

# THE CHEMICAL ENGINEERING SUMMER SEMINAR SERIES

## at Virginia Polytechnic Institute and State University

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Preparing chemical engineering undergraduates to make effective technical presentations is a topic of current interest to chemical engineering educators, a fact attested to by recent articles in *Chemical Engineering Education* by Felder [1] and by Brewster and Hecker [2]. An equally important issue is the promotion of good communication skills among graduate students. This topic was recently addressed in an article by Modi and Bowman [3] which described a symposium developed at Carnegie Mellon University.

At Virginia Polytechnic Institute and State University (VPI&SU), graduate students have several avenues available to them for the development of both oral and written communication skills. Two programs are offered by the Graduate Student Assembly [4]. In the first of these programs (the Graduate Research Development Project), graduate students compete for supplemental research funding via written research proposals. The second program (the Graduate Research Symposium) is conducted every fall semester and provides a forum for graduate students to present their research in the form of poster sessions. Finally, the VPI&SU chemical engineering department offers a one-hour graduate seminar class where students are instructed on the basics of oral communication. Each student gives black-

board, overhead, and slide talks on both technical and non-technical material, and he or she is critiqued by fellow students and the course professor.

In addition to these opportunities, the Chemical Engineering Graduate Society in our department felt that a forum for organizing and presenting technical oral presentations of the nature of professional society meetings would be beneficial. We also felt that such a forum would supplement the department's academic-year seminar program by enhancing our understanding in areas of departmental research outside of our particular thesis and dissertation areas. Consequently, the Chemical Engineering Summer Seminar Series (CES<sup>3</sup>) was conceived in the spring of 1987 by several graduate students in our department, and it has been successfully administered solely by graduate students since its inception. The purpose of this article is to describe this unique seminar program.

### OBJECTIVES

The overall purpose of the CES<sup>3</sup> program is to give students practice in making oral presentations, to provide helpful suggestions concerning graduate students' research, and to broaden the horizons of those attending the seminars. By providing an opportunity to present research in a structured seminar format to an audience of peers, this seminar

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program encourages the development of oral communication skills. Also, since we do not require that all topics be research-related, we do not limit speaker participation to graduate students who have made significant progress in their research.

As a second goal, this forum allows for critique of a student's research without the accompanying pressure of a professional presentation. Therefore, for students who are well into their thesis or dissertation research, the CES<sup>3</sup> affords an opportunity to practice presentations that will later be given at a professional meeting.

A third objective of the CES<sup>3</sup> program is to broaden the horizons of the participants. As Professor Gerry Beyer said in a recent CES<sup>3</sup> seminar, "...graduate students should venture down the hall to see what research their fellow graduate students are doing." This program provides such an opportunity. Consequently, the program serves as an excellent supplement to the department's academic-year seminar program, which generally entails more specific topics.

## **PROGRAM DEVELOPMENT**

In the fall of 1986, the chemical engineering students at VPI&SU formed the Chemical Engineering Graduate Society for the purpose of helping coordinate graduate student activities in the department and addressing graduate student concerns. Several graduate students were interested in working with the departmental academic-year seminar program, and so the Seminars Committee was formed. Through discussions in the Seminars Committee, the idea of CES<sup>3</sup> was conceived. The program was originally organized during the spring of 1987 and was administered for the first time during the summer of 1987.

During the initial planning and organization of the CES<sup>3</sup> program, departmental faculty and graduate students were surveyed to determine their interest in such a program. Approximately half of the graduate students and more than a half-

dozen faculty responded. All of the responses were very positive, with a large majority of them expressing an interest in giving a presentation. The faculty have supported the concept of CES<sup>3</sup> from the very beginning.

## **PROGRAM OPERATION**

The CES<sup>3</sup> program is attractive from an operational standpoint in that it does not require a great deal of planning and organization. The program is run exclusively by graduate students, with monetary support from the department for food and beverages. The work is divided among several graduate students so that no one person is overburdened with responsibility. One student serves as the seminar coordinator and is responsible for seminar scheduling and publicity, and a committee of three to four students is responsible for purchasing the food and drinks and ensuring that the room is set up for the seminar presentation.

The program runs the entire length of the summer session, generally from mid-May to mid-August, with one seminar given each week. Speaker participation is solicited a couple of months prior to the first seminar. An information bulletin is sent to all graduate students, faculty, and staff in the chemical engineering department. It has a detachable portion (to be returned to the coordinator) which allows the speakers to specify their topic area and to choose the date of their presentation. About three weeks before the seminar series is to start, a specific title is requested from the speakers, and a final schedule is then completed and distributed to all faculty, staff, and graduate students.

## **SEMINAR FORMAT**

Speakers are encouraged to prepare seminars as though they were making a presentation at a national technical meeting. The format of the seminars is structured, yet flexible enough to allow for different styles of presentation. Speakers generally use slides or overhead transparencies; however, video tapes and computers are occasionally incorporated into the talks. Seminars are generally 40- to 45-minute presentations, followed by a 10- to 15-minute question-and-answer period. Quite often, students and professors alike remain for a short time following the talk to continue discussions generated by the seminar. Speakers are encouraged to give a fairly detailed introduction since their audience is

quite diverse in its technical background.

## TOPICS

One of the unique features of the CES<sup>3</sup> program is the requirement that the seminar topic be related to chemical engineering only in a distant way, and that it does not necessarily have to be research-related. The 1988 CES<sup>3</sup> featured talks ranging from "Some Thoughts on Chemical Engineering Education, or On Being Beaten at Your Own Business," by Henry McGee, to "Use of Colloidal Gas Aphrons in the Chemical Engineering Department at VPI&SU," by former graduate student Alan Foss. Table 1 is a representative sample of the seminars given during the first three years of CES<sup>3</sup> and shows the diversity of subjects covered.

