



Ph.D Joda

Taiwan International Graduate Program Academia Sinica

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December 20, 2007

PÉCSI TUDOMÁNYOS EGYETEM ÁLTALÁNOS ORVOSI TUDOMÁNYI KAR LÉRKÖZI FŐVETÉL	
Érkezett: 2008 FEBR 13.	
Iktatószám: 102-495	Melléklet:

/ 2008

Dear Colleague,

Academia Sinica, the preeminent research institution in Taiwan, is pleased to announce that its Taiwan International Graduate Program is now accepting applications for the 2008-2009 academic year.

Founded in 1928, Academia Sinica is now an internationally known research institution with more than one thousand researchers from Taiwan and abroad, most of them respected scholars in their fields, working in thirty one institutes and research centers.

In 2002, Academia Sinica established the "Taiwan International Graduate Program" (TIGP), a Ph.D. granting program in cooperation with the most prestigious national universities in Taiwan. Currently, it offers eight Ph.D. programs and those who successfully complete the academic requirements will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP. There is a possibility for scholarships for successful TIGP candidates.

Enclosed is the information on TIGP and an application form. Further details are available on our website at: <http://tigp.sinica.edu.tw/>. Your assistance in distributing our announcement and program brochure would be much appreciated.

Sincerely,

Chao-Han Liu, Ph.D.
Director
Taiwan International Graduate Program
Vice President, Academia Sinica



Taiwan International Graduate Program (TIGP)

Molecular and Biological Agricultural Sciences (MBAS)

Introduction

There has been a long history of agriculture-related research in Academia Sinica, starting about 40 years ago with a breeding program in Taiwan's local rice varieties. Since then, various life science research institutes have been working on a wide range of agricultural projects including crop plant improvement, aquaculture, and others. More recently, Agricultural Biotechnology Research Center, Plant and Microbial Biology, Cellular and Organismic Biology, Molecular Biology, and Biological Chemistry, to varying degrees, have developed research projects, to address specific issues in specialized areas of agricultural biology.

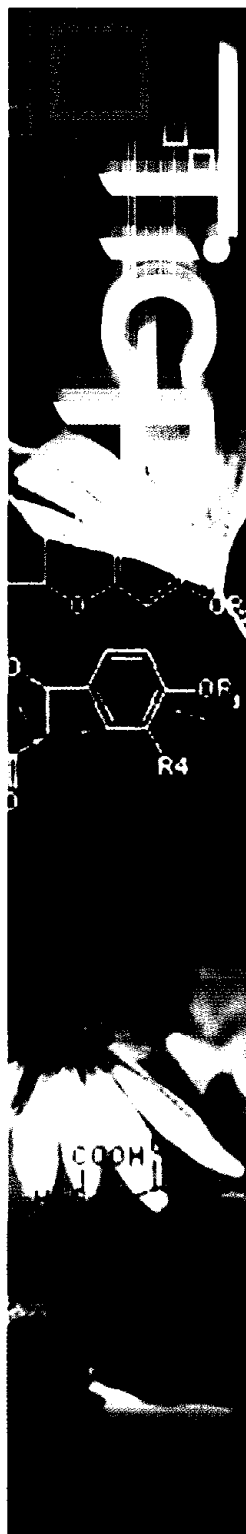
To keep up with the pace of today's fast evolving scientific and technological world, we emphasize the need for building an innovative and integratable graduate school program that, at the outset, addresses the necessary measures to accomplish complementation or harmony between agricultural biotechnology and bio-diversity/environmental protection. The Molecular and Biological Agricultural Sciences (MBAS) program pursues basic and applied mission-oriented research in the bio-agricultural sciences that has the potential to lead to new platform technologies to develop into novel systems and industrial applications in biotechnology. Three or four emerging core technology systems in molecular and biological agriculture are emphasized. Besides, highlighting innovative research and development programs, the MBAS program will also try to provide networking opportunities and information systems to satisfy the communication and technological needs of the agricultural and business sectors of the biotechnology industry in Taiwan and worldwide.

In order to reach these objectives, we have invited various faculties and scientists in agricultural and biotechnology research from National Chung Hsing University and other universities to join hands with Academia Sinica to establish a strong teaching and research program for graduate studies in molecular and biological agriculture. The vision of this MBAS program is to facilitate the integration and upgrading of these resources in order to create an effective, internationally competitive graduate program of molecular biology in agriculture.

A key emphasis of the MBAS program is to promote "translational" research whenever it is possible, particularly when specific new breakthrough findings in basic research can be readily and efficiently translated into experimental research projects in our own programs, and demonstrated to have the potential to be transformed or engineered into platform technology systems and industrial applications for agriculture. Graduate students enrolled in the MBAS program are encouraged to participate actively in the design of basic/translational/applied research environment, and to develop the skills to identify and address important issues of modern biotechnology.

The TIGP Program on "Molecular and Biological Agricultural Sciences"

The Taiwan International Graduate Program has been established to attract highly qualified young researchers both from home and abroad in order to booster the development of several frontier areas that are crucial to the future development in science and technology. Therefore, specific graduate programs have been introduced to enhance the innovative potential and academic standards of research in these and related fields. In this context, the graduate program on "Molecular and Biological Agricultural Sciences" is geared up to build a research and teaching environment that can inspire young graduate students to engage themselves in innovative and inter-disciplinary studies in bio-agriculture. At the outset, we intend to train our students to employ multi-disciplinary approaches to address specific and important questions in biotechnology, and to develop emerging technology or experimental systems that can contribute to future agricultural biotechnology research and development. Therefore, the curriculum is



oriented toward self-motivated and talented students, who are determined to acquire a solid background and training to pursue an original thesis project as part of their career development.

To acquire a sound and fundamental training in basic modern biology and biotechnology research, students should take two core courses focused on in-depth comprehensive training in advanced molecular biology, cell biology, and biochemistry before engaging in research in applied bio-agricultural science and biotechnology.



Faculty and Staff

Academia Sinica

Agricultural Biotechnology Research Center

Ming-Tsair Chan
Ph.D., Dept. of Agronomy, National Taiwan University
Plant gene transfer, plant physiology and molecular biology, tissue culture

Yee-Yung Charng
Ph.D., Dept. of Biochemistry, Michigan State University
Biochemistry, molecular biology, biotechnology

Tzyy-Jen Chiou
Ph.D., Physiological and Molecular Plant Biology Program, Univ. of Illinois
Sugar/phosphate transport, plant-mycorrhiza interaction

Pei-Wen Hsiao
Ph.D., Endocrinology and Reproductive Physiology Program, Univ. of Wisconsin- Madison
Steroid regulated gene expression, chromatin and gene regulation, cancer cell biology and molecular biology, prostate cancer

Shu-Mei Liang
Ph.D., Biochemistry, Univ. of Arkansas for Medical Sciences
Immunology in innate response and cytokines, vaccinology, protein engineer, signal transduction

Lie-Fen Shyur
Ph.D., Dept. of Agricultural Chemistry, National Taiwan University
Metabolomics and cancer chemo-prevention bioactivities of medicinal herbs; protein engineering and directed evolution of industrial enzymes

Kin-Ying To
Ph.D., Dept. of Botany, National Taiwan University
Transgenic plant biotechnology, plant functional genomics, plant molecular biology

Ning-Sun Yang
Ph.D., Biochemical Genetics, Michigan State University
Transgenic plants, GMO, herbal medicine and DNA vaccines

Wen-Chin Yang
Ph.D., Institut de Cancerologie et d'Immunologie de Marseille, Universite Mediterranee, France
T cell development and activation, signal transduction in T cells, immunology, cell biology, molecular biology, biochemistry, mouse genetics (transgenic and knockout mice)

Kuo-Chen Yeh
Ph.D., Plant Biology Graduate Group, UC Davis
Plant biology, enhance the production of secondary metabolites in Chinese herbal medicine

Institute of Plant and Microbial Biology

Long-Fang Chen
Ph.D., Plant Breeding and Cytogenetics, Iowa State University
Plant molecular markers and flow cytometric analysis

Wan-Hsing Cheng
Ph.D., Plant Molecular and Cellular Biology Program, Univ. of Florida
Plant molecular biology, functional genomics, and sugar signal transduction

Hsiu-An Chu
Ph.D., Biochemistry, UC Riverside
Structure and function of photosynthetic reaction centers

Teng-Yung Feng
Ph.D., Dept. of Biophysics, Univ. of Chicago
Molecular mechanism of plant and microbe interaction

Hong-Yong Fu
Ph.D., Plant Molecular Biology, Texas A&M University
Functions and mechanisms of ubiquitin-mediated proteolysis

Tuan-Hua David Ho
Ph.D., Biochemistry, Michigan State University
Hormone and stress regulated gene expression, function of stress proteins

Ming-Hsiun Hsieh
Ph.D., New York University
Plant molecular genetics

Yue-Ie Hsing
Ph.D., Dept. of Agronomy, Univ. of Illinois
Plant genome, functional genomics, seed development

Li-Chun Huang
Ph.D., Dept. of Botany and Plant Sciences, UC Riverside
Plant tissue culture

Guang-Yuh Jauh
Ph.D., Dept. of Botany and Plant Sciences, UC Riverside
Plant cell biology and sexual reproduction

Erh-Min Lai
Ph.D., Plant Pathology, UC Davis
Bacterial pathogenesis and plant-microbe interactions, Proteomics

Na-Sheng Lin
Ph.D., Dept. of Plant Pathology, Univ. of Nebraska-Lincoln
Interactions of plant virus, satellite RNA and host plants

Yaw-Huei Lin
Ph.D., UC Los Angeles
Protease and inhibitors, storage proteins

Sunny Wan-Sheng Lo
Ph.D., Molecular Genetics Program, Department of Biological Sciences, St. John's Univ., New York
Molecular genetics, chromatin modifications, gene regulation and ChIP-on-chip

Wolfgang Schmidt
Ph.D., Dept. of Biology, Univ. of Oldenburg, Germany
Plant molecular biology, environmental stress, root development, root physiology

Jei-Fu Shaw
Ph.D., Biochemistry and Molecular Biology, Univ. of Arkansas
Postharvest biotechnology, enzymes and plant molecular farming

Chih-Hua Tsou
Ph.D., Dept. Biology, City Univ., New York
Plant embryology, systematic

Shih-Long Tu
Ph.D., Graduate Institute of Life Science, National Defense Medical Center
Biochemistry and cell Biology, photoreceptors, protein targeting

Long-Chi Wang
Ph.D., Molecular Genetics, Albert Einstein College of Medicine, New York
Plant genetics and molecular biology

Shu-Hsing Wu
Ph.D., Plant Biology, UC Davis
Plant biology, functional genomics

Tien-Shin Yu
Ph.D., National Defense Medical Center
Genetics, cell biology

Institute of Cellular and Organismic Biology

Chi-Yao Chang
Ph.D., National Tsing Hua University, Taiwan
Molecular biology, virology, cellular biology

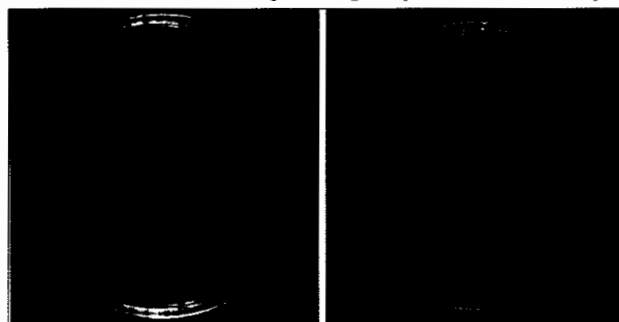
Hsiao-Yung Ho
Ph.D., Dept. of Entomology, Univ. of California, Riverside
Chemical ecology, insects pheromones

Ya-Li Hsu
Ph.D., Oregon State University
Virology, molecular biology, immunology

Yung-Feng Liao
Ph.D., University of Georgia
Neuroinflammation in Alzheimer's disease, notch signaling in neural stem cell development

Jen-Leih Wu
Ph.D., University of Arkansas
Molecular biology, virology, biochemistry, fish pathology

Isolation of senescence-associated genes in high temperature-treated *Arabidopsis*



Institute of Molecular Biology

Yu-Chan Chao
Ph.D., Dept. of Entomol., Univ. of Arkansas
Development of nanotechnologies for engineered protein production, functional genomics, and novel biosensors

Jy-Chian Chen
Ph.D., Dept. of Biol. Sci., Washington Univ.-St. Louis
Plant molecular genetics

Su-May Yu
Ph.D., Dept. of Plant Biology, Univ. of Arkansas
Signal transduction, molecular farming, and rice functional genomics

Research Center for Biodiversity

Shu-Miaw Chaw
Ph.D., Dept. of Biology, Tulane University
Phylogeny of seed plants and molecular evolution

Jiunn-Tzong Wu
Ph.D., Göttingen University, Germany
Phycology, limnology, eco-physiology

National Chung Hsing University

Nei-Li Chan
Ph.D., Dept. of Biochemistry, The Univ. of Iowa
Structural biology, X-ray crystallography, biochemistry

Ban-Yang Chang
Ph.D., Microbiology Group, UC Davis
Gene regulation in prokaryote, protein chemistry

Pi-Fang Linda Chang
Ph.D., Dept. of Horticulture, Purdue University
Molecular plant stress biology, plant biotechnology, molecular biology of plant-pathogen interactions

Poa-Chun Chang
Ph.D., National Yang Ming Medical College, Taiwan
DNA replication of streptomyces plasmid, regulation of gene expression during antibiotics production in streptomyces, molecular genetic study of virus, development of genetic engineering vaccine

Tien-Jye Chang
Ph.D., Dept. of Veterinary Microbiology, UC Davis
Molecular virology, vaccine development

Jiann-Hwa Chen
Ph.D., Dept. of Biochemistry and Molecular, The Pennsylvania State University
Molecular biology, microbiology

Paris Honglay Chen
Ph.D., Dept. of Civil Engineering, UC Berkeley
Bio-engineering, environmental engineering, bio-environmental management, bio-environmental medicine

Liang-Jwu Chen
Ph.D., Dept. of Plant Molecular Biology, Univ. of Illinois
Plant molecular biology, chloroplast genetic engineering, functional genomics

Chia-Chung Chen
Ph.D., Dept. of Agricultural Engineering, Univ. of Minnesota
Biosensing systems, environmental control of protected culture

Pei-Chung Chen
Ph.D., Institute of Plant Physiology, Universitat Goettingen, Germany
Hydrogen production from algae, attached mechanisms of epipellic diatoms

Chuan-Mu Chen
Ph.D., Dept. of Animal Science, National Taiwan University
DNA methylation and imprinting in developmental embryo; transgenic animal technology

Lung-Chung Chen
Ph.D., Dept. of Plant Pathology, Tohoku University, Japan
Fungal genetics and biotechnology, fungal-plant interactions, molecular biology and edible and pharmaceutical fungi

Tony J. Fang
Ph.D., Dept. of Food Science and Technology, The Ohio State University
Fermentation biotechnology, food microbiology, food safety control system

Yau-Heiu Hsu
Ph.D., Dept. of Plant Pathology, Univ. of Nebraska
Plant molecular virology

Chung-Chi Hu
Ph. D., Dept. of Plant Pathology, Univ. of Kentucky
Molecular plant virology, bioinformatics

Nien-Tai Hu
Ph.D., Biochemistry, Saint Louis University
Molecular biology, biochemistry, bacterial genetics

Mu-Chiou Huang
Ph.D., Dept. of Animal Science, National Taiwan University
Animal breeding and genetics, molecular biology

Yuh-Ming Huang
Ph.D., Dept. of Plant Sciences, Oxford University
Soils management of organic wasteland and wastewater,
fertilizer applications, land use evaluation

Jenn-Wen Huang
Ph.D., Dept. of Plant Pathology, Univ. of Georgia
Ecology and integrated management of plant pathogens

Fuh-Jyh Jan
Ph.D., Dept. of Plant Pathology, Cornell University
Plant virology, diagnosis of plant virus diseases, plant bio-
technology

Hsin-Mei Ku
Ph.D., Dept. of Plant Biology, Cornell University,
Plant molecular biology, plant molecular genetics, plant ge-
nomics, and plant molecular breeding

Mei-Chin Lai
Ph.D., Dept. of Microbiology, Univ. of Rhode Island
Archaea, methanogen, extreme halophiles, environmental
microbiology, osmoregulation, biopolymer

Wen-Shann Lee
Ph.D., Dept. of Environment Horticulture, Univ. of Florida
Olericulture, soilless culture

Long-Huw Lee
Ph.D., D.V.M., Univ. of Georgia
Animal virology, viral pathogenesis, avian medicine

Wei-Ming Leu
Ph.D., Institute of Biochemistry, National Yang-Ming Medi-
cal College, Taiwan
Molecular biology, biochemistry

Yi-Sheng Lin
Ph.D., Dept. of Plant Pathology, Washington State University
Plant disease and ecology of soilborne plant pathogens

Menghsiao Meng
Ph.D., Dept. of Microbiology and Public Health, Michigan
State University
Protein engineering, enzymology

Cheng-Chu Nee
Ph.D., Dept. of Horticulture, Oregon State University
Deciduous fruit tree, physiology of dormancy

Ching-Hsiu Tsai
Ph.D., Genetics Program, Oregon State University
Plant molecular virology

Jason T. C. Tzen
Ph.D., Genetics, UC Riverside
Structure-function and application of seed oil body proteins

Kuo-Ching Tzeng
Ph.D., Dept. of Plant Pathology, Univ. of Wisconsin
Bacterial plant diseases and physiological plant pathology

Der-Syh Tzeng
Ph.D., Dept. of Plant Pathology, UC Davis
Physiological and molecular plant pathology, free radical
chemistry

Co-Shine Wang
Ph.D., Dept. of Biochemistry, Kansas State University
Plant development, molecular biology

Min-Ying Wang
Ph.D., Dept. of Chemical Engineering, Univ. of Maryland at
College Park
Biochemical engineering

Sheng-Yang Wang
Ph.D., Dept. of Forestry, National Taiwan University
Natural product chemistry, wood chemistry

Chang-Hsien Yang
Ph.D., Genetics Graduate Group, UC Davis
Plant molecular biology, plant molecular genetics

Jeng-Tze Yang
Ph.D., Dept. of Entomology, National Chung Hsing University,
Taiwan
Insect taxonomy and biodiversity, insect acoustics

Shyi-Dong Yeh
Ph.D., Dept. of Plant Pathology, Cornell University
Molecular studies on papaya ringspot potyvirus and water-
melon tospovirus, control of plant viruses by transgenic ap-
proaches

Hungchen E. Yen
Ph.D., Program in Plant Physiology, Washington State University
Plant stress physiology, biochemistry and molecular biol-
ogy, with a specialty of salinity stress in higher plants

Visiting Professors

Stanton B. Gelvin
Department of Biological Sciences, Purdue University, USA

Lan-Ying Lee
Department of Biological Sciences, Purdue University, USA



Research Topics

The Molecular and Biological Agricultural Sciences gradu-
ate program will focus its research projects and themes
more on the regional needs or issues of agriculture; for
example, on the sub-tropical crop or flower plant systems,
major infectious diseases of pig or chicken farms, and warm
water marine products, and the subtropical herbal plant
systems of Chinese traditional medicine. The program will
encourage students to develop strong ability for reasoning,
logical thinking and decision-making and practical skills in
strategic research of biotechnology. With this intention four
subprograms and related research areas have been defined
and actively pursued in the program. These include:

- Subprogram I:
Plant Sciences and Biotechnology

- Subprogram II:
Molecular Virology and Vaccine Technology for Agricultural Applications
- Subprogram III:
Applications of Protein Engineering to Bio-industry
- Subprogram IV:
Phytochemistry and Herbal Medicine

- Students are required to complete the core courses during the first two years
- Multiple elective courses will be continuing throughout the period of the graduate training
- Students are required to produce a preferably dual-discipline/-area thesis/report research project under guidance of an advisor

Course Programs

1. Core Courses:

- (1) Molecular & Cellular Approaches for Biotechnology, Advanced Plant Biology and Advanced Animal Biology: Students are required to take two of these three core courses, depending on their research emphasis. These courses have been designed to cover the basic principles of biochemistry, molecular biology, and also cell biology, application of transgenic technology in modern biotechnology and also the broad based human experience in agricultural sciences.
- (2) Seminars and Symposia: Four credits of seminar (one credit per semester) have to be taken during the first two years of the Ph.D. program.
- (3) Laboratory Rotations: Students are required to participate in two laboratory rotations in different labs within MBAS program in the first year.

2. Elective Courses:

- (1) Track Courses
 1. Topics in Bio-Agricultural Sciences
 2. Plant-Environment & Plant-Pest Interactions (offered by subprogram I)
 3. Plant Genetics and Genomics (offered by subprogram I)
 4. Molecular Virology (offered by subprogram II)
 5. Emerging Vaccine Technology (offered by subprogram II)
 6. Application of Protein Engineering to Bio-industry (offered by subprogram III)
 7. Phytochemistry and Herbal Medicine (offered by subprogram IV)
- (2) Other Courses
 8. Elective courses offered by other programs under TIGP
 9. Selected courses offered at National Chung Hsing University

3. TA and Chinese Language

TA experience is an essential part of our program. Thus, all students from TIGP must serve as TA for at least one semester. Additionally, in order to help their daily lives' communication with the local people, international students are required to take one year course of Mandarin Chinese.

Curriculum Highlights

- All courses will be conducted in English. The main features of the curriculum of Molecular and Biological Agricultural Sciences graduate program are as follows:
- Students are expected to complete their Ph.D. program within four to five years.
- Students have a broad choice of research topics in basic and applied bio-agricultural sciences and technology

Degree Requirements

Research advisors who supervise students' doctoral theses researches are selected before the end of the second year. Students have to pass the qualifying examination for Ph.D. candidacy before the end of the third academic year. An original research proposition in a non-thesis-related research and an oral defense of the written proposal are required. The proposal should include a clear outline of goals and specific aims of the proposed research, and should provide a description of the issues to be resolved within broader scientific context of the field. After successful defense of the research proposal, a thesis advisory committee is constituted by the research advisor to guide the student with his/her doctoral research. Usually, after the requirements of the qualifying exam have been satisfied, the student is advanced to the candidacy, to focus on his/her doctoral research.



Thesis Preparation and Defense

Upon completion of thesis research, the student prepares a written thesis and submits the thesis for approval by the thesis advisory committee. The student subsequently presents an oral seminar on his/her research, and defends the work before the thesis committee.

Summary of Credits

Total credits to be taken to complete MBAS Ph.D. program:

Courses	18 credits
Thesis preparation	12 credits
Seminars	4 credits
Rotation	2 credits
Total:	36 credits

Admission to the Ph.D. Program

The MBAS Program Admission Committee considers all applicants for admission on an individual basis. Prospective students are encouraged to correspond with participating faculty whose research most closely matches their own interest.

Admission decisions are based on a number of factors, such as candidate's academic background, statement of purpose, letters of recommendation and relevant work experience. The appropriateness of your goals to the program and to the research interests of its faculty will also be considered.



Requirements for Admission

The minimum graduate admission requirements are: (1) a bachelor's degree or an equivalent from an accredited institution; (2) evidence of adequate undergraduate training in the biological sciences, or related field; and (3) a satisfactory grade point average (GPA), usually a minimum of 3.0 (A=4.0).

1. Academic Records and Degree Certificates.

Applicants are required to submit official records and certificates from each academic institution attended after senior high school. Official records must either be the original documents issued by the institution, which bear the original stamp or seal of the issuing institution and the signature or signature stamp of the appropriate authorizing official, or duplicate copies that are certified by a university officer.

The records must be issued in the original language and accompanied by English translations prepared by the issuing institution. If English translations are not available from the institutions issuing your records, you may have a translation prepared by a government translator or an official translator. They must state that this is a complete and exact word-for-word translation of the original. The translator's statement should be prepared on the letterhead of the translator's institution. Translators must sign their statements in ink and indicate their title. If possible, translators should also use the stamp or seal of their institution.

Academic records must show the dates of your enrollment, all subjects or courses taken, units, credits per hour, and grades earned in each subject. If rank is determined by the results of comprehensive examinations, records should show the examination date and your scores, rank, class, and division. All records must include a complete description of institutional grading scales or other standards of evaluation with maximum grades and mini-

imum marks indicated. If official academic records issued by your institution do not list the courses or subjects studied in preparation for comprehensive examinations or identify the topics on which you were examined, you should prepare two copies of course descriptions or lists of lectures, seminars, or laboratory periods attended during the academic year. Wherever possible you should include hours per week devoted to each subject and marks earned in that subject. A university officer or the supervisor of your studies should certify that such course descriptions or lists are complete and accurate.

2. Statement of Purpose and Research Plan.

The statement should be typed in English on A4 papers, and should not exceed 2 pages.

3. Letters of Recommendation.

At least three letters of recommendation are required. Letters should be submitted in sealed envelopes with signatures of the reference across the seal.

4. English Proficiency Requirement.

Applicants whose native language is not English must submit the score on the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) unless they have studied for two or more years in a college or university in a country where English is both the language of instruction and the native language. The minimum requirement is as below:

TOEFL score: 550 on paper-based, or 213 on computer-based, or 79 on internet-based test

IELTS score: 5.5

Applicants who are graduates of English-speaking universities are not required to take these tests.

Applicants in Taiwan may take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center. Applicants are required to submit their High-intermediate level certificate when applying for admission.

The Graduate Record Examination (GRE).

All applicants must formally submit GRE's General Test scores to be evaluated for admission. An advanced Subject Test in biochemistry, chemistry, biology, cell and molecular biology, or physics is strongly recommended. However, an applicant who fails to meet this requirement may be evaluated by additional submitted criteria for demonstrable reasons determined by the committee on graduate studies.

Applicant's published paper(s) will be useful for admission.

The above submitted application materials will not be returned to applicants under any circumstances. An early decision maybe made on January 31 for the applicants who submit their applications before this date. The final decision to all applicants will be made after the final application deadline on March 31, 2008.

Please send the complete application materials to:

Admissions Office
Taiwan International Graduate Program
128, Sec. 2, Academia Road
Nankang, Taipei 115
Taiwan

TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>.

Student Status and Degree Conferral Policy

Based on the Regulations of the Ministry of Education in

Taiwan, students will officially register with our partner university i.e. Graduate Institute of Biotechnology at National Chung Hsing University. Upon completion of the program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Cost of Study

The payment of tuition fees (about US\$ 900 per semester) is due upon registration.

Fellowship and Stipends

The TIGP will provide appropriate fellowship support for all graduate students for 3 years. The stipend levels are about NTD32000 (about US\$980) per month. The second and third year students will receive assistantship based on their academic performance in the past year. In subsequent years, the students may be funded by their thesis advisors.



Medical Insurance

Four months after they receive their student I.D., the students will qualify for Taiwan's National Health Insurance Program. The students are expected to pay the same premium (about US\$210 per year) as all the Taiwan citizens and will be entitled to the same medical coverage.

