Graduate Institute of Biotechnology
Chaoyang University of Technology

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    886-4-23323000 ext. 7582
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http://www.cyut.edu.tw/~ib
ABOUT THE INSTITUTE

Since the social environment has changed, Taiwan Government is mainly concentrating on biotechnological approaches to elevate the agricultural, industrial and ecological preservation and now it become the crucial policy, which concerned the future prosperity of the country. Biotechnology involves the application of biological knowledge and techniques to produce substances and services beneficial to agriculture, the environment, industry and medicine. The Institute of Biotechnology of the Chaoyang University is regarded as one of the unit for promoting research and education in agriculture based biotechnology projects to the future prosperity with potential to generate outstanding individuals. By providing information about resources, as well as avenues for further exploration, we intend to open the doors of biotechnology resources to graduate, post-graduate students, and researchers. The institute offers several biotechnology courses and also organizes invited lectures by eminent professors from recognized research centers of Taiwan and other countries to enrich the knowledge of the students at various levels.

AIMS OF THE INSTITUTE

The Institute of Biotechnology of Chaoyang University is a center of excellence in biotechnology research. It was established to meet growing demands for highly skilled research personnel, and the new knowledge necessary for continuing expansion of the science platform upon which biotechnology innovations are based.

The Institute's aims are:

✱ To provide the best training in biotechnology for high quality graduates from the physical, chemical, and biological sciences.

✱ To ensure a rapid and effective transfer of ideas and developments in biological science between University and Industry.

✱ To conduct research in selected areas of biotechnology
OVERVIEW OF RESEARCH

Institute of Biotechnology is a multidisciplinary field, which covers wide range of projects. In addition to basic courses it is collaborating several projects with industries by providing trained students to carryout the research. The main focus of the institute has been on innovative research, and scientific collaboration with other university departments and with industry. The institute is giving training to meet meaningful challenges in the area of biotechnology and to exploit the fruits of basic and infrastructural research in molecular biology, metabolic engineering, protein engineering, microbiology, peptide research, and plant biotechnology.

RESEARCH FACULTY

Four full time professors and ten associate professors are guiding the students in different aspects of biotechnology projects. In addition to this conducting workshops to provide practical knowledge for students. Invited lectures on genetic engineering and some other emerging fields of biotechnology have been arranged to enable the students to develop skills in specialized subjects. Many experts from Taiwan Agricultural Research Institute and Taiwan Agricultural, Chemical and Toxic substances Research Institute are delivering lectures to provide updated information in the relevant areas.

FUTURE PROSPECTUS

Biotechnology is intended to be a learning tool that will attract students and enrich the public’s knowledge of biology and agriculture based projects in the world today. The most unique aspect of the Institute is its multi-disciplinary approach, which fosters and encourages interactive project work between in-house groups. This unique strength gives the Institute important links with those departments containing relevant expertise in the university, with local, national and international Industry, and with research centers around the world. In near future, the institute will closely coordinate with industry, integrate internal and foreign biotechnology human resources, develop teamwork, and engage in up-middle stream research work of biotechnology foresees.
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**Institute required**
6 courses 9 credits

**Professional selective**
38 courses 114 credits, minimum selective of 15 credits

**Minimum graduation credit**
30 credits including 6 credits for master thesis
Yew-Min Tzeng  
Professor

**Education:**  
University of Toronto  
Ph.D. in Chemical Engineering and Applied Chemistry

**Major subjects:**  
Biochemical Engineering,  
Bioprocess Engineering  
Biopesticide  
Food Biotechnology

**E-mail:** ymtzeng@mail.cyut.edu.tw

**Publications:**

1. Quantitative analysis of thuringiensin by micellar electrokinetic capillary chromatography.
2. Recovery of thuringiensin with cetylpyridinium chloride using micellar-enhanced ultrafiltration process.
3. Characterization study on the sporulation kinetics of *Bacillus thuringiensis*.
4. Production of cyclodesipeptides destruxin A and B from Metarhizium anisopliae.
5. Morphological characterization and germination of aerial and submerged spores of an entomopathogenic fungus *Verticillium lecanii*.

