Chemical and Molecular Engineering

Chairperson
Dilip Gersappe, Old Engineering Building 316 (631) 632-8499

Graduate Program Director
Devinder Mahajan, Engineering Building 210 (631) 632-1813

Graduate Program Coordinator
Devinder Mahajan, Engineering Building 314, (631)632-8484

Department Office
Engineering Building 314, Zip 2275

Office Staff
Chandrani Roy, Assistant to the Chair

Degrees Awarded
M.S. in Chemical and Molecular Engineering; Ph.D. in Chemical and Molecular Engineering

Website
https://www.stonybrook.edu/matscieng

Application
https://graduateadmissions.stonybrook.edu/apply/

Chemical Engineering

The Chemical and Molecular Engineering program, in the College of Engineering and Applied Sciences, offers graduate work leading to the Master of Science and Doctor of Philosophy degrees.

The main mission of the graduate program is to train the next generation of chemical engineers that will make important discoveries, develop new technologies, and apply innovative approaches to solve problems related to the production or use of drugs, food, chemicals, fuel and other products. Our programs in Chemical and Molecular Engineering offer students an extensive curriculum with the opportunity to pursue advanced studies and gain knowledge of chemical engineering theory and its relationship to related engineering processes, including catalysis, nanotechnology, computational modeling, environmental science, fluid mechanics, rheology, materials processing, polymers, thin films, biochemical, biomedical, biotechnology, separations, transport phenomena, and thermodynamics. The motivating philosophy of the graduate program is to provide the student with a broad knowledge in theoretical and experimental techniques to ensure that students graduate with the skills necessary for professional research and teaching in the chemical engineering field.

The faculty in the Chemical and Molecular Engineering program are actively involved in research in different areas and work with graduate students on projects that have both applied and fundamental aspects.

Research Areas

Research areas for the graduate program include Catalysis, Environmental Engineering, Nanotechnology, Nanotoxicology, Drug Delivery, Polymers, Energy Science and Computational Modelling.

Chemical and Molecular Engineering, MS and PhD

The MS degree in Chemical and Molecular Engineering is primarily a degree for students who wish to equip themselves with a more solid foundation in the principles of chemical and molecular engineering for further advanced study or pursuing a career as professional engineers. Master's degree candidates may elect a thesis or non-thesis option.

The PhD degree in Chemical and Molecular Engineering provides a thorough grounding in the fundamental principles of chemical engineering, as well as an intensive research experience. This degree is mainly designed to prepare students for a research career in academia, government or private laboratories, R&D in industry, or elsewhere.

Admission:-

We are excited that you are considering our Graduate Program. Chemical and Molecular Engineering department offers admission to M.S. and Ph.D. programs. The Ph.D. program is intended for students who wish to pursue a research-oriented career, while M.S. program is intended for students who are looking for advanced positions in industry. Admission to the Ph.D. program is more competitive than the M.S. program.
To apply for Graduate Studies in Chemical and Molecular Engineering at Stony Brook you must fill out and send an online application. You can fill out the application online at Graduate School’s web site. Please note that there may be more steps involved than simply filling out the form online. Please note that there are no application fee waivers. Also, when sending the required application documents please include a photocopy of your GRE and TOEFL scores besides having official scores sent.

Requirements

Admission to the M.S. and Ph.D. Programs are handled separately by the departmental Admissions Committee. The requirements for admission to graduate study in CME include:

1. Bachelor's Degree: A bachelor’s degree in CME (or a closely related field).
2. A grade average of at least B (i.e., 3.0/4.0) in all mathematics, engineering, and science courses.
3. GRE Examination. All applicants to the MS or PhD program must submit Graduate Record Examination (GRE) scores for the general aptitude tests. Applicants are encouraged to submit GRE test scores for the advanced examination in Computer Science as well.
4. Submission of TOEFL Test scores for all students whose native language is not English. Please reference for minimum score requirements. Masters students that have completed a degree program from a U.S. institution may be eligible for a TOEFL waiver and need to request the waiver from our Graduate Program Director. All PhD applicants with a TA stipend whose native language is not English must demonstrate a sufficient level of English-speaking proficiency (TOEFL Speaking score) and may be required to take ESL courses based on these measures.

Deadlines

For Spring 2022
MS Domestic & International Application- October 15, 2021

For Fall 2022:
MS Domestic-April 15, 2022, 11:59pm
MS International-February 15, 2022, 11:59pm
PhD Domestic & International- January 15, 2022, 11:59pm.