Living and Housing Costs

Options include on-campus housing and off-campus housing. On-campus self-catering student dormitory providing single study bedrooms is available to TIGP students at reasonable costs (for details please visit our website at <http://www.sinica.edu.tw/~tigrp/dorm.html>). Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$5,000-15,000 per month.

Meals are available on campus at the Activity Center Cafeteria, the Café, the Chinese Restaurant, and the Western Restaurant at modest costs. Various types of local cuisines are also available at off-campus cafeterias and restaurants within walking distance and at affordable costs.

Correspondence and Information

For general information concerning TIGP, please contact:

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
Academia Sinica
E-mail: nancyy@gate.sinica.edu.tw
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Fax: 886-2-2785-8944

For information concerning this program, please contact:

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Miss Hsuan Wu
Secretary
Agricultural Biotechnology Research Center
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<http://tigrp.sinica.edu.tw>

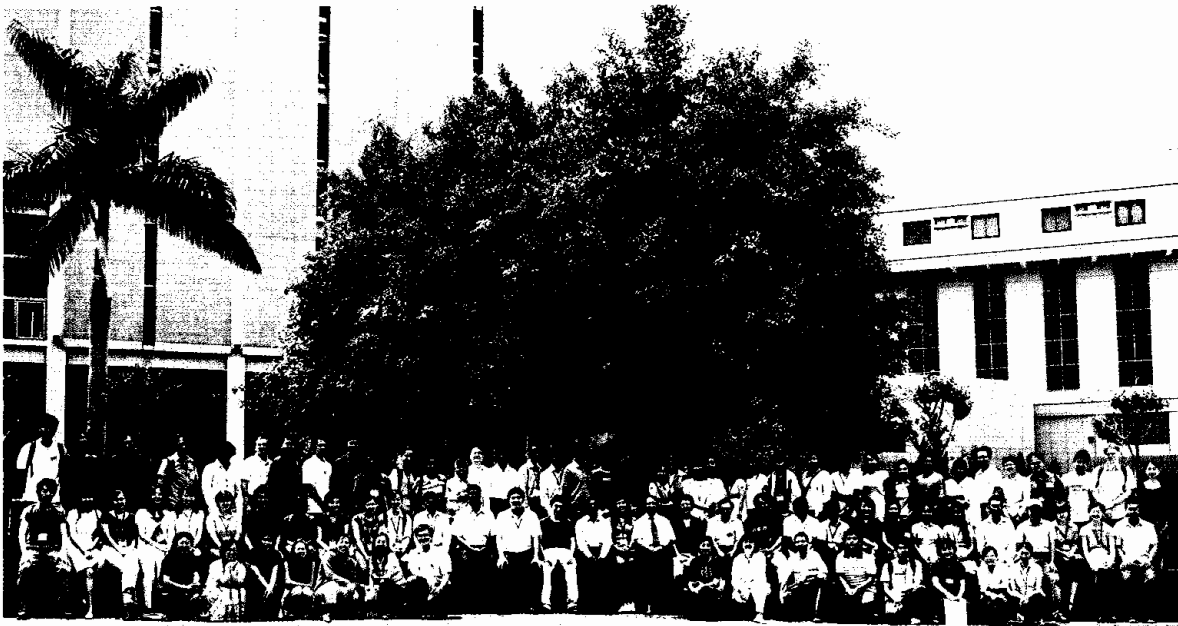
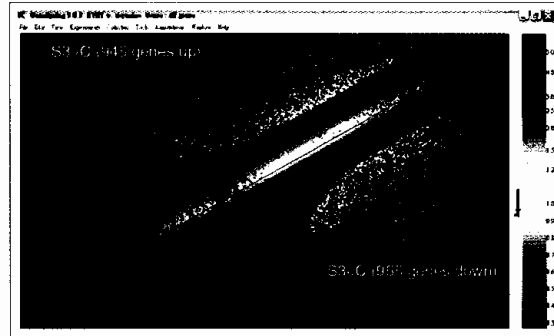
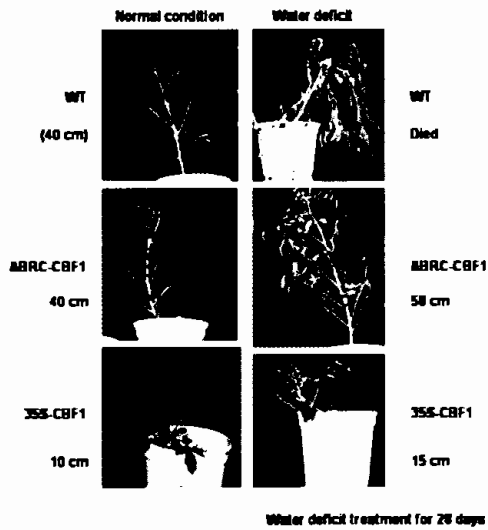
Agricultural Biotechnology Research Center, Academia Sinica:
<http://abrc.sinica.edu.tw/>

Institute of Plant and Microbial Biology, Academia Sinica:
<http://ipmb.sinica.edu.tw/index.html>

Institute of Molecular Biology, Academia Sinica:
<http://www.imb.sinica.edu.tw/en/>

Institute of Cellular and Organismic Biology, Academia Sinica:
<http://www.icob.sinica.edu.tw/>

National Chung Hsing University:
<http://www.nchu.edu.tw/>



TIGP Orientation, Academia Sinica, Taiwan (2006)

This Program is sponsored by
 Agricultural Biotechnology Research Center,
 Institute of Plant and Microbial Biology,
 Institute of Molecular Biology,
 Institute of Cellular and Organismic Biology,
 Academia Sinica

In cooperation with
 Graduate Institute of Biotechnology,
 Department of Life Sciences,
 National Chung Hsing University



Taiwan International Graduate Program (TIGP)

Bioinformatics Program

Introduction

Academia Sinica has established the Taiwan International Graduate Program (TIGP) in collaboration with a consortium of key national research universities in Taiwan. The purpose of the program is to develop the research manpower pool in those modern multidisciplinary fields that are important in the future economical and social development of Taiwan and to enhance the innovative potential and academic standards of research in these and related fields.

TIGP will offer Ph.D. programs in only selected disciplines to be agreed upon between Academia Sinica and its national research universities partners. It is the intent of the Program to offer Ph.D. degree programs only in inter-disciplinary areas in the physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences.

Academia Sinica will assume principal oversight of the academic options of the Program. It will provide the intellectual leadership, the research resources, and the research and physical facilities. Qualified and interested faculty members of the participating national research universities are invited to join the various programs as affiliated faculty of the Program, and participate in the teaching of courses, supervision of research, and mentoring of the international graduate students.

The TIGP Program on "Bioinformatics"

The Taiwan International Graduate Program has been established to attract highly qualified young researchers both from home and abroad in order to help jump-start the development of several frontier areas that are crucial to the future development in science and technology. Specific graduate programs have been developed to enhance the innovative potential and academic standards of research on these and related fields. Within this context, the graduate program on "Bioinformatics" is designed to offer specific training and research opportunities to Ph.D. students interested in working on this particular area.

The TIGP Program on Bioinformatics (BP) is a joint-degree program sponsored by Academia Sinica (Institute of Information Science, Institute of Statistical Science, and Institute of Biomedical Sciences), National Tsing Hua University, National Chiao Tung University, and National Yang Ming University. Additional teaching support will be available from other major research universities in Taiwan. Unlike most Bioinformatics programs offered in other universities that adopt existing courses in various departments, our courses are specifically designed for BP students and taught by active and experienced researchers in bioinformatics. The program provides interdisciplinary training and research opportunities that seamlessly integrate the related areas so that students can be well-prepared for independent research in these new, fascinating areas of bioinformatics. We will focus on genetics and proteomics study and emphasize data transfer, data analysis, biological information and biological feature extraction, knowledge management using advanced computation methodologies and computer science technology.

Research Topics

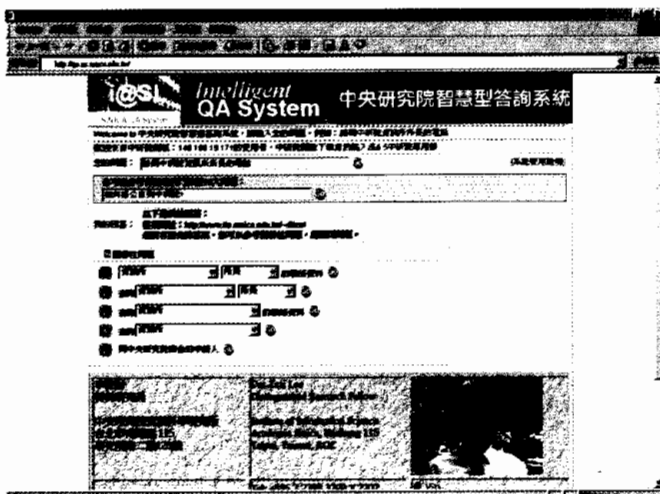
- (1) **Computational biology:** This area focuses on the design of various algorithms for sequence analysis, gene prediction, disease gene mapping, motif finding, and gene networks.
- (2) **Biological knowledge management:** This area focuses on the integration of various heterogeneous databases, biological knowledge representation, automation of pipeline experiments,



and the construction of various annotation databases. In addition, biological literature search is also a crucial component.

(3) Bioinformatics applications: This area focuses on using existing tools to analyze biological sequences, microarray data, proteomic data, etc. Statistical analysis and data mining techniques will be used to reach the goal of "information-driven biomedical research."

(4) Computational structural biology: This area focuses on protein structure prediction and classification, automated biomolecule docking, and molecular dynamics.



Faculty and Staff

Academia Sinica

Institute of Information Science

Der-Tsai Lee
Ph.D., University of Illinois, Urbana
Computational geometry, computational molecular biology

Wen-Lian Hsu
Ph.D., Cornell University
Algorithms, computational molecular biology, intelligent agents, knowledge management, natural language processing

Chun-Nan Hsu
Ph.D., University of Southern California
Intelligent agents, machine learning

Ting-Yi Sung
Ph.D., New York University
Algorithms, knowledge management, computational molecular biology

Huai-Kuang Tsai
Ph.D., National Taiwan University
Bioinformatics, Evolutionary algorithm

Institute of Biomedical Sciences

Ming-Jing Hwang
Ph.D., University of Pittsburgh
Computational biology, bioinformatics, structural biology, genome science

Wen-Chang Lin
Ph.D., Case Western Reserve University
Bioinformatics, tumor biology

Shen-Jang Fann
Ph.D., University of Iowa
Genetic statistics, genetic epidemiology

Yuh-Shan Jou
Ph.D. Michigan State University
Cancer Genomics, Tumor Biology, Bioinformatics

Institute of Statistical Science

Chun-Houh Chen
Ph.D., University of California, Los Angeles
Bioinformatics, Information visualization, multivariate analysis, statistical computing

Shwu-Rong Shieh
Ph.D., University of Wisconsin, Madison
Analysis of microarray gene expression data, construction of gene networks and biomedical pathways, directional data

Genomics Research Center

Wen-Hsiung Li
Ph.D., Brown University, Providence, RI, USA
Evolution of gene regulation, Evolution of duplicate genes, Development of statistical methods and computational analysis of genomic data

An-Suei Yang
Ph.D., The Johns Hopkins University
Computational structural biology and structural bioinformatics for recombinant antibody/protein design and engineering with high throughput phage display platform

Institute of Molecular Biology

Cheng-Ting Chien
Ph.D., SUNY at Stony Brook, USA
Neural development and Protein degradation control

Institute of Botany

Yue-Ie Hsing
Ph.D., University of Illinois
Comparative genomics, global analysis of gene expression, positional cloning of specific rice genes, transposable elements of plant genome

National Yang Ming University

Ueng-Cheng Yang
Ph.D., Princeton University
Information-driven biomedical research: integration of genome, transcriptome, and proteome information, disease gene hunting

Wailap Victor Ng
Ph.D., University of Massachusetts
System biology

Chuan-Hsiung Chang
Ph.D., University of Southern California
Comparative genomics, genome engineering

Hsuan-Cheng Huang
Ph.D. in Physics, National Taiwan University
Computational Systems Biology, Network Biology

Hsei-Wei Wang
Ph.D., National Taiwan University
Informatics-driven cancer and stem cell research

Kun-Pin Wu
Ph.D., National Taiwan University
Algorithms, Computational Proteomics, Immunoinformatics

National Chiao Tung University

Jenn-Kang Hwang
Ph.D., University of Southern California
Computational structural biology, molecular simulation, QM/MM simulation

Yuh-Jyh Hu
Ph.D., University of California, Irvine
Bioinformatics, machine learning, data mining, artificial intelligence

National Tsing Hua University

Chuan Yi Tang
Ph.D., National Chiao Tung University
Algorithms, computational biology, bioinformatics, protocol testing, parallel processing

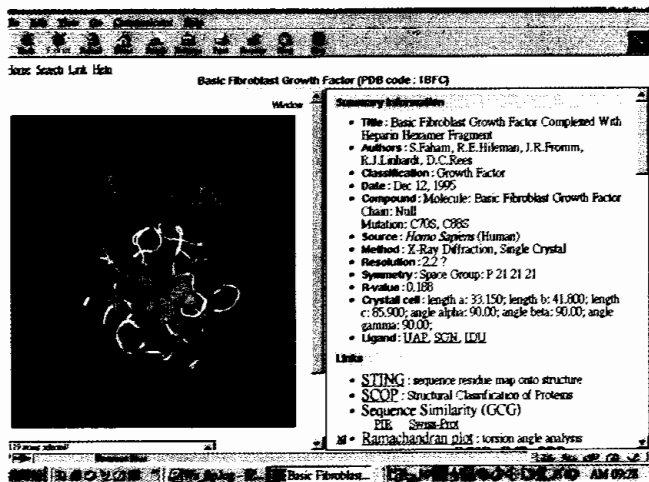
P. C. Lyu
Ph.D., New York University
Computational structure genomics, de novo protein design

National Taiwan University

Kuan-Mao Chao
Ph.D., The Pennsylvania State University
Algorithms, computational molecular biology, network design

Chih-Jen Lin
Ph.D., University of Michigan
Support vector machine, semi-definite programming

Hung Chen
Ph.D., University of California, Berkeley.
Efficient semi-parametric modeling, locating maximizer of a nonlinear function, missing covariate problem and continuous time Markov chain with applications to cancer modeling



Course Programs

There are three types of courses: (1) Required courses: courses to be taken by all students. (2) Core courses: basic courses in molecular biology and computing methods. Students with sufficient prior background can waive some of these courses (if approved by the program committee). (3) Elective courses. A total of 24 credit units are required for graduation.

1. Required courses:

1. Directed Reading (1 credit unit, 1.5 hours/week for two semesters)
2. Seminar (1 credit unit per semester, a total of 4 credit units)

2. Core courses:

B1. Basic molecular biology for bioinformatics I (3 credit units)

- Functions of the molecules and organelles in the cell
- Basic strategies of biochemistry-assay and cell fraction
- Enzyme kinetics and mechanisms
- Major pathways and principles in biology
- Introduction to genetics
- Introduction to genes and gene structures
- Gene expression & regulation
- DNA replication & other perpetuations
- Genetic engineering
- Introduction to protein structures
- Forces that determine protein structures
- Protein structure determination
- Protein structure prediction

B2. Basic molecular biology for bioinformatics II (3 credit units)

- Genome Sequence Acquisition & Analysis
- The Human Genome Project
- Genomic Variations
- Genomics Databases & Bioinformatics Applications (I)
- Genomics Databases & Bioinformatics Applications (II)
- Introduction to statistical genetics
- Introduction to evolutionary genomics
- DNA Microarrays: principles and applications (I)
- DNA Microarrays: principles and applications (II)
- Transcriptome-related bioinformatics databases & applications
- Protein informatics
- Structural proteomics & drug design
- Protein-protein interaction network and databases
- Databases of biochemical pathways

C1. Biological computing I: Design and analysis of algorithms for biologists (3 credit units)

- Introduction to data structure
- Growth of functions & Asymptotic notation
- Recurrence relations
- Sorting - Insertion sort, Quicksort, Mergesort, Heapsort, Radix sort
- The Greedy method
- The Divide-and-conquer strategy
- Tree searching strategies
- Dynamic programming
- Graph algorithms - Representations, BFS, DFS
- Graph algorithms - MST
- Data mining
- NP-completeness
- Approximation algorithms
- Case studies of computational biology problem specification and modeling solutions

C2. Biological computing II (3 credit units)

- Dynamic programming - applications (alignment, structure prediction).
- BLAST and its variations
- Stochastic processes and probability theory
- Hidden Markov Models
- Basic statistics: random variables, distributions, estimation, testing hypothesis, randomization
- Regression
- Experimental design and ANOVA
- Sampling and resampling
- Statistical graphics
- Analysis of microarray data: data pre-processing, missing data imputation, permutation test
- Association rules: categorical and continuous random variables, relationship among multiple variables
- Multivariate analysis: clustering, PCA, canonical correlation, classification, etc
- Statistical genetics

3. Elective courses:

At least one of the following two courses C3 and C4:

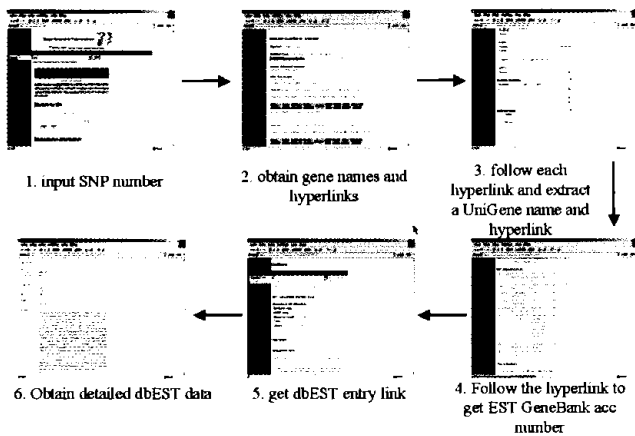
C3. Advanced algorithms in computational biology (3 credit units)

- String matching - KMP, Boyer-Moore
- Sequence analysis algorithms
- Multiple sequence alignment
- Restriction mapping - Double digest problem
- Map assembly - Interval graphs SVM
- Gene-prediction algorithms
- Genome rearrangements
- Phylogenetic trees construction
- Structure prediction
- Protein classification
- Computational proteomics
- Selected topics

C4. Advanced statistical methods (3 credit units)

- Introduction to microarray experiments: principles and experimental design.
- Biomedical image analysis (2D gel, DNA and protein chips)
- Advanced analysis of microarray data
- Markov Chain Monte Carlo
- Exploratory data analysis and visualization
- Cluster analysis: hierarchical clustering, k-means, self-organizing maps, gene shaving, plaid models, dimension reduction, principal component analysis, singular value decomposition, correspondence analysis, multi-dimensional scaling.
- Supervised learning: discriminant analysis, neural networks, error-rate concepts, support vector machines, tree-based methods, bagging, boosting.
- Bayesian networks: graphical probabilistic models and related computation algorithms, applications to genetic networks.
- Comparative genomics. Genetic modeling.
- Current research topics of interest.

L1. Lab work (1 credit unit, spend 6 hours/week working in a lab of students' choice for one semester) This course can be taken more than once, but not with the same lab.



TA and Chinese Language

TA experience is an essential part of our program. Thus, all students from TIGP must serve as TA for at least one semester. Additionally, in order to help their daily lives' communication with the local people, international students are required to take a required one year course of Mandarin Chinese.

Academic System

The program emphasizes research training and developing one's capability and self-confidence for independent research. Once entering this program, students can choose mentors and thesis advisors for their study according to their research interests. Students are required to advance to doctoral candidacy by the end of the third year or the beginning of the fourth year. A student may petition for probation; but he or she still needs to complete this requirement by the end of the fourth year in the program.

In this program, we invite faculty from various disciplines to participate. This program adopts a team-teaching system, where each faculty member teaches a subject according to his or her expertise. In keeping up with the international trend, all courses are offered in English.



Advance to Candidacy

1. Requirements for advancing to candidacy include: Satisfactory completion of coursework: core courses and 24 credit units.
2. Satisfactory performance in a written qualifying exam (must finish before the end of the third year), which will be offered once every year after the winter break. The exam will cover C1, C2, B1, B2 and at least one of C3 and C4.
3. A TOEFL score of 100(IBT) or 250(CBT) is required for non-native speakers.
4. Research Plan approved by the academic committee.
5. Successful defense of the above research plan.

Degree Requirements

1. At least two (full) papers presented at leading international conferences (such as RECOMB, ISMB and PSB) and journals in the field as approved by the exam committee.
2. Ph.D. thesis.
3. Successful defense of the thesis, in which the candidate must show that she/he has made original and substantial scientific contribution.

Admission to the Ph.D. Program

The Program admits students to the fall semester only. The following materials and qualification are required for application:

1. Master's or Bachelor's degree in biology, computer science, statistics or other related areas.

2. Fluency in English: TOEFL score of 550 (213 on computer-based) or higher. However, this can be waived for those who have obtained bachelor or master degrees from English speaking countries.
3. GRE score from the general exam. For the Bioinformatics Program, an applicant may submit one of the following materials in place of a GRE general test score:
 - Any evidence of research ability such as papers published in international conferences or journals.
 - Satisfactory performance in any course or project work related to the design of algorithms or probability such as discrete mathematics, algorithms, computational complexity, data structure, probability, computer architecture, compiler, and computer programming.
4. (Required) Basic programming skills
5. A Statement of Purpose that includes a research plan
6. Official transcripts from academic institutions attended after senior high school
7. Three letters of recommendation
8. GRE score from related subject exam (highly recommended, but not mandatory)

Applicants in Taiwan can take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center. Applicants are required to submit their High-intermediate level certificate when applying for admission.

The above submitted application materials will not be returned to applicants under any circumstances. The complete application materials must reach TIGP before March 31, 2008. Please send them to:

Admissions Office Taiwan International Graduate Program
128 Sec. 2, Academia Road Nankang, Taipei 115 Taiwan

TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>.

Student Status and Degree Conferral Policy

Based on the Regulations of the Ministry of Education in Taiwan, students will officially register with our partner universities i.e. National Tsing Hua University, National Chiao Tung University or National Yang Ming University, depending on their research interests. Upon completion of the program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Cost of Study

The payment of tuition fees (about US\$ 1,500 per year) are due upon registration.

Fellowship and Stipends

The TIGP will provide full fellowship support for all graduate students for 3 years. The stipend levels are about NTD32000 (about US\$980) per month. In subsequent years, the financial support may be provided by the student's thesis advisor.

Medical Insurance

Four months after they receive their student I.D., the students will qualify for Taiwan's National Health Insurance Program. The students pay the same premium (about US\$ 210 per year) as all the Taiwan citizens and will be entitled to the same medical coverage.

Living and Housing Costs

On campus self-catering student dormitory providing single study bedrooms is available to TIGP students at reasonable costs (for details please visit our website at <http://www.sinica.edu.tw/~tigp/dorm.html>).

Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$ 5,000 - 15,000 per month. Meals are available on campus at the Activity Center Cafeteria, the Café, the Chinese restaurant, and the Western restaurant at modest costs. Various types of local cuisines are also available at off campus cafeterias and restaurants within walking distance and at affordable costs.

Correspondence and Information

For general information concerning TIGP, please contact:

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
128, Section 2, Academia Road
Nankang, Taipei 115, Taiwan
E-mail: nancy@gate.sinica.edu.tw
Tel.: 886-2-2789-8050
Fax: 886-2-2785-8944

For information concerning this Program, please contact:

Dr. Wen-Lian Hsu
Institute of Information Science
Academia Sinica
128, Section 2, Academia Road
Nankang, Taipei, Taiwan 115
E-mail: hsu@iis.sinica.edu.tw
Tel: 886-2-2788-3799 ext 1804
Fax: 886-2-2782-4814

Dr. Ting-Yi Sung
Institute of Information Science
Academia Sinica
128, Section 2, Academia Road
Nankang, Taipei, Taiwan 115
E-mail: tsung@iis.sinica.edu.tw
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E-mail: elsapan@iis.sinica.edu.tw
Tel: 886-2-2788-3799 ext 2213
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Our mailing address is:
Taiwan International Graduate Program

Academia Sinica
128, Section 2, Academia Road
Nankang, Taipei 115 Taiwan

Websites Information

Taiwan International Graduate Program, Academia Sinica:
<http://tigp.sinica.edu.tw>

Institute of Information Science, Academia Sinica:
<http://www.iis.sinica.edu.tw>

National Tsing Hua University:
<http://www.nthu.edu.tw>

National Chiao Tung University:
<http://www.nctu.edu.tw>

National Yang Ming University
<http://www.ym.edu.tw>

This program is sponsored by
Institute of Information Science,
Academia Sinica

In cooperation with

Department of Life Science and
Department of Computer Science,
National Tsing Hua University

Department of Life Science



Taiwan International Graduate Program (TIGP)

Computational Linguistics and Chinese Language Processing (CLCLP)

Introduction

Academia Sinica established the Taiwan International Graduate Program (TIGP) in 2002 in collaboration with a consortium of key national research universities in Taiwan. The purpose of TIGP is to develop the research talent pool in multidisciplinary frontier fields and to enhance the innovative potential and academic standards of research in neighboring fields.

Doctoral programs offered by TIGP are jointly determined by Academia Sinica and national research university partners. All degree programs are inter-disciplinary by design. The areas covered include: physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences.

Academia Sinica assumes principal oversight of the academic developments of TIGP. It provides intellectual leadership, research resources, as well as research and physical facilities. Participating universities provide the curriculum infrastructure as well as leading faculty members to complement the research expertise of Academia Sinica faculty members.

The TIGP Program on Computational Linguistics and Chinese Language Processing

Computational linguistics is an inter-disciplinary field that has developed and matured over the past 40 years. It integrates scholarship from the two major component areas of linguistics and computer science. In addition, its current research methodology is highly dependent on statistics. It is considered an essential component of cognitive science. Its relationship with other cognitive science is two-fold: First, it offers the environment as well as tools for the simulation and evaluation of cognitive models of linguistic behavior. Second, and consequently, computational linguistic theories interact with other disciplines in cognitive science and receive feedback from them.

Even though there are many highly-competitive Ph.D. programs in computational linguistics around the world, there is none in Taiwan. In addition, there is no academically competitive computational linguistics program specializing in Chinese Language Processing anywhere in the world. Many international pre-doctoral and post-doctoral fellows have already come to work with Academia Sinica research groups on Chinese computational linguistics over the past nine years. They come from some of the most prestigious American universities, including Stanford and MIT, as well as from Canada, Germany, and Australia. Furthermore, our local computational linguistics society (Association of Computational Linguistics and Chinese Language Processing), together with Academia Sinica, has organized the most prestigious international conference on computational linguistics: the 19th International Conference on Computational Linguistics in 2002. It was the first time ever that this prestigious conference was hosted in a country outside of the EU, North America, or Japan. In our first two years, CLCLP students presented more than 12 papers at international conferences, including ACL and PACLIC.

