

UCLA
CHEMICAL ENGINEERING DEPARTMENT

ACADEMIC YEAR
2004-2005



STUDENT INFORMATION HANDBOOK
AND
GRADUATE DEGREE REQUIREMENTS

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CHEMICAL ENGINEERING FACULTY
2004-2005

Name	Office & Phone	Lab & Phone
REGULAR FACULTY		
Chang, Jane P. Associate Professor	5532-D Boelter Hall Ext. 6-7980	1564/1667 Boelter Hall
Panagiotis D. Christofides Associate Professor	5532-F Boelter Hall Ext. 4-1015	4264 Boelter Hall Ext. 5-4189
James Davis Professor & Associate Vice Chancellor, Information Technology	2329 Murphy Hall Ext. 6-0011	----
Yoram Cohen Professor	5531-C Boelter Hall Ext. 5-8766	5651 Boelter Hall Ext. 6-1297
Sheldon K. Friedlander Professor	5531-K Boelter Hall Ext. 5-2206	5819 Boelter Hall & 5806-S Boelter Hall
Robert F. Hicks Professor	5532-J Boelter Hall Ext. 6-6865	6564/6631 Boelter Exts. 5-8891
Louis J. Ignarro Professor	23-305 CHS 5-5159	---
James C. Liao Professor & Vice Chair	5531-E Boelter Hall Ext. 5-1656	5810/02/05 Boelter Hall Ext. 6-1642
Vasilios Manousiouthakis Professor & Chair	5549 Boelter Hall Ext. 6-0300	4266,5506 Boelter Hall Ext. 6-6152
Harold G. Monbouquette Professor	5531-D Boelter Hall Ext. 5-8946	7820 Boelter Hall Exts. 6-3866, 6-8922
Gerassimos Orkoulas Assistant Professor	5532-G Boelter Hall Ext. 4-0169	---
Tatiana Segura Assistant Professor	On-Leave	---
Selim M. Senkan Professor	5532-B Boelter Hall Ext. 6-4106	6819 & 6763 Boelter Hall Exts. 6-7948, 5-6303
Yi Tang Assistant Professor	5531-H Boelter Hall Ext. 5-0375	5667 Boelter Hall Ext. 5-9538
EMERITI FACULTY		
Eldon L. Knuth Professor Emeritus	5531-J Boelter Hall Ext. 5-8485	---
Ken Nobe Professor Emeritus	5288 Boelter Hall Ext. 5-2447	---
Lawrence B. Robinson Professor Emeritus	5532-H Boelter Hall Ext. 5-5372	---
William D. Van Vorst Professor Emeritus	5532-H Boelter Hall Ext. 5-5372	---
A. R. Frank Wazzan Prof. & Dean Emeritus	6288 Boelter Hall Ext. 6-1598	---

ADMINISTRATIVE STAFF

NAME	OFFICE & PHONE
Victoria Corrin Administrative Assistant	5531 Boelter Hall Ext. 5-2046
Alain De Vera Management Services Officer	5531 Boelter Hall Ext. 5-9062
Gelly Christodoulou Student Affairs Officer	5532-A Boelter Hall Ext. 5-9063
Miguel Perez Fund Manager	5531-A Boelter Hall Ext. 5-8572
Larry Taylor Programmer Analyst	5532-L Boelter Hall 5-9548

RESOURCE PERSONNEL

NAME	OFFICE & PHONE
William Beard Representative to Industry	5532-E Boelter Hall Ext. 6-7947

UCLA Telephone Prefixes

(310) 206-XXXX

(310) 267-XXXX

(310) 794-XXXX

(310) 825-XXXX

FACULTY RESEARCH AREAS

Jane Chang, Associate Professor

Electronic Materials Processing

- Electronic Materials Synthesis and Processing
- Gas-phase and Surface Reaction Kinetics
- Solid State Interfacial Properties
- Plasma Enhanced Chemistries
- Atomic Layer Deposition
- Chemical Microelectromechanical Systems
- Computational Surface Chemistry

Panagiotis Christofides, Associate Professor

Process Control and Dynamics; Multiscale Systems

- Fault-Tolerant and Networked Control Systems
- Analysis and Control of Multiscale, Hybrid and Distributed Systems.
- Applications to Semiconductor Manufacturing, Particulate Processes and Biological Systems.