Application Instructions

All applications must be submitted online. All additional required documents, such as, official transcripts, recommendation letters, etc. must be sent directly to our department.

Please do not put your additional required documentation in any type of binder, portfolio, or report cover.

Mail your application materials to the following address:
Stony Brook University
Department of Chemical and Molecular Engineering
Engineering, Room 314
Attn: Graduate Program Coordinator
Stony Brook, NY 11794-2275
USA

The Graduate School application fee is $100* and is non-refundable. It is required for applicants from all countries.

Checking on the Status of your Application

Fall applications are reviewed in February. If your application file is missing anything, you will receive an e-mail from the department. Due to the high volume of applications we receive, we can’t respond to e-mails checking on status until AFTER April 10th.

Offer letters will begin to be mailed out in March. We ask that you do not send us numerous e-mails checking on the status of your application or telephone us regarding application status.

If you do NOT receive a letter of offer from us by April 10th, you should then contact us if you have any questions.

We appreciate your patience during this busy time of year.
Financial Support

Admitted Ph.D. students are typically offered financial support in the form of teaching or research assistantships, which include full tuition. Admission into this program is very competitive, though, and you must have the intention of completing this program. M.S. students are typically admitted with no financial aid. Information regarding tuition and other costs can be found from the Graduate School.

Transfer of credits into M.S. or Ph.D. programs

Students may transfer up to 9 credits of graduate courses obtained from another US accredited university. The following conditions and procedure is required to transfer any credits.

In order to be counted towards graduation, the credits must be evaluated by CME graduate director or one of our faculty members. The evaluation must establish equivalence between a course being transferred from another institution and a CME course in Stony Brook, which is accepted as part of the graduation requirements. The faculty member must be one of those who are teaching the corresponding graduate course on a regular basis. The professor typically evaluates the course materials/contents, student transcripts, etc. The approval is not automatic and we generally take a very careful look at such transfer requests.

Graduate courses that do not meet the previous requirement can be transferred without being counted towards graduation. This can sometimes be useful because students who have earned 24 graduate credits of any kind need to be registered for only 9 credits (instead of 12) in order to have full status. Therefore, gaining this status early might reduce tuition liability.

M.S. to Ph.D

A student in the M.S. program can subsequently apply for admission into the Ph.D. program, but should keep in mind the higher standards for entry into the Ph.D. program. The CME Ph.D. program recognize M.S. degree from other accredited US institutions, person that has M.S. degree in CME can be exempt from the mandatory course requirements for the PhD, totaling 24 credits. The student will be accepted as G5 level student and expected to complete remaining credits and requirements towards the Ph.D. degree.

University Labs and Centers:

SensorCat New York State Center for Advanced Technologies
Geospatial Center
Trace Element Laboratory
Trace Organic Chemical Mass Spectrometry Laboratory
Flax Pond Marine Laboratory
Southampton Marine Station
Advanced Energy Research and Technology Center
Center of Excellence in Wireless and Information Technology

External Labs and Facilities:

National Synchrotron Light Source (NSLS) II, Brookhaven National Lab.
Center for Functional Nanomaterials (CFN), Brookhaven National Lab.

Requirements for the MS in Chemical and Molecular Engineering

Course requirements: Successful completion of a total of 30 course credits, which include four core courses (CME 501, CME 502, CME 503, CME 504) for a total of 12 credits, a choice of two out of five advanced elective chemical engineering courses (CME 511, CME 512, CME 513, CME 514, CME 515) for a total of six credits, two out of seven specialization elective courses, all requiring capstone projects; (CME 521, CME 522, CME 523, CME 524, CME 525, CME 526, CME 527) for a total of six credits.

In addition to these courses the different programs have the following requirements;
Masters (MS) Degree requires another six credits for a total of 30 credits. Each track has different requirements for these six credits as follows;

Track:
(i) Non-Thesis; Six credits of special topics (CME 596), additional electives or research (CME 599), and satisfactory completion of a capstone project as part of the specialization elective course selection.
(ii) Thesis; Six credits of research courses (CME 599), which culminate in an original Master’s thesis.
Students may automatically transfer into the PhD program at the completion of this track.

Requirements for the Ph.D. Degree in Chemical and Molecular Engineering

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
A. Plan of Work
Before completion of one year of full-time residence, the student must have selected a research advisor who agrees to serve in that capacity. The student will then prepare a plan of further coursework. This must receive the approval of the student’s advisor and of the Graduate Program Committee.

