

A COLLOQUIUM SERIES IN CHEMICAL ENGINEERING

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In describing a course on technical talks, Felder^[1] points out the importance of communication skills for all practicing engineers. The significance of effective communication skills is also underlined by Hanzevack and McKean^[2] in a discussion of effective oral presentations as part of the senior design course for chemical engineers. In both references, the reader can find suggestions for successful oral presentations. Furthermore, in the latter paper a "presentation feedback form" is illustrated which can be used not only for evaluation of an oral technical presentation but also for drawing the attention of the speaker to some important points during the organization of the presentation.

Most undergraduate programs in chemical engineering include a course on how to improve oral communication skills, and some graduate programs further develop those skills through technical presentations as part of a course. Good written and oral communication skills are the goals of the Depart-

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The presentations are designed to simulate a thesis or dissertation oral examination. The duration of each seminar (which the speakers are encouraged not to exceed) is about thirty minutes.

ment of Chemical Engineering and Materials Science at Syracuse University. Faculty and students are both concerned with the student's ability to communicate technical expertise.

A seminar program called "Colloquium Series in Chemical Engineering and Materials Science" (ColCEMS) has been initiated and is run by the students in collaboration with the faculty to satisfy this mutual concern. The ColCEMS operates during the fall and spring semesters of the academic year, as well as during the summer sessions. It is a step beyond the summer seminar program which was initiated at Virginia Polytechnic Institute and State University.^[3] The purpose of this article is to describe all the activities within the colloquium series and to provide an example for students in other schools to follow.

OBJECTIVES

The main objectives of ColCEMS are

- to improve the communication skills of graduate students
- to share knowledge obtained from recent research activities
- to exchange ideas and develop constructive criticism.

Although the above objectives are all equally important, good communication skills are necessary in order for a speaker to share ideas and results with an audience and to receive feedback in the form of constructive criticism. This is a reality that is recognized by all students, and it serves to strengthen their determination to improve their own communication effectiveness.

The departmental seminar program that runs in parallel is a rich source for examples of both good and bad presentations. Although the main objective of the department program is the exchange of ideas, due to the ColCEMS students are able to see beyond

the speaker's ideas and findings. In this way they develop a rounded critical opinion of both the speaker and the presented work.

SCHEDULE

Preparation for the subsequent seminar schedule starts even before the current one ends. The coordinators encourage all graduate students to submit a seminar title and a preferred date for its presentation, although participation is voluntary for both speakers and audience members. Not many students come forward, however, until they have a considerable amount of information to share, usually in the second or later year of their graduate studies.

To complete the schedule (which consists of approximately twelve seminars) the coordinators invite research associates, faculty members, and even some students and faculty from other departments who have similar backgrounds and interests. In this way the seminar program covers many research areas and attracts people with diverse backgrounds.

The participation of research associates and faculty, both as speakers and as audience, is very important for the ColCEMS since it engenders more

departmental attention and encourages the speakers to carefully prepare their presentations. A good balance between graduate students, research associates, and faculty (corresponding to the number of people in each category within the department) is maintained.

The seminar schedule is announced two weeks before the first presentation. Each speaker and each member of the department receives a copy of the schedule, and additional copies are distributed to faculty members in other departments at Syracuse and at SUNY/Environmental Science and Forestry where chemical engineering faculty members collaborate on joint research projects. Finally, a copy of the schedule is sent to the *Syracuse Record*, a weekly campus newspaper.

The seminar topics for 1991 are shown in Table 1. The table also serves to demonstrate the diversity of research interests in the department. Seminars of general interest, such as "All You Wanted to Know About Physics and Were Afraid to Ask," "Quantum Gravity," and "The Human/Animal Bond: Interaction Among Pets and People" are exciting and well received by the audience. Our goal is to have such

TABLE 1
Topics: 1991 Colloquium Series in Chemical Engineering and Materials Science

Spring 1991

- Modeling of the Electrostatic Corona Discharge Reactor
- Approximate Solutions to Intraparticle Diffusion Equations
- Transport of Ions Near Fractal Electrodes
- Solvent Extraction Separation of Main Group Elements with Macrocyclic Polyethers
- Adsorption of Metal Ions from Aqueous Solutions
- Design of Polymer Membranes for Superior Separation Properties
- Precipitation from Homogeneous Solution: A New Technique for the Preparation of Catalysts and Catalyst Supports
- Application of Impregnated Ceramic Membranes for Metal Ion Separation from Hazardous Waste Streams
- Monte Carlo Experiments for Desorption of Molecules from Solid Surfaces
- Computer Modeling of Electromigration
- Design of a Laboratory Supercritical Extraction and Oxidation System for PCBs
- Membrane Processes for Gas Separations
- A Membrane Process for In Situ Removal of Carbon Dioxide from Diving Atmospheres

Summer 1991

- Droplet Breakup in Liquid Dispersions
- All You Wanted to Know About Physics and Were Afraid to Ask
- Relationships Between the Chemical Structure of Fluorine-Containing Polyimide Membranes and Their Gas Permeability
- Quantum Gravity
- An Experimental Demonstration of Facilitated and Active Transport in the Human Placenta
- Properties of Amphoteric Oxides: Surface Charge Development in

Aqueous Solution and pH Dependence of Metal Ion Adsorption

- Deposition of Diffusive Aerosols
- Evaluation of Adsorption Energy Distribution for Heterogeneous Surfaces
- Simulation of Bubble Dynamics
- Electrical Breakdown of Polymers
- Acoustics of Bubbly Liquids
- The Human/Animal Bond: Interaction Among Pets and People

Fall 1991

- Analysis of Cake Formation and Growth: Formulation and Possible Solutions
- Control of Extraction Columns
- I. Effect of Intrasegmental Mobility on Gas Permeability of Polyimide Membranes
- II. Representation of Gas Solubility and Diffusivity in Glassy Polymers
- Estimation of Parameters in Differential Models by Infeasible Path Optimization
- Interrelationship Between the Source Material for Activated Carbons: Its Structure and Chemical Effects During Hydrogen Adsorption
- Water in Polyimides: Solubility and Transport
- Aerosol Deposition in Fibrous Systems
- Sulfate Adsorption on Mineral Soils
- Magnetism in Thin Films
- Computer Simulation for Adsorption of Molecules on Solid Surfaces
- Development of Inorganic Chemically Active Beads for Metal Ion Separation from Hazardous Waste Streams

seminars not only in the summer but also during the two academic semesters.