Yoram Cohen, Professor

Polymer Science and Transport Phenomena

- Polymerization Reaction Engineering
- Brownian Dynamics of Macromolecules
- Polymer Grafting and Adsorption
- Non-Newtonian Fluid Mechanics
- Water Purification
- Multimedia Transport of Toxic Chemicals and Exposure Analysis

James F. Davis, Assoc. Vice-Chancellor,

Information Technology, Professor

Intelligent Systems in Process, Control, Operations, Design

- Decision Support Systems
- Abnormal Situation Management
- Hazard Analysis
- Data Analysis
- Data Interpretation
- Knowledge-based Systems
- Neural Reasoning Techniques
- Pattern Recognition

Sheldon K. Friedlander, Professor

Aerosol Technology and Air Pollution

- Formation and Behavior of Submicron Particles
- Source Allocation and Receptor Modeling
- Air Pollution Control
- Mass Transfer and Diffusion
- Particle/ Surface Interactions

Robert F. Hicks, Professor

Surface and Interface Engineering

- Surface Chemistry of Materials
- Chemical Vapor Deposition
- Atmospheric Plasma Processing

Louis J. Ignarro, Professor

Regulation and modulation of NO production

James C. Liao, Professor and Vice Chair

Metabolic Engineering and Molecular Biotechnology

- Systems Biology Metabolic Engineering Bioinformatics
- Molecular Physiology of Recombinant Microbes
- Nitric Oxide-Arginine Metabolism in Physiological and Pathological Conditions
- Nitric Oxide-Hemoglobin Interaction
- Systems Analysis for Metabolic and Signal Transduction Pathways

Vasilios Manousiouthakis, Professor and Chair

Process Systems Engineering

- Linear and Nonlinear Control Systems Design
- Systems Engineering for Electronic Material Manufacturing Processes
- Pollution Prevention through Process Synthesis
- Globally Optimal Process Network Synthesis
- Hydrogen Economy
- Process Modeling, Simulation, Control, Design and Optimization

Harold G. Monbouquette, Professor

Biotechnology and Molecular Engineering

- Biosensors
- Biotechnology of Extreme Thermophiles
- Nanotechnology

Orkoulas, Gerassimos, Assistant Professor

Theoretical Modeling and Simulation of:

- Ionic Solutions
- Gaseous Plasmas
- Colloidal Suspensions
- Polymers (solutions, melts, blends)
- Charged Macromolecules: Polyelectrolytes, Polyampholytes, Ionomers

Tatiana Segura, Assistant Professor

- Bioactive Hydrogels for Tissue Regeneration
- Materials for Drug and Nucleic Acid Delivery

Selim M. Senkan, Professor

**Chemical Kinetics, Catalysis and Reaction
Engineering**

- Combinatorial and High Throughput Catalysis
- Nanoparticle Synthesis and Catalysis
- Laser Ablation and Laser Diagnostics
- Combustion Reaction Engineering
- Computational Chemistry

Yi Tang, Assistant Professor

- Natural Product Biosynthesis
- Artificial Biomaterials Biosynthesis

GENERAL REFERRALS

Please see the appropriate person(s) listed below regarding various departmental matters.

Undergraduate Student Matters

AIChE (American Institute of Chemical Engineering) Student Chapter
Faculty Advisor: Professor Jane Chang

Undergraduate Advising

- Professor Harold Monbouquette is the general departmental Undergraduate Advisor.

Graduate Student Matters

Graduate Admissions

- See Professor James Liao, Gelly Christodoulou and/or Alain De Vera

Graduate Academic Advising

- See Professor Panagiotis Christofides, Gelly Christodoulou and/or Alain De Vera

Graduate Student Affairs

- Contact Gelly Christodoulou or Alain De Vera
5531 Boelter Hall
Phone numbers 825-9063, 825-9062

See Gelly Christodoulou or Alain De Vera for graduate student affairs matters, degree requirements, financial support processing.

Chemical Engineering Graduate Seminar Series

- See Professor Gerassimos Orkoulas

Departmental Student Employment Matters

Readerships

- See the appropriate faculty member instructing the course to express interest in being considered as a Reader
- Applications are available from Alain De Vera or Gelly Christodoulou

Research Assistantships

- Consult with research advisor
- See Alain De Vera or Gelly Christodoulou for employment processing

Teaching Assistantships

- See Alain De Vera or Gelly Christodoulou to express your interest in being considered for a TA assignment

GENERAL INFORMATION

Housing Information

- 270 De Neve Drive, Campus
- For Off-Campus Housing Information call 825-4491.
- For On-Campus Housing Information call 825-4271.
- Also, check the classified ads in the Daily Bruin, web site ,
<http://www.dailybruin.ucla.edu>
- UCLA Housing Office web sites: <http://www.cho.ucla.edu>
<http://housing.ucla.edu/>

Keys

- See Victoria Corrin

Parking

- See Victoria Corrin

Departmental Mail

- Each graduate student is assigned an individual mailbox in 5531-B Boelter Hall. Your name is affixed **above** your mailbox. Check your mailbox regularly for important schedules and announcements.