B. Coursework
- An average grade of B or higher is required for all courses.
- A minimum of 24 graduate course credits is required to graduate (excluding CME 599, 697, 698, and 699).
- The 24 course credits must include the following four core courses: CME 501, 502, 503, and 504. If the student does not receive a minimum of a B in a core course, he or she may repeat that course one other time.
- All students must complete CME 555 Teaching and Mentoring Techniques.
- The student must pass at least three credits of CME 698 Practicum in Teaching and six credits of CME 699 Dissertation Research on Campus.
- All courses taken outside the Department require permission from the Graduate Program Director.
- All PhD students must act as teaching assistants for five semesters (regardless of support), and they must register for CME 698 Practicum in Teaching - 0 credits for four semesters, 3 credits for one semester.

C. Preliminary Examination
The preliminary examination must be taken before the beginning of the student’s fifth semester. This is an oral examination designed to test the student’s ability to utilize his or her chemical engineering background to carry out research in a chosen field of study, and to make clear written and oral presentations of research. At least ten days prior to the examination, the candidate should submit a research proposal (10-15 pages) to the examiners that places the research in context of other work in the area, demonstrates original thought, clearly outlines its broader impact, and provides a sustainable timeline for its completion.

The examination committee will consist of three Chemical and Molecular Engineering faculty members, and one member from another department or institution. If a second examination is required, it must be completed by the tenth week of the fifth semester.

Once the student has advanced to candidacy, the student must report to the committee at least once a year before the end of the spring semester on progress towards his/her dissertation.

D. Advancement to Candidacy
After the student has successfully completed all requirements for the degree, other than the dissertation, he or she is eligible to be recommended for advancement to candidacy. This status is conferred by the Dean of the Graduate School upon recommendation of the Chairperson and the Graduate Program Director.

E. Dissertation
The most important requirement of the Ph.D. degree is the completion of a dissertation, which must be an original scholarly investigation. The dissertation shall represent a significant contribution to the scientific literature, and its quality shall be compatible with the publication standards of appropriate and reputable scholarly journals. At least two semesters should elapse between the preliminary exam and submission of the dissertation.

F. Defense
The candidate shall defend the dissertation before the examining committee.

G. Time Limit
All requirements for the Ph.D. degree must be completed within seven years after completing 24 credit hours of graduate courses in the program.

Faculty
Faculty of Materials Science and Chemical Engineering Department
Chemical Engineering Program
Profsers
Mahajan, Devinder, CME Graduate Program Director, Ph.D., 1979, University of British Columbia: catalysis and process engineering; large-scale energy storage for decarbonization of power and transportation sectors via Hydrogen economy and Renewable methane.
Tannenbaum, Rina, PhD 1982, ETH Zurich: Polymers, Biomaterials, nanotechnology and nanomedicine.

Associate Professors
Koga, Tadanori, Ph.D., 1998, Kyushu University, Japan, Physics: green nanofabrication of polymer thin films; chemical recycling of waste plastics and methane hydrate as a future energy resource

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
Kim, Taejin, PhD, 2007, Lehigh University, Catalysis and Reaction Engineering, Operando methods of characterizing catalytic reactions, biomass conversion to fuels and chemicals

**Assistant Professors**

Rajput, Nav Nidhi, Assistant Professor, Ph.D., Louisiana State University (2013). Research: Molecular dynamics studies of ionic liquids, Nanoporous materials; Electrochemistry

**Lecturers**

Meng, Yizhi, PhD, 2003, Cornell University, Food Engineering

Nitodas, Steve PhD, 2001, University of Rochester, Materials Science & Chemical Engineering, Kinetic Investigation and Modeling of the Chemical Vapor Deposition of Aluminum Oxide, Silicon Oxide and Aluminosilicates from Mixtures of Metal Chlorides, Carbon Dioxide, and Hydrogen

**Crossover with Materials Science**

**Distinguished Professors**

Rafailovich, Miriam, Ph.D., 1980, Stony Brook University: Polymeric liquids; phase transitions; thin film wetting phenomena; atomic force microscopy; ion, X-ray, and neutron scattering.

Sampath, Sanjay, Ph.D., 1989, Stony Brook University: Thermal spraying; protective coatings; functioning graded materials; thick film electronics and sensors.


**Professors**

Clayton, Clive R., Ph.D., 1976, Surrey University, England: Environmental degradation of materials; XPS; AES; dynamic and static SIMS; electrochemical analysis synthesis by ultra-fast laser ablation; RHEED; protective coatings.

Dudley, Michael, Ph.D., 1982, University of Warwick, England: Synchrotron topography; crystal defects; mechanical properties.

