

Molecular and Cell Biology Program(MCB)

Introduction

Choosing a graduate program is one of the most important decisions you will make in your life. Then, why should you choose MOLECULAR AND CELL BIOLOGY PROGRAM? Because it is a **SMART** choice.

Support that encompasses both academic and living needs.

1. The supportive faculty strives to mentor young scientists and provide strong career foundations.
2. Supportive staff works to facilitate student interactions, and to make them feel at home at the institute and in Taipei. Finally, the MCB TiGP program provides competitive financial support, including low tuition fees and access to the medical care as well as grants to support students' research, living, and conference travel costs.

Molecular biology training that is both comprehensive and integrative.

Students in TiGP MCB program receive a solid foundation in every aspect of molecular biology and are given opportunities to apply their knowledge to a diverse array of research fields.

Accessible faculty who strive to train the next generation of scientists.

Whether in the lab or in the classroom, TiGP-MCB program gives students access to nationally and internationally recognized professors at Academia Sinica and the National Defense Medical Center.

Resources encompassing everything from technical support in cutting-edge technologies and facilities to assistance with scientific writing and communication ensure that students receive comprehensive help in achieving their research and academic goals.

Taipei offers all the conveniences of a global, cosmopolitan city while remaining accessible, friendly, and one of the safest cities in the world.

The "SMART" training provided in the MCB program which is sponsored by the Institute of Molecular Biology (IMB), Academia Sinica in cooperation with the Institute of Life Sciences (ILS), National Defense Medical Center will help you build up your professional career.



Research Interests

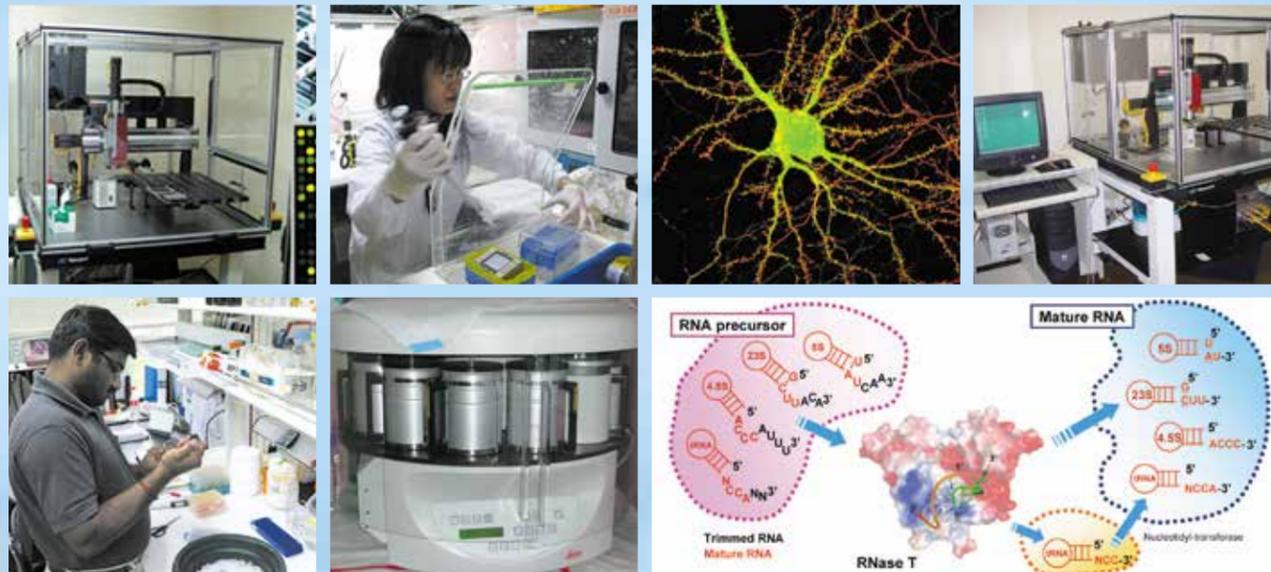
The MCB program has about 40 faculty members; most have been trained in internationally highly regarded universities with extensive ties with global scholars. The research conducted by the faculty of MCB program covers a wide range of topics in basic researches with great potential of applications.

