



# *Chemical Engineering*

UNIVERSITY OF FLORIDA

Fall 2002

## Chairman's

## Corner



Greetings from Gainesville:

The faces of our faculty have changed by over 40 % during the past 5 years with the additions of Drs. Rajagopalan, Ladd, Ren, Narang, Weaver, Chauhan, Butler, and Kopelevich. These new positions were added to meet the increasing enrollments, to help staff the Engineering Research Center on Particle Science and Technology, and to fill faculty vacancies. In particular, Dr. Art Fricke retired from the University last year (now Emeritus Professor), although the term retired is used loosely judging from the time Art spends in the office and on consulting. Dr. Fricke joined the faculty in 1985 as department chair and developed a well-recognized research program around the processing of black liquor. Many graduates from these last 17 years will remember him for bringing the practical aspects of chemical engineering into the classroom.

In contrast, our undergraduate curriculum has not substantially changed for over 30 years. Focused on the chemical engineering sciences, this curriculum has served our students well as evidenced by their success in the workplace. The

workplace, however, is rapidly changing (e.g., diversity in industries hiring our students, globalization of engineering) and we have looked for ways to improve the effectiveness of our program. After 2 years of planning, the department is introducing a substantially revised curriculum this Fall. One objective is to give students more flexibility in their degree program. We now have 15 credits of technical electives (vs. 8), changed the chemistry requirements (added analytical, dropped organic from 2 courses to one 4-credit course (the one the Chem. Majors take), and, yes, dropped P. Chem. II). The number of chemistry credits remains the same, but students can now change the mix depending on their choice of technical option. Undergraduate students will be able to graduate in 4 years (and not just on paper), more easily pursue a coop (our department has 20% of the coop students on campus!), and for most receive a B.S. in chemistry with just 2 additional courses. This new curriculum also includes an Introduction to Biology for Engineers course at the Freshman level, a 1-credit safety course in conjunction with unit ops, transport before fluids, senior seminar in the junior year, several combined courses, an optional multidisciplinary design sequence (IPPD), and an elective immersion experience in process engineering. We hope these changes will help students better prepare for the workplace or graduate school, yet instill the foundations of our discipline.

We have experienced an increase in enrollments in all degree programs. Last year we graduated a record high 93 B.S. students and 15 Ph.D. students. The substantial increase in the number of high school graduates in Florida, the Bright

Futures program, and the presence of only 2 other Chemical Engineering programs in the state (FAMU-FSU and USF) have led to increased enrollment pressures at the undergraduate level. The number of graduate students however, is directly related to available research funds since we support all PhD students. According to the most recent records provided by the NSF, the department ranked 18th in the nation in research expenditures in 2000. This increase in enrollment has gladly been accompanied by an increase in the credentials of both our undergraduate and graduate students, making our job that much easier.

And we had an election this November with a mandated change from the recently installed Board of Education back to the original Regents system. Of course there were some problems in some counties with the vote counting (pun intended). I overheard one resident responding to a little ribbing from a visitor reply, "If you don't like the way we count votes, then just get on I-75 north and visit one of the other 54 states."

This newsletter features the class of 1956 and its recent reunion. They got together for a long weekend on campus and had a grand time retelling stories from their undergraduate days. In listening to the reminiscing, I was struck how some things have not changed over the last 46 years. If you would like to organize a reunion of your class, the department would be more than happy to help with arrangements.

To an optimist, the glass is half full. To a pessimist, the glass is half empty. To a chemical engineer, the glass is twice as big as it needs to be. Wishing you a happy holiday season.