Frenkel, Anatoly., PhD 1995, Tel Aviv University, Application of synchrotron measurements in materials, Structure-property-function relationships in applied nanomaterials, catalysis

Gersappe, Dilip., Chairperson, Ph.D., 1992, Northwestern University: Polymer theory and simulation, Modeling of complex fluids and electrochemical processes

Sokolov, Jonathan C., ESM Graduate Program Director, Ph.D., 1983, Stony Brook University: Surface and interface properties of polymers and blends; phase transitions; neutron and X-ray scattering; EXAFS; SIMS.

**Associate Professors**

Halada, Gary, Ph.D., 1993, Stony Brook University: Electron spectroscopy; electrochemistry; surface engineering; optical spectroscopy; environmental remediation.

Orlov, Alexander, Ph.D., 2005, University of Cambridge, UK, Physical Chemistry: M.Phil. Chemistry University of Cambridge, UK; M.S.E. Engineering, University of Michigan, USA; M.E./B.E. Engineering, National Technical University, Ukraine. Materials for environmental applications; physical chemistry, environmental nanotechnology and photocatalysis

Trelewicz, Jason, Ph.D., 2008, M.I.T.; thermodynamic and mechanical properties of binary nanocrystalline alloys by implementing a combination of analytical theory and experimental mechanics

Venkatesh, T.A., Ph.D., 1998, Massachusetts Institute of Technology: Nanomaterials, Smart Materials, Materials for MEMS and biomedical applications

**Assistant Professors**

Chen-Wiegart, Karen, PhD, 2011, Northwestern University, x-ray imaging and spectroscopic techniques to study novel functional materials. Energy storage and conversion, nano-/meso-porous materials, thin film & surface treatment

**Research Professor**

Koga, Maya Ph.D. 2005, Kyoto University, Japan, Polymer Physics.

Marshilok, Amy, University of Buffalo, Energy storage and electrochemical transport. New material and electrode concepts for high power, high energy density, extended life primary and secondary batteries

Snead, Lance, Ph.D., 1992, Rensselaer Polytechnic Institute, Nuclear Engineering
Sprouster, David, Ph.D., 2010, Physics, Australian National University (Canberra). Research School of Physics and Engineering: “Ion Beam Formation and Modification of Cobalt Nanoparticles”

Samuilov, Vladimir, Ph.D., 1986, Belarus State University: Physics.

Adjunct Faculty

Adzic, Radoslav, Ph.D., 1974, University of Belgrade, Chemistry; Surface electrochemistry; electrocatalysis; direct energy conversion; fuel cells.

Abboud, Marcus, Ph.D., 2003, University of Bonn, Dental Medicine; “Correlation between gingival recession and tooth deflections in patients with mandibular crowding”


Allahverdiyev, Adil M., (M.D. PhD) a professor and the Director of Laboratory of Cell Culture and Tissue Engineering at Yildiz Technical University in Turkey

Bhatt, Vatsal, Ph.D., 2014, CEPT University Ahmedabad, India, Urban Energy, Water and Climate Change

Boscoboinik, Jorge Anibal, Ph.D., University of Wisconsin Milwaukee, Chemistry; Small Organic Molecules in Transition Metal Surfaces and Monte Carlo Simulations of Bimetallic Surface Alloys.

Butcher, Thomas, Ph.D. 1987, Stony Brook University, Mechanical Engineering

Chidambaran, Dev, Ph.D., 2003, Stony Brook University: Corrosion science and surface analysis.

Concepcion, Javier, Ph.D 2002, Pontifical Catholic University of Chile (Chile) and Georgia Institute of Technology (USA): Inorganic Chemistry


Dawber, Matthew, Ph.D. 2003, University of Cambridge, UK, ferroelectric materials, mostly as thin films, with a current focus on artificially layered ferroelectric superlattices.

DiMarzio, Donald, Ph.D, 1987, Physics, Rutgers University New Brunswick, NJ.


Gangwal, Santosh, Ph.D., 1977, University of Waterloo, CA, Chemical Engineering

Harrison, Robert, Ph.D., 1984, University of Cambridge, Theoretical Chemistry

Hassan, Arbab, M., Dual Ph.D., 2011, Electrical Engineering and Nanotechnology

Hasty, Julia, Ph.D., 2015, Materials Science and Engineering, Stony Brook University

Htun, Nay, Ph.D, Chemical Engineering, Imperial College, U.K.