The active research resulted in publications in reputable journals including Cell, Nature, Nature Genetics, Nature Structure Biol., Developmental Cell, Genes & Development, Neuron, Plant Cell, EMBO J., P.N.A.S., Genomics, Molecular Cell. Biol., J. Exp. Med., J. Biol. Chem., J. Virol., and J. Immunology.

- Developmental Biology
- Chromosome Biology
- RNA Biology
- Neuroscience
- Structural Biology
- Plant Biology
- Infection and Immunobiology
- Systems Biology

Research Resource

In MCB program, high-quality research core facilities are equipped and feasible for each graduate student in the labs. Core facilities include transgenic mouse, transgenic fly, electron microscopy, confocal microscopy, X-ray crystallography, mass spectroscopy, microarray, electrophysiology, FACS and so on. 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. In addition, Public Service such as computer and printer facility, English Editor and Bioinformatics are used to support the in-campus research activities.



Faculty Members

Academia Sinica Institute of Molecular Biology

Wen Chang

Ph.D., Microbiology and Immunology, University of Washington-Seattle, USA
Molecular mechanism of vaccinia virus entry into mammalian hosts
Cellular defense mechanisms and viral host range genes antagonizing host restriction

Yu-Chan Chao

Ph.D., Virology/Entomology, University of Arkansas, USA
Baculovirus gene regulation and protein engineering; pseudotyped influenza virus studies and applications

Hung-Ta Chen

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

Jun-An Chen

Ph.D., the Wellcome Trust Gurdon Institute, Univ of Cambridge, UK
Non-coding RNA Function during Motor Neuron Development, Degeneration, and Regeneration

Liuh-Yow Chen

Ph.D., Biochemistry & Molecular Biology, Baylor College of Medicine, USA
Telomere Biology and Telomere Diseases

Sheng-hong Chen

Ph.D., Biological Sciences, University of California, San Diego, CA, USA
Lab for Cell Dynamics aims to quantify and model dynamics of signaling networks in single cells as the basis to control cellular behavior for therapeutic purposes



Pei-Lin Cheng

Ph.D., Biochemistry, National Yang-Ming University, Taiwan
Mechanisms of neuronal polarization and regeneration

Soo-Chen Cheng

Ph.D., Biochemistry, Duke University, USA
Molecular mechanism of pre-mRNA splicing

Cheng-Ting Chien

Ph.D., Biochemistry and Cell Biology, Stony Brook University, USA
Dendrite arborization in development and diseases
Synapse formation and plasticity

Huai-hu Chuang

Ph.D. in Biomedical Sciences, University of California, San Francisco, USA
Receptor and Channel Function

Bon-chu Chung

Ph.D., Biochemistry, University of Pennsylvania, USA
Steroid Regulation, Zebrafish Development, Disease Model, Gene Regulation

Kuo-Chiang Hsiao

Ph.D., The Rockefeller University, USA
Molecular and structural basis of cell division

Chwan-Deng Hsiao

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

Yen-Ping Hsueh

Ph.D., Molecular Genetics and Microbiology, Duke University, USA
Interactions between Nematodes and Nematode-trapping Fungi

Yi-Ping Hsueh

Ph.D., Microbiology and Immunology, National Yang-Ming University, Taiwan
Neuronal Morphogenesis
Neurodevelopmental disorders
Neurodegeneration

Chih-Yen King

Ph.D., Biophysics, Harvard University, USA
Molecular biology of amyloid and prions
Structural principle of amyloids

Jun-Yi Leu

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

Yeast genomics and experimental evolution
Cell-cell communication and gene network regulation
Genetic and noise buffering

Hsou-min Li

Ph.D., Cell and Molecular Biology, Univ. of Wisconsin-Madison, USA

Protein sorting within cells
Developmental regulation of protein trafficking

Nan-Shih Liao

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

Intestine mucosal immunity
Anti-cancer immunity and immunotherapy

Lin, Chien-Ling

Ph.D., Molecular Medicine, University of Massachusetts Medical School, Worcester, MA, USA