## FACULTY PARTICIPATION

Although our seminar program is aimed primarily at the graduate student population, several faculty are encouraged each year to give talks on their research or interest areas. We feel that this gives the graduate students a chance to get better acquainted with the faculty and their research and extracurricular activities. This is particularly important with faculty who do not teach graduate

courses, faculty with smaller research groups, and new departmental faculty. Our department has three recent additions to the faculty, and each of them has been asked to present a seminar during the summer after his first year, to give graduate students an idea of his research interests. Out of a total of ten to eleven seminar slots each summer, typically two to three seminars are given by faculty.

## ATTENDANCE

The summer seminars are attended primarily by graduate students, with approximately fifty percent of the graduate students in residence attending on a regular basis. Additionally, several post-doctoral research assistants and undergraduates frequently attend. At VPI&SU, the unit operations laboratory is held in the summer, and on occasion the entire class attends a seminar that is applicable to one of the unit operations experiments. Faculty attendance varies widely, with ten to twenty-five percent of the faculty attending on a regular basis. Since many of the seminar topics are interdisciplinary, they have attracted audiences from other departments such as forest products, materials science and engineering, and chemistry.

## PITFALLS AND PROBLEMS

The program is not without flaws. For example, the number of seminar presentations given each summer depends upon the number of graduate students who are interested in giving presentations. This problem is aggravated by the transient nature of the graduate student population, which affects the number of students available. Any program (such as CES<sup>3</sup>) that is initiated and administered solely by graduate students tends to vary yearly due to the aforementioned problem. If such a program can be maintained, however, it can be a valuable part of the graduate student experience.

## SUMMARY

In summary, we have initiated and successfully run a summer seminar program for the past three summers. The benefits of the program include enhancing oral

**TABLE 1**  
Selected Titles from the VPI&SU CES<sup>3</sup>

Year	Speaker	Topic
1987	Arthur Squires	<i>Maestros or Duffers: What an Engineer Should Look For in His or Her First Bosses</i>
	Benku Thomas	<i>Vibrofluidization</i>
	Cal Moreland	<i>Polyurethane Foams</i>
	Kim Hunter	<i>Process Dynamics</i>
1988	Henry McGee	<i>Some Thoughts on Chemical Engineering Education, or On Being Beaten at Your Own Business</i>
	Daan Feng	<i>Polymer Materials</i>
	Alan Foss	<i>Use of Colloidal Gas Aphrons in the Chemical Engineering Department at VPI&amp;SU</i>
	Randy Moynihan	<i>Polymer Processing</i>
1989	Nancy Rauschenberg	<i>Natural and Biodegradable Polymer Systems</i>
	Jeff Kaster	<i>Biochemical Engineering</i>
	Tom Quantrille	<i>Innovative Process Design</i>
	Gerry Beyer	<i>SEX: Surface Enhanced eXtraction</i>

communication skills among graduate students, affording graduate students the opportunity to present their research to an audience of peers, and increasing the breadth of knowledge of the participants through a diversity of topics. In addition, the benefits exceedingly outweigh the time investment of the program administrators.

The largest problem in the organization and operation of such a program is generating sufficient interest to fill the available seminar slots. Overall, however, the program has been very beneficial to our department and to the graduate students involved in planning the program and presenting seminars. A summer seminar program similar to the one described here may be applicable at other universities.

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## REFERENCES

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2. Brewster, B.S., and W.C. Hecker, "A Course on Making Oral Technical Presentations," *Chem. Eng. Ed.*, **22**, 48 (1988)
3. Modi, A.K., and P.T. Bowman, "The ChEGSA Symposium: A Continuing Tradition at Carnegie Mellon University," *Chem. Eng. Ed.*, **23**, 100 (1989)
4. The VPI&SU Graduate Assembly is a graduate student-run governance organization for the entire graduate community. It is administered under the auspices of the Graduate School. □

## ChE stirred pots

*(Tune: Battle Hymn of the Republic)*

*Free energy and entropy were whirling in his brain  
With partial differentials and Greek letters in their  
train;  
For delta, sigma, gamma, theta, epsilon, and pi  
Were driving him distracted as they danced before his  
eye.*

*(Refrain)*

*Glory, glory, dear old thermo.  
Glory, glory, dear old thermo.  
Glory, glory, dear old thermo.  
I'll learn you by and by*

*Heat content and fugacity revolved within his mind  
Like molecules and atoms that you never have to wind.  
With logarithmic functions doing cake walks in his  
dreams  
And partial molal quantities devouring chocolate  
creams.*

*(Refrain)*

*They asked him on the final if a mole of any gas  
In a vessel with a membrane through which hydrogen  
could pass  
Were compressed to half its volume, what the entropy  
would be,  
If two-thirds delta sigma equalled half of delta P?*

*(Refrain)*

*He said he guessed the entropy would have to equal  
four,  
Unless the Second Law would bring it up a couple  
more.  
But then it might be seven if the thermostat were good,  
Or it might be almost zero if once rightly understood.*

*(Refrain)*

*The professor read his paper with a corrugated brow,  
For he knew he'd have to grade it, but he didn't know  
quite how.  
Till a sudden inspiration in his cerebellum smote,  
And he seized his trusty fountain pen and this is what  
he wrote:*

*(Refrain)*

*"Just as you guessed the entropy, I'll have to guess your  
grade,  
But the Second Law won't raise it to the mark you  
might have made;  
For it might have been a hundred if your guess had  
been quite good,  
But I think it must be zero till you've rightly under-  
stood."*

*(Refrain)*

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