Telephone

Departmental telephone numbers:

- Main Phone Lines (310) 825-2046
- FAX number (310) 206-4107

Coffee, Breakfast, Lunch, & Dinner

UCLA has a variety of eateries throughout the campus, the list below are the ones close to the Chemical Engineering Department:

- HSSEAS Café on the 5th Floor of Boelter Hall, room 5800W
- Bombshelter, east of Boelter Hall at the Science Court
- Kerkhoff Coffee House near Ackerman Student Union
- Ackerman Student Union has many cafeterias, a pizza shop, salad bar, ice cream parlor and a convenience store.

Books and Supplies

- Ackerman Student Union Bookzone

HSSEAS Material and Building Services

- HSSEAS operates a machine shop, a tool crib, carpentry shop and electrical shop for use by students and faculty. The shop is located in Engineering I, first floor and the phone number is 825-2186.
- The Store House provides office supplies, located at 2432 Boelter Hall
- Audiovisual and Slide Making Services are available at 2685 Boelter Hall
- Shipping and Receiving is located at 14-108 Engineering IV, and the phone number is 206-0303.

CHEMICAL ENGINEERING DEPARTMENT GRADUATE PROGRAM DEGREE REQUIREMENTS

The Department of Chemical Engineering offers the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Chemical Engineering.

Graduate Advisor

Dr. Panagiotis Christofides

Phone: (310) 824-1015

Graduate Student Affairs Advisor

Gelly Christodoulou or Alain De Vera

Phone (310) 825-9063/(310) 825-9062

Graduate Course Information:

All graduate students must be enrolled in a minimum of **12 units** per quarter to maintain full-time Status. This requirement may be satisfied by taking 590-series courses. Enroll in 2-12 units to fulfill the graduate requirement. Courses are listed by academic advisor.

- 597B - Preparation for the Ph.D. oral or written exam.
- 597C - Preparation for the Ph.D. qualifying exam. (prospectus)
- 598 - Preparation for the Master's thesis research
- 599 - Preparation for the Ph.D. dissertation
- 299 - the departmental seminar is **mandatory** for all graduate students during each quarter of residence.

*Graduate Students assigned as Teaching Assistants **must enroll** in 4 units of the Teaching Apprentice Practicum course **375**.

Master's Degree

Advising

Each department in the School of Engineering and Applied Science has a faculty graduate adviser. A current list of graduate advisers can be obtained from the Office of the Associate Dean for Academic and Student Affairs, 6426 Boelter Hall, School of Engineering and Applied Science.

Students are assigned a faculty graduate adviser upon admission to the School. Advisers may be changed upon written request from the student. All HSSEAS faculty serve as advisers. During the first quarter in residence, the students meet with all faculty members in the department, and choose three professors with whom they would like to conduct master's thesis research.

These choices are submitted to the graduate adviser. The faculty meets separately and assigns each student their faculty research adviser, taking into account the students' choices and the interests of the department as a whole. The department will consider changing an adviser upon written request for the student.

During the **second quarter** in residence, students should arrange an appointment as early as possible with their faculty research adviser to plan the proposed program of study towards the M.S. degree. Continuing students are required to confer with their research adviser during the time of enrollment each quarter so that progress can be assessed and the study list approved.

Based on the quarterly transcripts, student records are reviewed at the end of each quarter by the departmental graduate adviser and Associate Dean for Academic and Student Affairs. Special attention is given if students were admitted provisionally or are on probation. If their progress is unsatisfactory, students are informed of this in writing by the Associate Dean for Student Affairs.

Students are strongly urged to consult with the departmental Student Affairs Advisor and/or the Office of Academic and Student Affairs regarding procedures, requirements, and the implementation of policies. In particular, advice should be sought on advancement to candidacy for the M.S. degree, and on the use of the Filing Fee.

Areas of Study

Consult the Graduate Advisor.

Foreign Language Requirement

None.

Course Requirements

The requirements for the M.S. degree are a thesis, nine courses (36 units), and a 3.0 grade-point average in the graduate courses. Chemical Engineering 200, 210, and 220 are required. Two courses must be taken from regular offerings of the department, and two courses may be Chemical Engineering 598, involving work on the thesis. The remaining two courses may be taken from those offered by the department, or from any other field in life sciences,

physical sciences, mathematics, or engineering. At least 24 units must be in letter-graded 200-level courses.

