



國立清華大學

National Tsing Hua University

**International Ph.D. Program
in Biomedical Engineering**
College of Nuclear Science

生醫工程與環境科學館

Biomedical Engineering and
Environmental Sciences Building

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<http://www.bmes.nthu.edu.tw/main.php>

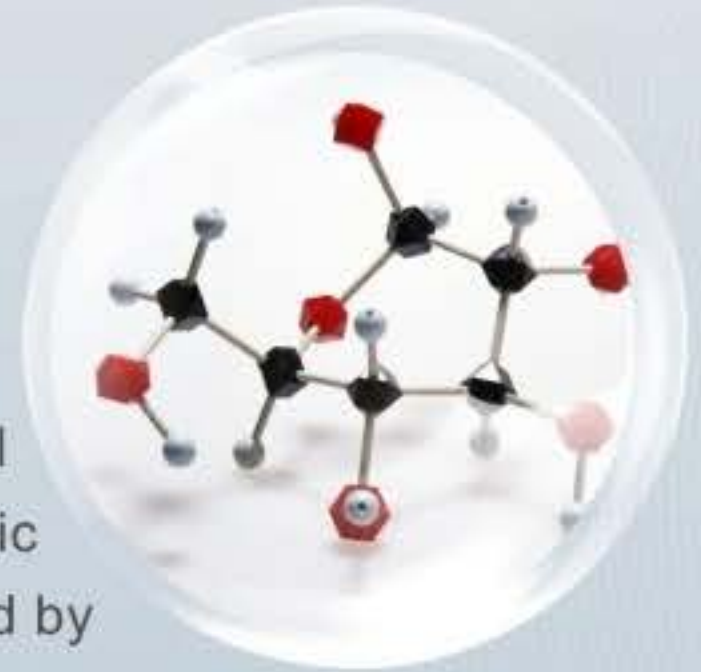


Introduction

The International Ph.D. Program in Biomedical Engineering is provided by the College of Nuclear Science at National Tsing Hua University. Biomedical Engineering is one of the most multidisciplinary scientific fields in relation to human life, and has been highlighted by national developments, social needs and international trends.

With a strong base on atomic, molecular, and nano-technology, the main theme of the Ph.D. program in Biomedical Engineering is to develop clinical techniques and applications based on fundamental sciences such as physics, chemistry and biology; and to utilize knowledge from chemical engineering, materials science, mechanical engineering, and electrical engineering. Furthermore, the research fields are extended from traditional tissue and organ levels to modern cellular and molecular scales by combining interdisciplinary research fields to study various critical issues, e.g., developments of polymers and nanoparticles for both ultrasonic and macrophages-mediated cancer therapy.

The goal of Biomedical Engineering is to advance fundamental understanding of biological system functions and responses in terms of physical/chemical mechanisms, and to develop effective technologies and applications to address social needs by designing novel medical materials, devices, and imaging techniques for diagnosis, treatment, and prevention of diseases.