The Computational Linguistics and Chinese Language Processing Ph.D. program is a joint-degree program sponsored by Academia Sinica (Institute of Linguistics and Institute of Information Science) and National Tsing Hua University (Institute of Information Systems and Applications) and National Taiwan University (Institute of Linguistics). Within the CLCLP program, we offer two tracks for students to choose from: the Human Language Technology (HLT) Track and the Corpus and Computational Linguistics (CCL) Track. Each track has its own research emphases and graduation requirements. But the two tracks will interact and co-operate intensively with each other during the course of a student's studying.

I. The Human Language Technology Track

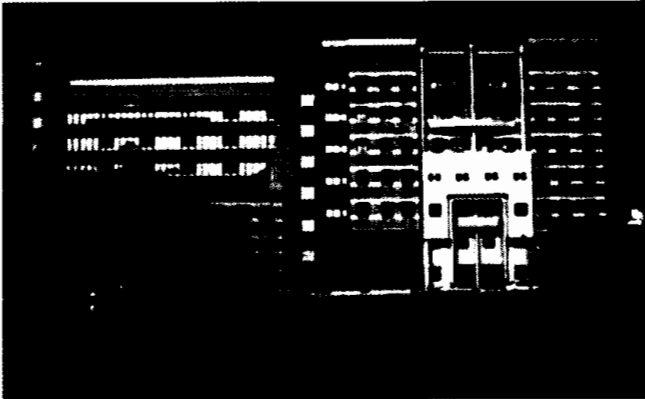
This track focuses on how language sciences can be applied to create technologies that can improve the quality of human life, especially in the area of human communication and

TIGP

knowledge acquisition. Solid training in computer and information science is required in order to implement these technologies, while knowledge of linguistic theory is also essential in modeling and solving the technical issues. Other related fields such as psychology, neural science, sociology, semiotics, can also be integrated to help to create truly innovative HLT.

II. The Corpus and Computational Linguistics Track

This track focuses on scientific understanding of language as well as how computational tools and resources can help us in the scientific study of language. Comprehensive and in-depth training in linguistic theories is essential, as well the ability to use corpora and computational tools to explore linguistic data. Knowledge of neighboring disciplines that can help create broader account of language is also encouraged.



Research and Faculty

The CLCLP program has 15 faculty members with a wide range of research expertise in linguistics, computational linguistics, and information technology. This program offers six research tracks:

Corpus Linguistics and Language Archives

Ching-Chun Hsieh (Academia Sinica):
Digital archives, Intelligent character encoding
Ph.D. in C.S., National Chiao Tung University
Chair Professor, Hsuan Chuang University
Adjunct Research Fellow, Institute of Information Science and Institute of Linguistics, Academia Sinica
Founding President, ROCLING (1989-1991)

Hsien-Chin Liou (National Tsing Hua University):
CALL, TEFL
Ph.D. in Second Language Acquisition and Teacher Education, University of Illinois, Urbana-Champaign

Computational Modeling of Language Cognition and Evolution

Kathleen Ahrens (National Taiwan University):
Conceptual metaphor, Lexical semantics, Human language processing
Ph.D. in Linguistics, University of California, San Diego

Chia-Ying Lee (Academia Sinica): Chinese orthography - phonology transformation
Ph.D. in Psychology, National Chung Cheng University

Information Retrieval and Information Extraction

Lee-Feng Chien (Academia Sinica):
IR-KA, SLP: Search engines, Web data mining
Ph.D. in C.S., National Taiwan University
Consultant, Microsoft Research Asia (2000-present)

Professor, Department of Information Management, National Taiwan University (2005-present)
Deputy Director, Institute of Information Science, Academia Sinica (2003-present)

Wen-Lian Hsu (Academia Sinica):
Information retrieval, Information extraction, Ontology, Question answering, Dialogue
Ph.D. in Operations Research, Cornell University
President, Taiwanese Association for Artificial Intelligence (2001-2002)
Board member, ROCLING
Editorial Board: Information Processing Letters

Knowledge Representation and Acquisition

Chu-Ren Huang (Academia Sinica):
Corpus linguistics, Lexical semantics, Ontology
Ph.D. in Linguistics, Cornell University
President, Linguistic Society of Taiwan
Permanent Member, International Committee on Computational Linguistics
President, ROCLING (1994-1995)
Chair, Organizing Committee, COLING 2002
Editorial Board: Cambridge Studies in Natural Language Processing, Journal of Chinese Linguistics, Computational Linguistics and Chinese Language Processing, Language and Linguistics, Journal of Computational Linguistics, and Language Resources and Evaluation.

Mei-chun Liu (National Chiao Tung University):
Discourse analysis, Lexical semantics, Pragmatics
Ph.D. in Linguistics, University of Colorado
Professor and Chair, Dept. of Foreign Languages and Literatures, National Chiao-Tung Univ. (2003-present)

Natural Language Processing

Jason S. Chang (National Tsing Hua University):
Machine translation
Ph.D. in C.S., New York University
President, ROCLING (2002-2003)
Editorial Board: Computational Linguistics and Chinese Language Processing

Keh-Jiann Chen (Academia Sinica):
Chinese treebank, Language parsing
Ph.D. in C.S., SUNY-Buffalo
President, ROCLING (1992-1993)
Editor-in-Chief: Computational Linguistics and Chinese Language Processing (1996-2004)

Spoken Language Processing

Janice Fon (National Taiwan University):
Phonetics, Psycholinguistics
Ph.D. in Linguistics, Ohio State University

Jyh-Shing Jang (National Tsing Hua University):
Music information retrieval, Speech recognition and synthesis, Natural language processing
Ph.D. in E.E. and C.S., University of California at Berkeley

I-Wen Su (National Taiwan University):
Pragmatics, Discourse analysis
Ph.D. in Linguistics, University of Hawaii

Shu-Chuan Tseng (Academia Sinica):
Spoken corpora processing, Spontaneous speech analysis
Ph.D. in Computational Linguistics, University of Bielefeld
Executive Secretary, ACLCLP (2002-present)

Hsiao-Chuan Wang (National Tsing Hua University):
Spoken corpora, Speech recognition
Ph.D. in E.E., University of Kansas
President, ROCLING (2000-2001)
Chair, IEEE Taipei Section (1997-1998)

Editorial Board: IEEE Trans. Speech and Audio Processing, Computational Linguistics and Chinese Language Processing

Hsin-Min Wang (Academia Sinica):
Speech recognition, Multimedia (speech and music) information retrieval
Ph.D. in E.E., National Taiwan University
Editorial Board: Computational Linguistics and Chinese Language Processing

The CLCLP program includes consulting faculty members who offer advice and guidance in his/her areas of research expertise to students as well as to the program. Upon further arrangements, a consulting faculty member may also oversee an exchange program, direct a thesis, or offer courses.

Sin-Horng Chen (National Chiao Tung University)
Mandarin speech recognition and speech synthesis

Zhao-Ming Gao (National Taiwan University):
Computational linguistics, Corpus linguistics

Aravind Joshi (University of Pennsylvania):
Tree-adjoining grammar

Dan Jurafsky (Stanford University):
FrameNet, Computational psycholinguistics

Martha Palmer (University of Pennsylvania):
Computational semantics, Chinese treebank, SENSEVAL

Keh-Yih Su (Behavior Design Corporation):
Machine translation, Stochastic language modeling

Chiu-yu Tseng (Academia Sinica):
Experimental phonetics, Spoken corpora

Jhing-fa Wang (National Cheng Kung University):
Speech recognition, TTS, Machine learning

William Shi-Yuan Wang (Academia Sinica):
Acoustic phonetics, Language engineering, Language and evolution

Pei-chuan Wei (Academia Sinica):
Historical Chinese corpora

Chung-hsien Wu (National Cheng Kung University):
Speech recognition, Stochastic language modeling, Intelligent agents

Shiwen Yu (Beijing University):
Natural language processing

Elizabeth Zeitoun (Academia Sinica):
Corpora of Formosan languages



Participating Research Labs

The most prestigious laboratories in the field of computational linguistics and Chinese language processing will provide their facilities to students of the CLCLP program. These include the following institutions:

- Chinese Knowledge Information Processing (CKIP), Institute of Information Science, Academia Sinica
- Chinese Language Processing Lab, Department of Computer Science and Information Engineering, National Cheng Kung University
- Corpus Linguistics Research Group, Institute of Linguistics, Academia Sinica
- Intelligent Agent Lab, Institute of Information Science, Academia Sinica
- Natural Language Systems Lab, Department of Computer Science, National Tsing Hua University
- Natural Language Processing Lab, Department of Information Science, National Taiwan University

Location

The Taiwan International Graduate Program is located principally in the Taipei area. At the moment, the CLCLP partner universities include National Taiwan University and National Tsing Hua University. These campuses are within driving distance and are approximately 30 minutes and 90 minutes respectively from Academia Sinica. There are shuttle buses that operate regularly between National Taiwan University and the Academia Sinica campus and between National Tsing Hua University and the Academia Sinica campus.

Student Status and Degree Conferred

Based on the Regulations of the Ministry of Education in Taiwan, students will register officially at one of CLCLP's partner institutions. Students who choose to study in the Human Language Technology Track will be registered at the Institute of Information Systems and Applications, National Tsing Hua University. Students who choose to study in the Corpus and Computational Linguistics Track will be registered at the Institute of Linguistics, National Taiwan University. Upon successful completion of the program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Academic System

The TIGP program emphasizes research training and developing one's self-reliance and self-confidence for independent work. In the CLCLP program, an entering student will be assigned a research advisor before the student chooses his/her thesis advisor, which should take place within the first two semesters after their admission into the graduate program. Typically, students complete a program of core courses before embarking on research training. All first-year core courses will be offered at Academia Sinica, while the venue of advanced courses and research activities will take place at research labs. Both core courses and research training adopt a team-teaching system; each faculty member teaches the subject according to his or her expertise. Courses offered include traditional core courses, elective courses, and special topics. Commensurate with the international stature of the program, all core courses will be offered in English. Some elective courses may be offered in Chinese.

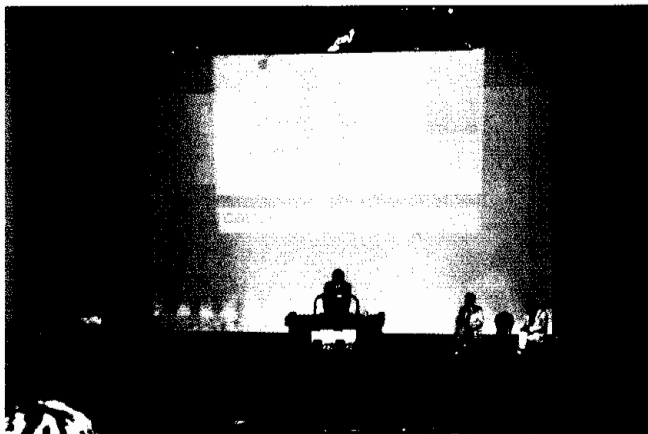
Course Programs

1. Core Courses

Pro-Seminar in Computational Linguistics: 6 credits
Pro-Seminar is organized by the Pro-Seminar Coordinator but taught by all faculty members. This course is designed to familiarize students with important basic scientific issues underlining CLCLP. Participating faculty members will direct students to read and discuss classic scientific articles dealing with foundational issues pertaining to language, computation, and cognition. This course is composed of two 3-credit courses, each for one semester.

2. Elective Courses

Seminar courses on specific topics can be offered depending on student interests and research needs. A partial list representing some of the expertise of our faculty is given below: Knowledge representation, machine translation, speech understanding, spoken language interface, information retrieval, textual comparison, etc.



Requirements for the Ph.D. Degree

1. Course work

In principle, during the first one-and-a-half years, students are advised to complete all courses (NTHU 18 credits/NTU 27 credits). It is the responsibility of research advisor and thesis advisor to assist each student in formulating a program of study that will best satisfy his or her personal needs as well as fulfilling the graduate requirements.

2. Selection of thesis advisor

Incoming students will be assigned a research advisor upon admission. By the end of the first year, the student must select a thesis advisor. Although every effort will be made to honor the student's first or second choice of thesis advisor, the Curriculum Committee of the program must approve the final selection of thesis advisor.

3.1 Passing the qualifying examinations

Students registered at National Tsing Hua University must pass three qualifying exams within the first five semesters of graduate study. There are eight qualifying exams students may choose to take from, and they are: Operating Systems, Compiler, Algorithm, Computer Architecture, Computational Theory, Data Structure, Probability, and Computational Linguistics. Qualifying exams are held at the second week in the beginning of each semester. For more information, please visit the ISA-NTHU website (http://www.isa.nthu.edu.tw/vChinese/Course_PHD.html#Rule).

3.2 Passing the Qualifying Papers of Publishable Quality

Students registered at National Taiwan University must pass the Qualifying Papers of Publishable Quality (QPPQ). Before a student graduates, he/she must publish one journal paper in a level-one journal and another paper in a level-two journal. The classification of level-one and level-two journal is determined jointly by the CLCLP Curriculum Committee and National Taiwan University. For more information, please visit the IL-NTU website (<http://homepage.ntu.edu.tw/~gilntu/data/rule/phd.htm>).

4. Oral examination

A student seeking admission to the Ph.D. candidacy must take a qualifying oral examination before the end of his or her third year in residence. The oral examination is based predominantly on a research proposal submitted by the student. However, before presenting the proposal to the examining committee (consisting of at least five faculty members), the student should be prepared to discuss with the committee members his or her research progress and plans for the thesis work, including a thorough review of the relevant literature.

5. Advancement to candidacy

Every student must advance to candidacy for the Ph.D. degree by the end of the third year of graduate study. The criteria for advancement to candidacy for CLCLP-NTHU students will include passing the written qualifying exams in addition to the oral qualifying exam. CLCLP-NTU students will include passing the QPPQ and oral qualifying exam. Once a student has been advanced to candidacy, s/he will devote his/her full time to independent study and research on his/her thesis topic.

6. Thesis defense

A Ph.D. candidate defends his or her thesis research before a thesis committee. This defense will take the form of a thesis seminar followed by an oral examination on the research. The examination committee shall consist of at least five faculty members familiar with the candidate's area of research.

Schedule for Application and Admission

January 31, 2008: Early application deadline
March, 2008: Notification of early admission
March 31, 2008: Application deadline
May, 2008: Notification of admission
Early September, 2008: Program inauguration

Application Requirements

1. Certificate of degree:

All applicants are required to submit official certification of their Bachelor's and Master's (or equivalent) degrees from each academic institution attended. Unless diplomas were received in Taiwan or were issued in English, the official records in their original language must be submitted with an authorized, complete and exact English translation. **Please note that CLCLP does not accept students without a Master's degree.**

2. Official copies of undergraduate and graduate transcripts

3. Proof of English proficiency:

All applicants whose first language is not English must submit a TOEFL score of at least 550 on pBT, 213 on cBT, or 79 on iBT. Applicants may also submit an IELTS score of at least a 5.5 overall Band Score for the Academic Test. Applicants residing in Taiwan can also

show a GEPT certificate for the High-Intermediate level. Applicants who have recently completed a degree program in an English speaking country may be exempted with a letter of proof of English proficiency from an advisor at their institution.

4. Graduate Record Examination (GRE) score:

GRE is required for application. Our institution code and name is 7142 Academia Sinica. However, an applicant with proven research credentials can submit published work in lieu of GRE score. Please submit one journal paper or two conference papers (ACL, COLING or comparable conferences) to be reviewed for approval.

5. Three letters of recommendation:

Recommendation letters should comment on the applicant's personal character and qualifications for independent study, including intellectual ability, research potential, and scientific motivation.

6. A Statement of Purpose that includes a research plan, and the names of two faculties they would like to work with.

7. Working knowledge of Chinese (strongly preferred): equivalent to 6- credit hours of college level Mandarin Chinese, or other proof of near-native fluency.

8. Proven ability in computational linguistics (desirable): Published papers, completed projects, etc.

9. Application forms

Financial Support

Students of the CLCLP-TIGP program will be offered three-year research assistantship upon admission. Renewal of this assistantship for the second and third year is contingent upon satisfactory academic performance. The assistantship is initially set at the maximal level of NT\$32,000 (roughly US\$980) per month for the first year. Second and third year students will receive assistantship at either this maximal level or a lower level based on their academic performance in the past year. Fourth year students will be funded directly by his/her thesis advisor. Exceptional fourth year student can also receive partial assistantship from the CLCLP program.

The student will work as his/her research advisor's or thesis advisor's research assistant. A research assistant will be asked to work in the lab of his/her research/thesis advisor for up to twelve hours a week. Apart from lab work, a student is also compulsorily required to work up to three hours each week in the CLCLP Office. The CLCLP Program Secretary in conjunction with the affiliated institutes will appoint weekly duties to the student.

Cost of Study

All graduate students of TIGP are responsible for the payment of tuition fees to their registered university (about US\$1,500 per year) upon registration.

Medical Insurance

Four months after international students have received their student I.D. from the registered university, students are entitled/obligated to join in Taiwan's National Health

Insurance Program. International students are expected to pay the same premium (approximately US\$230 per year) as Taiwanese citizens and are entitled to the same medical coverage.

Living and Housing Costs

Options include on-campus housing and off-campus housing. The TIGP on-campus student dormitory provides self-catering single bedrooms for TIGP students at a low cost of NT\$5,500 per month. Off-campus private housing is more expensive, which ranges from NT\$8,000 to NT\$15,000 per month.

Meals are available on-campus in the Academia Sinica's Activity Center of the Cafe, the Chinese Restaurant, and the Western Restaurant at modest costs. Various types of local cuisines are also available at off-campus cafeterias and restaurants within walking distance.

Correspondence and Information

For TIGP general information, please contact:

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
128 Academia Road Sec.2, Nankang, Taipei 115, Taiwan
Tel.: 886-2-2789-8050
Fax: 886-2-2785-8944
E-mail: nancy@gate.sinica.edu.tw

For CLCLP program information, please contact:

Prof. Chu-Ren Huang
CLCLP Program Director
Institute of Linguistics
Academia Sinica
Nankang, Taipei, Taiwan 115
E-mail: churen@gate.sinica.edu.tw

Ms. Clara Chen
CLCLP Secretary
Institute of Linguistics
Academia Sinica
Nankang, Taipei, Taiwan 115
Tel.: 886-2-2652-5047
Fax: 886-2-2652-5022
E-mail: phdclclp@gate.sinica.edu.tw

Websites

Taiwan International Graduate Program, Academia Sinica
<http://tigp.sinica.edu.tw>

Computational Linguistics and Chinese Language Processing Ph.D. Program
<http://clclp.ling.sinica.edu.tw/index.htm>



Taiwan International Graduate Program

<http://tigp.sinica.edu.tw/>

(TIGP)

Preface

To keep up with the pace of today's fast evolving scientific and technological world and to promote the internationalization of higher education in Taiwan, Academia Sinica established the Taiwan International Graduate Program (TIGP) in 2002, in collaboration with a consortium of key national research universities. The interdisciplinary Ph.D. programs offered by TIGP are designed to provide advanced scientific training and research environments for those who wish to do advanced research, to think critically and experience a mature international academic setting. Since its inception, under the stewardship of the successive directors, TIGP has grown and expanded on both the number of interdisciplinary programs and the number and global distribution of students – from 2007 fall semester on, there will be 216 students from around 25 countries studying in TIGP.

Why TIGP?

- *TIGP is under the supervision of Academia Sinica, a government-funded foremost research institution with a proud tradition and international recognition*
- *TIGP, in collaboration with top research universities in Taiwan, offers highly specialized, interdisciplinary Ph.D. programs at cutting-edge of science and technology*
- *TIGP offers all-English tutoring and research environment, world-class faculty and state-of-the-art facilities*
- *TIGP offers graduate fellowships (~USD970/month) to each student admitted to the program for up to 3 years*

Ph.D. programs

Ph.D. programs available for the 2008 fall semester:

- 1. Chemical Biology and Molecular Biophysics**
<http://www.sinica.edu.tw/~tigpcbmb/>
- 2. Molecular Science and Technology**
<http://tigp.iams.sinica.edu.tw/MST.htm>
- 3. Molecular and Biological Agricultural Sciences**
<http://www.sinica.edu.tw/~ibawww/mba/mba.html>
- 4. Molecular and Cell Biology**
<http://www.imb.sinica.edu.tw/mcb/>
- 5. Bioinformatics**
<http://tigbbp.iis.sinica.edu.tw/>
- 6. Nano Science and Technology**
<http://www.phys.sinica.edu.tw/TIGP-NANO/>
- 7. Molecular Medicine**
<http://www.ibms.sinica.edu.tw/mmp/>
- 8. Computational Linguistics and Chinese Language Processing**
<http://clclp.ling.sinica.edu.tw/>

*** In the near future, TIGP is planning on setting up more interdisciplinary Ph.D. programs in disciplines such as Earth System Science and Taiwan Study.**

Our Partner Institutions

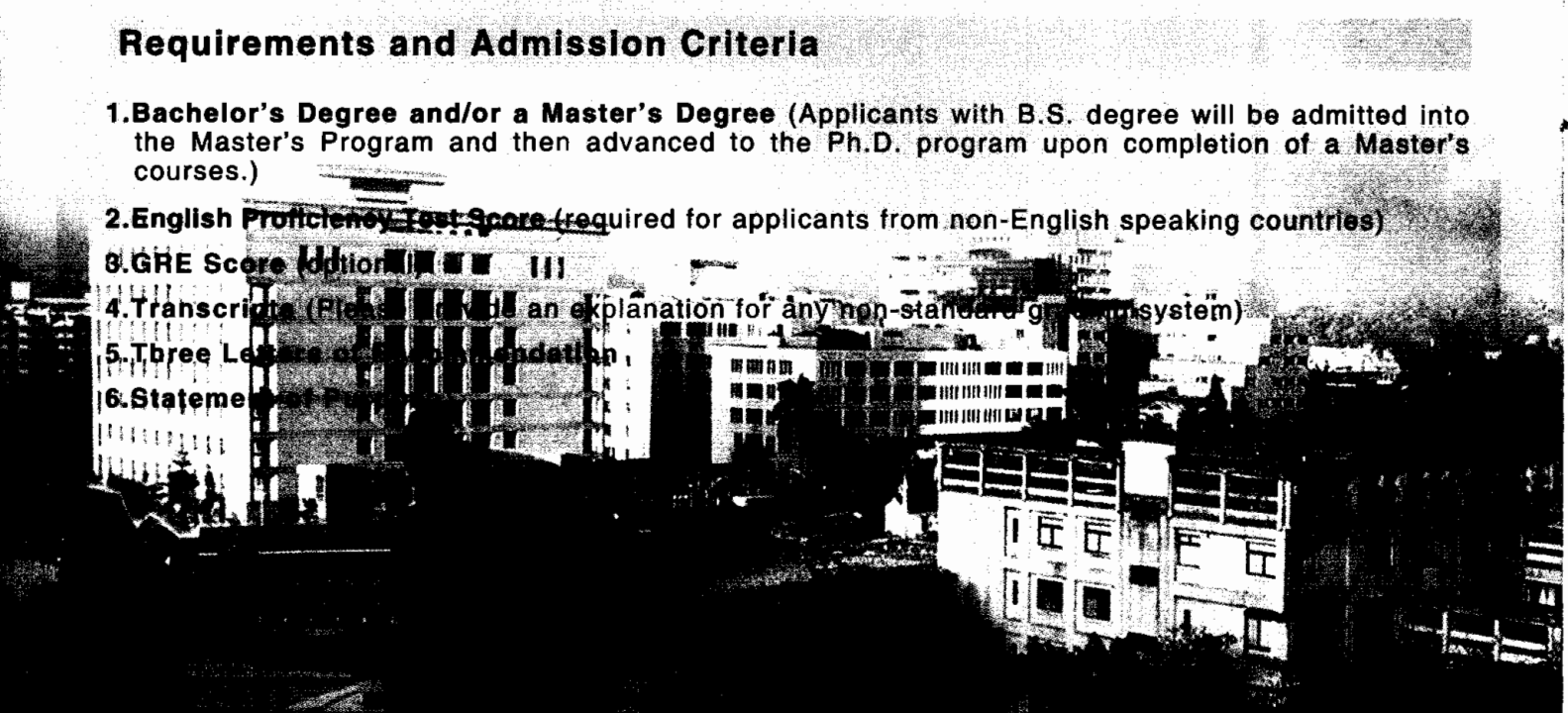
To ensure the best teaching support and intellectual environment, TIGP provides world-class faculty and state-of-the-art facilities by working closely with prestigious local universities (as listed below) and prominent researchers with respective expertise.

No	Programs	Our Partner Universities	Institutions Involved
1	Chemical Biology and Molecular Biophysics (CBMB)	National Taiwan University http://www.ntu.edu.tw	Institute of Biochemical Sciences
		National Tsing Hua University http://www.nthu.edu.tw	1. Department of Life Sciences 2. Department of Chemistry
2	Molecular Science and Technology (MST)	National Tsing Hua University http://www.nthu.edu.tw	Department of Chemistry
		National Central University http://www.ncu.edu.tw/index.php	Department of Physics
3*	Molecular and Biological Agricultural Sciences (MBAS)	National Chung Hsing University http://www.nchu.edu.tw	1. Graduate Institute of Biotechnology 2. Department of Life Sciences
4*	Molecular and Cell Biology (MCB)	National Defense Medical Center http://www.ndmctsgh.edu.tw	Graduate Institute of Life Sciences
5	Bioinformatics (BIOINFO)	National Yang-Ming University http://www.ym.edu.tw	Institute of Bioinformatics
6*	Nano Science and Technology (NST)	National Taiwan University http://www.ntu.edu.tw	1. Department of Chemistry 2. Department of Physics
		National Tsing Hua University http://www.nthu.edu.tw	Department of Engineering and System Science
7*	Molecular Medicine (MM)	National Yang-Ming University http://www.ym.edu.tw	Institute of Biochemistry
8*	Computational Linguistics and Chinese Language Processing (CLCLP)	National Tsing Hua University http://www.nthu.edu.tw	Institute of Information Systems and Applications
		National Taiwan University http://www.ntu.edu.tw	Graduate Institute of Linguistics

* programs applying early decision date

Requirements and Admission Criteria

1. Bachelor's Degree and/or a Master's Degree (Applicants with B.S. degree will be admitted into the Master's Program and then advanced to the Ph.D. program upon completion of a Master's courses.)
2. English Proficiency Test Score (required for applicants from non-English speaking countries)
3. GRE Score (optional)
4. Transcripts (Please provide an explanation for any non-standard grading system)
5. Three Letters of Recommendation
6. Statement of Purpose



English Proficiency

TOEFL A minimum score of **550** on the paper-based TOEFL, or **213** on the computer-based TOEFL, or 79-80 on the New Internet based TOEFL (TOEFL-iBT) taken within the past 2 years, is required for admission by all programs (for details, please refer to individual program). Please note that our institution code and name are: 7142 Academia Sinica.

