pelteobagrus fulvidraco (Siluriformes) metallothionein cDNA: molecular cloning and transcript expression level in response to exposed to heavy metals (Cd, Cu and Zn). Fish Physiol Biochem.(Published online).

- Kim, J.-H., Dahms, H.-U., Rhee, J.-S., Lee, Y.-M., Lee, J., **Han, K.-N**., Lee, J.-S., 2010. Expression profiles of seven glutathione S-transferase (GST) genes in cadmium-exposed river pufferfish (Takifugu obscurus). Comp. Biochem. Physiol. 151C, 99-106.

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- Wang, S. Y., **Han, K.-N**., Takao Y., 2008. Comparison between a-LNA and DHA in early developmental stages of takifugu obscurus and Takifugu rubripes. Fisheries Science 74, 937-945

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- Molecular cloning, phylogenetic analysis and expression of a MAPEG superfamily gene from the pufferfish Takifugu obscurus, COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY C-TOXICOLOGY & PHARMACOLOGY, 149, pp358~362, 2009. - Cloning of a river pufferfish (Takifugu obscurus) metallothionein cDNA and study of its induction profile in cadmium-exposed fish, CHEMOSPHERE, Vol.71 No.7, pp1251~1259, 2008.

- Molecular cloning and beta-naphthoflavone-induced expression of a cytochrome P450 1A (CYP1A) gene from an anadromous river pufferfish, Takifugu obscurus, MARINE POLLUTION BULLETIN, Vol.57 No.6-12, pp433~440, 2008.

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- \* Research Area :
  - Hydrodynamics
  - Sediment Dynamics
  - Sediment Transport
  - Morphodynamics
- \* Academic Works :
  - Lee, G., W.B. Dade, C.T. Friedrichs, and C.E. Vincent, Examination of reference concentration under waves and currents on the inner shelf, Journal of Geophysical Research, 109(C2), 10.1029/2002JC001707, 2004.
  - Lee, G., W.B. Dade, C.T. Friedrichs, and C.E. Vincent, Spectral estimates of bed shear stress using suspended-sediment concentrations in wave-current boundary layers, Journal of Geophysical Research, 108 (C7), 10.1029/2001JC001279, 2003.
  - Lee, G., C.T. Friedrichs, and C.E. Vincent, Examination of diffusion versus advection dominated sediment suspension on the shoreface under storm and swell conditions, Duck, NC, Journal of Geophysical Research, 107 (C7), 10.1029/2001JC000918, 2002.
  - Sediment eddy diffusivity and selective suspension under waves and currents on the inner shelf, GEOSCIENCES JOURNAL, 12, pp349~359, 2008.

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  - Computational Hydraulics
  - Coastal Engineering
  - Wave mechanics: wave generation, wave groups
  - Wave climatology: Response of upper ocean to strong storms
  - Numerical modeling of coastal and estuarine hydrodynamics and water quality
- \* Academic Works :
  - Finite element method for strong reflection of water waves, Ocean Engineering, Vol.31, p653-667,2004.
  - Finite element model for modified Boussinesq equations II: application to nonlinear harbor oscillations, Journal of Waterway Port Coastal and Ocean Engineering , Vol.130, No.1, p17-28, 2004.01
  - Finite element model for modified Boussinesq equations I: model development, Journal of Waterway Port Coastal and Ocean Engineering, Vol.130, No.1, p1-16, 2004.01
  - The Classification of Estuary and Tidal Propagation Characteristics in the Gyeong-Gi Bay, South Korea, JOURNAL OF COASTAL RESEARCH, Vol.64 No.2, pp1624~1628, 2011.
  - Characteristics of cross-channel momentum balance at Yeomha Channel, Gyeonggi bay, South Korea, JOURNAL OF COASTAL RESEARCH, 64, pp1515~1519, 2011.
  - Solitary wave transformation on the underwater step: Asymptotic theory and numerical experiments, APPLIED MATHEMATICS AND COMPUTATION, 217, pp1704~1718, 2010.
  - Characteristics of abnormal large waves measured from coastal videos, NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, Vol.10 No.4, pp947~956, 2010.