# PhD Graduates

Name	Dissertation Title	Supervisory Chair(s)	Placement
<b>Summer 2001</b>			
<b>Giovanina Nunes</b>	Design and Analysis of Multivariable Predictive Control Applied to an Oil-Water-Gas Separator: A Polynomial Approach	Dr. Oscar Crisalle	Petrobras Research Center – Brazil
<b>Aaron M. Thomas</b>	Mass Transfer and Separation of Species in Oscilating Flows	Dr. Ranga Narayanan	University of Idaho, Assistant Professor
<b>Rachel A. Worthen</b>	Centrifugal Air Classification of Fine Particles Using Rotating Disks	Dr. Spyros A. Svoronos	Equilon Enterprise, LLC; Houston , TX
<b>Anping Zhang</b>	Nitride-Based Electronic and Optoelectronic Devices	Dr. Fan Ren	General Electric; Schenectady, NY
<b>Fall 2001</b>			
<b>Gerard T. Dang</b>	Design, Fabrication and Characterization of 850nm Vertical-Cavity Surface-Emitting Lasers	Dr. Fan Ren	Army Research Lab; Washington, DC
<b>Feridun Demir</b>	Feedback Control of Chlorine Disinfection Reactors with Variable Dead Time	Dr. Oscar Crisalle	Middle East Technical University
<b>Jerry Wayne Johnson</b>	Fabrication and Characterization of Gallium Nitride Electronic Devices	Dr. Fan Ren	Nitronex Corporation; Raleigh, NC
<b>Michael A. Mastro</b>	Growth and Characterization of Thin and Thick GaN	Dr. Tim Anderson	TDI, Inc.; Silver Springs, MD
<b>Ronald C. Sabo</b>	Colloidal Interactions in Filtration Processes	Dr. Chang-Won Park	Searching
<b>In-Sung Sohn</b>	Fabrication of Graded-Index Plastic Optical Fiber by the Diffusion-Assisted Co-extrusion Method	Dr. Chang-Won Park	Postdoctoral Researcher; UF (Dr. Raj Rajagopalan)
<b>Spring 2002</b>			
<b>Daniel W. Crunkleton</b>	Determining the Inertial States of Low Prandtl Number Fluids Using Electrochemical Cells	Dr. Tim Anderson, Dr. Ranga Narayanan	Post-doctoral Researcher, Vanderbilt University
<b>Rene I. Gonzalez</b>	Synthesis and In-Situ Atomic Oxygen Erosion Studies of Space-Survivable Hybrid Oxygen/Inorganic Polyhedral Oligomeric Silsesquioxane Polymers.	Dr. Gar B. Hoflund	US Air Force; Edward AFB, CA
<b>Serkan Kincal</b>	Modeling and Control of Multiple Thermal Effusion Sources in a Migration Enhanced Epitaxy Reactor for the Deposition of Cu(In,Ga)Se <sub>2</sub> Absorbed Layers for Solar Cell Applications.	Dr. Oscar Crisalle	Intel; Santa Clara, CA
<b>Michael A. Membrino</b>	Transdermal Delivery of Therapeutic Compounds by Iontophoresis	Dr. Mark E. Orazem	Searching
<b>Michael D. Reed</b>	Growth and Characterization of Freestanding Gallium Nitride Substrates by the Hyride-Metalorganic Vapor Phase Epitaxy Technique	Dr. Tim Anderson	II-VI, Inc.; Saxonburg, PA

## MS Graduates - Summer 02

Name	Dissertation Title	Supervisory Chair(s)
<b>Summer 2002</b>		
<b>Jokotade Adekanmbi</b>		
<b>Anna Casasus-Zambrana</b>	Effect to Oxygen on the Diauxic Lab	Dr. Spyros A. Svoronos
<b>Thanwa Papaiwong</b>		

# Undergrad Comes Home!



**Dr. Jason F. Weaver** joined the faculty of the chemical engineering department in January of 2000. Jason is a native Floridian and an alumnus of the chemical engineering department at University of Florida. He received both B.S. and M.S. degrees in chemical engineering from UF in 1992 and 1993. He then went to Stanford University for graduate school, where he earned a Ph.D. in chemical engineering in 1998.

Jason's research interests are in the area of gas-surface reactivity, which has applications in fields such as heterogeneous catalysis and semiconductor processing. Jason and his students have spent the past two years developing an ultrahigh vacuum analysis system in which they investigate chemical reactions at surfaces. They are currently studying the reactions of gas-phase oxygen atoms at surfaces in a general effort to better understand the surface chemistry occurring in extreme environments such as plasmas and flames.

## Faculty Notes

**Tim Anderson** was the recipient of the University of Michigan and Michigan State University Joint Lectureship. He was also named to the editorial board of the *Journal of SMET Education*.

**Oscar Crisalle** received the 2002 University of Florida Teacher of the Year Award. Oscar also organized an international conference in Brazil last year. The 2nd Pan American Workshop on Process Systems Engineering, held in September 2001 in Guaruja, Brazil, brought together industrial practitioners and university researchers specializing in the area of Process Engineering. The goal of the activity was to foster international cooperation, and to exchange views on the state-of-the-art regarding process control, process design, and optimization of process operations. Participants from the US, Brazil, Argentina, Uruguay, Mexico, and Peru contributed papers that will be published in a Special Issue of Computers and Chemical Engineering that will appear in March of 2003.

**Tony Ladd** was invited to Bulgaria and Japan in 2002 to give lectures on his research. Tony gave a talk titled "Simulations including Hydrodynamics" in Varna, Bulgaria and plans to give a talk titled "Dynamics and Structure in a Settling Suspension" in Kyoto, Japan this December.

**Mark Orazem** returned in July from a year's sabbatical leave at the Université Pierre et Marie Curie in Paris France. Mark has accepted a position as Associate Editor for the Journal of the Electrochemical Society and for Electrochemical and Solid-State Letters, and he is organizing the 6th International Conference on Electrochemical Impedance Spectroscopy to be held in Florida in May 2004.

**Fan Ren** is a member of two editorial boards: *Solid State Electronics* and *Materials Research Society Internet Nitride Journal*.

**Raj Rajagopalan** serves as an advisor to the Joint University of Illinois (UC) - Singapore research and educational program. He has also been invited to Japan as a visiting scholar (Kyoto & Tohoku).