IELTS In general, all programs accept IELTS test score as an indication of English proficiency. A minimum score of 5.5 overall Band Score for **Academic Test**, taken within the past 2 years, is required for admission by programs that accept IELTS score (please refer to the individual program brochure for the precise admission standard).

GEPT Alternatively, applicants in Taiwan may take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center (LTTTC). The High-intermediate level certificate is required for the admission application.

Student Status and Degree/Certificate Conferral Policy

Based on the regulations of Ministry of Education, students will officially register with our partner universities. Upon completion of the program, each student will receive a Ph.D. degree from the partner university and the **TIGP Certificate** signed by the President of Academia Sinica and the Director of TIGP.

Application

1. TIGP offers admissions for the fall semester only.
2. The official application deadline is March 31, 2008, however, some programs do make early decision for applications received before January 31, 2008. (programs applying early decision date are marked with *in the above table)
3. Application can be submitted through **the on-line application system (<http://db1n.sinica.edu.tw/textdb/tigp/>; available in November 2007)** or by post to : Admissions Office, Taiwan International Graduate Program, Academia Sinica; 128, Academia Road, Section 2, Nankang District, Taipei 115, Taiwan.
4. Required Application Materials
 - Application Form
 - Academic Records (Transcripts) and Degree Certificates (Diplomas)
 - Statement of Purpose and Research Plan
 - Three Letters of Recommendation
 - English Proficiency Certificates (TOEFL, IELTS, GEPT, etc.)
 - The Graduate Record Examination (GRE) (if required by the program)
 - Additional Information (research and/or working experiences, published)

Stipend and Cost of Study/Living

- TIGP scholarship payable to students as a monthly stipend (NT\$30,000) for students admitted to TIGP for up to 3 years; the first year is guaranteed, the stipend for the second and third years will depend on student's performance. Eligible for the TIGP scholarship upon their registration to the University. The admission fee will take care of paying the student, amounting to NT\$10,000 on both sides.



- Cost of Study: All graduate students are responsible for the payment of tuition fees to their registered university (about US\$1,500 per year).
- Living and housing costs: The on-campus self-catering student dormitory costs NTD5,500/month. Off-campus private accommodation is comparatively more expensive, the cost varies according to the facilities, size and location. Meals are available on campus at modest costs.

Contact Us

For general enquiries of TIGP and application, please contact:

Ms. Nancy Yang (Tel: 886-2-2789-8050)/ **Ms. Alice Lee** (Tel: 886-2-2789-9696)
 FAX: 886-2-2785-8944 E-mail: tigp@gate.sinica.edu.tw

For enquiries concerning a specific Ph.D. program, please contact:

Chemical Biology and Molecular Biophysics Program

Dr. Po-Huang Liang
 Institute of Biological Chemistry
 Tel: 886-2-2785-5696 ext. 6070
 Fax: 886-2-2788-9759
 E-Mail: phliang@gate.sinica.edu.tw
 Assistant: Ms. Teresa Pan
 Tel: 886-2-2785-5696 ext. 1164
 E-Mail: shp583@gate.sinica.edu.tw

Molecular Science and Technology Program

Dr. Chau-Chung Han
 Institute of Atomic and Molecular Sciences
 Tel: 886-2-2366-8235
 Fax: 886-2-2362-0200
 E-Mail: cchan@po.iams.sinica.edu.tw
 Assistant: Ms. Jennifer Ma
 Tel: 886-2-2362-4938
 E-Mail: jennifer@gate.sinica.edu.tw

Molecular and Biological Agricultural Sciences Program

Dr. Ning-Sun Yang
 Agricultural Biotechnology Research Center
 Tel: 886-2-2651-5911
 Fax: 886-2-2651-5693
 E-mail: nsyang@gate.sinica.edu.tw
 Assistant: Ms. Hsuan Wu
 Tel: 886-2-2652-2928
 E-Mail: hsuanwu@gate.sinica.edu.tw

Molecular Medicine program

Dr. Yijung Chern
 Institute of Biomedical Sciences
 Tel: 886-2-2789-9028
 Fax: 886-2-2782-9143
 E-Mail: bmychern@ibms.sinica.edu.tw
 Assistant: Ms. Alice Tsai
 Tel: 886-2-2789-9114
 E-Mail: cfmeow@ibms.sinica.edu.tw

Bioinformatics Program

Dr. Wen-Lian Hsu
 Institute of Information Science
 Tel: 886-2-2788-3799 ex. 1804
 Fax: 886-2-2782-4814
 E-mail: hsu@iis.sinica.edu.tw
 Assistant: Ms. Elsa Pan
 Tel: 886-2-2788-3799 ext. 2213
 E-Mail: elsapan@iis.sinica.edu.tw

Molecular and Cell Biology Program

Dr. Wen Chang
 Institute of Molecular Biology
 Tel: 886-2-2788-3629
 Fax: 886-2-2782-6085
 E-mail: mbwen@ccvax.sinica.edu.tw
 Assistant: Ms. Jessica Shih
 Tel: 886-2-2789-9972
 E-Mail: jshih@imb.sinica.edu.tw

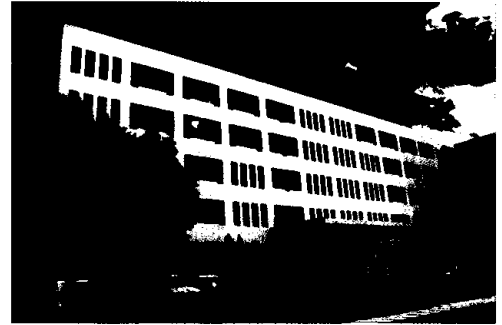
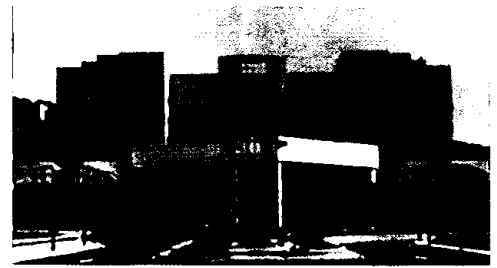
Nano Science and Technology Program

Dr. Chia-Seng Chang
 Institute of Physics
 Tel: 886-2-2789-6722
 Fax: 886-2-2651-0704
 E-mail: jasonc@phys.sinica.edu.tw
 Assistant: Ms. Flora Wu
 Tel: 886-2-2789-8794
 E-Mail: lhwu@phys.sinica.edu.tw

Computational Linguistics and Chinese Language Processing Program

Dr. Chu-Ren Huang
 Institute of Linguistics
 Tel: 886-2-2786-3300 Ex. 108
 Fax: 886-2-2785-6622
 E-Mail: churen@gate.sinica.edu.tw
 Assistant: Ms. Clara Chen
 Tel: 886-2-2652-5047
 E-Mail: phdclclp@gate.sinica.edu.tw

Molecular and Cell Biology of Taiwan International Graduate Program



Introduction

The Taiwan International Graduate Program (TIGP) in "Molecular and Cell Biology" (MCB) is sponsored by the Institute of Molecular Biology (IMB), Academia Sinica in cooperation with the Institute of Life Sciences (ILS), National Defense Medical Center. It is a multi-discipline, integrative graduate program, reflecting the trend of integrating the major fields of modern basic biology. Faculty of the MCB program consists of top researchers in Taiwan. Research interests cover a wide range of biological questions and experimental systems. This graduate program aims to provide solid training to Ph.D. students for a future career in basic and applied research in modern biology. Academia Sinica provides an international environment, which is culturally rich and intellectually stimulating. English is used for courses, seminars and discussions. Most of the labs have experience in hosting international scholars, postdocs, or students.

Location and Environment

Taipei is located in the northern part of Taiwan, and is the largest city in Taiwan with a population of about 2 million. IMB is located in the Academia Sinica campus in Nankang district, which is situated at the southeast corner of the Taipei city. ILS in National Defense Medical Center is located in Neihu district, which is adjacent to Nankang. Taipei is a friendly and safe cosmopolitan city for foreigners. Public transportation, bus and metro, are convenient and inexpensive, and reach virtually every corner of the city. The weather is subtropical.

Facility

All labs in the MCB program are well equipped. Core facilities include transgenic mouse, transgenic fly, electron microscopy, confocal microscopy, X-ray crystallography, mass spectroscopy and microarray. Academia Sinica has an excellent Biological Sciences Library, with a large collection of books and research journals, as well as e-journals available on-line through the library.

Other Graduate Programs

The International Graduate School of Taiwan has several other graduate programs in biological sciences: Bioinformatics, Molecular Medicine, Chemical Biology and Molecular Biophysics, and Molecular and Biological Agriculture Sciences. These programs closely interact with each other. In principle, all courses in these four programs are open to the students of MCB.

International Connections

Close contact is maintained with the international science community. All participating institutes having regular seminar series are conducted primarily in English. The speakers include world famous scientists, and are available during their stay to discuss research projects with students. Several international symposiums and conferences on various topics are held each year. The internet provides an instant connection to the global science community.

Past Graduates

All participating labs have trained many graduate students (M.S. and Ph.D.) in the past. These students have often gone on to postdoctoral research in many excellent labs in the world. Some have even become faculty members in prestigious universities or research institutions.

Faculty and Research

The MCB program has about 40 faculty members. Most have been trained abroad and all have extensive ties with international scientists. The research conducted by the faculty of MCB program covers a wide range of topics. The active research resulted in publications in reputable journals including Nature, Nature Genetics, Nature Struc. Biol., Developmental Cell, Genes & Development, Neuron, Plant Cell, EMBO J., P.N.A.S., Genomics, Mol. Cell. Biol., J. Exp. Med., J. Biol. Chem., J. Virol., and J. Immunol.

1. Cellular Communication and Signal Transduction

Wen Chang

Ph.D., Microbiology & Immunology, Univ. Washington-Seattle, USA

- 1) Entry mechanism of vaccinia virus and dengue virus into mammalian cells;
- 2) Cellular defense mechanisms and viral host range genes antagonizing host restriction

Yu-Chan Chao

Ph.D., Virology / Entomology, University Arkansas, USA

- 1) Baculovirus protein engineering and the analysis of protein folding in cells;
- 2) Cross-phylum analysis of baculovirus transcriptome in insect and mammalian cells;
- 3) Isolation and study of autoantigens in the autoimmune diseases;
- 4) Baculovirus as a surrogate system for the study of human viruses

Rey-Huei Chen

Ph.D., Physiology, Harvard Univ., USA

Regulation of the metaphase-to-anaphase transition

Cheng-Ting Chien

Ph.D., Biochemistry & Cell Biology, SUNY, Stony Brook, USA

- 1) Nedd8 modification of CRL E3 ligases;
- 2) Function of CRL E3s in the Hh signaling pathways

Chih-Yen King

Ph.D., Biophysics, Harvard University, USA

Molecular biology of amyloid and prions

Michael MC Lai

M.D. / Ph.D., Molecular and Cell Biology, UC Berkeley, USA

Molecular basis of replication and pathogenesis of RNA viruses including corona virus, SARS-CoV, hepatitis C virus, and hepatitis delta virus

Jun-Yi Leu

Ph.D., Molecular, Cellular, & Developmental Biology, Yale Univ., USA

- 1) Experimental evolution and genomic analysis of yeast mating preference;
- 2) Cell-cell communication and mating pathway regulation during yeast mating;
- 3) Molecular mechanism of genetic buffering and its role in evolution

Ching-Len Liao

Ph.D., Microbiology and Immunology, School of Medicine, Univ. Southern California, USA

- 1) Study of functional alterations on organelles in flavivirus-infected host cells;
- 2) Flaviviral persistence and interference on cell-virus and virus-virus interactions;
- 3) Employing genetic-tractable, simple host systems to study molecular virology and virus-cell interactions

Nan-Shih Liao

Ph.D., Biological Sciences, Illinois State Univ., USA

- 1) IL-15/IL-15R and T cell development and function;
- 2) Mucosal immunity in the small intestine

Huey-Kang Sytwu

Ph.D., Microbiology and Immunology, Stanford University, USA

- 1) Immunopathogenesis of autoimmune diseases;
- 2) Immunomodulation and immunotherapy on autoimmune diabetes;
- 3) Establishment of genetically-engineered islet grafts and lenti-siRNA-mediated knockdown mice

Huey-Nan Wu

Ph.D., Biochemistry, Univ. Illinois, USA

- 1) The identification, characterization and application of RNA chaperones;
- 2) The molecular mechanism of flavivirus RNA replication

Hsin-Fang Yang-Yen

Ph.D., Molecular Biology and Pharmacology, Baylor College of Medicine

Cytokine growth factor signal transduction and gene regulation

2. Nuclear Structure and Function

Tsu-Chung Chang
Ph. D., Biochemistry, Univ. Illinois, Urbana-Champaign, USA
Regulation of gene expression and molecular action of steroid hormones

Hung-Ta Chen
Ph.D., Chemistry, University of Georgia, USA
Mechanisms of RNA polymerase II and III transcription

Soo-Chen Cheng
Ph.D., Biochemistry, Duke Univ., USA
Molecular mechanism of pre-mRNA splicing

Bon-chu Chung
Ph.D., Biochemistry, Univ. Pennsylvania, USA
Function and regulation of steroid biosynthesis

Yi-Ping Hsueh
Ph.D., Microbiology & Immunology, National Yang-Ming Univ., Taiwan
Nuclear structure and gene expression in mammalian neuron

Der-Hwa Huang
Ph. D., Biological Chemistry, Washington Univ., USA
1) Heterochromatin organization;
2) Chromatin remodeling in gene regulation;
3) RNAi and chromatin organization

Sue Lin-Chao
Ph. D., Molecular & Cell Biology, Univ. Texas at Dallas, USA
1) Signal pathways govern the control of bacterial RNA degradation;
2) Function of RNA degradosome components

Huey-Nan Wu
Ph.D., Biochemistry, Univ. Illinois, USA
1) The identification, characterization and application of RNA chaperones;
2) The molecular mechanism of flavivirus RNA replication

Meng-Chao Yao
Ph.D., Biology, Univ. Rochester, USA
1) Gene amplification, deletion and rearrangements in eukaryotic cells
2) The role of dsRNA in gene silencing, heterochromatin formation and DNA rearrangements

Su-May Yu
Ph.D., Plant Biology/Pathology, Univ. Arkansas, USA
1) Mechanisms of sugar signal transduction and regulation in plants;
2) Generation and screening of rice gene knockout/activation tagged mutants for functional genomics;
3) Plant molecular farming

3. Developmental Biology

Chung-Faye Chao
Ph.D., Anatomical Sciences, SUNY At Buffalo, USA
Development of the skin and the cardiovascular system

Bon-chu Chung
Ph.D., Biochemistry, Univ. Pennsylvania, USA
Function and regulation of steroid biosynthesis

Sue Lin-Chao
Ph. D., Molecular & Cell Biology, Univ. Texas at Dallas, USA
Function of growth-arrest genes during mouse brain development

Y. Henry Sun
Ph.D., Biology, Caltech, USA
Molecular mechanism of eye development in Drosophila

Hsin-Fang Yang-Yen
Ph.D., Pharmacology, Baylor College of Med., USA
Cell death control during mouse development

4. Neurobiology

Chung-Faye Chao
Ph.D., Anatomical Sciences, SUNY, Buffalo, USA
Development of the nervous system

Cheng-Ting Chien
Ph.D., Biochemistry & Cell Biology, SUNY, Stony Brook, USA
1) Neural and glial specification; and 2) Neuronal morphogenesis

Yi-Ping Hsueh
Ph.D., Microbiology & Immunology, National Yang-Ming Univ., Taiwan
Molecular mechanism of neurite extension and synaptogenesis

Jia-Yi Wang
Ph.D., Pharmacology, Univ. Minnesota, Medical School, USA
1) Regulation on gene expression of endogenous proteins for neuroprotection in mammalian CNS;
2) Brain injury and repairing mechanism;
3) Neuron-glia interactions and neuroimmunology;
4) Proteomics of human cerebrospinal fluid in brain diseases

Shwun-De Wang
Ph.D., Anatomy/Neuroscience, the Medical College of Pennsylvania, Philadelphia, Pennsylvania, USA
Molecular mechanism of drug abuse-induced behavioral sensitization in the central nervous system



Chih-Shung Wong

PhD, Pharmacology, Duke University, USA

- 1) Molecular and cellular mechanisms of morphine tolerance, neuropathic pain;
- 2) The role of glutamate transporters and neuroinflammation in neuropathic pain and morphine tolerance;
- 3) Molecular and cellular mechanisms of spinal cord ischemia;
- 4) The role of excitatory amino acids and cytokines in osteoarthritis

5. Plant Molecular Biology

Jychian Chen

Ph.D., Biological Sciences, Washington Univ.-St. Louis, USA
Genetic and molecular analysis of Arabidopsis carbohydrate metabolic mutants, regulation and function of carbohydrate metabolic genes in plants

Yi-Fang Tsay

Ph.D., Biological Sciences, Carnegie Mellon Univ., USA
Nitrate signaling and transport: Function and regulation of nitrate transporters, molecular analysis of nitrate signaling mutants.

Su-May Yu

Ph.D., Plant Biology/Pathology, Univ. Arkansas, USA
1) Mechanisms of sugar signal transduction and regulation of gene expression in plants.
2) Generation and screening of rice gene knockout/activation tagging library for functional genomics

6. Structural Biology

David C-D Hsiao

Ph.D., Crystallography, Univ. Pittsburgh, USA
Structural and functional study of protein-DNA and protein-protein interaction by X-ray crystallography

Chih-Yen King

Ph.D., Biophysics, Harvard University, USA
Structural principle of amyloids

Yen-Chywan Liaw

Ph.D., Chemistry, National Taiwan Univ., Taiwan
X-ray crystallographic studies of biological molecules

Hanna S. Yuan

Ph.D., Chem., Univ. Southern California, USA
Structural and functional characterization of DNA- and RNA-binding proteins involved in transcription, replication and DNA cleavage

7. Human Disease Models, Pathology, and Therapy

Cheng-Ting Chien

Ph.D., Biochemistry & Cell Biology, SUNY, Stony Brook, USA
Study of human disease genes in Drosophila

Earl Fu

D.Sc.D., Oral Biology, Boston Univ., USA
1) The mechanisms of gingival overgrowth;
2) The pathogenesis of periodontal disease

Hsu-Shan Huang

Dr. rer. nat., Medicinal Chemistry and Pharmaceutical Technology, Regensburg University, Germany

- 1) New drugs design and drug discovery programs;
- 2) Design, synthesis and biological evaluation of potential anticancer and antiviral agents;
- 3) Research of small molecule natural products on telomerase and topoisomerase II inhibitors;
- 4) Novel glycosylation methods and their application to natural products synthesis

Yi-Ping Hsueh

Ph.D., Microbiology & Immunology, National Yang-Ming Univ., Taiwan
Neurofibromatosis type I (NF1)

Ying-Hue Lee

Ph.D., Entomology, Texas A&M Univ., USA
Modeling human metabolic disorders in mice by genetic manipulation

8. Biotechnology

Chung-Faye Chao

DDS, PhD, Anatomical Sciences, SUNY at Buffalo, USA
Establishment an in vitro model for screening Whitney Chinese herb

Yu-Chan Chao

Ph.D., Virology / Entomology, University Arkansas, USA
1) Baculovirus protein engineering and the analysis of protein folding in cells;
2) Cross-phylum analysis of baculovirus transcriptome in insect and mammalian cells;
3) Isolation and study of autoantigens in the autoimmune diseases;
4) Baculovirus as a surrogate system for the study of human viruses.

Jaulang Hwang

Ph. D., Biological Chemistry, Michigan, USA
1) Applying linear array epitope technology to develop therapeutic vaccine against major human diseases, targeting at cancer and aging-related disease;
2) Applying linear array epitope technology to develop antibody bichip for in vitro disease diagnosis and to develop target-specific nanoprobe for in vitro disease diagnosis.

Ying-Hue Lee

Ph.D., Entomology, Texas A&M Univ., USA
1) Anti-obesity gene therapy development;
2) Diagnostic system development for obesity predisposition

Su-May Yu

Ph.D., Plant Biology/Pathology, Univ. Arkansas, USA
Optimization of expression systems for plant molecular farming



Curriculum

Course Program

1. Required Courses: required for all students.

- Molecular and Cell Biology
(organizer: Dr. R-H Chen; 4 credits, 1st semester of the 1st year)
- Seminar
(organizer: Dr. Y-P Hsueh; 1 credit/semester, 1st and 2nd years)
- Thesis Research (12 credits)

2. Elective Courses:

- Lab Rotation (2 credits; 1st year)
- Experimental Approaches in Molecular and Cell Biology
(organizer: Dr. N-S Liao; 2 credits, every Spring)
- Developmental Biology
(organizer: Dr. C-T Chien; 2 credits, Spring, every 2 years)
- Structural Biology
(organizer: Dr. C-D Hsiao; 3 credits, Spring, every 2 years)
- Topics in Plant Science
(organizer: Dr. Y-F Tsay; 2 credits, Spring, every 2 years)
- Virus and Cell Interactions
(organizer: Dr. W Chang; 3 credits, Spring, every 2 years)
- Cellular and Molecular Immunology
(organizer: Dr. H-K Sytwu; 2 credits, Spring, every 2 years)
- Special Topics in RNA
(organizer: Dr. S-C Cheng; 2 credits, Spring, every 2 years)

In addition, the MCB students may take any course offered by other programs in TIGP and by NDMC.

3. Courses Offered 2007-2010

Courses	credits	Fall, 2007	Spring, 2008	Fall, 2008	Spring, 2009	Fall, 2009	Spring, 2010
Molecular and Cell Biology	4	+		+		+	
Experimental approaches in molecular and cell biology	2		+		+		+
Structural Biology	3		+		+		+
Virus and Cell Interaction	3		+				+
Topics in plant	2		+				+
Developmental Biology	2				+		
Cellular Immunology	2				+		
RNAi	2		+				+
Total	20	1	5	1	4	1	5

Graduate Requirements

Qualifying Exam

Qualifying exam (QE) will be held from June to August every year. Students should take the QE before the start of the third academic year. Students must pass the Molecular and Cell Biology course and have a thesis advisor before taking the QE. Student should submit an application form and a one-page non-thesis research proposal containing Abstract and Specific Aims to the Curriculum and Degree Committee during April 15th - 30th. The Curriculum and Degree Committee will evaluate each proposal and appoint a 5-member QE committee, excluding the student's thesis advisor, for each student according to the subject of the proposal. The date of QE exam will be announced before June 1st. Student should turn in the complete non-thesis proposal to the MCB office no less than two weeks before the exam date.

The format of non-thesis proposal:

1. Abstract or Summary
2. Specific Aims
3. Backgrounds and Significance
4. Experimental Design and Methods
5. Expected Results
6. Discussion

The items 5 and 6 can be presented separately or combined together.

The format of the references should follow that in the journal "Cell" or "Nature".

Students will conduct an oral presentation and defend their proposal in front of the QE committee. It requires at least four QE committee members' approval to pass the exam. In case of failing the exam, students can retake the exam within 3 to 6 months after the first one.

Thesis Research

A minimum of two-year thesis research is required. Twelve credits will be granted to the student upon completion of the thesis defense.

1. Lab Rotation

Students may rotate through several labs with the goal of finding a lab to conduct their thesis research. The duration of each lab rotation is upon mutual agreement between the student and the advisor, but shall not exceed four months. A maximum of 2 credits will be granted, even if students take more than two lab rotations. Students are highly recommended to decide on the thesis research lab by the end of the first summer. Studentship will be terminated if a student cannot find a thesis research lab before applying for qualifying exam.

2. Thesis Committee

The thesis advisor will organize the thesis committee within one month after the student chooses the lab. Each committee should consist of at least three members, including the advisor. The thesis committee shall meet at least once a year for the progress report of the student. The committee evaluates the progress and advises on current research problems and the future direction of the project.

3. Progress Report

Students must give an annual progress report to the thesis committee. The first report is a thesis proposal and should be given by the end of the third semester. Thereafter, the progress report should be given once a year by the end of each Fall semester. Students should prepare a written proposal or progress report according to the format given by the MCB office, and submit it to the thesis committee and MCB office one week before the committee meeting.

Thesis Defense

Upon the consent of the thesis committee a thesis defense committee of 5-7 members shall be formed. Students shall present the thesis work in an open seminar, followed by a defense of the thesis in front of the thesis defense committee.

Requirement for thesis defense: Publication

The student should publish, or have the manuscript accepted, at least one first-author paper on the thesis research. The affiliation of TIGP students in their published work should be listed as "Taiwan International Graduate Program, Graduate Institute of Life Science, National Defense Medical Center and Academia Sinica", followed by the primary affiliation of the advisor.

(1) Written thesis in English

(2) Consent of the thesis committee to proceed with the thesis defense

Summary of Credits

Molecular and Cell Biology	4
Seminar	4
Thesis Research	12
Elective Courses	>10
Total	30

Admission Requirements

The MCB program offers a wide range of topics in molecular biosciences for graduate study and research. Students with backgrounds in biochemistry, biology, molecular biology, genetics, anatomy, chemistry, physics and related fields are welcome to apply.

The MCB program's application procedure places responsibility on the applicant for gathering all supporting credentials and submitting them in one envelope (Self-Managed Application Instructions and Forms). This will allow the Admission Committee of the Program to process applications and make decisions in a timely fashion.

Certificate of degree

All applicants are required to submit certification of M.Sc. (or its equivalent) degrees from each academic institution attended. Unless diplomas are issued in English by the institution, the official records in their original language must be submitted with an authorized, complete and exact English translation. Certificates for degrees from institutions in Taiwan can be in Chinese. Official records are defined as original documents issued by the institution that bear the actual signature of the Registrar (not a photocopy) and the seal of the issuing institution. Do not send the original of an academic record that cannot be replaced; obtain a properly certified copy instead. If you have attended more than one institution, separate official records should be submitted by each institution.

Transcripts

Two official copies of your transcripts may be sent directly from the registrars of the academic institutions you have attended, or you may request official copies and send them yourself. A grade point average (GPA) of 3.0 or higher for all college work (4.0 = A) is preferred.

English Requirements

English is the official language of this program. Applicants whose first language is not English must certify their proficiency in English. Such applicants must submit scores received on the Test of English as a

Foreign Language (TOEFL) or International English Language Testing System (IELTS) as part of their application. The TOEFL is administered by the Educational Testing Service (ETS, <http://www.toefl.org/>). Information on IELTS can be obtained from <http://www.ielts.org/>. The minimum requirement of TOEFL score is 213 on computer-based test, and the minimum requirement of IELTS score is 6. Applicants who are graduates of English-speaking universities are not required to take these tests.

Applicants in Taiwan can take the General English Proficiency Test (GEPT) administered by the Language training and Test Center. Applicants are required to submit the High-intermediate level certificate when apply for admission.