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- M.S. : Oceanography / Inha University / Korea

\* Research Area :

- Biogeochemical cycles of trace elements

- Glaciochemical studies of atmospheric composition

- Isotope application to environmental geochemistry

\* Academic Works :

- Eemian interglacial reconstructed from a Greenland folded ice core, Nature, 2013, Vol 493, pp489-494.

- Evidence of global-scale As, Mo, Sb, and Tl atmospheric pollution in the Antarctic snow, Environmental Science & Technology, 2012, Vol. 46, pp11,550-11,557.

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  - Coastal and estuarine sedimentary processes
  - Sediment dynamics in bottom boundary layer
  - Hydrography and circulation in Polar Oceans

\* Academic Works :

- Kim, J.W., Kim, D.J., Kim, S.H., Ha, H.K., and Lee, S.H., 2015. Disintegration and acceleration of Thwaites Ice Shelf on the Amundsen Sea revealed from remote sensing measurements. GIScience and Remote Sensing, 52(4), 498–509.

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- Ha, H.K., and Chough, S.K., 2003. Intermittent turbulent events over current ripples: a motion-picture analysis of flume experiments. *Sedimentary Geology*, 161, 295–308.

# 4. Course List

Maior	Course	Column	Credit	Taught
IVIAJOI	Code	Course		in English
Biological	BOC5006	Advanced Biochemical Separation Process	3	flexible
Engineering	BOC5011	Advanced Molecular Biotechnology	3	flexible
	BOC5012	Systems Biology and Bioengineering	3	flexible
	BOC5013	Advanced Cosmetics and Dermatology	3	flexible
	BOC6001	Advanced Marine Biotechnology	3	flexible
	BOC6033	Bionanotechnology	3	flexible
	BOC6044	Technical Report Writing and Presentation	3	0
	BOC6046	Biodiesels	3	flexible
	BOC6051	Advanced Biofuels	3	flexible
	BOC6052	Bioethanol	3	flexible
	BOC6054	Optical Bio-imaging Analysis	3	0
	BOC7001	Advanced Applied Microbiology	3	flexible
	BOC7010	Advanced Microbial Engineering	3	flexible
	BOC7016	Metabolic Engineering	3	flexible
	BOC7059	bioMEMS	3	0
	BOC7076	Tissue Engineering	3	0
	BOC7077	Nano Bioengineering Analysis	3	0
	BOC7080	Bio-inspired Engineering	3	0
	BOC7081	Nano Bio-Senor Engineering	3	0
	BOC6002	Advanced Molecular Biology	3	flexible
	BOC6034	Genomics of Industrial Microbiology	3	flexible
	BOC6035	Biology of Disease	3	Х
	BOC6038	Trends in Industrial Microbiology	3	flexible
	BOC6039	Patenting Biotechnology and Drug Inventions	3	Х
	BOC6040	Applied biostatistics	3	Х
Biopharmaceuticais	BOC6042	Introduction to pharmaceutical industry	3	Х
	BOC6043	Patent and Information Analysis	3	Х
	BOC6045	Applied engineering of protein purification	3	Х
	BOC6047	Applied biostatistics2	3	Х
	BOC6053	Protein production & purification applied engineer	3	х

	BOC7018	Advanced Molecular Genetics	3	flexible
	BOC7020	Animal Cell Culture Engineering	3	flexible
	BOC7022	Biopharmceutical Process Validation	3	Х
	BOC7023	Stem Cell and Regenerative Medicine	3	flexible
	BOC7028	Introduction to Biopharmaceuticals	3	Х
	BOC7030	Seminars on the Current Biotechnology	3	flexible
	BOC7058	Manufacture & Quality of Biologics	3	Х
	BOC7060	Cancer chemotherapy	3	0
	BOC7063	Immunology-based vaccine 1	3	0
	BOC7064	Immunology-based vaccine 2	3	0
	BOC5017	Marine Affairs Seminar	3	Х
	BOC5024	Biogeochemistry Seminar	3	Х
	BOC5025	Global Environment Seminar	3	Х
	BOC6004	Advanced Sedimentology	3	Х
	BOC6005	Topics in Geological Oceanography	3	Х
	BOC6006	Sediment Dynamics	3	flexible
	BOC6007	Advanced Coastal Morphodynamics	3	flexible
	BOC6008	Topics in Physical Oceanography1	3	Х
	BOC6009	Topics in Physical Oceanography2	3	Х
	BOC6010	Basic Estuarin Hydrodynamics	3	flexible
	BOC6011	Numerical modeling in ocean science	3	flexible
	BOC6012	Advanced Coastal Engineering	3	flexible
Oceanography	BOC6013	Advanced Chemical Oceanography	3	Х
	BOC6014	Topics in coastal pollution and management	3	Х
	BOC6015	Advanced Seawater Analysis	3	Х
	BOC6029	Marine Meteorology	З	0
	BOC6041	Introduction to Ocean Data Assimilation Method	3	flexible
	BOC6049	Application of Numerical modeling in ocean	3	flexible
		science		
	BOC6050	Practical application of ocean data Assimilation	3	flexible
	BOC7032	Depositional Sedimentary Environment of Shallow Se	3	Х
	BOC7033	Topics in Marine Geophysics	3	Х
	BOC7034	Advanced Marine Geomorphology	3	flexible
	BOC7035	Advanced Stratigraphy	3	flexible