Genome-Wide Analysis of the mRNA Splicing and Translation

Suewei Lin

Ph.D., Neuroscience, University of Oxford, UK

Molecular and neural mechanisms of motivation and memory

Sue Lin-Chao

Ph. D., Molecular and Cell Biology, the University of Texas at Dallas, USA

Signal pathways govern the control of bacterial RNA degradation;
Function of RNA degradosome components
Function of growth-arrest genes during mouse brain development
RNA biology

Yi-Fang Tsay

Ph.D., Biological Sciences, Carnegie Mellon University, USA

Molecular mechanism of Nitrate signaling and transport

Ting-Fang Wang

Ph.D., Biochemistry and Molecular Biology, Harvard University, USA

Chromosome biology and fungal sexual development

Huey-Nan Wu

Ph.D., Biochemistry, University of Illinois, USA

The molecular mechanism of flavivirus RNA replication:
the role of viral RNA elements and virus nonstructural protein interactions

Meng-Chao Yao

Ph.D., Biology, University of Rochester, USA

Gene amplification, deletion and rearrangements in eukaryotic cells
The role of dsRNA in gene silencing, heterochromatin formation and DNA rearrangements

Su-May Yu

Ph.D., Plant Biology/Pathology, University of Arkansas, USA

Mechanisms of nutrient and O₂ deficiency signaling in rice
Mechanisms of stress regulation of root development in rice

Hanna S. Yuan

Ph.D., Chemistry, University of Southern California, USA

Structural and functional studies of DNA and RNA metabolism

Institute of Cellular and Organismic Biology

Shen-Ju Chou

Ph.D., Molecular and Cellular Biology, Baylor College of Medicine, USA

Neural Development
Cortical patterning

Ya-Hui Chou

Ph.D., Institute of Life Sciences, National Defense Medical Center, Taiwan

The development of olfactory local interneurons
Neuronal diversity and variability; neuronal circuit function and insect behavior

Hsu, Hwei-Jan

Ph.D., Institute of Life Sciences, National Defense Medical Center, Taiwan

Developmental Biology, Stem cell Biology

Institute of Plant and Microbial Biology

Chih-Horng Kuo

Ph.D., Genetics, University of Georgia, USA

Utilize genomic, metagenomics, and bioinformatics tools to investigate microbial genome evolution and the diversity

Genomic Research Center

Tien-Hsien Chang

Ph.D., Molecular Biology, State University of New York at Buffalo, USA

Genome-wide bypass of essential genes
Genome architecture
Molecular mechanism of pre-mRNA splicing, mRNA export, and translation
In vivo roles of DExD/H-box proteins in RNA metabolism

National Defense Medical Center Graduate Institute of Life Sciences

Tsu-Chung Chang

Ph. D., Biochemistry, University of Illinois, Urbana-Champaign, USA

Regulation of gene expression and molecular action of steroid hormones

Chen, Chien-Fu F.

Ph.D., Cellular and Behavioral Neurobiology, University of Oklahoma, Norman, Oklahoma, USA

Neurobiology of mammalian olfactory system

Po-Shiuan Hsieh

M.D., National Defense Medical Center, Taiwan;

Ph.D., Molecular Physiology, Vanderbilt University, USA

The casual relationship between inflammation and obesity-associated metabolic syndrome and diabetes mellitus
The therapeutic approach to prevent and treat metabolic syndrome and type II diabetes

Shih-Ming Huang

Ph.D., Biochemistry and Molecular Biology, University of Southern California, CA, USA

Nuclear receptor coactivator functions

Tzu-Yang Lin

Ph.D. Molecular & Cellular Biology, National Tsing Hua University, Taiwan
Synapse biology and disease models

Chia-Yang Shiau

Ph.D., University of Oxford, UK

Pseudohypoxia function of hypoxia inducible factors implicated in stemness, tumorigenesis, and inflammation.
Annexin based chimera as therapeutic and diagnostic tool;
Non-ribosomal peptide synthetase (ACV synthetase and Gramicidin S synthetase)