**Research Projects from National Science Council:**

1. Purification and characterization of chitinase from *Verticillium lecanii*.
2. Investigation of analysis and purification of human chorionic gonadotropin.
3. Preparation and application of chitinase and chitin-chitosan materials.
Hsin-Sheng Tsay
Professor

Education:
National Taiwan University  
Ph.D. in Agronomy

Major subjects:
Tissue Culture  
Genetic Engineering  
Genetics  
Plant Breeding

E-mail: hntsay@mail.cyut.edu.tw

Publications:
1. Conservation of *Anoectochilus formosanus*, a medicinally important terrestrial orchid, by synchronizing flowering, hand-pollination, and in vitro culture of seeds.
2. Abscisic acid (ABA) promotes development of somatic embryos on converted somatic embryos of *Corydalis yanhusuo* (Fumariaceae).
3. Profiling and characterization antioxidant activities in *Anoectochilus formosanus* Hayata.
4. Studies on tissue culture of Chinese medicinal plant resources in Taiwan and their sustainable utilization.
5. Isolation and quantitative analysis of cryptotanshinone, an active quinoid diterpene formed in callus of *Salvia miltiorrhiza Bunge*.

Research Projects from National Science Council:
1. Tissue culture technologies of *Panax notoginseng* (Burk) Hoo et Tseng.
2. Studies on medicinally important species of *Dendrobium*-their collection, molecular identification, pollination success, and mass propagation of *Dendrobium huoshanense* C. Z. TANG et S. J. CHENG.
3. Development of transgenic plants via *Agrobacterium*-pollen mediated method for important floriculture plants of Taiwan.
Kuo-Ching Feng
Professor

Education:
Cornell University
Ph.D. in Entomology

Major subjects:
Biology, Histochemistry
Electron Microscopy
Neura-Cytology

E-mail: kcfeng@mail.cyut.edu.tw

Publications:
1. Effect of fungal pellet size on the high yield production of destruxin B by *Metarhizium anisopliae*.
2. Application of bioprocess engineering on microbial biopesticides.
3. Morphological characterization and germination of aerial and submerged spores of the entomopathogenic fungus *Verticillium lecanii*.
Chee-Shan Chen
Professor
Purdue University
Ph.D. in Food Engineering

Major subjects:
Microbiology
Dynamic Model
Application of Biochemistry
Food Engineering

E-mail: csc@mail.cyut.edu.tw

Publications:
1. Optimisation of Kojic Acid Monolaurate Synthesis with Lipase PS from *Pseudomonas cepacia*.
2. Antibacterial effects of N-sulfonated and N-sulfobenzoyl chitosan and application to oyster preservation.
3. Optimising the frying temperature of gluten balls using response surface methodology.
5. Production of xylanase and cellulase from agricultural wastes, applied biochem.
Chia-Chung Chen
Associate Professor

Education:
The University of Texas at Austin
Ph.D. in Chemistry and Biochemistry

Major subjects:
Formulation of Biological Agents

E-mail: ccchen@mail.cyut.edu.tw

Publications:
1. The production method and formulation technology of water dispersible granule of pesticide.
2. The application of new granular formulation of bti as a mosquito insecticide.
3. The study of granular formulation for high active ingredient content with agsorb clay.
4. Quaternary ammonium salts of a sulfonyleurea.
5. The production method and formulation technology of emulsion in water of pesticide with good dispersibility.
Te-Fang Yang
Associate Professor