The Graduate Record Examination (GRE)

All applicants are strongly recommended to take the GRE's General Test. However, if you have difficulty in taking the GRE Aptitude test on time, please contact us and provide us with supplementary information (e.g. M.S. thesis, research publication, description of research experiences) that can demonstrate your potential in research. Your qualification will be reviewed by the Admissions Committee.

Letters of Recommendation

Three letters of recommendation are required (PDF form is available from website). Applicants are not permitted to inspect letters of recommendation.

Statement of Purpose and Study Plan (less than three pages)

Other Evidence of Scholarly Achievements

Please provide your M.S. thesis, research publication, description of research experiences to evaluate by MCB Admission Committee. The above submitted application materials will not be returned to applicants under any circumstances. Please send all above application materials to:

Admission Office

Taiwan International Graduate Program

128 Sec. 2, Academia Road

Nankang, Taipei 115

Taiwan

TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>

Student Status and Degree Conferred

Based on the Regulations of the Ministry of Education in Taiwan, students who officially register with our partner universities. Upon completion of the program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Fellowship

Students of the MCB program will receive a three-year fellowship upon admission. Student fellowships in the second and third year will be renewed after successful fulfillment of the fellowship requirements.

1. Satisfactory academic performance, including completion of all required courses
2. completion of a non-thesis examination
3. An agreement with a MCB faculty to become the student's thesis advisor.

Starting from the fourth year, the thesis advisor is responsible for the MCB student fellowship and the amount of money received may vary depending on the advisor's source of funding.

Medical Insurance

Four months after they receive student I.D., the students will qualify to join the National Health insurance Program. They pay the same premium (about US\$ 210 per year) as all the citizens in Taiwan and enjoy the same medical coverage.

Study, Living and Housing Costs

The students are responsible for the payment of tuition fees (about US\$ 1,500 per year) when register.

Options include on-campus housing and off-campus housing. On-campus self-catering student dormitory providing single study bedrooms is available to TIGP students at reasonable costs (for details please visit our website at <http://www.sinica.edu.tw/~tigp/dorm.html>). Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$ 5,000 - 15,000 per month.

Meals are available on campus at the Activity Center Cafeteria, the Café, the Chinese Restaurant, and the Western Restaurant at modest costs. Various types of local cuisines are also available at off-campus cafeterias and restaurants within walking distance and at affordable costs.

Correspondence and Information

For general information concerning TIGP, please contact:

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
E-mail: nancy@gate.sinica.edu.tw
Tel: 886-2-2789-8050
Fax: 886-2-2785-8944

For information concerning this program, please contact:

Ms. Jessica Shih
Institute of Molecular Biology
Academia Sinica
E-mail: jshih@imb.sinica.edu.tw
Tel: 886-2-27899972
Fax: 886-2-27892292

Taiwan International Graduate Program
Molecular and Cell Biology Ph.D. Program

Address:
128 Academia Road, Section 2
Nankang, Taipei 115, Taiwan
Location:
Rm.418, IMB

Telephone: 886-2-2789-9972
Facsimile: 886-2-2789-2292
<http://www.imb.sinica.edu.tw/en/>
<http://www.imb.sinica.edu.tw/mcb/>

TAIWAN INTERNATIONAL GRADUATE PROGRAM



Tai

Molecular Medicine Program

Introduction

Academia Sinica has established the Taiwan International Graduate Program (TIGP) in collaboration with a consortium of key national research universities in Taiwan. The purpose of this program is to develop the pool of research manpower in the modern multidisciplinary fields that are important for the future economical and social development of Taiwan and to enhance the innovative potential and academic standards of research in these and related fields.

TIGP will offer Ph.D. programs in selected disciplines to be agreed upon between Academia Sinica and some of the local key research universities. It is the intent of the TIGP to offer Ph.D. degree programs in inter-disciplinary areas in the physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences. All courses will be offered in English.

Academia Sinica will assume principal oversight of the academic options of the Program. It will provide the intellectual leadership, the research resources, and the research and physical facilities. Qualified and interested faculty members of the participating national research universities are invited to join as affiliated faculty of the Program, and participate in the teaching of courses, supervision of research, and mentoring of the international graduate students.

The TIGP program on "Molecular Medicine"

The complete mapping of the human genome ensures that we will witness breakthroughs in biomedical research at an accelerated pace in the coming decades. For the first time in the history of medicine, the physiological functions and pathology of normal and disease genes are being studied at both the molecular and genomic levels. Although the lag between the identification of disease-associated genes and the development of therapeutic protocols is rapidly decreasing, the scientific and technical challenges in the postgenomic era are beginning to rise. An efficient collaboration that integrates basic science, clinical research, and biotechnology should address these challenges.

The Molecular Medicine Program (MMP) is offered by the Institute of Biomedical Sciences, Academia Sinica and the School of Life Science, National Yang Ming University. The MMP program has 50 faculty members with specific disciplines in both fundamental research and technological development. We have not only established vigorous collaboration with the research communities at Academia Sinica, but also have close ties with clinicians in the major medical centers throughout Taiwan through an unique Clinical Research Center (CRC) program. The MMP program is designed to offer specific training and research opportunities to Ph.D. students who are interested in working on the frontier areas of biomedical sciences. The objectives of establishing comprehensive teaching and research programs are three-fold:

- (1) To promote biomedical research and pursue excellence of science by developing a strong teaching and research program in frontier biomedical sciences;
- (2) To broaden and deepen our understanding of human diseases: from genomics to function and from physiology to pathology;
- (3) To strengthen and promote interdisciplinary research by bridging basic science and clinical studies and to expedite the development of new therapies.

Search Topics

The MMP program has about 50 faculty members whose research projects encompass basic and clinical-oriented research related to human diseases that include the following four fields:

(1) Functional Genomics and Bioinformatics

- Disease Gene Discovery Using Genomic and Proteomic Approaches
- Functional Genomics
- Bioinformatics

(2) Molecular and Cellular Basis of Gene Function

- Gene Regulation
- Apoptosis and Cell Cycle Regulation
- Signal Transduction
- Differentiation and Development
- Immunobiology
- Reproductive Biology
- Electrophysiology

(3) Disease Mechanisms

- Molecular Epidemiology and Toxicology
- Cardiovascular and Blood Diseases
- Neuronal Diseases
- Virus and Infectious Diseases
- Cancer and Neoplastic Transformation

(4) Medical Biotechnology

- Biochips and Microarrays
- Disease Gene Diagnosis and DNA Vaccine Development
- Stem Cell Biology
- Cell and Gene Therapy
- Drug Design and Development

Dr. Chih-Cheng Chen
Ph.D. University College London
Pain/Neurobiology/Mouse Genetics

Dr. Joanne Jeou-Yuan Chen
Ph.D. University of Minnesota
Cancer Genomics/Tumor Biology

Dr. Steve S.-L. Chen
Ph.D. Purdue University
Retrovirology/Virus-Host Interactions/Viral Pathogenesis

Dr. Yuan-Tsong Chen
Ph.D. Columbia University
Genomic Medicine/Human Genetics

Dr. Yijiang Chern
Ph.D. University of Massachusetts
Signal Transduction/Gene Regulation

Dr. Mei-Shang Ho
M.D. Indiana University
Epidemiology/Virology

Dr. Yi-Shuan Huang
Ph.D. University of Texas, Southwestern Medical Center
Translational Control / Molecular Neuroscience

Dr. Yuh Shan Jou
Ph.D. Michigan State University
Cancer Genomics/ Human Molecular Genetics

Dr. Sho Tone Lee
Ph.D. University of Manitoba, Canada
Drug Resistance/ Vaccine Development

Dr. Te-Chang Lee
Ph.D. National Taiwan University
Cell Biology/Genetic Toxicology

Dr. Teng-Nan Lin
Ph.D. University of Missouri-Columbia
Cerebral Ischemia/ Angiogenesis/ Neurochemistry

Dr. Wen-chang Lin
Ph.D. Case Western Reserve University
Bioinformatics/Tumor Biology/Cancer Metastasis

Dr. Wen-Harn Pan
Ph.D. Cornell University
Cardiovascular/Nutrition/Genetic Epidemiology

Dr. Steve Roffler
Ph.D. University of California, Berkeley
Monoclonal Antibodies/Prodrugs/Surface Expression

Dr. Chiaho Shieh
Ph.D. Massachusetts Institute of Technology
Molecular Virology/Viral Hepatitis and Hepatoma/Cancer

Dr. Ru-Chi Shieh
Ph.D. University of Rochester
Electrophysiology/Biophysics

Dr. Sheau-Yann Shieh
Ph.D. Baylor College of Medicine
Cancer Research /Molecular Biology/Biochemistry

Faculty and Staff

Academia Sinica

Dr. Chang Chen
University of Alabama at Birmingham
Functional MRI/S / Neuroscience

Dr. Lan-Yang Ch'ang
Ph.D. Vanderbilt University
Genomic/Bioinformatics

Dr. Lee-Young Chau
Ph.D. University of Kentucky
Cardiovascular biology/Gene therapy

Dr. Chien-Chang Chen
Ph.D. University of Illinois, Urbana-Champaign
Electrophysiology/Cardiovascular
function/Gene targeting/Mouse genetics

Dr. Chia-Ho Shih
Ph.D. Massachusetts Institute Technology
Molecular Virology/Viral Hepatitis and Hepatoma/Cancer

Dr. Hsiu-Ming Shih
Ph.D. University of Minnesota
Signaling Transduction/Protein Kinases/Phosphatases

Dr. Song-Kun Shyue
Ph.D. University of Texas-Houston
Viral Vector/Gene Transfer/Vascular Protection

Dr. Tang K. Tang
Ph.D. Yale University
Molecular Genetics/Cell Mitosis & Germ Cell Development

Dr. Pang-Hsien Tu
Ph.D. University of Pennsylvania
Neuropathology / Neurodegenerative Disease

Dr. Mi-Hua Tao
Ph.D. Columbia University
Cancer Vaccines/Immunotherapy/Gene Therapy

Dr. Woan-Yuh Tarn
Ph.D. National Tsing Hua University
RNA Processing /Nucleocytoplasmic Transport

Dr. Danny Ling Wang
Ph.D. University of Nevada
Vascular Biology/Gene Regulation

Dr. Yu-Ting Yan
Ph.D. University of Medicine and Dentistry of New Jersey
Molecular Genetics/Developmental Biology

Dr. Ruey-Bing (Ray) Yang
Ph.D. University of Texas, Southwestern Medical Center
Receptor Biology/Signal Transduction/Vascular Biology

Dr. Jeffrey J.Y. Yen
Ph.D. Baylor College of Medicine
Molecular & Cell Biology/Hematopoiesis/Apoptosis

Dr. Pauline H. Yen
Ph.D. University of California, Berkeley
Mammalian Sex Chromosomes/Male Infertility

National Yang Ming University

Dr. Kuo-Wei Chang
Ph.D. Northwestern University
Molecular Pathology

Dr. Tai-Jay Chang
Ph.D. Mt. Sinai school of Medical
Cancer Genomics

Dr. Cheng-Chen Chen
Ph.D. London school of Hygiene and Tropical Medicine
Molecular Entomology/Insect Immunity

Dr. Chi-Ju Chen
Ph.D. Michigan State University
Molecular Virology/Host-Virus Interaction

Dr. Jyh-Cheng Chen
Ph.D. University of Arizona
Molecular Imaging

Dr. Mei-Yu Chen
Ph.D. The Johns Hopkins University
M.D. National Yang Ming Medical College
Molecular Genetics/Biochemistry

Dr. Yi-Ming Arthur Chen
DSc. Harvard University School of Public Health
M.D. National Yang Ming University
Cancer Biology/Tumor Virology/Molecular Epidemiology

Dr. Henrich Cheng
Ph.D. Karolinska Institute, Sweden
Neurosurgery/Neurochemistry/Cell Biology

Dr. Tzu-Hao Cheng
Ph.D. Rutgers, the state University of New Jersey
Molecular Genetics/Gene Regulation

Dr. Yueh-Hsin Ping
Ph.D. Rutgers, the state University of New Jersey/UMDNJ
Gene regulation / Molecular interaction / MicroRNA

Dr. Eileen Jea Chien
Ph.D. Albert Einstein College of Medicine
Signal Transduction/Immunobiology

Dr. Teh-Ying Chou
Ph.D. The Johns Hopkins University
M.D. National Yang-Ming University
Thoracic Pathology/Tumor Biology

Dr. Shie-Liang Hsieh
Ph.D. University of Oxford
Molecular Immunology/Immunotherapy

Dr. Ming Ta Hsu
Ph.D. California Institute of Technology
Genomics/Biochemistry/Molecular Biology

Dr. Shan-Ling Hung
Ph.D. University of Pennsylvania, USA
Virology/Molecular Biology

Dr. Jeng-Jong Hwang
Ph.D. Colorado State University
Medical Biotechnology

Dr. Lung-Sen Kao
Ph.D. University of Massachusetts, Amherst
Neurosciences

Dr. Yan-Hwa Wu Lee
Ph.D. University of Tennessee
Biochemistry/Molecular Virology

Dr. Shu-Chun Lin
Ph.D. University of Illinois at Chicago
Tumor Biology/Gene Regulation

Dr. Wan-Jr Syu
Ph.D. University of Wisconsin-Madison
Disease Mechanisms

Dr. Shin-Feng Tsai
Ph.D. Mt. Sinai School of Medicine
Human Genetics/Genomics

Dr. Yau-Huei Wei
Ph.D. State University of New York at Albany
Bioenergetics/Molecular Basis of Diseases

Curriculum and Degree

Introduction:

The education and training of graduate students will be an important component of this program and will include in-depth laboratory training programs, scientific courses and seminars, and forums involving outstanding invited speakers (e.g. Nobel laureates; members of the National Academy of Sciences, USA, ROC, etc.) from abroad. During the first year of study, graduate students in the MMP will take two multidisciplinary core courses, which cover the entire spectrum of biomedical sciences from the principles of macromolecular structure to the function of biological systems at the whole organ level. With this broad perspective, students are prepared for advanced course work in specific areas of interest. The various research groups spanning nearly every major field in the biomedical sciences offer a variety of advanced courses. By selecting different combinations of advanced courses, graduate students have the flexibility to formulate an interdisciplinary education tailored to their individual interests and career objectives. Laboratory rotation during the first year provides in depth laboratory experience and opportunity to survey cutting-edge research in different fields of biomedical science. Students should complete their formal coursework with a qualifying exam before advancing to his/her Ph.D. candidacy.

Required courses:

1. Molecular Medicine (3 credit units)

This course covers a rapidly evolving area of biomedical sciences that include molecular basis of cellular function and patho-physiological aspects of disease medicine such as cancers, infectious diseases, neurological and cardiovascular disorders, and hereditary disease. New technologies and their application on molecular medicine are also discussed.

2. Molecular and Cell Biology (4 credit units)

This course is mainly offered by Molecular and Cell Biology program. The current state of molecular cell biology will be addressed, including the structure and function of molecules within the cells, the interactions between cells, and development of different organisms.

3. Seminar in Molecular Medicine (1 credit unit per semester, total 4 credit units for the first two years)

The course is composed of a series of weekly "journal club" presentation and discussion in which graduate students lead a review and discussion of recently published, cutting-edge scientific papers of major interest in the field of Molecular Medicine.

4. Laboratory rotations (1 credit unit).

Elected courses:

1. Experimental Approaches in Molecular Medicine

This course covers a broad spectrum of modern bioscience technology, including basic and advanced methods in molecular and cell biology and application of computational biology, such as genomics in diseases and genetic epidemiology.

2. Immunology

This course will cover basic topics in cellular and humoral immunity with the goal of providing the students with an adequate background to effectively read and understand immunology related research papers. Practical immunologically-related techniques used in the lab will also be introduced.

3. Translational Medicine

This course is obtaining the basic and clinical knowledge of various human diseases and relevant research models. To learn current techniques and tools used in genetic discoveries, pharmacogenomics and drug development. Knowing bioethical issues and rules relevant to human studies.

4. Neuronal Signaling

This course introduces several prototype-signalling pathways in the nervous systems, the mechanistic concepts and various experimental approaches in signal transduction. The aim is to discuss concepts, questions and future challenges in this rapidly developing field.

5. Elective courses are also offered by other graduate programs within the TIGP, including Developmental Biology, Molecular Pathology, Structural Biology, Virus and Cell Interactions, Bioinformatics and etc.

Teaching Assistant (TA) and Chinese Language:

All students of MMP program are required to serve as a TA for one semester. In order to help the international students in their daily lives' communication with the local people, TIGP offer a required one-year course in Mandarin Chinese.



Requirements for the Ph.D. Degree

- ▶ 1. Satisfactory completion of an oral qualification exam administered by a committee of the faculty. This examination should be taken no later than the beginning of the third-year enrollment. The student should turn in two non-thesis topics with one-page abstracts. One topic will be selected for examination. A formal proposal should be developed by the student for examination by a faculty committee appointed by the program office. In case of failure, the student should take it once more. Every student must advance to Ph.D. candidacy by the end of the third year of graduate study.
- ▶ 2. Satisfactory completion of at least 18 credits in formal courses including required courses and elective courses, and 12 credits in Ph.D. thesis. Note that an extra of 12 credits in formal courses is required for students with a B.S. degree to obtain the Ph.D. degree.
- ▶ 3. Satisfactory completion of rotation in two laboratories (3 months/one lab) in the first year. The lab rotations should be finished before the beginning of the second-year enrollment. After lab rotation, students may choose his/her thesis advisor and start full-time research.
- ▶ 4. Completion of a satisfactory investigation and presentation in the form of a thesis (12 credits), approved by a committee of the faculty. Oral defense of the thesis by the candidate before a committee of the faculty.
- ▶ 5. Written acceptance of the thesis by each member of the final oral examination committee.
- ▶ 6. Not more than seven years may elapse between the date of matriculation and fulfillment of all requirements for the degree.
- ▶ 7. Students should give an annual progress report to the thesis committee. The first annual report should be given during the period of the third-year enrollment.



TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>

Admission to the Ph.D. Program

We encourage students from around the world to apply. The official application deadline for admission in fall 2008 is March 31, 2008. Applications received before February 1, 2008 will be considered for early decision. Applicants are therefore encouraged to submit their applications early.

Individuals (either international students or students from Taiwan) with a B.S. or M.Sc. degree (or equivalent) from an accredited institution are eligible to apply. Information provided in the following documents will be used to evaluate the applicant's qualification for admission.

- ▶ 1. Two official copies of undergraduate and graduate (if applicable) academic records or transcripts. A grade point average (GPA) of 3.0 or higher on a 4.0 scale for all undergraduate or graduate study is preferred.
- ▶ 2. TOEFL (or equivalent) score: all applicants whose first language is not English must submit a TOEFL (or equivalent) score, except those applicants who can provide evidence to show that they have recently completed two or more years of study in an English-speaking country. Applicants in Taiwan may take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center. A minimal score of 550 on paper-based or 213 on computer-based TOEFL test is required for admission to the program.
- ▶ 3. Graduate Record Examination (GRE) scores: All applicants are strongly recommended to take the GRE's General Test. An advanced Subject Test in biochemistry, cell and molecular biology, chemistry, or biology is highly recommended. A high GRE score will significantly enhance the chance of admission to the program.
- ▶ 4. Three letters of recommendation commenting on the applicant's personal character, and qualifications for independent study, including intellectual ability, research potential, and scientific motivation.
- ▶ 5. Statement of purpose and plan for graduate study (in English)
- ▶ 6. Other evidence of scholarly achievements

The evaluation process also includes an interview. Local candidates will be asked to come to Taipei for interviews, and international students will be interviewed by phone. Please send the above documents to:

Admissions Office
Taiwan International Graduate Program
Academia Sinica
128 Academia Rd., Section 2
Nankang, Taipei 115
Taiwan

Degree Conferral Policy

Based on the Regulations of the Ministry of Education in Taiwan, students will officially register with our partner universities (Inst. of Biochemistry and Molecular Biology, National Yang Ming University). Upon completion of the program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Fellowship and Stipends

The TIGP will provide full fellowship support for all enrolled graduate students for 3 years. The stipend levels are about NT\$32,000 per month. In subsequent years, the financial support for outstanding students will be in general in Ph.D. student assistantships provided by the thesis advisor's grant from the National Science Council, National Health Research Institute, or Academia Sinica.

Medical Insurance

Four months after receiving their student I.D., students are qualified for Taiwan's National Health Insurance Program. Students pay the same premium (about US\$ 210/year) as all Taiwan citizens and are entitled to the same medical coverage.

Cost of Study

The tuition fee is about US\$ 1,500 per year.

Living and Housing Costs

Academia Sinica has a dormitory building for TIGP graduate students near the Academia Sinica campus. The structure is completed, a block of private rooms with bath have been set aside in the Guest House of the Activity Center of Academia Sinica. This type of housing will be available to the TIGP graduate students NT\$5,500 per month. Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$ 5,000-15,000 per month. In addition, Yang Ming University also provides limited rental housing at Yang Ming campus. Meals are also available at the Activity Center Cafeteria/Dining Hall, the Chinese restaurant, and the Western restaurant on the Academia Sinica campus at modest costs.

Correspondence and information

For general information regarding TIGP, please contact

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
128 Academia Rd., Section 2
Nankang, Taipei 115
Taiwan
E-mail: nancyy@gate.sinica.edu.tw
Tel: 886-2-2789-8050
Fax: 886-2-2785-8944

For information concerning this program, please contact:

Dr. Yijuang Chern
Institute of Biomedical Sciences
Academia Sinica
128 Academia Rd., Section 2
Nankang, Taipei 115
Taiwan
E-mail: bmychern@ibms.sinica.edu.tw
Tel: 886-2-2652-3913
Fax: 886-2-2782-9142

Ms. Alice Tsai
Administrative Assistant of Molecular Medicine Program
Institute of Biomedical Sciences
128 Academia Rd., Section 2
Nankang, Taipei 115
Taiwan
E-mail: cfmeow@ibms.sinica.edu.tw
Tel: 886-2-2789-9114
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Website Information:

Taiwan International Graduate Program,
Academia Sinica
<http://www.tigp.sinica.edu.tw>

Institute of Biomedical Sciences,
Academia Sinica
<http://www.ibms.sinica.edu.tw>

National Yang Ming University
<http://www.ym.edu.tw>

This Program is sponsored by
Institute of Biomedical Sciences,
Academia Sinica
In cooperation with
Institute of Life Sciences,
National Yang Ming University



Taiwan International Graduate Program (TIGP)

Chemical Biology and Molecular Biophysics (CBMB)

Introduction

Under the leadership of the program director, Dr. Andrew H-J Wang (2002-2006), and the current director Dr. Ming-Daw Tsai (2006-present), the Taiwan International Graduate Program (TIGP)- Chemical Biology and Molecular Biophysics (CBMB)-founded by the Academia Sinica in 2002- has been advanced to an excellent interdisciplinary program in cooperation with two top universities in Taiwan: the National Taiwan University and National Tsing Hua University, aiming to enhance scholarly exchanges that will accelerate the overall upgrading of academic research in the cooperated institutes and Academia Sinica; and moreover to develop the research manpower pool for the economical and social development of Taiwan.

The emphasis of the student training in this program is placed on basic sciences at the interface between chemistry/physics and biology. The range of 59 outstanding faculty members' expertise covers biochemistry, bioorganic and bioinorganic chemistry, biophysics and bioinformatics, carbohydrate synthesis, mass spectrometry, molecular biology, organic and medicinal chemistry, structural biology, and so on. And, core courses provided are 'Fundamental Chemical Biology and Molecular Biophysics', 'Experimental Molecular Biophysics', and 'Advanced Chemical Biology'.

Research facilities include nuclear magnetic resonance (solution and solid state); electron paramagnetic resonance (continuous and pulse); X-ray crystallography (rotation anode/synchrotron radiation); storage ring for spectroscopy using synchrotron radiation; advanced tandem mass spectrometry (Q/TOF, TOF/TOF, ion trap, FT-ICR); surface plasmon resonance; circular dichroism; stopped-flow; analytical ultracentrifuge; workstations for modeling; fluorescence spectroscopy (time-resolved and steady state); capillary electrophoresis; 2D gel electrophoresis; peptide synthesizer; isothermal titration calorimeter; GC-MS; HPLC, FPLC; cryo electron microscopy and single molecule fluorescence microscopy; single molecule spectroscopy; scanning tunneling microscopy; atomic force microscopy; confocal microscopy; flow cytometry; high-throughput drug screening; and RT-PCR.

The Academia Sinica and TIGP Program

The Academia Sinica, established in 1928 and composed of 25 institutes/preparatory offices and 5 research centers, is one of the most prominent independent academic institution in the Republic of China, while affiliated directly to the Presidential Office of Taiwan, R.O.C. The mission of the Academia Sinica is to undertake in-depth academic research on various subjects in the sciences and humanities, and to provide guidelines, channels of coordination, and incentives geared toward raising academic standards in Taiwan. Dr. Chi-Huey Wong is the current president and devotes himself to promoting the internal integration of research activities in exploring new knowledge and enriching human life.

In fulfilling this goal, the Taiwan International Graduate Program (TIGP) is established to advance innovative multi-disciplinary scientific research fields. The Chemical Biology and Molecular Biophysics (CBMB) Program is the first international, interdisciplinary, and cross-institutional Ph.D. graduate program not only in the TIGP but also in Taiwan. For the 2008 academic year, the TIGP will offer the following eight programs.

1. Bioinformatics Program
2. Chemical Biology and Molecular Biophysics Program
3. Computational Linguistics and Chinese Language Processing
4. Molecular and Biological Agriculture Sciences Program
5. Molecular Cellular and Developmental Biology Program
6. Molecular Dynamics and Spectroscopy Program
7. Molecular Medicine Program
8. Nano Science and Technology Program



Faculty and Faculty Members

Academia Sinica

Genomic Research Center

Dr. Wei-Chieh Cheng
Ph.D., University of California, Davis, CA, USA
Total synthesis of various biologically active products, new synthetic methodology, combinatorial chemistry, solid phase organic synthesis, chemical biology, and new drug discovery.

Dr. Yun-Ru Ruby Chen
Ph.D., North Carolina State University, NC, USA
Equilibrium and kinetic mechanisms in protein folding; Amyloids and deficient enzymes in protein misfolding disease

Dr. Tsung-Lin Li
Ph.D., Chemistry, University of Cambridge, UK
Research interests are centered on natural product biosynthesis, functional & structural enzymology, and microbial pathogenicity.

Dr. Che Alex Ma
Ph.D., University of Pennsylvania, PA, USA
Membrane Protein Structural Biology; The main focus of our research is to use X-ray crystallography and nuclear magnetic resonance (NMR) spectroscopy to elucidate the structures of membrane proteins.

Dr. Ming-Daw Tsai
Ph.D., Purdue University, IN, USA
The main research program of Tsai lab focuses on proteins involved in cell cycle progression that are closely related with cancer and virus infection.