Huey-Kang Sytwu

M.D., National Defense Medical Center, Taiwan;

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

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

Lan-Hsin Wang

Ph.D. Institute of Molecular Biology, Academia Sinica & Institute of Life Science, National Defense Medical Center

Molecular and genetic mechanism of the Hippo pathway in development and disease

Chin-Chen Wu

Ph.D., Pharmacology, University of London

Mechanisms and possible therapies of sepsis associated with septic shock, disseminated intravascular coagulation, or multiple organ failure

Gwo-Jang Wu

M.D., National Defense Medical Center, Taiwan;

Ph.D., Endocrinology-Reproductive Physiology, University of Wisconsin-Madison, USA

Cellular and Molecular Mechanisms of Fertilization
Gametogenesis and Embryo Implantation in Mammals

Sung-Sen Yang

M.D., China Medical University, Taiwan

Ph.D., Homeostasis and Nephrology, Tokyo Medical and Dental University
Human inherited channelopathy and blood pressure regulation
Genetic Engineering



Admission Requirement

The MCB Program admits students to the fall semester only. Students with backgrounds in biochemistry, biology, molecular biology, genetics, anatomy, chemistry, physics and related fields are welcome to apply.

Applicants holding a B.S. degree from an accredited institution, or who will obtain the degree within one semester, can apply for admission.

1. Certificate of degree

Official records are defined as original documents issued by the institution that bear the actual signature of the Registrar and the seal of the issuing institution.

2. Transcripts

A grade point average (GPA) of 3.0 or higher for all college work (4.0 = A) is preferred.

3. English Requirements

Students from non-English-speaking countries are expected to read, write, comprehend, and speak English in order to be admitted for graduate study. Applicants whose first or native language is not English are required to take a test of English proficiency as part of the application procedure. One of the following language test scores must be provided for application. Please note that test scores submitted must be taken within the past two years. Applicants should ensure that the test score(s) be sent to the TIGP Admissions Office prior to the application deadline.

Although the English proficiency requirement for admission may vary in respective programs, the recommended requirements are as follows:

(1) TOEFL: A total score of 79 on internet-based (TOEFL-iBT), 213 on computer-based TOEFL or 550 on paper-based TOEFL is strongly recommended as the minimum admission requirement for all programs. Please note that institutional TOEFL will

not be accepted; only ETS International TOEFL will be accepted.

(2) IELTS: A minimum overall Band Score of 5.5 on the Academic Test of International English Language Testing System (IELTS) taken within the past two years is required.

(3) GEPT: In addition to TOEFL and IELTS, applicants in Taiwan may take the General English Proficiency Test (GEPT), administered by the Language Training and Testing Center. Under this option, applicants must submit their high-intermediate level certificate with the application.

Exemption from the English proficiency requirement
The test of English proficiency can be exempted for applicants graduated from universities where English is the primary language of instruction, if the applicants provide an official certification issued by the Office

4. The Graduate Record Examination (GRE)

We encourage the applicants to take GRE's General Test. Alternatively, the applicants should 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.

5. Two Letters of Recommendation

6. Statement of Purpose and Study Plan (less than 3 pages)

7. Other Evidence of Scholarly Achievements

After reviewing all the supporting documents mentioned above, candidates passing the first screening will be invited for an interview. Local candidates will be asked to come to Taipei for interviews, whereas international students will be video interviewed.

Requirements for Ph.D. Degree

The Ph.D. in the MCB program requires successful completion of a minimum of 30-credit courses, a qualifying exam and thesis research.

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

Note: those with only a Bachelor's degree are required to complete 42 credits

Courses

1. Required Courses

Courses	Credits	Semester
Molecular and Cell Biology	4	Fall
Seminar	4	1st and 2nd year
Annual Progress Report	0	every fall semester, starting in the 2nd academic year
Thesis Research	12	Graduation

2. Elective Courses

Courses	Credits	Semester
Cellular and Molecular Immunology*	2	Spring
Developmental Biology*	2	Spring
Experimental Approaches in Molecular and Cell Biology	2	Fall
Special Seminar in Chromosome Biology	2	Fall
Lab Rotation	2	1st year
Topics in Plant Science*	2	Spring
Virus and Cell Interactions*	2	Fall
RNA Biology*	2	Spring
To be a Scientist: Perspectives and Essential Skills	3	Spring

* Courses are offered every other year. In addition, the MCB students may take any course offered by other programs in TIGP and by NDMC.