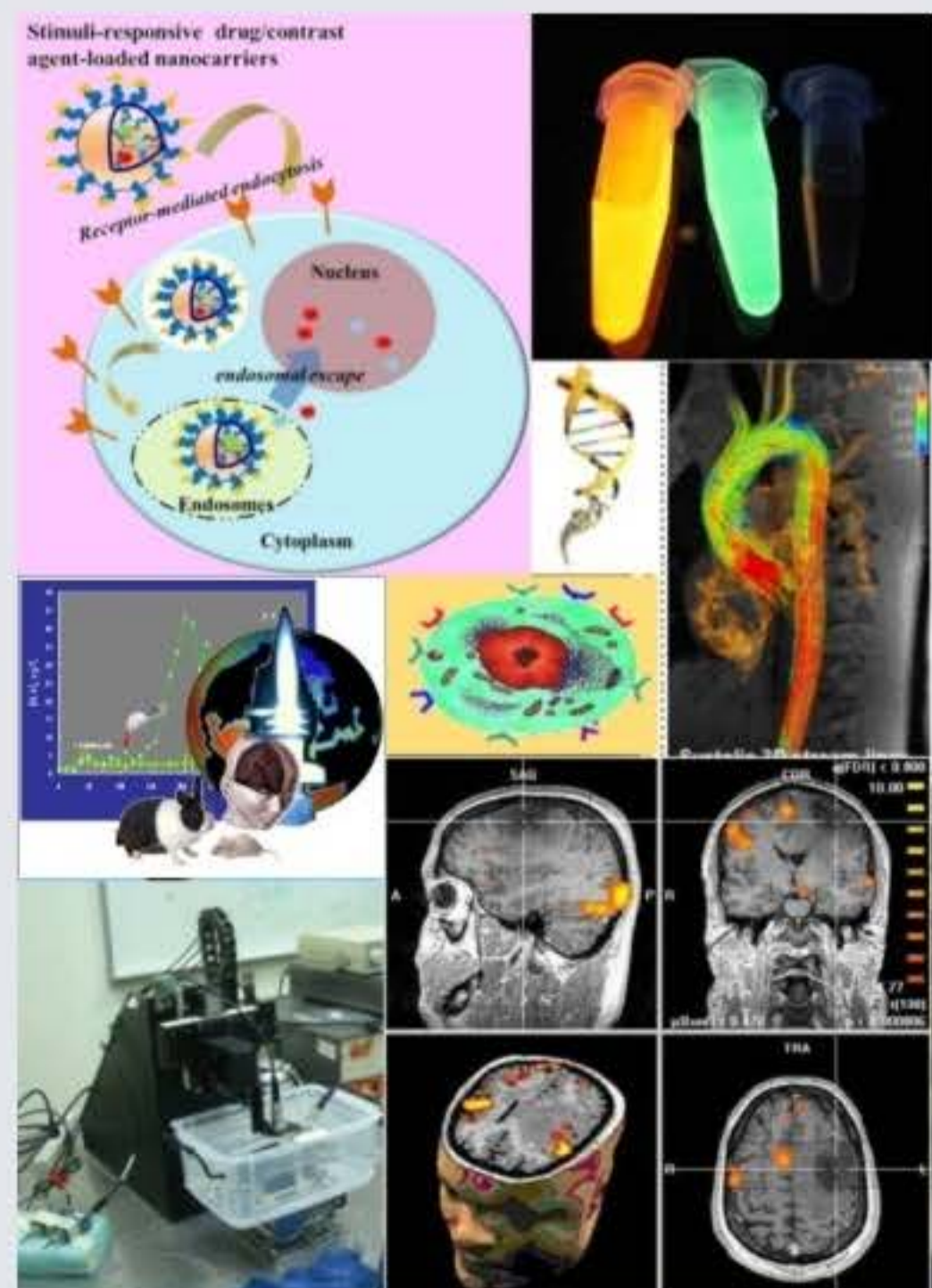
Research

There are two research tracks in the International Ph.D. Program in Biomedical Engineering.

- The first track, Molecular Biomedical Engineering (MBE), aims to implement basic biomedical research to practical applications. MBE combines fields of medicine, engineering, chemistry, physics, biology, and photonics to equip students with the knowledge for biomedical applications. Novel optoelectronic and microelectronic techniques are used for highly sophisticated biological and medical research topics. Different scales of complexity, ranging from the molecular level to the whole organism, are covered in this area. Specific research topics include: development and application of biochips, nanotechnology, micro-electro-mechanical systems, biomedical control and measurement of nano-molecules, biomaterials, stem cells and tissue engineering, drug delivery and release, cancer gene therapy, molecular imaging in drugs, synthesis of lipids, carbohydrates, and nucleic acids, biomedical and molecular toxicology, epidemiology, and biomedical informatics.
- The second track, Medical Physics (MP), concentrates on comprehensive applications of knowledge from ultrasound, magnetic resonant imaging, nuclear sciences in medicine, which includes medical imaging, radiation physics, radiation biology, nuclear medicine and radiotherapy, molecular imaging and pharmaceuticals in cancer therapy. We have strong collaborative relationships with domestic and foreign universities and research hospitals and aim at training experts who possess professional knowledge in medical physics and biomedical engineering techniques.