All master's degree candidates are required to enroll in Chemical Engineering 299 (Department Seminar) during each quarter of residence.

A program of study which encompasses these requirements must be submitted to the departmental Student Affairs Office for approval **before the end of the student's second quarter** of residence.

Undergraduate Courses. No lower division courses may be applied toward graduate degrees. In addition, the following upper division courses are not applicable toward graduate degrees: Chemical Engineering M105A, 199; Civil Engineering 106A, 108, 199; Computer Science M152A, M152B, 199; Electrical Engineering 100, 101, 102, 103, 110L, M116D, M116L, 199; Materials Science and Engineering 110, 120, 130, 131, 131L, 132, 150, 160, 161L, 190, 191L, 199; Mechanical and Aerospace Engineering 102, 103, M105A, 105D, 199.

Teaching Experience

Not required.

Field Experience

Not required.

Comprehensive Examination Plan

None.

Thesis Plan

All M.S. students must complete a thesis. Students should consult the graduate adviser for details on this plan.

Time-to-Degree

The average length of time for students in the M.S. program is five quarters. The maximum time allowed for completing the M.S. degree is three years from the time of admission to the M.S. program in the School of Engineering and Applied Science.

Doctoral Degree

Advising

Each department in the School of Engineering and Applied Science has a faculty graduate adviser. A current list of graduate advisers can be obtained from the Office of the Associate Dean for Academic and Student Affairs, 6426 Boelter Hall, School of Engineering and Applied Science.

Students are assigned a faculty graduate adviser upon admission to the School. During the first quarter in residence, the student meets with all faculty members in the department, and chooses three professors with whom he would like to conduct Ph.D. dissertation research. These choices are submitted to the graduate adviser. The faculty meets separately and assigns each student their faculty research adviser, taking into account the student's choices and the interests of the department as a whole. The department will consider changing an adviser upon written request from the student.

During the second quarter in residence, students should arrange an appointment as early as possible with their faculty research adviser to plan the proposed program of study toward the Ph.D. degree. Continuing students are required to confer with their research adviser during the time of enrollment each quarter so that progress can be assessed and the study list approved.

Based on the quarterly transcripts, student records are reviewed at the end of each quarter by the departmental graduate adviser and Associate Dean for Student Affairs. Special attention is given if students were admitted provisionally, or are on probation. If their progress is unsatisfactory, students are informed of this in writing by the Associate Dean for Academic and Student Affairs.

Students are strongly urged to consult with the departmental student office staff and/or the Student Affairs Officer and/or the Office of Academic and Student Affairs regarding procedures, requirements, and implementation of the policies. In particular, advice should be sought on advancement to candidacy, on the procedures for taking Ph.D. examinations, and on the use of the Filing Fee.

Major Fields or Subdisciplines

Consult the Graduate Advisor.

Foreign Language Requirement

None.

Course Requirements

All Ph.D. students are required to take six courses (24 units). Three of these are Chemical Engineering 200, 210, and 220. Two additional courses must be taken from those offered by the department. The third course can be selected from offerings in life sciences, physical sciences, mathematics, or engineering. All of these units must be in letter-graded, 200-level courses. Students are encouraged to take more courses in their field of specialization. These minor field courses should be selected in consultation with their research adviser. A **3.33** grade-point average in graduate courses is required. A program of study to fulfill the course

requirements must be submitted for approval to the departmental Student Affairs Office no later than one quarter after successful completion of the preliminary oral examination.

All Ph.D. students are required to enroll in Chemical Engineering 299 (Department Seminar) during each quarter of residence.

For information on completing the Engineer degree, students should see Engineering Schoolwide Programs in Program Requirements for UCLA Graduate Degrees.

Teaching Experience

Not required.

Written and Oral Qualifying Examinations

All Ph.D. students are required to take a preliminary oral examination. This examination tests each student's understanding of chemical engineering fundamentals in the areas of thermodynamics, transport phenomena, chemical kinetics and reactor design. Students are provided problems in writing, and are then asked to solve them orally in front of a faculty committee. Students are **required** to take Chemical Engineering **200, 210, and 220** in preparation for this examination. Students whose first degree is in chemical engineering take this examination at the end of the **second quarter in residence**. Students whose first degree is not in chemical engineering (but in chemistry, for example) may petition to postpone this examination to the following year. Any student failing the Ph.D. preliminary examination may petition to reenter the Ph.D. program after successfully completing the master's thesis. If this petition is granted, then the student takes the preliminary examination concurrently with the master's thesis defense.