3. Chinese Language

In order to help TIGP students' daily lives' communication with the local people, international students are required to take one year course of Mandarin Chinese.

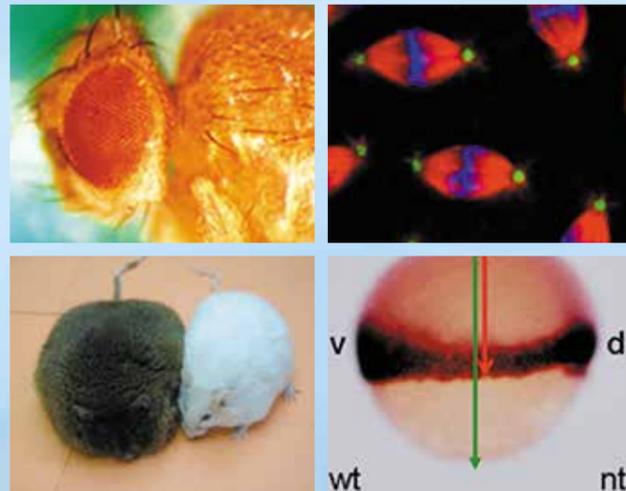


Transferring Credits

New students who have transferred or re-entered from a Ph.D. program, and have previously completed graduate school coursework with a grade of 70 or higher at other domestic or international colleges or universities within five years of admission, can make a request to the Curriculum and Degree Committee to have those credits transferred if any of the following criteria is met:

1. The course has an identical title and content (transcript and course outline required).
2. For courses with a similar title and content, a course transcript, course outline, syllabus and titles of the prescribed textbook(s) need to be submitted to the Curriculum and Degree Committee and the corresponding TIGP-MCB program-associated course instructor for approval.

Requests for transferring credits should be submitted in the first week of the first semester after enrolling into the program. The maximum number of credits that can be transferred is 6 credits.



Qualifying Exam

TIGP-MCB Qualifying exam (QE) will be held twice every year. Students should take the QE before the start of the third academic year. Students who pass the Molecular and Cell Biology course are eligible to apply for taking QE.

Two formats for applicant proposals:

1. Non-thesis proposal: The topic cannot be closely related to the student's Master's or PhD thesis, or to the advisor's research. However, the topic can be in the general field of the student's thesis research.
2. Thesis proposal: With the consent of their thesis advisor, students can submit their thesis proposal for the examination.

Thesis Research

A minimum of two years of thesis research is required. Twelve credits will be granted to the student upon completion of their thesis defense. Students should choose a thesis advisor from among the eligible TIGP-MCB faculty after their enrollment.

Lab Rotation

Students may rotate through several labs with the goal of finding a lab in which to conduct their thesis research. The duration of each lab rotation is based 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 their thesis research lab by the end of the first summer. Studentships will be terminated if a student cannot find a thesis research lab before applying for the QE.

Thesis Advisor

The thesis advisor must be a faculty member of the TIGP-MCB program and have agreed to advise and sponsor the student for the entire period of graduate study.

Thesis Committee

The thesis advisor will organize a Thesis Committee within one month of a student choosing their lab. Each thesis Committee should consist of at least three members, including the advisor. The thesis Committee must meet at least once a year to evaluate the progress report from the student. The Thesis Committee evaluates the progress and advises on current research problems and the future direction of the project.

Progress Report

Students are required to complete their annual progress reports to the Thesis Committee in a timely manner in order to graduate. The first report should be given by the end of the third semester aimed at discussing the thesis proposal with the committee. Thereafter, progress reports should be given once a year by the end of each Fall semester. Students should



prepare a written proposal or progress report (see below for format), and submit it to their Thesis Committee and the TIGP-MCB office at least one week before their scheduled annual progress report meeting.