	BOC7036	Sediment Transport Modeling	3	flexible
	BOC7037	Cohesive Sediment Dynamics	3	flexible
	BOC7039	Geophysical Fluid Dynamics	3	Х
	BOC7040	Waves in the Ocean and Atmosphere	3	Х
	BOC7041	Application of Estuarine Hydrodynamics	3	flexible
	BOC7042	Applied coastal oceanography	3	flexible
	BOC7043	Water Quality-Ecology Modeling	3	flexible
	BOC7044	Marine Biogeochemistry	3	Х
	BOC7047	Advanced Marine Organic Chemistry	3	Х
	BOC7055	Marine Applied Math	3	0
	BOC7061	Applied Isotope Geochemistry	3	Х
	BOC7062	Applied Polar Environment	3	flexible
	BOC7065	Topics in Paleoenvironmental Change	3	flexible
	BOC7068	Depositional environment of Tidal flat	3	flexible
	BOC7069	Sediments and sedimentary structure	3	flexible
	BOC7070	Coastal Ocean Dynamics	3	Х
	BOC7071	Open Ocean Dynamics	3	Х
	BOC7073	Applied Environmental Geochemistry	3	Х
	BOC7074	Coastal Ocean Dynamics Seminar	3	Х
	BOC5018	Marine Biostatistics	3	Х
	BOC5019	Advanced Marine Ecology	3	Х
	BOC5020	Advanced Estuarine Ecology	3	Х
	BOC5021	Marine Pollution Ecology	3	Х
	BOC5022	Marine Conservation Biology and Management	3	Х
	BOC5023	Environmental Assessment for Coastal Fisheries	3	Х
0	BOC5026	Data Analysis of Marine Benthic Communites	3	Х
Biological and	BOC6016	Marine Phytoplankton Ecology	3	Х
	BOC6017	Marine Food Web	3	Х
Oceanography	BOC6018	Marine Plankton Ecology in Korea	3	Х
	BOC6019	Microphytobenthos Ecology	3	Х
	DOOCOOO	Population and community Ecology of coastal	0	V
	BUC6020	bentho	3	~
	BOC6021	Intertidal Ecology	3	Х
	BOC6024	Advanced in Fisheries	3	X
	BOC6026	Marine Microbial Ecology	3	flexible

BOC60	27 Marine Environment Microbiology	3	flexible
BOC60	28 Methods in Marine Microbiology and Biotechnology	3	Х
BOC60	BO Egg and larval ecology	3	Х
BOC60	B1 Fisheries resource science	3	Х
BOC70	Advanced Marine Plakton Ecology	3	Х
BOC70	0 Advanced Marine Aquaculture	3	Х
BOC70	Advanced Fish Physiology	3	Х
BOC70	3 Molecular Taxonomy of Marine Organisms	3	flexible
BOC70	Advances in Marine Biotechnology	3	flexible
BOC70	66 Marine Protozoa ecology	3	Х
BOC70	Ecological Restoration of the Coastal ecosystems	3	flexible
BOC70	2 Advanced Marine Zooplanktonlogy	3	Х
BOC70	75 Marine Plankton Ecology Seminar	3	Х
BOC70	78 Advanced Ecology of Fishe	3	flexible
BOC70	'9 Seminar in fisheries Oceanography	3	flexible

### 5. Others

### (1) Biological Engineering & Biopharmaceuticals

\* 11 Laboratories in Biological Engineering Department.