Education:
State University of New York at Binghamton
Ph.D. in Chemistry

Major subjects:
Organic Chemistry
Biochemistry

E-mail: tfyang@mail.cyut.edu.tw

Publications:
1. Preparation and application of (+)-(3, 3-dimethyl-2-methylenenorbornan-1-yl) methyl methanesulfonate: a new and versatile chiral fenchone analogue.
2. Isolation and quantitative analysis of cryptotanshinone, an active quinoid diterpene formed in callus of *salvia miltiorrhiza* Bunge.
3. Proton nmr study on two structures of 3’-o-(Acetylimino)3’-de(phosphinico)-thymidylyl-(3,5’)-deoxythymidine, in aqueous solution.
4. Synthesis of thymidine dimers containing novel (n-acetyl)imino linkages.
5. Studies on the stereoselective synthesis of 3’-deoxy3’-α-N-hydroxy-N-methylamino-d-thymidine using (s)-5-(triphenylmethoxy-methyl)-2(5h)-furanone as the starting material.
Long-Shan Lai  
Associate Professor

**Education:**

Ph.D. Worcester Polytechnic Institute

**Major subjects:**

- Fermentation Chemistry and Technology
- Applied Microbiology
- Biochemical Engineering

**E-mail:** lslai@mail.cyut.edu.tw

**Publications:**

1. Pellet formation in different dissolved O$_2$ and its relation to lovastatin production by *Aspergillus terreus* in submerged cultures.
2. The influence of medium design on lovastatin production and pellet formation with a high-producing mutant of *Aspergillus terreus* in submerged cultures.
3. Application of oxygen vectors to *Aspergillus terreus* cultivation.
4. Medium optimization for lovastatin production by *Aspergillus terreus* in submerged cultures.
5. Influence of increased dissolved oxygen tensions by agitation on the secondary metabolite production by a mutant of *Aspergillus terreus* in a 5L fermentor.
Wei-Jyun Chien  
Assistant Professor  

**Education:**  
State University of New York at Stony Brook  
Ph.D. in Chemistry  

**Major subjects:**  
Protein NMR Spectrography  

**E-mail:** wjchien@mail.cyu.edu.tw  

**Publications:**  
1. NMR and circular dichroism studies on the conformation of a 44-mer peptide from a CD4-binding domain of human immunodeficiency virus envelope glycoprotein.  
2. The FLG motif in the N-termina region of gp41 of HIV-1 adopts a type i -turn in aqueous solution and serves as initiation site for helix formation.  
3. Interactions of the amino-terminal fusion domain peptide of gp41 of HIV-1 with sodium dodecyl sulfate micelles: Conformational flexibility of the glycine at the micellar-aqueous interface.  
4. Application of pulse field gradient nmr on the measurement of binding constant of peptide-micelle interaction.  
5. The Preference of amino acids in cyclic peptides: an application of bio-information in elementary biochemistry.
Bing-Lan Liu
Assistant Professor

**Education:**

University of Essex  
Ph.D. in Chemistry and Biological Chemistry Biochemistry

**Major subjects:**

Biochemistry, Enzymology  
Biochemical Engineering  
Fermentation Technology

**E-mail:** binglan@mail.cyut.edu.tw

**Publications:**

1. Effect of fungal pellet size on the high-yield production of destruxin B by *Metarhizium anisopliae*.
2. Production of chitinase from *Verticillium lecanii* F091 using submerged fermentation.
3. Application of bioprocess engineering on microbial biopesticides.
5. Effect of rice-glycerol complex medium on the production of lovastatin by monascus rubber.
Gwo-Chen Li
Professor

Education:
  Ph.D. University of Rhode Island Agricultural Chemistry

Major subjects:
  Plant Protection
  Environmental Science
  Environmental Toxicology

E-mail: gcli@tactri.gov.tw

Publications:
1. Safety evaluation and regulatory control of pesticide residues in Taiwan.
2. Distribution and degradation of pyrazosulfuron-ethyl in paddy field.
3. Dissipation of epoxiconazole in the paddy field under subtropical conditions of Taiwan.
4. The formation of as-organic complex.
5. Effect of organic substances on the adsorption of arsenate on soils.
Chien-Yih Lin
Professor

Education:
PhD. Purdue University

Major subjects:
Biotechnology Application
Bio-Resources of Agriculture
Biopesticide
Seeds and Seedlings