Graduation

Degree Requirements

In order to earn a Ph.D. under the TIGP-MCB program, a candidate must successfully complete/meet the following criteria within seven years:

- Completion of course requirement: 30 credits of course work (including 12 credits for thesis research) are required for students with a Master's degree and 42 credits for students with only a Bachelor's degree.
- Publication: The student should have published at least one manuscript, or have a manuscript accepted for publication, as first-author¹ in a research journal that is ranked in the top 50% of journals in that subject amongst SCI list publications. The affiliation for TIGP-MCB program students should be listed in their published work as "Molecular and Cell Biology, Taiwan International Graduate Program, Academia Sinica and Graduate Institute of Life Science, National Defense Medical Center, Taipei, Taiwan", followed by the primary affiliation of the advisor. An alternative option is: "Molecular and Cell Biology, Taiwan International Graduate Program, Academia Sinica and National Defense Medical Center, Taipei, Taiwan". The publication date of the manuscript can be any time after the student has been enrolled in the TIGP-MCB program.
- The thesis must be written in English.
- Students must have completed annual progress reports in a timely manner.
- Students must have the consent of their Thesis Committee to proceed with the thesis defense.
- Students must pass the thesis defense.

Thesis Defense Committee

With the consent of the student's Thesis Committee, a Thesis Defense Committee of 5-7 members must be formed. The Thesis Defense Committee must comprise 2-4 non-MCB faculty members. Students must present their thesis work in an open seminar, followed by a defense in front of the Thesis Defense Committee.

¹ If there is more than one first-author in the publication, the student's Thesis Committee is required to verify that the quality and quantity of the student's work is sufficient to gain a Ph.D. degree under the TiGP-MCB program.

TiGP-MCB evaluation procedure for co-first author papers or publications with special circumstances:

Step 1: The student should make a progress report available to all Thesis Committee members and submit it to the TiGP-MCB program office.

Step 2: An evaluation will be conducted by the TiGP-MCB program office and the program office will send its evaluation to the individual Thesis Committee members.

Step 3: The MCB's Curriculum and Degree Committee (CDC) will review the publication and will send its reviews to the relevant committee of any Partner University for a majority vote.

Step 4: Upon the evaluation and approval by the CDC and Partner University committees, the application will then be submitted to the National Defense Medical Center-Institute of Life Sciences (NDMC-ILS) Board of Education; the presence of at least half of the Board's members is required for discussion of applications to proceed. Approval will be deemed granted if a two-thirds majority of the Board members present vote in favor of the evaluation.



Degree Conferral Policy

Based on the Regulations of the Ministry of Education in Taiwan, students will 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 and Stipend

The 1st year:

Each student will receive a monthly stipend of NT\$34,000 (around US\$ 1,060) from TiGP.

The 2nd and 3rd years:

Student fellowships will be renewed after successful fulfillment of the fellowship requirements:

1. Satisfactory academic performance, including completion of all required courses.
2. An agreement with a MCB faculty to serve as the student's thesis advisor.
3. Completion of the qualifying exam.

The 4th year and after:

The thesis advisor is responsible for the student fellowship. The amount of fellowship may vary depending on the advisor's funding situation and the student's academic performance.



Tuition and Medical Insurance

The structure of tuition fee is consisted of basic fee at around NT\$ 12,000 and credit fees according to the credits you take per semester upon registration. Each credit fee will cost approximately NT\$ 1,350. Six months after receiving their Alien Residence Certificate, students are qualified to join the National Health Insurance Program. Students are expected to pay the same premium as all the Taiwan citizens and will be entitled to the same medical coverage.

Living and Housing Costs

Housing options include on-campus and off-campus. On-campus self-catering student dormitory with single study bedrooms is available to TiGP students at reasonable costs (for details please visit our website at <http://tigp.sinica.edu.tw/Accommodation.html>). Off-campus private housing is generally more expensive with rents range from NT\$ 5,000 - 15,000 per month. Program will provide assistance to students who wish to seek for off-campus housing. Meals are available on campus at the Activity Center Cafeteria and near-by restaurants at affordable cost.