Research Topics

- Molecular Biomedical Engineering (MBE)
- Biophysics
- Biomaterials and Tissue Engineering
- Drug Delivery and Release
- Biochips/BioMEMS
- Nano/Micro Fluidic Systems & Optical Systems
- Cancer Gene Therapy
- Molecular Toxicology and Epidemiology
- Bioinformatics and Health Assessment
- Medical Physics (MP)
- Biomedical Electronics and Instrumentations
- Biomedical Signal and Image Processing
- Physiological and Functional Medical Imaging
- Medical Imaging: Ultrasounds, Magnetic Resonant Imaging, Nuclear Medicine



International Ph.D. Program in Biomedical Engineering

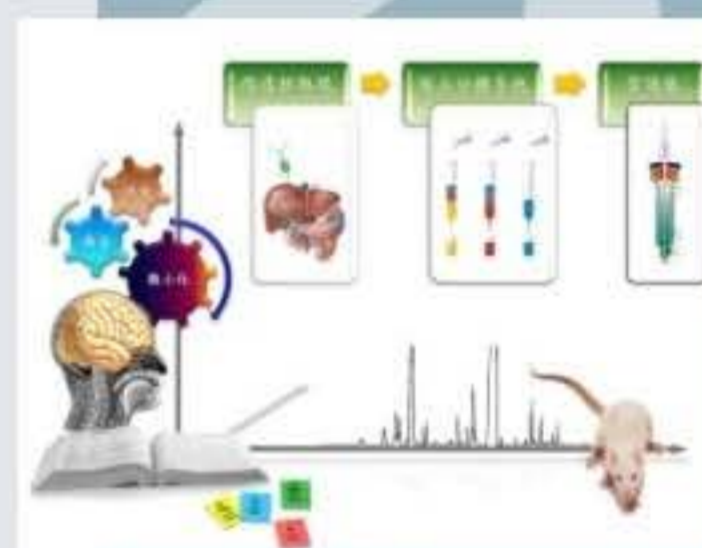
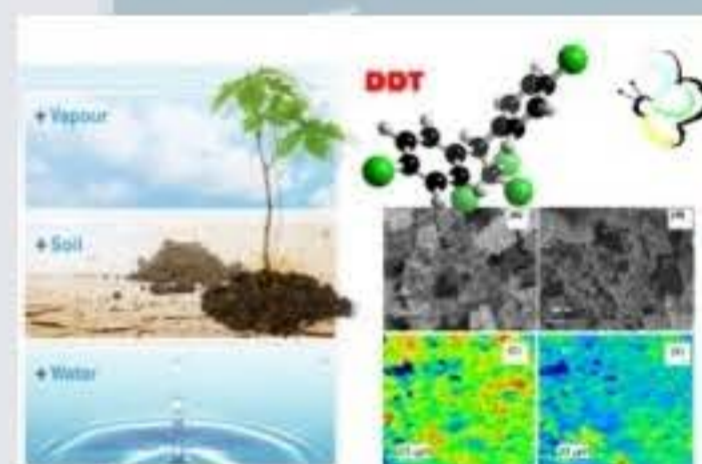
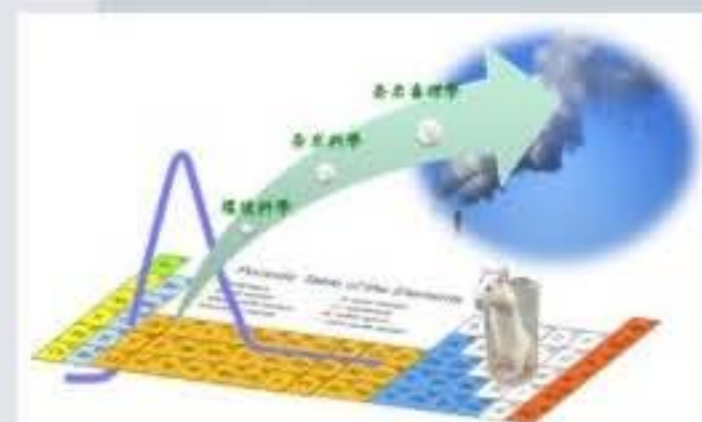
Faculty