Dr. Chi-Huey Wong
Ph.D., Massachusetts Institute of Technology, MA, USA
Research in the Wong lab encompasses a broad spectrum of bioorganic and synthetic chemistry. Development of small molecules targeting proteins and RNA has been performed to investigate how small molecules interact with biologically important molecules and in turn, learn more about the function of those molecules. Development of both synthetic and bioorganic strategies is also paramount to our research.

Dr. Chung-Yi Wu
Ph.D., National Chiao-Tung University, Taiwan, R.O.C.
We focus on the development of new and efficient methods to prepare the important oligosaccharides and use sugar array to address their bio-function.

Dr. An-Suei Yang
Ph.D., The Johns Hopkins University, MD, USA
The research direction in this laboratory is to engineer proteins of significant biomedical importance. We develop computational and bioinformatic approaches to design stable protein scaffolds and use phage-based molecular evolution to engineer stability in folding and affinity toward target molecules. The goal is to enhance the insight into molecular basis on protein recognition and to use the engineered proteins in biomedical applications.

Dr. Wen-Bin Yang
Ph.D., National Taiwan University, Taiwan, R.O.C.
Our research team is interested in the study of function and chemical composition of *Ganoderma lucidum* (Ling-Zhi) polysaccharides.

Dr. Alice Lin-Tsing Yu
Ph.D., University of Chicago, IL, USA
Research interests in translational research, aiming to bridge the gap between Laboratory research and Clinical medicine

Institute of BioAgricultural Sciences

Dr. Lie-Fen Shyur
Ph.D., National Taiwan University, Taiwan, R.O.C.
Directed evolution and structure-function studies of industrial enzymes; and Metabolomics and chemo-prevention bioactivities of medicinal plants.

Institute of Biological Chemistry

Dr. Guang-Chao Chen
Ph.D., University of Texas at Austin, USA
The family GTPase signaling pathways in *Drosophila* developmental morphogenesis. Functional analysis of focal adhesion proteins in development and tumorigenesis.

Dr. Shui-Tein Chen
Ph.D., National Taiwan University, Taiwan, R.O.C.
Systems biology research; Enzymes in organic synthesis; Protein engineering by chemical approach; Enhance efficiency of drug delivery and targeting.

Dr. Rita P.-Y. Chen
Ph.D., University of Cambridge, UK.
The research interest is regarding protein folding and misfolding behaviors in order to answer how proteins can fold into its native structure and how certain proteins can misfold and cause disease.

Dr. Kay Hooi Khoo
Ph.D., Imperial College, University of London, UK.
Development and applications of advanced mass-spectrometry and separation techniques in high sensitivity structural mapping and sequencing of complex glycans, particularly sulfated N- and O-glycans, polysialylation, and/or large polymeric glycan chains

Dr. Po-Huang Liang
Ph.D., University of Maryland, MD, USA.
Our laboratory has been mainly focusing on (i) enzyme mechanistic and structural studies and drug discovery. (ii) biopolymer synthesis and degradation enzymes (iii) anti-bacterial and endotoxin binding proteins and their biotech applications.

Dr. Chung-Hung Lin
Ph.D., The Scripps Research Institute, CA, USA.
We are particularly interested in the enzymes involved in infectious diseases and cancers. The approaches include designing and making potent enzyme inhibitors for new drug candidates, developing high throughput screening for activity assays, deciphering structure basis associated with enzyme activity, and developing novel synthetic methods to prepare biologically important sugars.

Dr. Tzu-Ching Meng
Ph.D., University of Nebraska Medical Center, NE, USA.
The broad, long-term goal of our study is to delineate the fundamental mechanisms to the control of tyrosine phosphorylation-dependent signal transduction pathways.

Dr. Inn-Ho Tsai
Ph.D., Northwestern University, IL, USA.
The venom species of medical importance, representative or monotypic, or of high biodiversity.

Dr. Andrew H.-J. Wang
Ph.D., University of Illinois at Urbana-Champaign, IL, USA.
Using structural proteomics to understand the functions of important bio- systems. Primary methodologies are high-throughput synchrotron protein crystallography and proteomics. Other advanced technologies, e.g., NMR spectroscopy, biophysical or immunological methods are used if necessary.

Dr. Ting-Fang Wang
Ph.D., Harvard University, MA, USA.
Biochemistry of protein complexes involved in DNA recombination and chromosome structure.

Dr. Shih-Hsiung Wu
Ph.D., University of Wisconsin, Madison, WI, USA.
Carbohydrate chemistry and glycobiology; preparation of chiral or other useful intermediates by chemoenzymatic methods; Studies on the structure-functional relationship of proteins and peptides by NMR

Dr. Yu-Ling Shih
Ph.D., University of Cambridge, UK
Mechanisms of spatial and temporal control of bacterial cell division and functional study of bacterial cytoskeletons

Institute of Biomedical Sciences

Dr. Chin-Pan Chen
Ph.D., University of Washington, WA, USA.
Structure/function study of biologically significant biomolecules by using a variety of biophysical techniques: GISP-like proteins, DNA-binding proteins and other proteins.

Dr. Ming-Jing Hwang
Ph.D., University of Pittsburgh, PA, USA.
Computational biology, bioinformatics, structural biology, genome science.

Dr. Carmay Lim
Ph.D., University of Minnesota, MN, USA.
Computational biophysics & chemistry; bioinformatics; pro-

tein structure, folding and dynamics; molecular recognition and structure-based drug-design.

Dr. Tai-huang Huang
Ph.D., Brandeis University, MA, USA.

We employ state-of-the-art high field nuclear magnetic resonance and other physico-chemical and molecular biology techniques to investigate the structure, dynamics, folding, and functions of proteins, focusing on those that have important pathological consequences.

Institute of Chemistry

Dr. Sunney I. Chan
Ph.D., University of California Berkeley, CA, USA.
Physical biochemistry; structure and function of membrane proteins; magnetic resonance spectroscopy; X-ray spectroscopy; bioorganic chemistry; protein folding; bioenergetics.

Dr. Ding-Kwo Chang
Ph.D., University of Wisconsin-Madison, WI, USA.
Conformation of HIV-1 envelope glycoprotein fragments and its folding kinetics to understand binding between CD4, coreceptors and HIV-1 envelope glycoprotein; Protein-membrane interactions and proteomics from bioinformatics; Search of SARS coronavirus cellular receptor and inhibitors of viral attachment to the target cell. Development of antibody to the SARS virus for diagnosis and SARS treatment; Development of inhibitors of HIV-1, SARS coronavirus and other virus replication with derivatives of viral envelope fusion proteins

Dr. Wei-Hau Chang
Ph.D., Stanford University, CA, USA.
Structure and function of macromolecules that are important in human disease processes; Reconstitution of a minimal DNA repair system of budding yeast; Cryo electron microscopy; Optical microscopy.

Dr. Yu-Ju Chen
Ph.D., Iowa State University, IA, USA.
Analytical and physical chemistry; biochemical and biotechnological applications of mass spectrometry; structure elucidation and unimolecular dissociation mechanisms of biomacromolecules.

Dr. Chao-Ping Hsu
Ph.D., California Institute of Technology, CA, USA.
Development and applications of related electronic structure theories of electrons in molecules and materials, in order to provide satisfactory prediction of chemical and physical properties with affordable computational cost; studies of protein structure and interaction between protein and other biological molecules with knowledge derived from genomic databases.

Dr. Lou-Sing Kan
Ph.D., Duquesne University, PA, USA.
Studies of nucleic acids; Special emphasis in the area of triple stranded DNA; Studies of the folding and structure of proteins by quasi-static-like process.

Dr. Wen-Shan Li
Ph.D., Case Western Reserve University, OH, USA.
Drug Discovery; Enzyme Kinetics and Mechanism; Enzymatic Bioremediation; Cellular Studies; Artificial enzyme.

Dr. Der-Lii M. Tzou
Ph.D., School of Physics, Georgia Institute of Technology, GA, USA.
Current research focuses on the specific interaction between vaccine viral envelope protein A27L and glycosaminoglycans (GAGs). Research topics include the self-assembly formation of A27L protein and the specific binding mechanism to heparin. Liquid state NMR and CD spectroscopy were utilized to study the molecular structure of A27L. In addition, SPR and ITC were applied to analyze the structure/function relationship. We aim to better understand the mechanism of viral entry to normal cell.

Dr. Steve Sheng-Fa Yu
Ph.D., National Tsing Hua University, Taiwan, R.O.C.
Identification and biochemical as well as biophysical characterization of bacterial oxygenases; Structure and functional studies of copper membrane oxygenases; Process Engineering; Whole cells catalysts for chemical bulk synthesis of oxygenated fine chemicals

Institute of Molecular Biology

Dr. Wen Chang
Ph.D., University of Washington, Seattle, WA, USA.
Vaccinia Virus Entry; Host Restriction Mechanism Antagonized by a VV Host Range Protein CP77; Dengue virus entry.

Dr. Yu-Chan Chao
Ph.D., University of Arkansas, AK, USA.
Protein Engineering and Molecular Manipulation of Baculovirus

Dr. Chwan-Deng Hsiao
Ph.D., University of Pittsburgh, PA, USA.
The 70-KDa heat-shock protein cognate; Structural and Functional Study of the Outer Membrane Protein - Toc34 from Chloroplasts; Primosome Proteins - PriA and PriB.

Dr. Yen-Chywan Liaw
Ph.D., National Taiwan University, Taiwan, R.O.C.
Model Building and Crystallographic Studies of CHL1, SMN and Thioesterase I.

Dr. Ming-Fai Tam
Ph.D., University of Montana, MT, USA.
Structures and functions of protein arginine N-methyl transferases; cellular responses to protein arginine N-methylation.

Dr. Hanna S. Yuan
Ph.D., University of Southern California, CA, USA.
Structural and functional studies of DNA/RNA degradation nucleases in protection or killing of cells.

Institute of Plant and Microbial Biology

Dr. Hsiu-An Chu
Ph.D. University of California at Riverside, CA, USA.
Structure and mechanism of photosynthetic water oxidation

Dr. Shih-Long Tu
Ph.D. National Defense Medical Center, Taiwan, R.O.C.
Biosynthesis of phytylbiin chromophore

Institute of Physics

Dr. Chia-Seng Chang
Ph.D., Arizona State University, AZ, USA.
Bio-imaging and manipulation with atomic force microscopy (AFM) and phase-contrast transmission electron microscopy (TEM)

National Taiwan University

Institute of Biochemical Sciences

Dr. Shyh-Horng Chiou
Ph.D., Colorado State University, CO, USA.
Physicochemical study of lens crystallins and characterization of snake venom toxins.

Institute of Microbiology and Biochemistry

Dr. Chii-Shen Yang
Ph.D., University of Illinois at Chicago, IL, USA
G-protein structure and signal transduction in plant, regulation and specificity study of G-protein signal transduction using fluorescent probe modified RGS proteins, structural and kinetics study of photosensory signal transduction in halobacteria.

Department of Physics

Dr. Chen-Yuan Dong
Ph.D., University of Illinois at Urbana-Champaign, IL, USA.
Molecular imaging using optical microscopy, intravital microscopy, cellular biomechanics, tissue engineering.

National Tsing Hua University

Department of Chemistry

Dr. Sheng-Cheng Hung
Ph.D., National Tsing Hua University, Taiwan, R.O.C.
Carbohydrate recognition; carbohydrate-based drug discovery; bioorganic and medicinal chemistry; synthesis of natural products.

Dr. Reuben Jih-Ru Hwu
Ph.D., Stanford University, CA, USA.
Synthesis of novel nano-materials; Studies on affinity of

DNA-cleaving agents and nano-polymers; Development of novel DNA- and RNA-cleaving agents; Exploration of new bioorganic reaction mechanisms; Development of new drugs for anti-cancer, anti-virus, and anti-bacteria; Total Synthesis of biologically active compounds and natural products; Development of new synthetic methods and strategies; Development of organosilicon reagents and investigation on properties of organosilicon functional groups; Invention of new reactions involving silicon and studies of their mechanisms; Establishment of the concept and utilization of "counterattack reagents".

Dr. Chun-Chen Liao
Ph.D., The University of Western Ontario, Canada.
Organic synthesis; development of new synthetic methodology; organic photochemistry; total synthesis of natural products, synthesis of biologically active compounds.

Dr. Chun-Cheng Lin
Ph.D., The Scripps Research Institute, CA, USA.
Development of new methods for the synthesis of complex carbohydrate antigens; Application of functionalized nanoparticle in glycobiology; Study of carbohydrate-protein interaction; Fabrication of biomolecule microarray

Dr. Hsing-Jang Liu
Ph.D., University of New Brunswick, Canada.
Organic synthesis; natural product chemistry; medicinal chemistry.

Dr. Bling-Jiun Uang
Ph.D., Yale University, CT, USA.
Organic Synthesis; Natural Product Synthesis; Asymmetric Synthesis

College of Life Science

Dr. Dah-Tsyr Chang
Ph.D., The Johns Hopkins University, MA, USA.
Genetic engineering; bioorganic chemistry.

Dr. Jya-Wei Cheng
Ph.D., University of Washington, Seattle, WA, USA.
Structural biology, drug design; nuclear magnetic resonance.

Dr. Thy-Hou Lin
Ph.D., University of Michigan, MI, USA.
Docking & 3D-QSAR; Molecular dynamics simulation & Binding free energy analysis; Quantum mechanics to study drug reaction mechanism; Carbohydrates metabolism-related genes of Lactobacillus; Construct a stable food grade integration vector for Lactobacillus

Dr. Ping-Chiang Lyu
Ph.D., New York University, NY, USA.
Structural biology; biophysics; bioinformatics.

Dr. Rong-Long Pan
Ph.D. The Ohio State university, OH, USA.
A new look at the structure and function of vacuolar H⁺-pyrophosphatase and H⁺-ATPase. Exploration on the plant DNA end-binding proteins, Bionanotechnology.

Dr. Yuh-Ju Sun
Ph.D., University of Pittsburgh, PA, USA.
X-ray diffraction; macromolecular crystallography; structural biology

Dr. Wen-Guey Wu
Ph.D., University of Virginia, VA, USA.
My group is interested in the structure and dynamics of model and biological membranes, especially upon treatment with toxins or exogenously added lipids. We are also interested in applying NMR to study the structure and dynamics of model and biological membranes.

Curriculum

Three Core Courses:

1. Fundamental Chemical Biology and Molecular Biophysics (4 credit units per term, fall term) (Required for all students)
Topics: Biological macromolecules; Gene expression and protein production; Enzymes, catalysis and mechanism; Enzymes: kinetics and inhibition; Protein 3-D structures; Protein Folding (structure and dynamics); Protein structural simulation; Proteomics; Posttranslational modification; Carbohydrate chemistry; Enzymatic reaction for synthesis; Current challenges in Glycobiology; Lipid and membrane; Membrane protein; Signal transduction (ki-

nase and phosphatase); Protein network and interaction; Infection and resistance.

2. Experimental Chemical Biology and Molecular Biophysics (3 credit units per term; spring term) (Required for the students who are registered in the Institute of Life Science of the National Tsing Hau University, and optional for other students)

Topics: Mass spectrometry; Protein Crystallography; Cryo-Electron Microscopy; NMR; Spectroscopy; Computational biophysics.

3. Advanced Chemical Biology (3 credit units per term) (Required for the students who do not take the Experimental Chemical Biology and Molecular Biophysics course; spring term)

Topics: Synthetic Methodologies; Medicinal Chemistry; Good Examples of Pharmaceuticals.

Other Required Courses:

1. Colloquium (1 credit unit per term; a total of 4 credit units)
2. Elementary Chinese (3 credit units per term; a total of 6 credit units; required for oversea students only)
3. Faculty Presentation (1 credit unit per term; a total of 1 credit unit)
4. Lab Rotation (2 credit units per term; a total of 2 credit units)
5. Seminar (1 credit unit per term; a total of 4 credit units)

Elective Courses:

Students are encouraged to take the courses provided by the relevant TIGP programs.

Note: All courses are conducted in English.

Graduate Requirements

1. Course Credit

- a. Students, who are registered with a Master degree, must complete the courses amounted to 18 credits in total, including 12 credits for specialized courses and excluding the thesis research credits in two academic years. Students, who fail to meet the requirement before the end of their second academic year, will be disqualified from staying in the Program.
- b. Students, who are registered with a Bachelor degree, must complete the courses amounted to 30 credits in total, including 24 credits for specialized courses and excluding the thesis research credits. Students, who fail to meet the requirement before the end of their third academic year, will be disqualified from staying in the Program. (Students, before the end of July of their first academic year, must complete an application form for Ph.D. study for administration use).
- c. Students, who are registered either with a Master degree or with a Bachelor degree, and who are registered at NTHU, must complete for four terms the required course, entitled 'Curriculum', provided by NTHU.

2. Qualify Exam for the Advancement to Ph.D. Candidacy

- a. Cum Exams (conducted by the Chemistry Department of NTHU): Students, who are registered in the Chemistry Department of NTHU, must pass cum exams. Students, who fail to meet the requirement before the end of their third academic year, will be disqualified from staying in the Program.
- b. Written Exams (conducted by the College of Life Science of NTHU): Students, who are registered in the College of Life Science of NTHU, must pass written exams. Students, who fail to meet the requirement before the end of their third academic year, will be disqualified from staying in the Program.
- c. Non-thesis Oral Exam (conducted by TIGP-CBMB Program for NTU students): Students, who are registered in the Institute of Biochemical Sciences of NTU, must pass non-thesis oral exam. Students, who fail to take the non-thesis oral exam before the first day of their third academic year, or who fail both the first exam and the make-up exam (only one make-up exam is permitted and it must be scheduled between three and six months after the first examination), will be disqualified from staying in the Program.

qualified from staying in the Program.

3. Thesis Progress Report

- a. Students, who are registered at NTU or NTHU, and who have entered their third academic year and passed qualify exams, are eligible to request their thesis advisor to form a Thesis Progress Report Committee composed by three to five members with ranks of assistant fellow/professor and up. (Before the end of their first academic year, students must choose their thesis advisors.) The Thesis Progress Report Committee can serve as a committee for student's Ph.D. thesis defense.
- b. Students, from the third academic year onward, must annually submit a research progress report to the Committee. The annual research progress reports are to be kept in the administration office as references.

4. Minimum Publication Requirements

Students, should meet the minimum requirement for publication set by the University they are registered.

5. Ph.D. Thesis Defense Exam

- a. Students, who fulfill above four requirements, are eligible to apply for Ph.D. thesis defense exam.
- b. To apply for Ph.D. thesis defense exam, students need to provide TOFEL exam record (with grade 550 or more) or the IELTS exam record (with band 6.0 or more), the course record report, the qualify exam record, the thesis progress reports, the copies of the published papers, and the abstract of Ph.D. thesis. An application form enclosed with these documents will be assessed by the University where they are registered for exam permission. A check list signed by the student, his/her advisor, the chair of general affair committee, and the program director need to be submitted to the program office.
- c. A Ph.D. Thesis Defense Exam Committee composed by five members (usually including the Thesis Progress Report Committee members) with ranks of assistant fellow/professor and up is called by the TIGP-CBMB Director. At least one Committee member should come from the University where the student is registered. The student's thesis advisor, though is not excluded, should not be the chairman of the Committee. The Committee chairperson is decided by all Committee members.
- d. Each Committee member will give a score for pass or fail of the examination, on the basis of student's thesis contents and oral presentation. The full and passing marks will be 100 and 70, respectively. The final score will be an average of all scores by individual members. However, the examination should be recognized as fail if more than 1/3 of the examiners (≥ 2 persons) grade the result of examination less than 70.
- e. There will be one make-up examination, if the student fails the first examination. The make-up examination must be completed before the end of the student's seventh academic year. The minimum and maximum of the duration of Ph.D. study is two and seven years, respectively.
- f. Students, who pass the exam, will be rewarded with Ph.D. degree. Whereas Students, who fail the Ph.D. thesis defense exam, will have to comply with the graduate regulations of the University where they are registered. The regulations include:
 - (a) Students, who are registered with a Master degree in the Chemistry Department of NTHU, pass the qualify exam, but fail the Ph.D. thesis defense exam, will be disqualified from staying in the Program.
 - (b) Students, who are registered with a Bachelor degree in the Chemistry Department of NTHU, pass the qualify exam, but fail the Ph.D. thesis defense exam, will be rewarded with Master degree, if their Ph.D. thesis is approved by the Ph.D. Thesis Defense Exam Committee as qualified for it.
 - (c) Students, who are registered in the College of Life Science of NTHU, pass the qualify exam, but fail the Ph.D. thesis defense exam, will be rewarded with Master degree, if their Ph.D. thesis is approved by the Ph.D. Thesis Defense Exam Committee as qualified for it.
 - (d) Students, who are registered in the Institute of Biochemical Sciences of NTU, pass the qualify exam, but fail the Ph.D. thesis defense exam, will be dis-

6. Change of Thesis Advisor

- a. If the student decides to change his/her thesis advisor, he/she has to obtain a mutually signed agreement between his/her thesis advisor and the would-be thesis advisor. If the student has any difficulty in obtaining the mutual agreement, he/she is advised to approach the General Affair Committee for the matter. The duration of his/her Ph.D. study ranges from two to seven years and will not be extended due to any change of his/her thesis advisor.

Admission Requirements

1. Eligibility

Students (either international or local students) with a B.S. or M.S degree from an accredited institute are eligible to apply for the Ph.D. study of the program.

2. Requirements

- a. The Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), or the General English Proficiency Test (GEPT)

Applicants, whose first or native language is not English, are required to take the Test of English as a Foreign Language (TOEFL), the International English Language Testing System (IELTS), or the General English Proficiency Test (GEPT), as part of the application procedure, except those applicants who have recently completed two or more years of study in an English-speaking country. Under special circumstances, applicants, who have difficulties to submit TOEFL, IELTS, or GEPT scores on time but evaluated as qualified for the graduate study in other parts, may be admitted conditionally to the program.

(a) The Test of English as a Foreign Language (TOEFL)

We recognize the scores from the Educational Testing Service (ETS), and require a minimum score of 550 on the paper-based TOEFL, a minimum score of 213 on the computer-based TOEFL, or a minimum score of 79-80 on the internet-based TOEFL, taken within the past 2 years. (For the computer-based TOEFL, an additional score is indicated in the scale of six in parenthesis right after the total score to show the proficiency of the applicant's ability in English writing.)

The comparison of scores among the paper-based, the computer-based and the internet-based TOEFL is as follows.

The Internet-based TOEFL	The Computer-based TOEFL	The Paper-based TOEFL
79-80	213	550
90-91	233	580
100	250	600
120	300	677

(b) The International English Language Testing System (IELTS)

The scores from the University of Cambridge ESOL Examinations, the British Council, or from IDP: IELTS Australia, are also recognized by us. A minimum score of 6.0 taken within the past 2 years is required.

The comparison of scores between the IELTS and TOEFL is as follows.

IELTS	TOEFL
6.0	550
6.5	580
7.0	600
7.5 - 8.0	620 - 680

(c) The General English Proficiency Test (GEPT)

In place of TOEFL and IELTS scores, applicants in Taiwan can take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Centre. Applicants are required to submit their high-intermediate level certificate when applying for admission.

b. The General Test of the Graduate Record Examination (GRE)

The General Test of the Graduate Record Examination (GRE) General and Subject scores are optional but applicants are strongly encouraged to provide them. (The percentage indicated in parenthesis right after the GRE score means which percentile the applicant belongs to). Applicant, who fails to submit GRE scores for evaluation, will be evaluated by additional information, such as publications, professional experiences, etc.

c. Certificate of M.S. and/or B.S. degree

Applicants are required to submit the certificate of B.S. and/or M.S. degree with the signature of the registrar and with the seal of the issuing institution.

d. Academic Transcripts

Official transcripts of courses, including grades and grading scales, must be sent directly by the registrar of the institutions or submitted with the application form in sealed envelopes. An explanation for any non-standard grading system is highly recommended.

e. Statement of Purposes

The statement of purposes should be comprised of a brief statement of the scientific interests and career goals, together with a description of past accomplishments that are not evident from other documents submitted. If applicable, the result of any research in progress may be specified.

f. Recommendation Letters

The forms of recommendation letter, which can be downloaded from the website of our program, should be given to three individuals who are familiar with your academic works, and be submitted in sealed envelopes.

g. Additional Information

Any additional information about your professional experiences, publications, and other original works that support your application is advisable.

Note: The materials listed above must be submitted in English before March 31st, 2008. All translations must be the complete version of the original records. Irreplaceable records will be returned only upon a request and accompanied by a self-addressed envelope.

Note: The application form for 2008 academic year will be posted on the homepage of our website for applicants to download and complete. Completed application form and the required materials should be sent to the following address:

TIGP Admission Office
Taiwan International Graduate Program
128, Academia Road Sec. 2
Nankang, Taipei 115
Taiwan, R.O.C.

TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>.

Student Status and Degree Conferral Policy

Based on the Regulations of the Ministry of Education in Taiwan, students will be assigned officially to one of our partner institutes: the Biochemical Sciences of the National Taiwan University, the Chemistry Department of the National Tsing Hua University, and the College of Life Science of the National Tsing Hua University based on their academic background, research interests, and preference. Upon completion of the program, each student will be conferred a Ph.D. degree by the designated partner university

and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Tuition Fee and Medical Insurance Cost

Tuition fee is approximately NTD 58,000 (about US\$ 1,800) per academic year and due upon registration. The health insurance cost is approximately NTD 7,250 (about US\$ 230) per academic year. It is necessary to note here that, not until four months after receiving student ID from the registered universities are overseas students qualified for the Taiwan National Health Insurance program.

Fellowship and Stipends

The TIGP will provide full fellowship support for all graduate students for 3 years. The stipend levels are about NTD 32,000 (about US\$ 980) per month. In subsequent years, the financial support may be provided by the student's thesis advisor.

Living and Housing Costs

Meals are available at modest costs at the Cafeteria/Dining Hall, the Café, the Chinese restaurant, and the Western restaurant of the Activity Center, Academia Sinica.

The Sport Center on campus is equipped with jogging track, gym, swimming pool, aerobic court, tennis court, badminton court, and basketball court. The entrance fee for students to access the jogging track, gym, and swimming pool is NTD 50 (about US\$ 1.5) per person. And there is an additional charge for accessing courts.

The Academia Sinica International Student Dormitory provides accommodation for the first-year students. The rent for a single room is NTD 5,500 (about US\$ 170) per month. Please be noted that there is an additional charge for parking space: NTD 1,000 (about US\$ 30) per month for car; and NTD 200 (about US\$ 6) per month for motorcycle.