#### 1) BioNanoProcess Laboratory

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- \* Others : Enzymatic Synthesis and Production of Bio-materials using Ionic Liquids, Separation and Purification using Simulated Moving Bed,

Fermentation & Purification, Protein Folding & Refolding,

Process Optimization using Molecular Descriptor

#### 2) Skin-Bioactive Material Laboratory

- \* Homepage : <u>http://bioactive.inha.ac.kr/</u>
- \* Lab address : 2S134
- \* Tel: +82-32-872-2978

- \* Others : Biochip, Microarray, Protein chip, Cell mechanism, Fermentation, Biosurfectant, Antibiotics, Statistical process & analysis, Cytokine, Pigmentation, Bioconversion, Bioseperation
- 3) Cell Culture Engineering Laboratory
  - \* Homepage : <u>http://whs.inha.ac.kr/~kimdi/</u>
  - \* Lab address : 2S135
  - \* Tel: +82-32-863-5946
  - \* Others : 1. Plant cell cultures :
    - Transgenic rice cells, recombinant proteins production,
    - Scale up(bioreactor), culture optimization
    - 2. Animal cell cultures :
      - Adult stem cells, differentiation,
      - Ex vivo expansion, In vivo test
      - CHO cell culture, Scale-up

4) Microbial Eco-Engineering Laboratory

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- \* Tel: +82-32-860-8666
- \* Others : 1. microbial cell biotechnology
  - 2. stress biology
  - 3. gene cloning,
  - 4. genetic engineering
- 5) Biological Metabolic Engineering Laboratory
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  - \* Tel: +82-32-860-8751
  - \* Others : 1. Metabolic engineering:
    - $\ensuremath{\text{CO}_2}$  bioconversion systems for the production of C3–C6 compounds
    - Regulation of metabolic pathways for phytoceramides synthesis
    - 2. Bioenergy and Biorefinery
    - Energy and platform chemical production from biomass
    - Utilization of mixed sugars of biomass
- 6) Marine Biotechnology Laboratory
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- \* Lab address : C-202 & 4-104
- \* Tel: +82-32-865-7518
- \* Others : photobioreactor design, microalgae, CO<sub>2</sub> sequestration, biodiesel production, systems biology, metabolic redesign, bioactive compounds, artificial photosynthesis
- 7) Microbial Molecular Biotechnology Laboratory
  - \* Homepage : <u>http://actino.inha.ac.kr/</u>
  - \* Lab address : C-105
  - \* Tel: +82-32-860-8825
  - \* Others : Actinomycetes Molecular Biotechnology
    - Omics-driven *In Silico* Strain Improvement Metabolic Engineering for Hybrid Antibiotics Development Biosynthetic and Regulatory Pathway Engineering Microbial Synthetic Biotechnology
- 8) Integrated Tissue Engineering Laboratory
  - \* Homepage : <u>http://bioeng.inha.ac.kr</u>
  - \* Lab address : 4-113
  - \* Tel: +82-32-860-9176
  - \* Others: Tissue-engineered Devices for Environmental Health Monitoring Systems
    - Micro-Biomechanics Models of Cancers
    - Engineered Materials with Tunable Mechanical Properties
    - Development of Real-time Monitoring Devices with Separable 3-D
    - Engineered Skin & Lung
- 9) Biohybrid Systems Laboratory
  - \* Homepage : <u>http://bsl.inha.ac.kr</u>
  - \* Lab address : 4-115
  - \* Tel: +82-32-860-8990
  - \* Others :
  - · Biophysics Lipid Bilayer Membranes, Ion Channel Studies
  - Nanobiotechnology Liposomes/Vesosomes, Artificial Cells, Aquaporin
  - · Biosensors/Biochips Molecular Diagnosis, Cells/Tissues on a Chip