Hu, Enyuan, Ph.D., 2015, Stony Brook University, Mechanical Engineering, Solid-State Chemistry

Jerome, John, Ph.D., 2005, Stony Brook University, Materials Science & Engineering: Polymers in Confinement & Super Critical CO2

Jurukovski, Vladimir, Ph.D. 1999, Stony Brook University, Oral Biology & Pathology


Keister, Jeffrey, Ph.D. 1997: University of North Carolina at Chapel Hill, Physical Chemistry.


Krishna, C.R., Ph.D., 1974, Stony Brook University, Mechanical Engineering: Atomization, Combustion, Biofuels.

Lee, Wilson, Ph.D., 2007, Stony Brook University, Materials Science, Cosmetics Research and Development

Li, Qiang, Ph. D., 1991, Iowa State University at Ames: Energy and electronic materials; synthesis and characterization.

Liu, Ying, Ph.D. Stony Brook University
Liu, Mingzhao, Ph.D., 2007, The University of Chicago, Chemistry; Solar water splitting; Pulsed Laser Deposition (PLD), Atomic Layer Deposition (ALD); Colloidal nanoparticle synthesis; Numerical simulation for nanophotonic/plasmonic structures.

Lombardi, Jack, Ph.D., 2015, Stony Brook University, Materials Science and Engineering

Lu, Deyu, Ph.D., Physics, University of Illinois at Urbana-Champaign: Empirical nanotube model: Applications to water channel and nano-oscillators

Petrash, Stansislas, Ph.D., 1998, Polymer Science, University of Akron: "Neutron Reflectivity Studies of Human Serum Albumin Adsorption onto Well-Defined Surfaces"

Meng, Qingpeng, Ph.D, 2002, Shanghai Jiao Tong University, Materials Science and Engineering, Research field: Phase Transformation & Nanostructured Materials


Muller, Erik, Ph.D., 2005, Cornell University, Physics; Investigating the material properties of high quality synthetic diamond for use as both electron emitters and x-ray detectors

Mironava, Tatsiana, Ph.D., 2011, Stony Brook University, Materials Science, and Engineering

Nam, Chang-Yong, Ph.D., 2007, University of Pennsylvania, Materials Science and Engineering; Infiltration synthesis, with a focus on material hybridization & nanopatterning; Atomic layer deposition for oxidation catalysts; Organic & hybrid photovoltaics; Nanowire electronics; Semiconductor device physics & characterization

Okoli, Celest, Ph.D., 2018, Stony brook University, Materials Science & Chemical Engineering

Parisé, John, Ph.D., 1981, James Cook University

Pernodet, Nadine, Ph.D. 1997, Physical Chemistry, Universite’ Louis Pasteur-Institute Charles Sadron

Peterson, Elijah, Ph.D., 2007, University of Michigan, Environmental Engineering.

Petrovic, Cedimir, Ph.D. 2000, Florida State University, Physics.

Petrash, Stansislas, Ph.D., 1998, Polymer Science, University of Akron: "Neutron Reflectivity Studies of Human Serum Albumin Adsorption onto Well-Defined Surfaces"

Phillips, Reed, M.D., 1973, Downstate Medical Center, NY, Internal Medicine, Oncology.

Rodriguez, Jose, Ph.D., 1988, Indiana University, Chemistry, Catalysis and Surface Science

Shah, Raj, Ph.D, 1995, Pennsylvania State University, Chemical Engineering.

Sharma, Priyanka, Ph.D., 2014, CSIR-National Chemical Laboratory, India, Material Chemistry and Nanomaterials

Sharma, Sunil, Ph.D., 2016, IIT Bombay, Mumbai, India, Material Chemistry and Nanomaterials


Stacchiola, Dario, Ph.D., 2002, University of Wisconsin-Milwaukee, Physical Chemistry, Surface Science


Wang, Jia, Ph.D., 1987, Physical Chemistry, City University of New York: Surface Electrochemistry and Electrocatalysis

Xiao, Xianghui, PhD., 2002, Institute of High Energy Physics, Chinese Academy of Science, China, Physics

Xin, Huolin, Ph.D., 2011 Cornell University, Physics

Zhu, Yimei, Ph.D., 1987, Nagoya University, Japan: Materials physics.

Zhang, Zhiwei, Ph.D. 2003, Colorado School of Mines, Chemical Engineering, Reaction Kinetics and Reactor Engineering

Affiliate Faculty

Bhatia, Surita, Ph.D., 2000, Princeton University

Research Areas
Research areas for the graduate program include Alternate Energy, Catalysis, Computational Modelling, Drug Delivery, Environmental Engineering, Nanotechnology, Nanotoxicology, Polymers, Process Engineering.

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.