After successfully completing the required courses and the preliminary oral examination, each student must pass the **written and oral qualifying examinations**. These examinations focus on the student's **dissertation research** and are conducted by a doctoral committee consisting of at least four faculty members nominated by the department, and in accordance with university regulations.

The **written qualifying examination** consists of a dissertation research proposal that provides a clear description of the problem considered, a literature review of the current state of the art, and a detailed explanation of the approach that will be followed to solve the problem. The student first presents his ideas for the dissertation research at a pre-candidacy seminar administered by departmental faculty members of the student's doctoral committee. This seminar is held during the early part of the winter quarter of the student's second year of residency. Following the seminar, the student submits the dissertation research proposal to the doctoral committee. The written examination is due on the seventh week of the winter quarter.

The University **Oral Qualifying examination** consists of an oral defense of the dissertation research proposal, and is administered by the doctoral committee. The oral examination is held within two weeks of submitting the written examination.

Students nominate a doctoral committee **prior** to taking the University Oral Qualifying Examination. The doctoral committee consists of a minimum of four members. Three members, including the chair, are inside members and must hold appointments at UCLA in

the student's major department in the School of Engineering and Applied Science. The outside member must be a UCLA faculty member outside the student's major department.

Advancement to Candidacy

Students are advanced to candidacy upon completion of the written and oral qualifying examinations.

Final Oral Examination (Defense of Dissertation)

Not required for all students in the program. The decision as to whether a defense is required is made by the doctoral committee.

Time-to-Degree

From admission to graduate status (includes M.S. degree) to award of the Ph.D. degree: **18 quarters** (normative time to degree). Doctoral students are expected to advance to candidacy by the Spring Quarter of their second year in residence. All Ph.D. candidates are expected to present an oral progress report to the department at the end of their third year in residence. They should then complete their dissertation research within the next three years.

Termination of Graduate Study and Appeal of Termination

University Policy

A student who fails to meet the above requirements may be recommended for termination of graduate study. A graduate student may be disqualified from continuing in the graduate program for a variety of reasons. The most common is failure to maintain the minimum cumulative grade point average (3.00) required by the Academic Senate to remain in good standing (some programs require a higher grade point average). Other examples include failure of examinations, lack of timely progress toward the degree and poor performance in core courses. Probationary students (those with cumulative grade point averages below 3.00) are subject to immediate dismissal upon the recommendation of their department. University guidelines governing termination of graduate students, including the appeal procedure, are outlined in **Standards and Procedures for Graduate Study** at UCLA.

Special Departmental or Program Policy

A recommendation for termination is reviewed by the school's Associate Dean for Academic and Student Affairs.

In addition to the standard reasons noted above, a student may be recommended for termination for:

Master's

- (1) Failure to maintain a grade point average of 3.0 in all courses and in those in the 200-series.
- (2) Failure to maintain a grade point average of 3.0 in any two consecutive terms.
- (3) Failure to complete the thesis to the satisfaction of the committee members.
- (4) Failure to maintain satisfactory progress toward the degree within the three-year time limit for completing all degree requirements.

Doctoral

In addition to the standard reasons noted above, a student may be recommended for termination for:

- (1) Failure to maintain a grade point average of 3.25 in all courses and in any two consecutive quarters.
- (2) Failure of the preliminary oral examination.
- (3) Failure of the written and oral qualifying examination.
- (4) Failure of a required final oral examination (defense of the dissertation).
- (5) Failure to obtain permission to repeat an examination from an examining committee.
- (6) Failure to maintain satisfactory progress toward the degree within the specified time limits.

CHEMICAL ENGINEERING DEPARTMENT M.S. COURSE STUDY PLAN

Student Name: _____

UID# _____

Master's Degree to be awarded: _____

Department	Course Number	Units	Grade	Quarter Completed
ChE 200 (letter graded)	ChE 200	4		
ChE 210 (letter graded)	ChE 210	4		
ChE 220 (letter graded)	ChE 220	4		
ChE (letter-graded 200-level)	ChE _____	4		
ChE (letter-graded 200-level)	ChE _____	4		
ChE 598	ChE 598	4	S	
ChE 598	ChE 598	4	S	
Elective (4 units of letter-graded, 200-level ChE, life sciences, physical sciences, mathematics, or engineering)		4		
Elective (4 units of letter-graded ChE, life sciences, physical sciences, mathematics, or engineering). Upper division letter-graded undergraduate level courses must be approved by the Graduate Advisor.		4		
TOTAL # OF COURSES/UNITS	<u>9</u>	<u>36</u>		

This program is approved by the Chemical Engineering Graduate Advisor for the Master's degree.

Graduate Advisor

Date