FORMAT

The ColCEMS presentations are designed to simulate a thesis or dissertation oral examination. The duration of each seminar (which the speakers are encouraged *not* to exceed) is about thirty minutes. Overhead and slide projectors are usually used as visual aids, and some speakers include video-tape shows and laboratory equipment to make their talk more understandable. Due to the diversity of backgrounds in the audience, the seminars usually start with a relatively long introduction. Only clarification questions are allowed during the seminar, but the presentation is followed by a question-and-answer session directed by the seminar coordinators. The duration of this session is not fixed—it depends on the number of questions and may last anywhere from five to twenty minutes.

There are two seminar coordinators elected at the end of the summer colloquium series. They are responsible for preparing the seminar schedule at the beginning of each semester, arranging for financial support, arranging for refreshments, announcing each weekly seminar, arranging for the room and

any visual aids needed, introducing the speakers, announcing the following week's speaker, and directing the question-and-answer session at the end of each seminar.

ANNOUNCEMENT

Each seminar is announced in the weekly campus newspaper *Syracuse Record*, and an announcement is also made in the department by the coordinators. The coordinators ask the speaker for an abstract of no more than three hundred words, which is then typed on a special form with the seminar title, speaker's name, and date, time, and place (see Table 2). Copies of this announcement are placed in the mailboxes of students, research associates, faculty, and staff, usually one day before the seminar. Announcement copies are also placed on bulletin boards where everyone can see them.

SEMINAR DAY

The seminars are usually scheduled for Fridays, although in the summer of 1991 they were on Thursdays. The meeting time of 12 noon is set to avoid class conflicts. Between 12:00 and 12:15, attendees can socialize, and at 12:15 the seminar begins with the introduction of the speaker by one of the coordinators. A question-and-answer session, directed by the coordinator, is held after the seminar, usually between 12:45 and 1:00.

Refreshments, usually juice and fruit, are purchased with Graduate Student Organization or departmental funds just before the seminar. One of the two coordinators is responsible for procuring the refreshments, while the other readies the room and arranges for any visual aids the speaker may require.

Just before the seminar, a sign-up sheet is passed around the audience, solely for statistical purposes. These sign-up sheets, along with the abstracts and seminar schedules, are kept in the ColCEMS files.

From the data obtained during the first year, we have been able to determine that the audience primarily consists of chemical engineering graduate students, research associates, and faculty—with occasional participation of graduate students and faculty from other engineering and science departments. A number of faculty members attend all seminars, and the remainder attend according to their research interests.

AWARDS

At the end of the last seminar of each semester, the audience is asked to vote for their choice of the

TABLE 2
Typical Announcement

COLLOQUIUM SERIES
in
CHEMICAL ENGINEERING AND MATERIALS SCIENCE

SPEAKER: Ai Chen
Graduate Student
Chemical Engineering and Materials Science

TOPIC: Computer Simulation for
Adsorption of Molecules on Solid Surfaces

DATE: Friday, November 22, 1991

TIME: 12:15 PM

PLACE: 017 Hinds Hall

Adsorption of molecules on zeolite 5A has been studied using Monte Carlo simulations. Site-site potential energies were used to model the adsorbate-zeolite and adsorbate-adsorbate interactions. In the potential energy model, the dispersion, repulsion and electrostatic induction energies have been taken into account for monatomic molecules. In addition to the above terms, the quadrupole-quadrupole and ion-quadrupole interactions have been taken into account for diatomic molecules. A new Monte Carlo simulation model is proposed based on stochastic Markov process theory to carry out the simulations. A prominent advantage of the model is that it is suitable for massively parallel implementation. The preliminary results for the pure-component isotherms are in good agreement with experimental data. The study for multicomponent systems is still undergoing.

two best seminars. The awards are usually books provided by the department and presented to the winners at the first seminar of the following semester. Also, pointers (useful for seminars) are given to all speakers.

The gifts express the appreciation of all department members for the effort the speakers put into their presentations. They also serve as a motivation for the graduate students to come forward and give a seminar.

SUMMARY

The graduate students in the Department of Chemical Engineering and Materials Science at Syracuse University, in collaboration with the faculty, have developed a seminar program called the "Colloquium Series in Chemical Engineering and Materials Science," with the objectives of improving the communication skills of graduate students, sharing knowledge, and exchanging ideas. Our experience has been that those objectives have been met. Furthermore, the ColCEMS program has also served as a catalyst for bringing all members of the department closer together. Intellectual relations among graduate students, research associates, and faculty have been enhanced, and everyone has had the opportunity to see beyond the technical skills of the speakers.

We feel that in an academic setting, where people are constantly coming and going over a relatively short period of time, this kind of activity is important for both educators and students. We wanted to share this experience with the readers and to urge graduate students at other schools to initiate a similar program.

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BIO(MOLECULAR) ENGINEERING

Continued from page 199.

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