Correspondence and Information

For information concerning this program, please contact:

Dr. Po-Huang Liang
CBMB Program Coordinator
Institute of Biological Chemistry
128 Academia Road sec. 2,
Nankang, Taipei 115, Taiwan
E-mail: phliang@gate.sinica.edu.tw
Tel: 886-2-2785-5696 ext. 6070
Fax: 886-2-2788-9759

Ms. Shih-Yi Teresa Pan
CBMB Program Assistant
Institute of Biological Chemistry
128 Academia Road sec. 2,
Nankang, Taipei 115, Taiwan
E-mail: shp583@gate.sinica.edu.tw
Tel : 886-2-2785-5696 ext. 1164
Fax : 886-2-2788-9759

Program Homepage:
<http://www.sinica.edu.tw/~tigpcbmb/>

For general information concerning TIGP, please contact:

Ms. Nancy Yang
TIGP Administrative Assistant
Taiwan International Graduate Program
128, Academia Road sec. 2
Nankang, Taipei 115, Taiwan
E-mail: nancyy@gate.sinica.edu.tw
Tel.: 886-2-2789-8050
Fax: 886-2-2785-8944

Taiwan International Graduate Program (TIGP) Homepage:
<http://tigp.sinica.edu.tw>



Taiwan International Graduate Program (TIGP)

Molecular Science and Technology Program (MST)

Research Topics

The following research fields constitute the spectrum of the Molecular Science and Technology (MST) graduate program:

(1) **Chemical dynamics and molecular spectroscopy:** This topic currently focuses on studies of structures and dynamics of molecules, ions, radicals, and transient species, and covers mechanisms involved in photodissociation, reactive scattering, energy transfer, and elementary reactions in atmospheric and combustion chemistry with cutting edge tools such as laser spectroscopy and mass spectrometry. Research subjects also cover reaction and solvation dynamics, relaxation, diffusion, and phase transformation in liquids, solids, surfaces, and interfaces using FT-IR, Raman, fluorescence, UV-VIS, NMR, and single-molecule spectroscopic approaches.

(2) **Functional materials:** This subject focuses on syntheses and characterization of novel functional materials, such as microporous zeolites and mesoporous aluminosilicates, porous carbons, carbon nanotubes, organic optoelectronic materials, inorganic membranes and films, organic-inorganic hybrid materials, metal-incorporated materials, and colloidal crystals. Interdisciplinary efforts in utilizing these novel materials for nano-scaled sensing, adsorptive, catalytic, and energy-related (e.g., solar and fuel cells, and fuel storage) applications promise prominent prospect.

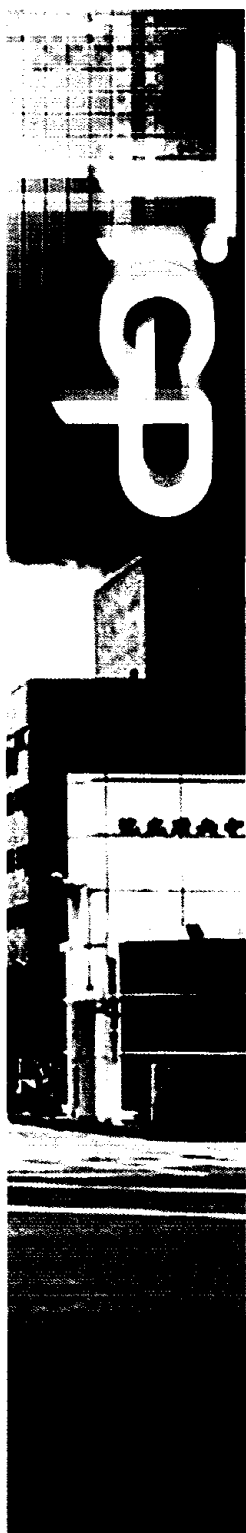
(3) **Biomolecular structures and dynamics:** This subject presently covers (1) spectroscopic and spectrometric characterization of biomolecules, clusters, and biopolymers, biological energy conversion, (2) biolabeling and biosynthesis assisted by nano-structured materials, (3) development of novel analytical biotechnologies for facilitating the study of molecular structures of DNA, proteins, and nucleic acids etc., (4) dynamics of protein folding and ligand binding in hemoglobin and myoglobin, and of electron transfer in metalloproteins and photosynthetic systems. and (5) Refolding dynamics of virus envelope proteins by fluorescent and spin labeling; molecular recognition of cellular receptor by viral fusion protein.

(4) **Ultrafast laser technology and high-field physics:** This area currently focuses on the development and application of high-intensity ultrafast laser technology, such as 100-terawatt-class femtosecond lasers, waveform synthesis, laser wakefield electron accelerators, soft x-ray lasers, plasma nonlinear optics, transient plasma photonic devices, high-harmonic generation, proton acceleration, keV coherent x-ray sources, and femtosecond gamma-ray sources.

(5) **Light-matter interactions and optical controlling:** This area focuses on comb laser applications, laser cooling of atom, Bose-Einstein condensation, molecule cooling and trapping, quantum control of atomic states and molecular dynamics, frequency-stabilized lasers, laser spectroscopy of atoms, nonlinear optics, quantum optics and high precision optical measurements.

(6) **Molecular electronics:** This area focuses on designing and fabrication of electronic/optoelectronic and electroluminescent/photovoltaic devices, and field effect transistors based on thin films, spintronics, monolayers, and single molecules. In addition, novel lithographic techniques have been developed to create electronic and/or molecular devices based on semiconductors, high-temperature superconductors, magnetic superlattices, and heterostructural materials, etc. The optical, electrical, and magnetic properties of these exotic materials are also explored.

(7) **Theoretical and computational chemistry:** This area focuses on development and application of theoretical methods, such as ab initio calculation of electronic and molecular structures, quantum dynamical calculations of atomic scattering and chemical reactions, and molecular dynamics simulations of biological systems in gas/liquid phase, protein folding, etc.



Faculty

Institute of Atomic and Molecular Sciences (IAMS), Academia Sinica

URL: <http://www.iams.sinica.edu.tw/introa>

Huan-Cheng Chang

Ph.D. in Chemistry, Indiana Univ., U.S.A.
Biophysical chemistry and bioanalytics

Ta-Chau Chang

Ph.D. in Chemistry, Iowa State Univ., U.S.A.
Biological applications of laser spectroscopy

Kuei-Hsien Chen

Ph.D. in Applied Sci., Harvard Univ., U.S.A.
Optoelectronic materials and nanosciences

Szu-Yuan Chen

Ph.D. in Electrical Engineering, Univ. Michigan, U.S.A.
Ultrafast optics, high-power lasers, and high-field sciences

Ying-Cheng Chen

Ph.D. in Physics, National Tsing Hua Univ., Taiwan
Laser cooling of atom, ultra-cold atom and molecule sciences, quantum optics

Wang-Yau Cheng

Ph.D. in Physics, National Tsing Hua Univ., Taiwan
Ultra-high resolution laser spectroscopy, frequency-stabilized lasers, photon-atom interaction

Wun-Shain Fann

Ph.D. in Physics, Stanford Univ., U.S.A.
Condensed matter dynamics

Chau-Chung Han

Ph.D. in Chemistry, Stanford Univ., U.S.A.
Biological mass spectrometry and chromatography

Yen-Chu Hsu

Ph.D. in Chemistry, Univ. of Pennsylvania, U.S.A.
Molecular spectroscopy and laser spectroscopy

Keh-Ning Huang

Ph.D. in Physics, Yale Univ., U.S.A.
Theoretical physics and atomic physics

Lian-Pin Hwang

Ph.D. in Chemistry, State University of N. T. at Stony Brook, U.S.A.
Magnetic Resonance Imaging, Magnetic Resonance Relaxation and Supercooled Water in confinement

Yuan-Tseh Lee

Ph.D. in Chemistry, Univ. of California at Berkeley, U.S.A.
Reaction dynamics

Jim Jr-Min Lin

Ph.D. in Chemistry, National Taiwan Univ., Taiwan
Reaction dynamics and photochemistry

Sheng Hsien Lin

Ph.D. in Chemistry, Univ. of Utah, U.S.A.
Spectroscopy and dynamics of molecules, protein folding, and nonlinear optics

Kopin Liu

Ph.D. in Chemistry, Ohio State Univ., U.S.A.
Chemical dynamics

Shang-Bin Liu

Ph.D. in Physics, College of William and Mary, U.S.A.
Nuclear magnetic resonance spectroscopy, porous materials, and catalysis

Chi-Kung Ni

Ph.D. in Chemistry, Columbia Univ., U.S.A.
Molecular dynamics

Ker-Jar Song

Ph.D. in Physics Univ. of Pennsylvania
Surface Science

Wen-Bih Tzeng

Ph.D. in Chemistry, Iowa State Univ., U.S.A.
Mass spectrometry and molecular ion spectroscopy
Jyhpyng Wang
Ph.D. in Applied Sci., Harvard Univ., U.S.A.
Ultrafast optics, high-power lasers, and high-field sciences

Yuh-Lin Wang

Ph.D. in Physics, Univ. of Chicago, U.S.A.
Scanning tunneling spectroscopy

Dah-Yen Yang

Ph.D. in Chemistry, Michigan State Univ., U.S.A.
Biophysics and statistical physics

Institute of Chemistry, Academia Sinica

URL: <http://www.sinica.edu.tw/chem>

Sunney I. Chan

Ph. D. in Chemistry, Univ. of California at Berkeley, U.S.A.
Physical biochemistry, structure and function of membrane proteins, and magnetic resonance spectroscopy

Ding-Kwo Chang

Ph. D. in Chemistry, Univ. of Wisconsin at Madison, U.S.A.
Molecular biophysics

Wei-Hau Chang

Ph. D. in Biophysics, Stanford Univ., U.S.A.
Cryo-electron microscopy, image processing, single molecule imaging, biochemistry

Chin-Ti Chen

Ph.D. in Chemistry, Univ. of Illinois at Urbana-Champaign, U.S.A.
Material chemistry

Yu-Ju Chen

Ph. D. in Chemistry, Iowa State Univ., U.S.A.
Biological Mass Spectrometry and Protoemics

Tahsin J. Chow

Ph. D. in Chemistry, Univ. of Cincinnati, U.S.A.
Organic chemistry

Chao-Ping Hsu

Ph. D. in Chemistry, California Institute of Technology, U.S.A.
Theoretical chemistry

Wen-Shan Li

Ph. D. in Chemistry, Case Western Reserve Univ., U.S.A.
Bioorganic chemistry

Jiann-T'suen Lin

Ph. D. in Chemistry, Univ. of Minnesota at Minneapolis, U.S.A.
Organometallic chemistry and material chemistry

Ling-Kang Liu

Ph. D. in Chemistry, Univ. of Texas at Austin, U.S.A.
Structural chemistry

Kuang-Lieh Lu

Ph. D. in Chemistry, National Taiwan Univ., Taiwan
Supramolecular chemistry and nanomaterials

Yu-Tai Tao

Ph. D. in Chemistry, Univ. of Rochester, U.S.A.
Organic materials chemistry and surface chemistry

Der-Lii Tzou

Ph. D. in Chemistry, Georgia Institute of Technology, U.S.A.
NMR Spectroscopy and Protein structural and functional relationship

Research Center for Environmental Changes, Academia Sinica

URL: <http://www.rcec.sinica.edu.tw/>

Shaw Chen Liu

Ph.D. in Physics, Univ. of Pittsburgh, U.S.A.
Atmospheric chemistry and biogeochemical cycles

Department of Chemistry, National Tsing Hua University

URL: <http://www.chem.nthu.edu.tw/>

Kuei-Jung Chao
Ph.D. in Chemistry, Univ. of Washington at Seattle, U.S.A.
Microporous and mesoporous materials, inorganic membranes and films, synchrotron X-ray spectroscopy

Po-Yuan Cheng
Ph.D. in Chemistry, Univ. of Georgia, U.S.A.
Ultrafast chemistry

Chia-Min Yang
Ph.D. in Chemistry, National Tsing Hua Univ., Taiwan
Physical chemistry and materials chemistry of mesoporous materials, organic-inorganic hybrid materials, and colloidal crystals

Chin-Hui Yu
Ph.D. in Chemistry, Ohio State Univ., U.S.A.
Theoretical chemistry, computational chemistry, electronic structure, and high-performance computing

Department of Physics, National Central University
URL: <http://www.phy.ncu.edu.tw/>

S.K. Lai
Ph.D. in Physics, University of Waterloo, Canada
Colloidal dispersion (structures, phase diagrams, phase transition), Metallic pure and alloy clusters (structures, thermal properties), Statistical mechanics (maximum entropy method)

Y.R. Lin-Liu
Ph.D. in Physics Northwestern University, USA
Plasma Physics, Computational Physics, Condensed Matter Physics

H.C. (Paul) Lee
Ph.D. in Physics, McGill University
Theoretical/Computational/Systems Biology

Jan B. Nee
Ph.D. in physics, University of Michigan
Synchrotron radiation spectroscopy, remote sensing of atmosphere, atmospheric physics and chemistry

Center for Condensed Matter Sciences, National Taiwan University
URL: <http://www.ntu-ccms.ntu.edu.tw/>

Michitoshi Hayashi
Ph.D. in Chemistry, Tohoku Univ., Japan
Theoretical, computational, and physical chemistry

Academic System

The MST program emphasizes establishment of problem-solving ability and developing individual's self-reliance and self-confidence to conduct independent research work. In this program, faculty members will take turns to serve as mentors for first-year students until they have formally joined a research group to conduct their thesis study, which should take place within the first two semesters after their admission into this graduate program. As a rule, students complete a program of required courses before embarking on the research training. The MST program adopts a team-teaching system, where each faculty member teaches the subject according to his or her expertise. Courses offered include required and elective courses. All courses will be delivered in English.

Requirements for Ph.D. Degree

(1) Student Status and Degree Conferral Policy

Based on the Regulations of the Ministry of Education in Taiwan, our degree candidates must be officially registered students of either the Chemistry Department of National Tsing Hua University, or alternatively, the Physics Department of National Central University. Students who enter the

MST program with a B.S. degree should enroll first as a pre-Ph.D. student till they are approved by a committee to enroll in the Ph.D. program (see below). Upon completion of our program, they will be conferred a Ph.D. degree by the designated partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

(2) Course Works

Students are advised to complete the course requirement during the first one-and-a-half years. It is the responsibility of the thesis advisor to assist each student in projecting a program of study that will best satisfy his or her personal needs as well as fulfilling the graduate requirements. Depending on the background of the incoming student, a prescribed program of courses will be required as part of the requirements toward the degree conferral. The details of this prescribed course program will be determined shortly upon arrival after consultation with the Graduate Study Committee of the graduate program.

Courses Offered

Required and Elective Courses Offered by the MST Program			
Course Title	Credit	National Tsing Hua Univ. (NTHU)	National Central Univ. (NCU)
		Dept. of Chemistry	Dept. of Physics
Required Courses (may differ with chosen field of discipline)			
Advanced Physical Chemistry (I: Quantum Chemistry; II: Thermodynamics & Statistical Mech.)	6 (I, II)		
Modern Experimental Techniques	6 (I, II)		6 (I, II)
Seminar	6		6
Special Topics	24		0
Quantum Mechanics			6 (I, II)
Statistical Mechanics I			3
Classical Electrodynamics I			3
Chinese Conversations (for International Students only)	6 (I, II)		0
Elective Courses			
Spectroscopy	3		3
Chemical Kinetics & Molecular Dynamics	3		
Computational Methods for Chemists	3		
Lasers Physics and Ultrafast Optics			3
Fundamental Chemical Biology and Molecular Biophysics	4		
Laser Cooling of Atoms and Molecules			3
Quantum Optics			3
Advanced Chemistry of Materials	3		
Classical Electrodynamics II			3
Statistical Mechanics II			3
Nonlinear Dynamics			3
Soft Matter Physics			3
Classical Mechanics			3
Introduction to Nanotechnology	6 (I, II)		6 (I, II)
Advanced Physical Chemistry (I: Quantum Chemistry; II: Thermodynamics & Statistical Mech.)	6 (I, II)		
Joint Program Course			
All NST Program Courses		All NST program courses are considered as elective courses for students who pick up chemistry as his/her major.	

Requirement for Ph.D. Degree

Total Credits for Ph.D. Degree Required by Partner Department/University		
Institution	National Tsing Hua Univ. (NTHU)	National Central Univ.(NCU)
	Dept. of Chemistry	Dept. of Physics
Requirement		
Qualify Examination	Yes	Yes
Preliminary Oral Defense	Yes	No
Credits Required for Ph.D. Degree	30	34
Thesis Oral Defense	Yes	Yes

(3) Selection of Thesis Advisor

Incoming students are required to select a thesis advisor by the end of the first year of their graduate study. They should be exposed to the research work of a number of laboratories before signing up for a specific faculty member. The process involves attending a series of seminars delivered by faculty members on their respective research and a series of laboratory rotations, each lasting for four weeks, during the first year of students' graduate study.

(4) Qualifying Examination

A student pursuing for the Ph.D. candidacy must pass the qualifying examinations in accordance with the University regulations in which each student enrolled. (Please see the "Student Status and Degree Conferral Policy" above), typically before the end of his/her second or third year in residence.

(5) Advancement to Ph.D. Candidacy

Each student must strive to qualify candidacy for the Ph.D. degree typically by the end of his/her second year of graduate study. The criteria for qualifying candidacy include: (i) submission of an official report describing the candidate's past accomplishments, (ii) certified completion of a series of written examinations on selected subjects required by the designated department/university, and/or (iii) certified completion of a preliminary oral defense on proposed research proposal.

(6) Thesis Defense

Prior to the final submission of a Ph.D. thesis, the candidate must fulfill all courses and earned credits required by the designated department/university at which he/she had registered. Upon completing these requirements, the Ph.D. candidate is then eligible to defend his/her graduate research under a written recommendation by his/her thesis supervisor(s). The thesis defense will take the form of a public seminar given by the Ph.D. candidate followed by an oral examination in front of a thesis examination committee, which shall consist of at least five faculty members (at least one third must come from another institution) familiar with the candidate's area of research.

Admission Requirements

The TIGP Program admits students to the fall semester only. Detailed admission requirements and application materials are available in the TIGP website (URL: <http://www.tigp.sinica.edu.tw>).

Either international students or domestic students from within Taiwan with a B.S. and/or a M.S. degree from an accredited institution will be considered for admission. The applicant's qualification for admission will be based mainly, but not exclusively, on the following certified/notarized documents provided by the applicant:

- (1) Undergraduate and graduate (if applicable) academic records or transcripts.
- (2) Graduate Record Examination (GRE) scores: General Test is required while Subject Test in applicants' area of academic specialty is optional (but highly recommended).

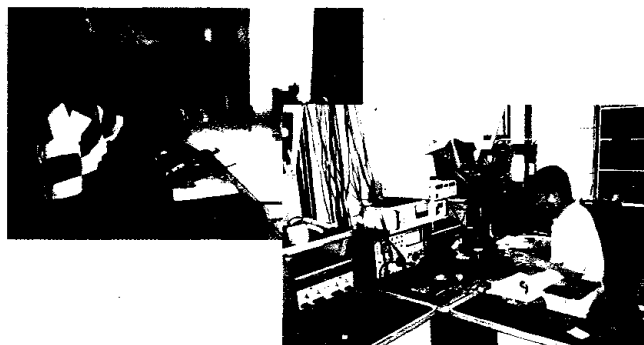
Applicants who cannot provide the GRE scores due to inaccessibility of the GRE General Test in their native countries must submit a request letter (together with application materials) to request permission for late submission or exemption. The board of admission committee will examine each request individually. Upon approval by further notification, the deadline for later submission of GRE scores is by the end of the first year of graduate study. Only applicants who clearly demonstrate research capabilities for graduate study are eligible for the exemption of GRE test.

- (3) English Proficiency: All applicants whose first language is not English must submit documents showing that at least one of the following requirements is fulfilled, unless they have recently completed two or more years of study in an English-speaking country.
 - (i) TOEFL (Test of English as Foreign Language): A minimum score of 550 (paper-based) or 213 (computer-based) or a minimum score of 79-80 on the New Internet based TOEFL (TOEFL-iBT) is required.
 - (ii) GEPT (General English Proficiency Test): For applicants in Taiwan, a High-Intermediate level certificate of GEPT is also acceptable.
 - (iii) IELTS (International English Language Testing System): A certificate of level 5.5 is required.
- (4) Three letters of recommendation commenting on the applicant's personal character, and qualifications for independent study, including intellectual ability, research potential, and scientific motivation.
- (5) A statement of purpose or plan for graduate study.

The above submitted application materials will not be returned to applicants under any circumstances. The complete application materials must reach TIGP before March 31, 2008. Applicants should send their application materials to:

Admissions Office
Taiwan International Graduate Program (TIGP)
Academia Sinica
128 Academia Road, Sec. 2, Nankang,
Taipei 11529, Taiwan, Republic of China

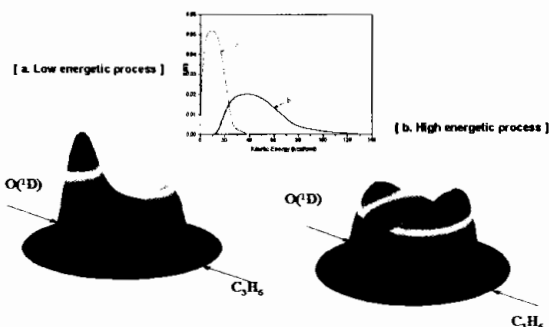
TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tigp/>.



The Electronics Shop

O(¹D) Reaction with C₂H₄

Velocity Flux Diagram for C₂H₄ Formation



Cost of Study

The payments of tuition fees (about US\$1,500 per year) are due upon registration.

Fellowship and Stipends

The TIGP will provide full fellowship for all graduate students for the first two years. The stipend is about NT\$ 32,000 (about US\$980) per month. A student get the same amount of stipend for the 3rd year if he/she has chosen an advisor before the end of the 2nd year. Otherwise, the stipend will be terminated. In subsequent years (after the 3rd year), the financial support will be provided by the student's thesis advisor(s).

Medical Insurance

As soon as the students receive their student I.D., they are qualified to join the "Taiwan National Health Insurance Program". The students are expected to pay the same premium (about US\$200 per year) as all the Taiwan citizens and will be entitled to the same medical coverage.

Living and Housing Costs

Options include on-campus housing and off-campus housing. A dormitory for TIGP graduate students near the Academia Sinica campus is available. This on-campus student housing facilities will be available to the TIGP graduate students at reasonable costs. Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$ 5,000-15,000 per month. Meals are also available at modest cost at the Activity Center Cafeteria/Dining Hall, the Café, located in the Academia Sinica campus and/or assorted restaurants nearby to the IAMS.

Correspondences and information

For general information concerning TIGP, please contact:

Executive Secretary for Student Affairs:
Dr. Seau-Feng Hong
E-mail: fenghong@gate.sinica.edu.tw
Tel: +886-2-2789-9414;
Fax: +886-2-2789-8045

Administrative Assistant:
Ms. Nancy Yang
E-mail: nancy@gate.sinica.edu.tw
Tel: +886-2-2789-8050
Fax: +886-2-2785-8944

Mailing Address:
Taiwan International Graduate Program (TIGP), Academia Sinica
128 Academia Road, Sec. 2, Nankang,
Taipei 11529, Taiwan, Republic of China

For information concerning MST program, please contact:

Coordinator, Admission Committee:
Dr. Chau-Chung Han
E-mail: cchan@pub.iams.sinica.edu.tw
Tel: +886-2-2366-8235
Fax: +886-2-2362-0200

Coordinator, Curriculum and Degree Committee:
Dr. Chi-Kung Ni
E-mail: ckni@po.iams.sinica.edu.tw
Tel: +886-2-2366-8277
Fax: +886-2-2362-0200

Administrative Assistant:
Ms. Jennifer Ma
E-mail: Jennifer@gate.sinica.edu.tw
Tel: +886-2-2362-4938
Fax: +886-2-2362-0200

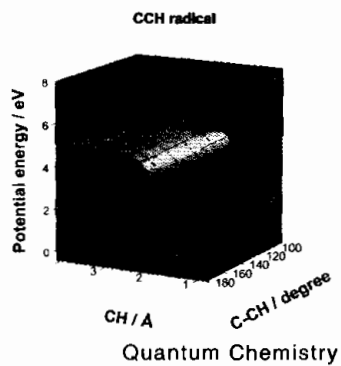
Mailing Address:
Molecular Science and Technology (MST) Program, TIGP
Institute of Atomic and Molecular Sciences, Academia Sinica
P. O. Box 23-166, 1 Roosevelt Road, Sec. 4
Taipei 10617, Taiwan, Republic of China

Websites Information:

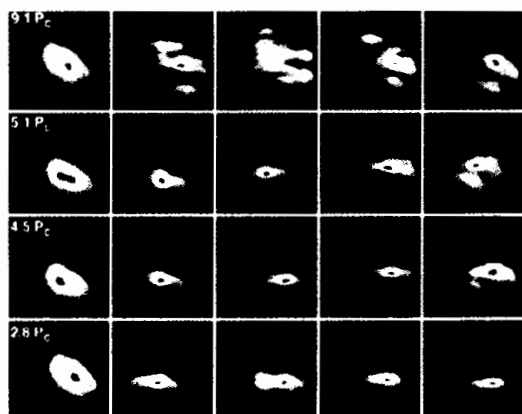
Academia Sinica, Taiwan, Republic of China:
URL: <http://www.sinica.edu.tw>

Taiwan International Graduate Program (TIGP), Academia Sinica:
URL: <http://tigp.sinica.edu.tw>

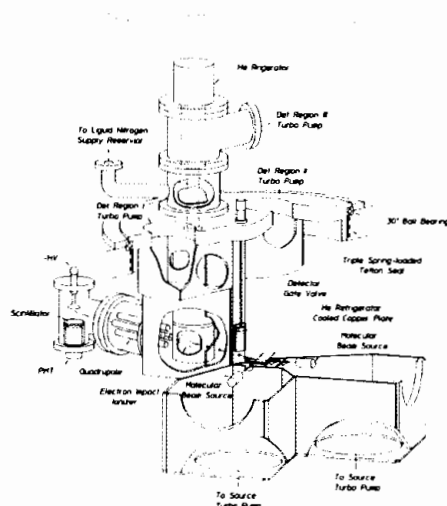
Institute of Atomic and Molecular Sciences (IAMS), Academia Sinica:
URL: <http://www.iams.sinica.edu.tw>



Chemical Dynamics



Ultrafast Optics



New Crossed Molecular Beams Apparatus

This Program is sponsored by
Institute of Atomic and Molecular Sciences (IAMS), Academia Sinica

In cooperation with
Institute of Chemistry and Research Center for Environmental
Changes,
Academia Sinica

&
Department of Chemistry
National Tsing Hua University

&
Department of Physics
National Central University



Taiwan International Graduate Program (TIGP)

Nano Science and Technology Program

Introduction

Academia Sinica has established the Taiwan International Graduate Program (TIGP) in collaboration with a consortium of the key national research universities in Taiwan. The purpose of the program is to develop the research manpower pool in those modern multidisciplinary fields that are important in the future economical and social development of Taiwan and to enhance the innovative potential and academic standards of research in these and related fields.