| Position | Name | Degree | Research Field | Office | Tel / e-mail |
|---------------------|------------------|---|---|--------------------------|---|
| Assistant Professor | Chien-Wen Chang | Ph.D. University of Utah | Protein Delivery Stem Cell Engineering | BMES R 213 | +886-3-5715131 ext 35531 chienwen@mx.nthu.edu.tw |
| Professor | Chi-Shiun Chiang | Ph.D. University of California, Los Angeles | Cancer Therapy Radiation Biology | BMES R 620 | +886-3-5715131 ext 35581 cschiang@mx.nthu.edu.tw |
| Professor | Hsin-Cheng Chiu | Ph.D. University of Utah | Drug Delivery System Biomaterials | BMES R 420 | +886-3-5715131 ext 34233 hscchiu@mx.nthu.edu.tw |
| Associate Professor | Chun-Yu Chuang | Ph.D. National Taiwan University | Molecular Toxicology Biomedical Epidemiology | BMES R 217 | +886-3-5715131 ext 34229 cychuang@mx.nthu.edu.tw |
| Assistant Professor | Guenter Engling | Ph.D. Colorado State University | Environmental Chemistry Atmospheric Chemistry | BMES R 516 | +886-3-5715131 ext 35568 guenter@mx.nthu.edu.tw |
| Associate Professor | Pai-Yi Hsiao | Ph.D. Universite Paris 7- Denis Diderot | Soft Matter Physics Molecular Simulation Critical Phenomenon | ESS R 516 | +886-3-5715131 ext 62247 pyhsiao@ess.nthu.edu.tw |
| Professor | Ian C. Hsu | Ph.D. University of Wisconsin Madison | Nano-Biotechnology | Biochip BMES R 214 | +886-3-5715131 ext 34215 ichsu@mx.nthu.edu.tw |
| Associate Professor | Ching-Han Hsu | Ph.D. University of Southern California | Medical Imaging Signal Processing | BMES R 416 | +886-3-5715131 ext 35562 cgshu@mx.nthu.edu.tw |
| Assistant Professor | Yu-Fen Huang | Ph.D. National Taiwan University | Analytical Chemistry Nano-Biomedicine | BMES R 514 | +886-3-5715131 ext 34212 yufen@mx.nthu.edu.tw |
| Professor | Chih-Hao Lee | Ph.D. National Tsing Hua University | Surface and Thin Film Photon Measurements Synchrotron Radiation X-Rays and Neutron | ESS R 412 | +886-3-5715131 ext 42856, 34281 chlee@ess.nthu.edu.tw |
| Assistant Professor | Hsu-Hsia Peng | Ph.D. National Taiwan University | Biomedical Imaging Magnetic Resonance Imaging | BMES R 706A | +886-3-5715131 ext 80189 hhpeng@mx.nthu.edu.tw |
| Professor | Fan-Gang Tseng | Ph.D. University of California, Los Angeles | BioNEMS Nano/Micro Fluidics Micro Fuel Cells | ESS R 418 | +886-3-5715131 ext 34270 fangang@ess.nthu.edu.tw |
| Assistant Professor | Fu-Nien Wang | Ph.D. National Taiwan University | Magnetic Resonance Imaging Functional Imaging of Brain | BMES R 417 | +886-3-5715131 ext 35492 fnwang@mx.nthu.edu.tw |
| Associate Professor | Chien-Ming Wu | Ph.D. National Tsing Hua University | Biophotonics Nanometrology | BMES R 212 | +886-3-5715131 ext 34327 cmwu@mx.nthu.edu.tw |
| Associate Professor | Chih-Kuang Yeh | Ph.D. National Taiwan University | Ultrasound Image Biomedical Signal Processing | BMES R 421 | +886-3-5715131 ext 34240 ckyeh@mx.nthu.edu.tw |
| Associate Professor | Chung-Shan Yu | Ph.D. University of Heidelberg | Medicinal Chemistry Nuclear Medicine | BMES R 617 | +886-3-5715131 ext 35582 csyu@mx.nthu.edu.tw |