E-mail: cylin@wufeng.tari.gov.tw

Publications:
1. Rice Biotech Research at the Taiwan Agricultural Research Institute.
2. Screening strain of *Trichiderma spp* for plant growth enhancement in Taiwan.
3. Studies on the production of some important secondary metabolites from the medicinal plants by plant tissue cultures.
Tzong-Zeng Wu
Professor

Education:
    National Taiwan University
    Ph.D. in Agricultural Chemistry

Major subjects:
    Biosensors
    Biochemistry
    Applied Microbiology
    Bioelectronics

E-mail: tzwu@mail.ndhu.edu.tw

Publications:
1. Development of immunochips for the detection of dengue viral antigens.
2. Piezoelectric immunochips.
3. Prospective of bioelectronic nose for monitoring withering and shaking process of Paochung tea.
4. The development and application of smell chips.
5. Discrimination of peptides by using a molecularly imprinted piezoelectric biosensor.
Suey-Sheng Kao
Professor

Education:
University of Minnesota
Ph.D. in Entomology

Major subjects:
Biopesticide
Microbial Control
Biotechnology
Insect Ecology And Control

E-mail: sskao@tactri.gov.tw

Publications:
1. Cloning of two new cry genes from Bacillus thuringieniss subsp. wuhanensis strain.
2. Use of random amplified polymorphic DNA to characterize entomopathogenic fungi, Nomuraea rileyei, Beauveria bassiana, and Metarhizium anisopliae from Taiwan and China.
3. Cloning and expression of the insecticidal crystal protein gene cry1Ca 9 of Bacillus thuringiensis G10-01A from Taiwan grainaries Curr.
4. Enterotoxigenicity and cytotoxicity of Bacillus thuringiensis strains and development of a process for Cry1Ac production.
5. Production and purification of immunogenic virus-like particles formed by chimeric infectious bursal disease virus structural protein, VP2H, in insect larvae.
Chang-Sheng Wang
Associate Professor

Education:
University of Illinois
Ph.D. in Agronomy

Major subjects:
Molecule Genetics
Genomics
Proteomics
Plant Metabolism

E-mail: cswang@wufeng.tari.gov.tw

Publications:
1. Rice biotech research at the Taiwan Agricultural Research Institute.
2. Rice -amylose transcriptional enhancers direct multiple mode regulation of promoters in transgenic Rice.
3. Enhanced methionine and cysteine levels in transgenic rice seeds by the accumulation of sesame 2S albumin.
5. Effects of grain position on the panicle on starch biosynthesizing enzymes activity in developing grains of rice cultivar Tainung 67 and its NaN3-induced mutant.
Shun-Cheng Wang
Associate Professor

Education:
National Taiwan University
Ph.D. in Plant Pathology and Entomology

Major subjects:
Safety Evaluation of GMO Product
Environmental Toxicology And Biotechnology
Applied Toxicology

E-mail: scwang@tactri.gov.tw

Publications:
1. Pulmonary toxicity of thuringiensin administered intratracheally in Sprague-Dawley rats.
2. Roles of endocrine-disrupting activity in the reproductive toxicity of carbendazim in rats.
3. Susceptibility to cartap induced lethal effect and diaphragmatic injury via ocular exposure in rabbits.
4. Safety evaluation of turmeric (Curcuma longa L.) powder via oral gavage for 28 days in rats.
5. Endocrine-disrupting activity in carbendazim-induced reproductive and developmental toxicity in rats.
Shih-Hua Fang
Associate Professor

Education:
   National Taiwan University
   Ph.D. in Microbiology

Major subjects:
   Immunology
   Virology
   Cell Biology
   Molecular Biology

E-mail: shfang@mail.cmc.edu.tw

Publications:
1. Morin sulfates/glucuronoides exert anti-inflammatory activity on activated macrophages and decreased the incidence of septic shock.
2. Functional measurement of hepatitis C virus core-specific CD8+ T-cell responses in the livers or peripheral blood of patients by using autologous peripheral blood mononuclear cells as targets or stimulators.
3. Ribavirin enhances interferon-g levels in patients with chronic hepatitis C treated with interferon-a.
4. Ribavirin enhancement of hepatitis C virus core antigen-specific type 1 T helper cell response correlated with the increased IL-12 level.
Hsiu-Ying Lu
Associate Professor