TIGP will offer Ph.D. programs in only selected disciplines to be agreed upon between Academia Sinica and the National Research Universities. It is the intent of the Program to offer Ph.D. degree programs only in inter-disciplinary areas in the physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences.

Academia Sinica will assume principal oversight of the academic options of the Program. It will provide the intellectual leadership, the research resources, and the research and physical facilities. Qualified and interested faculty members of the participating national research universities are invited to join the various programs as affiliated faculty of the Program, and participate in the teaching of courses, supervision of research, and mentoring of the international graduate students.

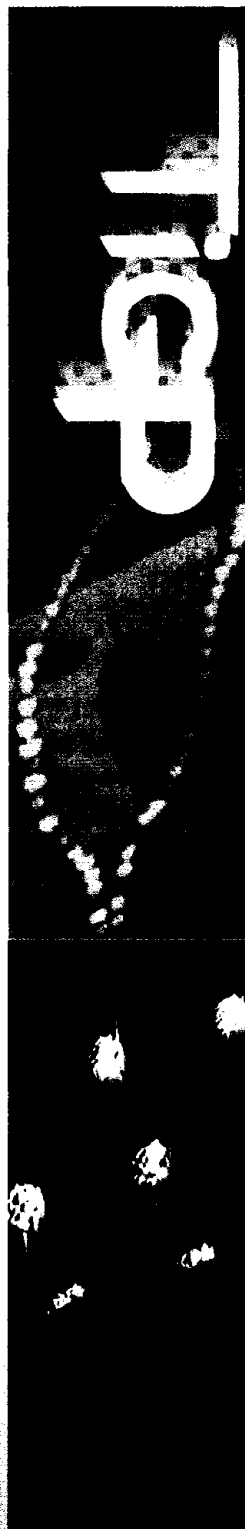
The TIGP Program on "Nano Science and Technology"

The Taiwan International Graduate Program has been established to attract high-quality young researchers from abroad in order to help jump-start the development of several frontier areas that are important to the future economical and social development of Taiwan and Asia Pacific regions. Specific graduate programs have been developed to enhance the innovative potential and academic standards of research in these and related fields. Within this context, the graduate program on "Nano Science and Technology" is designed to offer specific training and research opportunities to Ph.D. students who are interested in the following areas: Characterization of Nanomaterials and Nanostructures, New Nanomaterials and Structures, Theoretical Modeling, and Nanodevices Engineering. This option is a collaborative effort among the Academia Sinica, National Taiwan University and National Tsing Hua University.

The number of students admitted to "Nano Science and Technology" Program will be twenty every year. In addition to the ten students recruited by Department of Physics and Department of Chemistry, National Taiwan University, Department of Engineering and System Science, National Tsing Hua University will enroll ten students. The bulk of these students will be international students with reasonable proficiency in the use of the English language. Highly qualified Taiwan students (up to 50% of the total number) with adequate English proficiency will also be considered. These students may ultimately elect to do their thesis research with affiliated faculty whose principal appointments are associated with the participating research universities.

A whole array of laboratory equipment and facility for teaching and research in the four thrust areas are presently available within the participating units. The following is a sample of such laboratory resources: electron beam lithography, reactive ion etching machines, SEM, STM, AFM, NSOM, DCOM, MFM, microwave measurement system, nanoparticle spray system, ESCA/XPS/Auger spectroscopy, automatic SPR biosensor system, high resolution transmission electron microscope (HR-TEM), micro-Raman/photoluminescence system, surface characterization instruments such as XPS and AES, ultra-fast laser spectroscopy, ion milling system, etc.

With the above facilities and diverse expertise available, together with the close collaboration among scientists and engineers of all participating units, the present graduate program should provide young scientists and engineers with an excellent educational opportunity to cultivate their research interest in the four thrust areas, and to develop their creativity and skills in problem definition and problem solving in studies of complex systems.



Faculty

Academia Sinica

Institute of Chemistry

Dr. Yu-Tai Tao

Ph.D., University of Rochester
Self-assembled molecular films, opto-electronic materials, molecular electronic materials and devices

Dr. Kuang-Lieh Lu

Ph.D., National Taiwan University
Nanomaterials, Supramolecular materials

Dr. Jiann-Tsuen Lin

Ph.D., University of Minnesota
Organometallic supramolecules, electroluminescent materials, NLO materials

Dr. Shin-Guang Shyu

Ph.D., Ohio State University
Organometallic chemistry, CVD, Catalysis

Dr. Chin-Ti Chen

Ph.D., University of Illinois at Urbana-Champaign
Organic opto-electronic materials

Dr. Ta-Shin J. Chow

Ph. D., University of Cincinnati
Physical organic chemistry

Dr. Shih-Sheng Sun

Ph.D., State University of New York at Binghamton
Supramolecular materials, Supramolecular catalysis, Luminescent materials

Dr. Chao-Ping Hsu

Ph. D. California Institutes of Technology
Theoretical Physical Chemistry, Quantum Chemistry, Theory and computation of electron transfer and energy transfer

Dr. Yu-Ju Chen

Ph.D., Iowa State University
Proteomics, nanoparticle-based affinity mass spectrometry

Dr. Ling-Kang Liu

Ph. D., University of Texas at Austin
Ionic liquids: preparation/physical and chemical properties/applications in synthetic and catalytic reactions, structural chemistry

Dr. Chih-Hsiu Lin

Ph.D., Caltech.
Material Chemistry, Organic Synthesis

Dr. Ito Chao

Ph.D., UCLA
Computational chemistry, Quantum chemistry, Physical organic chemistry

Dr. Wei-Hau Chang

Ph.D., Stanford University
Structural Biophysics, Cryo Electron Microscopy

Dr. Fen-Tai Luo

Ph.D., Purdue University
Metallo-Organic Chemistry, Advanced Materials, and Catalysis

Institute of Physics

Dr. Wen-Tau Juan

Ph.D., University of Houston
Biophysical Chemistry and Nanoscience

tein structure and Protein folding, Quantum Monte Carlo method

Dr. Chia-Seng Chang

Ph.D., Arizona State University
Surface Science, Quantum effects in low-dimensional systems, Nanostructure Sciences, Development of SPM

Dr. Yeu-Kuang Hwu

Ph. D. University of Wisconsin Madison
Application Research of Synchrotron Radiation/ Photoelectron Spectromicroscopy Using Synchrotron Radiation

Dr. Ing-Shouh Hwang

Ph.D., Harvard University
Semiconductor Physics, Scanning Probe Microscopy, Surface Atomic and Molecular Dynamics, Mechanism of Epitaxial Growth

Dr. Wei-Bin Su

Ph. D., National Tsing Hua University
Surface Science, Scanning probe microscopy, Epitaxial growth of metal on semiconductor, Nanoscience, Observation of surface electronic structure

Dr. Yeong-Der Yao

Ph.D., Clarkson University
Magnetism, Superconductivity, Thin Films, Nanosize Structures and their Physical Properties

Dr. Yang-Yuang Chen

Ph.D., University of California-Irvine
Low Temperature Physics, Low Temperature Specific Heat Heavy Fermion, Nanoparticle, Thermoelectricity, Ground Freezing

Dr. Chii-Dong Chen

Ph.D., Chalmers University of Technology
Single electron transistors, Transport properties of nanomaterials, Superconducting and Ferromagnetic Nanostructures

Dr. Shang-Fan Lee

Ph.D., Michigan State University
Magnetism, Superconductivity, thin films

Dr. Sung-Kit Yip

Ph. D., University of Illinois, Urbana-Champaign
Superconducting phenomena, Quantum fluids, Strongly correlated electron systems

Dr. Keng-Hui Lin

Ph.D., University of Pennsylvania
Soft condensed matter physics, nanomaterial assembly

Dr. Yung Liou

Ph.D., Pennsylvania State University
Films and Surface Physics

Dr. Chia-Fu Chou

Ph.D., State University of New York
Biophysics; Biophotonics; Nanobiotechnology; Micro/nanofluidics; Liquid Crystals

Dr. Horng-Tay Jeng

Ph.D., National Tsing Hua University
Charge and orbital ordering in transition metal oxides; electronic structure of nano-related systems

Dr. Wen-Tau Juan

Ph.D., National Central University
Experimental Polymer Physics; Experimental Soft Condensed Matter Physics; Experimental Low Temperature Plasma Physics; Nonlinear Physics; Biophysics

Dr. Tian-Tzou Tsong

Ph.D., Pennsylvania State University
Surface Physics; Atomic Resolution Microscopy; Surface Atomic and Molecular Dynamics; Nanostructured Materials and their Physical Properties; Mechanisms of Growth in Crystals and Epitaxial Films

Dr. Shien-Uang Jen
Ph.D., Carnegie-Mellon University
Electron transport properties of ferromagnetic materials; Magnetostriction and application; Magnetic domains and domain walls; Magnetic anisotropy

Dr. Yeng-Long, Chen
Ph.D., University of Illinois at Urbana-Champaign
Polymer physics, Computer simulations of bio-macromolecule physics, Microscopic liquid state theory of colloidal and nano-particles, Dynamics of complex fluids

Dr. Hong-Shi Kuo
Ph. D., National Cheng Kung University
Preparation and Characterization of Single-Atom Tip, Electrochemical Scanning Probe Microscopy (EC-SPM), Focused Ion Beam (FIB) and Field Ionization, Electron Holography

Institute of Atomic and Molecular Sciences

Dr. Yuh-Lin Wang
Ph.D., University of Chicago
Nanolithography, nanostructure physics, scanning probe microscopy

Dr. Kuei-Hsien Chen
Ph.D., Harvard University
Nanomaterials, nanodevices

Dr. Shang-Bin Liu
Ph.D., College of William and Mary
Catalysis, porous materials, NMR spectroscopy

Dr. Ker-Jar Song
Ph.D., University of Pennsylvania
Surface morphology, thin film epitaxial growth

Dr. Wun-Shain Fann
Ph.D., Stanford University
Single molecule spectroscopy, bio-physics, polymer physics

Dr. Chia-Chun Jay Chen
Ph.D., Harvard University
Bio-labeling and biosynthesis using nanomaterials; Self-assembly of nanoparticles; Fabrication and application of nanomaterials in sensors

Dr. Ching-Ming Wei
Ph.D., University of Wisconsin-Milwaukee
Surface Science, Electron Holography, Ab initio total energy calculation

Dr. Je-Luen Li
Ph.D., University of California, Berkeley
First-principles electronic structure calculations of crystalline solids; Molecular dynamics simulation of water and aqueous solutions; Theory of van der Waals forces

Research Center for Applied Sciences

Dr. Yia-Chung Chang
Ph.D., Caltech
Electronic, optical, and transport properties of semiconductors and nanostructures, quantum transport properties, single-photon generators, spintronics, and quantum computing

Dr. Pei-Lin Chen
Ph.D., UC Irvine
Nano imprinting, self-assembly, nonlinear nano-optics

Dr. Ji-Yan Cheng
Ph.D., National Taiwan University
Self-assembled nanomaterials, Accessible nanopattern

Dr. Chao-Hsun Lee
Ph.D., National Tsing Hua University
University of California at Berkeley
Energy storage and applications, Nanotechnology and Nanography

Dr. Pei-Kuen Wei
Ph.D., National Taiwan University
Nano lithography/microscopy, nano integrated-optical devices

Dr. Jing-Jong Shyue
Ph.D., Case Western Reserve University
Nano-technology, nano-structures, 1-D nano blocks, synthesis and processing of functional materials, microcharacterization (electron microscopy and surface analysis)

Dr. Chih-Wei Chu
Ph.D., University of California, Los Angeles
Fabrication and characterization of optoelectronics and materials, Nanoscale covalent self-assembly applied to optoelectronics

Dr. Ming-Hwei Hong
Ph.D., University of California, Berkeley
New materials through novel epitaxy for new science and next generation devices, IIIV and GaN MOSFET, Quantum-Dot materials and devices

Dr. Min-Hsiung Shih
Ph.D., University of Southern California (USC)
Photonic crystal devices, lasers and waveguides, Chip-scale photonic integrated circuits, High-speed photonic devices, High-Q cavities for quantum communication

Dr. Kuo-Kan Liang
Ph.D., National Taiwan University
Ultrafast photo-induced electron transfer (PIET) in dye-sensitized solar cell (DSSC), Kinetic Ising model of protein structural dynamics

Dr. Chao-Cheng Kaun
Ph.D., McGill University
Computational molecular electronics, Transport theory in mesoscopic systems, Current-driven dynamics in nanomachines

National Taiwan University

Department of Chemistry

Dr. Chung-Yuan Mou
Ph.D., University of Washington
Nanoporous Materials, Nanocatalysis, Biosensor with nanoparticles

Dr. Sheng-Hsien Chiu
Ph.D., UCLA
Synthetic Chemistry, molecular machines

Dr. Jwu-Ting Chen
Ph. D., Chemistry, Iowa State University, Ames, Iowa
Organometallic chemistry applied in organic synthesis, catalysis, & olefin polymerization, Inorganic chemistry, Biomimic coordination chemistry

Dr. Huan-Tsung Chang
Ph.D., Iowa State University
Analytical Chemistry

Dr. Ru-Shi Liu
Ph.D., University of Cambridge
Materials Chemistry

Dr. Yit-Tsong Chen
Ph.D., University of Chicago
Nanomaterials, nanodevices, nanosensors

Dr. Shih-Ming Peng
Ph.D., University of Chicago
Inorganic Chemistry, Crystallography

Department of Physics

Dr. Chung-Hua Chang
Ph.D., University of California
Magnetism, Spin-dependent transport

Dr. Yang-Fang Chen
Ph.D., Purdue University
Nano-structured semiconductors

Dr. Chen-Yuan Dong
Ph.D., University of Illinois
Application of fluorescent nanoparticles for biological assay and imaging

Dr. Guang-Yu Guo
Ph.D., University of Cambridge
Theory of nanomaterials (nanotubes, nanoparticles, thin films, quantum dots and wires, giant molecules)

Dr. Din-Ping Tsai
Ph.D., University of Cincinnati
Nano-Photonics, Near-Field Optics

Dr. Minn-Tsong Lin
Ph.D., University of Halle, Germany
Nanomagnetism, Spintronics

Center for Condensed Matter Sciences

Dr. Cheng-Hsuan Chen
Ph.D., Cornell University
Transmission electron microscopy, Electron energy-loss spectroscopy, Phase transitions driven by electronic instabilities

Dr. Li-Chyong Lin Chen
Ph.D., Harvard University
C- and N-based Nanomaterials via Chemical/Physical Vapor Deposition, Electron Microscopy

Dr. Juen-Kai Wang
Ph.D., Harvard University
Innovative Spectroscopic Studies of Nanomaterials and Nanostructures

Dr. Hung-Hsiang Cheng
Ph.D., Oxford University
Si/Ge Nanostructures via MBE, Low-temperature and High-field Measurements

National Tsing Hua University

Department of Engineering and System Science

Dr. Ji-Jung Kai
Ph.D., University of Wisconsin-Madison
Nano-Metrology, Micro-Structure Analysis, Nano-Materials

Dr. Chuen-Horng Tsai
Ph.D., University of California - Berkeley
Electrochemistry, Carbon Nanotubes, Fuel Cell, Plasma Technology

Dr. Chin Pan
Ph.D., University of Illinois at Urbana-Champaign
Boiling Heat Transfer, Two Phase Flow, Nano-scale Transport Phenomena

Dr. Ching-Chang Chieng
Ph.D., Virginia Polytech and State University
Computational Fluid Dynamics, Microscale Heat Transfer, Molecular Dynamics Simulation

Dr. Fu-Rong Chen
Ph.D., Ph.D., State University of New York at Stony Brook
High Resolution TEM, Nano-metrology, Solid/Solid Interface, Sub-micron IC Device Analysis

Dr. Chih-Hao Lee
Ph.D., National Tsing Hua University
Synchrotron Radiation application, Surface Science, Scattering and Diffraction

Dr. Pan-Tsung Tseng
Ph.D., University of California - Los Angeles
Microfluidics for Nanofluidic Device Application, Microarray Technology, Nanofabrication, Nanoscale Characterization and

Dr. Pai-Yi Hsiao
Ph.D., University Paris VII, France
Nanophysics, Solid State Physics, Molecular Dynamics Simulation

Dr. Jang-Yu Hsu
Ph.D., Princeton University
Mesoscopic Physics and Nano Sciences and Nano Technologies; Plasma Physics and Controlled Fusion; Theoretical and Computational Physics

Research Topics

The following four research programs constitute the areas of concentration of this graduate program:

- (1) Characterization of Nanomaterials and Nanostructures**
This thrust area focuses on the studies of structural, thermal, optical, electronic, and magnetic properties of nanomaterials and surface nanostructures. Major characterization techniques include scanning probe microscopy, electron microscopy, calorimetry, linear and non-linear optics, x-ray photoelectron spectroscopy, Auger electron spectroscopy, Raman spectroscopy, photo- and cathode-luminescence, etc. Nano-physics measurements including spin-dependent and electrical transport under high-field and low-temperature, as well as field emission of the nanomaterials will be emphasized.
- (2) New Nanomaterials and Structures**
The scope of this trust area includes synthesis of nanomaterials such as quantum dots, nanotubes and nanowires, quantum wells, porous materials, nanocomposites, magnetic materials, surface nanostructures, and electronic molecules. Rational designs of these materials by means of chemical synthesis and fabrication technique such as PVD, CVD, MBE, pyrolysis method, anodic oxidation, solvothermal method, sol-gel method, and self-assembly method are introduced in this program to produce nanomaterials of specific composition, size, structure, shape, and functionality.
- (3) Theoretical Modeling**
This thrust area places emphasis on the investigations of structures and formation of nano-systems, chemical reactions and other rate processes involving nano-systems, mechanisms of electrical and thermal conductivities in nano-systems, non-linear optical properties, and catalytic activities of nano-systems, etc. The theoretical methods to be covered are ab initio and density functional theories, molecular dynamics calculations, path-integral method, and density matrix approach.
- (4) Nanodevices Engineering**
This thrust area focuses on exposition of a variety of representative nanodevices and components associated with photonics, optoelectronics, molecular electronics, spintronics, micro- and nano-mechanics, biochips, etc., as well as their analyses, fabrications, and characterizations. The various techniques for monolithic and hybrid integrations of the components into device modules and subsystems, and some selective applications will also be covered.

Course Programs

For all Students:

- Introduction to Nanoscience and Technology: An Overview I and II
- Seminar I, II, III, and IV

For Physics-oriented Students:

- Quantum Mechanics I and II
- Statistical Physics
- Classical Electrodynamics
- Solid-state Physics and Chemistry
- Fabrication and Analysis of Nanostructures
- Computational Materials Science

For Chemistry-oriented Students:

- Advanced Organic Chemistry I and II
- Advanced Inorganic Chemistry I and II
- Advanced Physical Chemistry I and II
- Advanced Analytical Chemistry I and II
- Advanced Chemistry of Materials
- Computational Materials Science

For Engineering-oriented Students:

- Computational Materials Science
- Solid State Physics
- Fabrication and Analysis of Nanostructures

TA and Chinese Language

TA experience is an essential part of our program. Thus, all students from TIGP must serve as TA for at least one semester. Also, in order to help the international students in their daily lives' communication with the local people, we offer a required one-year course in Mandarin Chinese.

Academic System

The program emphasizes research training and developing one's self-reliance and self-confidence for independent work. In the Nano Science and Technology Program, faculty members will take turns to serve as mentors for entering students until the students have chosen their thesis advisors, which should take place within the first two semesters after their admission into the graduate program. The program adopts a team-teaching system, where each faculty member teaches the subject according to his or her expertise. Courses offered include some traditional core courses, elective courses, and special topics, as listed in the Course Programs section. In keeping up with the international stature of the program, all courses will be offered in English.

Requirements for the Ph. D. Degree

(1) Course Work

The course requirements for the Ph.D. in all programs are similar. Basically, during the first one-and-a-half years, students are advised to complete the course requirements as suggested by the research advisor. It is the responsibility of the advisor to assist each student in formulating a program of study that will best satisfy his or her personal needs as well as fulfilling the graduate requirements. Students are also required to take a one-credit course on "Seminar and Research Discussion" during each semester of the first two academic years.

(2) Selection of Research Advisor

Incoming students are expected to select a research or thesis advisor by the end of the first six months, but, in any case, no later than the first year, of graduate study in Taiwan. Every incoming student is expected to become familiar with the research work of a number of laboratories before signing up for a specific faculty member. The process might involve attending a series of seminars on faculty research in the program, or a series of laboratory rotations. Although every effort will be made to honor the student's first or second choice of thesis advisor, the Graduate Study Committee of the program, taking into account of numerous factors, must

approve the final selection of thesis advisor.

(3) Oral Examination

A student seeking admission to the Ph.D. candidacy must take a qualifying oral examination according to the regulations of qualification examination of each program. The oral examination is based predominantly on a research proposition submitted by the student. However, before presenting the proposal to the examining committee, the student should be prepared to discuss with the committee members his or her research progress and plans for the thesis work, including relevant literature.

(4) Advancement to Candidacy

The criteria for advancement to candidacy vary from program to program, including the writing of an essay, a series of written examinations on the subject of the program, or the oral defense of a set of research propositions. Once a student has been advanced to candidacy, he or she will begin to devote full time to independent study and research on his or her thesis topic.

(5) Thesis Defense

A Ph.D. candidate defends his or her thesis research before a thesis committee. This defense will take the form of a thesis seminar followed by an oral examination on the research. The examination committee shall consist of faculty members familiar with the candidate's area of research. Some of the thesis examining committee must come from another institution.

Admission to the Ph.D. Program

The Program admits students to the fall semester only. Application materials are available in the TIGP web site. The application deadline for NSTP Early admission in fall 2008 is January 31, 2008, and regular admission deadline is March 31, 2008.

Students (either international students or students from within Taiwan) with a M.S. degree from an accredited institution may be admitted to the chemistry-oriented and physics-oriented programs. Those with a B.S. or M.S. degree may be admitted to the engineering-oriented program. Selection of program should be made at application. The following criteria will be used to evaluate the applicant's qualifications for admission:

(1) Undergraduate and graduate academic records or transcripts.

(2) Graduate Record Examination (GRE) scores in General Test is highly recommended. However, an applicant who fails to meet this requirement may submit additional criteria for committee evaluation. The GRE Subject Test is optional and one of the following subjects: Chemistry, Physics, Mathematics, or Biology is strongly recommended.

GRE substitution: If under special circumstances the test is not taken, some proof of applicant's competency might be considered. This proof should be more than just recommendation letters and transcripts, for example, documents like the award records, exam scores of national or international level, scientific publications, etc. will be helpful.

The admission committee will decide whether the proof is strong enough to support the application.

(3) English proficiency:

a) TOEFL: scores 550 on the paper-based (or 213 on the computer-based or 79-80 on the New Internet-based TOEFL (TOEFL-IBT)) or higher. (Our institution CODE & NAME are: 7142 Academia Sinica)

- b) GEPT: Instead of TOEFL, applicants in Taiwan may take the General English Proficiency Test (GEPT) administered by the Language Training and Testing Center. Applicants are required to submit their High-intermediate level certificate when applying for admission;
- c) IELTS (International English Language Test System): Score 5.5 or higher is required.

(4) Three letters of recommendation commenting on the applicant's personal character, and qualifications for independent study, including intellectual ability, research potential, and scientific motivation.

(5) Statement of Purpose (plan for graduate study).

The above submitted application materials will not be returned to applicants under any circumstances. The complete application materials must reach TIGP before January 31, 2008 for early admission, and March 31, 2008 for regular admission. Please send them to:

Admissions Office
Taiwan International Graduate Program
No. 128, Sec.2, Academia Road,
Nankang, Taipei 115
Taiwan

TIGP now offers an online application option, via our website. If you wish to submit your application online, please proceed to the <http://db1n.sinica.edu.tw/textdb/tlgp/>.

Student Status and Degree Conferment Policy

Based on the Regulations of the Ministry of Education in Taiwan, students will officially register with our partner universities, National Taiwan University or National Tsing Hua University, depending on the particular program. Upon completion of our program, each student will be conferred a Ph.D. degree by the partner university and a certificate jointly signed by the President of Academia Sinica and the Director of TIGP.

Cost of Study

The payments of tuition fees are due upon registration every semester. Both National Taiwan University and National Tsing Hua University are around NT\$33,000 (US\$ 1,000) per semester.

Fellowship Support and Stipends

Fellowship will be granted for applicants who receive admission. The stipend levels are about US\$ 11,000 for the first year. Additionally, the support will be extended to two more years for those students who perform well academically. The academic performance of each student will be reviewed by the Academic Committee every year. The Committee may decide to reduce the students' stipend level if his or her performance is less satisfactory. In subsequent years, the financial support will be provided by the student's thesis advisor with his/her research grant. The amount of the support will be under the discretion of the advisor.

Medical Insurance

Four months after they receive their student I.D., students are eligible for Taiwan's National Health Insurance Program. The students are expected to pay the same premium (about US\$ 210 per year) as all the Taiwan citizens and will be entitled to the same medical coverage.

Living and Housing Costs

Options include on-campus housing and off-campus housing. On-campus self-catering student dormitory providing single study bedrooms is available to TIGP students at reasonable costs (for details please visit our website at <http://www.tigp.sinica.edu.tw/dorm.html>). Off-campus private housing is generally more expensive. Rents for off-campus apartments range from NT\$ 5,000 – 15,000 per month. Meals are available on campus at the Activity Center Cafeteria, the Cafe, the Chinese Restaurant, and the Western Restaurant at modest costs. Various types of local cuisines are also available at off-campus cafeterias and restaurants within walking distance and at affordable costs.

Correspondence and Information

For general information concerning TIGP, please contact:

Ms. Nancy Yang
Administrative Assistant
Taiwan International Graduate Program
128 Academia Road Sec.2, Nankang, Taipei 115, Taiwan
Tel.: 886-2-2789-8050
Fax: 886-2-2785-8944
E-mail: nancy@gate.sinica.edu.tw

Taiwan International Graduate Program (TIGP), Academia Sinica
URL: <http://tigp.sinica.edu.tw>

For information concerning this program, please contact:

Dr. Chia-Seng, Chang
Institute of Physics, Academia Sinica
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Fax: 886-2-2651-0704
E-mail: jasonc@phys.sinica.edu.tw

Ms. Liang-Hui, Wu
Administrative Assistant
Nano Science and Technology Program, TIGP
Academia Sinica
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Program website:
<http://www.phys.sinica.edu.tw/TIGP-NANO/>

This program is sponsored by

Institute of Chemistry
Institute of Physics
Institute of Atomic and Molecular Sciences
Research Center of Applied Sciences
Academia Sinica

in cooperation with

Department of Chemistry
Department of Physics
Center for Condensed Matter Sciences
National Taiwan University

Department of Engineering and System Science
National Tsing Hua University