- 10) Control & Medical Engineering Laboratory
  - \* Homepage : <u>http://cyworld.com/hwasungshin</u>
  - \* Lab address : 2S132B
  - \* Tel: +82-32-861-9251
  - \* Others : Bio MEMS device design
     Stem cell proliferation & differentiation
     Bio process simulation & optimization
     Biomaterial & Nanofibers
- 11) Nano Bioengineering Analysis Laboratory
  - \* Homepage : <u>http://bio.inha.ac.kr/</u>
  - \* Lab address : 4-106
  - \* Tel: +82-32-860-9177
  - \* Others : Spectroscopic Bio-sensor

Electrochemical Analysis of Biomaterials Synthesis of Nano-hybrid Materials

Microfluidic Separation & Purification

### (2) Oceanography & Biological and Fishery Oceanography

\* 8 Laboratories in Oceanography and Fishery Oceanography Department.

- 1) Benthic Ecology Lab.
  - \* Homepage : <u>http://ocean.inha.ac.kr</u>
  - \* Lab address : 5N315
  - \* Tel: +82-32-860-7700
  - \* Introductions : Benthic Ecology Laboratory is interested in understanding the factors that determine the distribution and abundance of benthic organisms. Research topic is focused on the ecology and conservation of various coastal habitats. Our projects investigate issues at the interface between ecology, conservation science, and management. We are taking a population and community approach to understanding coastal habitats. Using infauna and epifauna as indicators, major interests are the factors controlling food web structure in coastal and estuarine habitats, the importance of various habitat types, especially tidal flat, salt

marsh, and seagrass as nurseries and foraging areas, and the influence of anthropogenic change on coastal communities. Specific ongoing researches include:

- Effects of disturbance on bottom communities

- Biodiversity of benthic communities in tidal flats and estuaries

- Ecological functions of various coastal habitats such as tidal flats, seagrasses, and salt marshes

2) Seawater Analysis Lab.

- \* Homepage : <u>http://ocean.inha.ac.kr</u>
- \* Lab address : 5N233
- \* Tel: +82-32-860-7700
- \* Introductions : The laboratory covers the organic and inorganic materials of seawater, spatial distribution, and biogeochemical processes. Other topics included are assessment of marine environmental quality, development of automated environment monitoring system. We also contribute to the establishment of marine pollution policy in the coastal area.

3) Aquaic Production Lab.

\* Homepage : <u>http://ocean.inha.ac.kr</u>

\* Lab address : 5N320

\* Tel: +82-32-860-8640

\* Introductions : Aquatic Production Laboratory conducts research about aquatic organisms which are living in the aquatic environment and affecting to human life directly and indirectly. To develop the aquaculture technology about valuable marine organisms and to produce experts on aquaculture is the aim of the laboratory.

4) Coastal Ocean Engineering Lab.

- \* Homepage : <u>http://ocean.inha.ac.kr</u>
- \* Lab address : 5N102
- \* Tel: +82-32-860-8255
- \* Introductions : The Coastal Environmental Engineering Lab carries out researches on numerical modeling of tides, tidal currents, circulations, and transportation of sediments and pollutants.

5) Coastal and Estuarine Morphodynamics Lab..

- \* Homepage : <u>http://ocean.inha.ac.kr</u>
- \* Lab address : 5N224
- \* Tel: +82-32-860-7707

\* Introductions : Introduction: Coastal & Estuarine Morphodynamics Laboratory (CEML)

The overall interest of CEML lies in large-scale, long-term morphodynamics in the estuarine, coastal and shelf environments. Physics-based deterministic estuarine-coastal-shelf processes are the direction we are pursuing at CEML. We are resolving problems related to benthic boundary layer processes, sediment transport, and estuarine-coastal-shelf morphodynamics by field-based observations and sediment transport modeling.

6) Environmental Geochemistry Lab.

- \* Homepage : <u>http://ocean.inha.ac.kr</u>
- \* Lab address : 5E-402C
- \* Tel: +82-32-860-7708
- \* Introductions : Environmental Geochemistry Laboratory

Environmental Geochemistry Laboratory focuses on investigating changes in different environmental compartments due to various processes such as climate and human activities. Climate-related and human-induced changes in global biogeochemical cycles of trace elements are of special interest for our lab, for which various archives including marine sediments and polar snow and ice cores are used. The study on elemental and isotope geochemistry from these archives is performed to provide long and detailed proxy record of past environmental changes.