Education:
National Taiwan University
Ph.D. in Agronomy

Major subjects:
Biometrics
Quantitative And Population Genetics
Biological System Modeling And Analysis
Ecology
Bioinformatics

E-mail: iying@wufeng.tari.gov.tw

Publications:
1. Seasonal variation in linear increase of taro harvest index in wetland taro explained by growing degree days.
2. Seasonal variation and quantitative analysis of growth patterns in size and shape for taro leaves.
3. Statistical methods of data Analysis in repeated measurements.
4. Quantitative analysis of the shape of rice grain. I. Determination of shape parameters.
5. Comparison of different models for non-destructive leaf area estimation in taro.
Jiunn-Liang Ko
Associate Professor

Education:
National Taiwan University
Ph.D. in Biochemistry

Major subjects:
Environment Toxicology
Cancer Molecular Biology
Immunity Toxicology

E-mail: jiko@csmu.edu.tw

Publications:
1. MDM2 mRNA expression is a favorable prognostic factor in non-small cell lung cancer.
2. Determination of destruxins, cyclic peptide toxins, produced by different strains of Metarhizium anisopliae and their mutants induced by ethyl methane sulfonate and ultra-violet using HPLC Method.
5. Loss of telomerase activity may be a potential favorable prognostic marker in lung carcinomas.
Chin-An Chang
Associate Professor

Education:
University of Florida
Ph.D. in Plant Pathology

Major subjects:
Plant Pathology
Plant Virus
Immunology
Molecular Biology

E-mail: cachang@wufeng.tari.gov.tw

Publications:
1. Partial characterization of two potyviruses associated with golden spider lily severe mosaic disease.
2. Molecular characterization of Tuberose mild mosaic virus and preparation of its antiserum to the coat protein expressed in bacteria.
3. Genetic variability in the coat protein genes of two orchid viruses: *Cymbidium* mosaic virus and *Odontoglossum* ringspot virus.
4. Identification of Turnip mosaic potyvirus isolates causing yellow stripe and spot on calla lily.
5. Phytosanitary certification program of oncidium seedlings and its future prospect to the development of ornamental industry in Taiwan.
Cheng-Ming Liu
Associate Professor

**Education:**
Hahnemann University
Ph. D. in Pathology and Experimental Medicine

**Major subjects:**
Immunology
Clinical Chemical
Physiology

**E-mail:** cheng-m@tmu.edu.tw

**Publications:**

1. Analysis of dextruxins produced from *Metarhizium anisopliae* by Capillary electrophoresis.
2. Purification and quantitative analysis of destruxins from *Metarhizium anisopliae* by HPLC.
3. Analysis of secretory IgA in human saliva by laser induced fluorescence capillary electrophoresis.
4. Quantitative analysis of biological and chemical insecticide mixture by capillary electrophoresis.
5. Purification of thuringien from *Bacillus thuringiensis* using calcium silicate adsorption and dibasic phosphate desorption methods.
Ju-Chien Cheng
Associate Professor

Education:
National Taiwan University
Ph.D. in Microbiology

Major subjects:
Virology
Gene Regulation
Signal Transduction
Biotechnology

E-mail: jccheng@mail.cmc.edu.tw

Publications:
1. Specific interaction between the hepatitis C virus NS5B RNA polymerase and the 3’ End of the viral RNA.
2. Roles of the AX4GKS and arginine-rich motifs of hepatitis C virus RNA helicase in ATP- and viral RNA-binding activity.
3. Association of hepatitis C virus infection in Taiwan with HLA class II DRB1 alleles.
4. Broad-range ribosomal RNA real-time PCR after removal of DNA from regents: melting profiles for clinically important bacteria.
5. Disabled-2 small interfering RNA reveals the reciprocal regulation of disabled-2 and MAPK during megakaryocyte differentiation of K562 cells.