(in alphabetical order)

Courses

| Title | Instructor | Credit |
|---|------------------|--------|
| Introduction to Biomedical Engineering (required) | Hsu-Hsia Peng | 3 |
| Introductory Radiation Biology (required) | Chi-Shiun Chiang | 3 |
| Introduction to Soft Condensed Matter | Pai-Yi Hsiao | 3 |
| Bioanalytical Chemistry | Yu-Fen Huang | 3 |
| Advanced Bioconjugated Chemistry | Chung-Shan Yu | 3 |
| Drug Controlled Release | Hsin-Cheng Chiu | 3 |
| Tissue Engineering | Chien-Wen Chang | 3 |
| Applied Optics | Chih-Hao Lee | 3 |
| Bionanotechnology | Ian C. Hsu | 3 |
| Biological Physics--Mechanics of Motor Proteins | Chien-Ming Wu | 3 |
| Molecular Dynamics Simulations | Pai-Yi Hsiao | 3 |
| Biomedical Signal Processing | Ching-Han Hsu | 3 |
| Principles of Medical Ultrasonics | Chih-Kuang Yeh | 3 |
| Magnetic Resonance Imaging Principles and Applications | Fu-Nien Wang | 3 |
| Applications of Synchrotron Radiation and Neutron Beams | Chih-Hao Lee | 3 |
| Nano/Micro Biomedical and Fluidic Systems | Fan-Gang Tseng | 3 |
| Biomedical Epidemiology and Molecular Toxicology | Chun-Yu Chuang | 3 |



環境科學館
Engineering and
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International Ph.D. Program in Biomedical Engineering

Scholarships

International students can apply for various scholarships or financial aid packages. Scholarships are available from different sources such as the following:

1. NTHU International Student Scholarships: TWD 20,000 (about USD 625) / month
2. Government Scholarships
 - (1) Taiwan Scholarship (Taiwan Embassy): TWD 30,000 (USD 909) / month
 - (2) Taiwan International Cooperation and Development Fund (ICDF) Scholarship: TWD 15,000 (USD 455) / month
3. College/Department Scholarship according to academic performance, Research/Teaching Assistant Scholarship based on availability: TWD 10,000~30,000 / month (can be obtained in addition to NTHU scholarship)

More information about the available scholarships can be found here:

- <http://oia.nthu.edu.tw/>
- <http://english.moe.gov.tw/ct.asp?xItem=12482&CtNode=11364&mp=1>

Application

Applications to the International Ph.D. Program in Biomedical Engineering are due by March 15 (Fall / September semester) and November 1 (Spring / February semester). For more information or to request supplemental documents, please refer to the following contact information:

Office of International Affairs

- Tel: +886-3-5162461 ▪ Email: dis@my.nthu.edu.tw
- <http://oia.nthu.edu.tw>



Degree Requirements

The requirements in order to receive the diploma are as follows: 18 credits (including the core courses), qualifying exam, and two SCI published manuscripts. Please see the curriculum brochures of BMES and ESS for more information.

- <http://www.bmes.nthu.edu.tw>
- <http://www.ess.nthu.edu.tw>

Contacts

College of Nuclear Science

- Tel: +886-3-5719773 ▪ Fax: +886-3-5716526 ▪ E-Mail: nuclear@my.nthu.edu.tw
- <http://www.nucl.nthu.edu.tw>

Department of Biomedical Engineering & Environmental Sciences

- Tel: +886-3-5725077 ▪ Fax: +886-3-5718649 ▪ E-Mail: ns@my.nthu.edu.tw
- <http://www.bmes.nthu.edu.tw>

Department of Engineering and System Science

- Tel: +886-3-5742663 ▪ Fax: +886-3-5720724 ▪ E-Mail: office@ess.nthu.edu.tw
- <http://www.ess.nthu.edu.tw>