**Jason Weaver** received the 2001 Ralph E. Powe Junior Faculty Enhancement award, sponsored by Oak Ridge Associated Universities.

**Dr. Yoshihiro Irokawa** from Toyota is visiting UF for 2 years to work with Professor Pearton (Mat. Sci. & Eng.) and Professor Ren (Chem. Eng.) on wide bandgap energy electronic devices as power switches for Toyota hybrid car.

## Alumni Notes

**Steve Johnston** (PhD 2000) is working for Intel and recently moved from Santa Clara, CA to their Hillsboro, OR facility and is working on advanced metallization schemes.

**Sung Min Cho** (alumni) is on the faculty at Sung Kyuh Kwan University in Suwon, Korea. He is spending a sabbatical year in the department working with Tim Anderson.

Two chemical engineering undergraduates, **Gregory T. Reeves** (currently in ChE, Princeton) and **Ashley Smart** (currently in ChE, Northwestern), were awarded an NSF graduate fellowship. They were the only UF undergrads in the college of engineering to receive the fellowships. Greg and Ashley both worked on research projects with Professor **Atul Narang**.

# 46th Year Reunion of 1956 ChE Class

The second reunion of the 1956 class was held on November 9 and 10, 2002. Its primary location was the Reitz Union Hotel, which is located near the center of the University of Florida campus. All but four of the living graduates attended. Of the four, Doug Baldwin could not be located, Marvin Shankin was in Italy on business, Rudy Cabina was traveling, and Gordon Riel's wife was in a Washington hospital.



The five major activities at the reunion were: A Saturday afternoon informal kibitzing and individuals news updates session in Union Suite 620, where Joe and Judy provided chips, dips, and sips; a Saturday evening dinner in the Micanopy Room of the Union; a late-night return to Suite 620 to continue with jokes and tall tales; a guided tour of the new (to most) Chemical Engineering Building on Sunday morning; and an off-campus Sunday lunch. Several formed small groups and walked the campus on Sunday, almost lost at times because of its growth and the numerous new buildings. A few visited a large museum on the campus.

The greetings, examining of faces, kidding, laughter and back-slapping began as people signed in at the Union desk at noon on Saturday. Fortunately, Credo Schwab had placed his attache case filled with name tags (with very large lettering) on the desk, as many had not seen some of the others since either graduation or their 25th-year reunion, which had been held 21 years earlier. Traveling the greatest distance, Jack Clement had flown from Akron, OH, Wally Sumner had driven from Aiken, SC, Bob Agee had driven from Baton Rouge, Al Leybourne from Hattiesburg, MS, and Tom Stewart from Miami. Most of the others lived closer. It was somewhat baffling to see once young, vigorous, and competitive classmates had become heavier, gray-haired, slower-speaking, generally retired, but not retiring, gentlemen. Any 'youngest looking' prize would probably have gone to Wally Sumner and his wife Carmen.

The dinner was attended by the graduates and their wives, Chemical Engineering Department Chairman and dinner host Tim Anderson, Dr. Seymour Block, who had assisted in the reunion planning and Reitz Union Hotel room reservations, retired Professor Mack Tyner, and Jim Bosworth who had agreed to guide the Chemical Engineering Building tour group

the next day. The dinner menu had been selected by Dr. Block's wife; the broiled salmon and chocolate cake dessert will be remembered with relish a long time. Every graduate had looked forward to seeing Dr. Tyner, who had been their stoichiometry instructor and was quietly present. All chemical engineers agree that one must obtain a good grasp of stoichiometry in order to successfully continue their education and then practice chemical

engineering. Earlier, futile attempts had been made to locate and invite Professor Neff of the Civil (or Mechanical) Engineering Department who had taught the class Strength of Materials, giving brutal exams and referring to the class as "You Chemicals." An invitation to Professor Neff would be akin to striking your head a second time, just to see if it really had hurt so badly the first time.

During desert, several commentaries were made. These included a statement by Chairman Anderson that the graduating class had grown from the 1956 size of approximately 20 to ones six times as large. A roasting of Joe Morris by Gil Brown, who insisted he had thought the "joint project" Joe had spoken of by telephone included an invitation for Gil and Barbara to spend a couple of weeks with Joe and Judy at their vacation home in the North Carolina mountains, as opposed to spending a couple of weeks searching telephone directories and the internet, locating and inviting classmates to a reunion! Several graduates spoke briefly of the more interesting work areas they had experienced before retirement. Some mentioned how much pleasure and pride their chemical engineering career had offered. A dozen 8X10 quality photographs of the 1956 Student AIChE Society were handed out by Gil. Several colored photographs of Drs. Tyner and Block were provided by Roland Foster, enabling recipients to obtain their autographs.

When Chairman Anderson asked for a show of hands to determine how many were still working, it was found approximately five were employed full time and about the same number doing consulting part time. Two still working full time were the Hall brothers (In college the Hall triplets had always been referred to as "The Hall boys." As they were always together and you never knew which one was which.), who are dentists,

# 46th Year Reunion of 1956 ChE Class

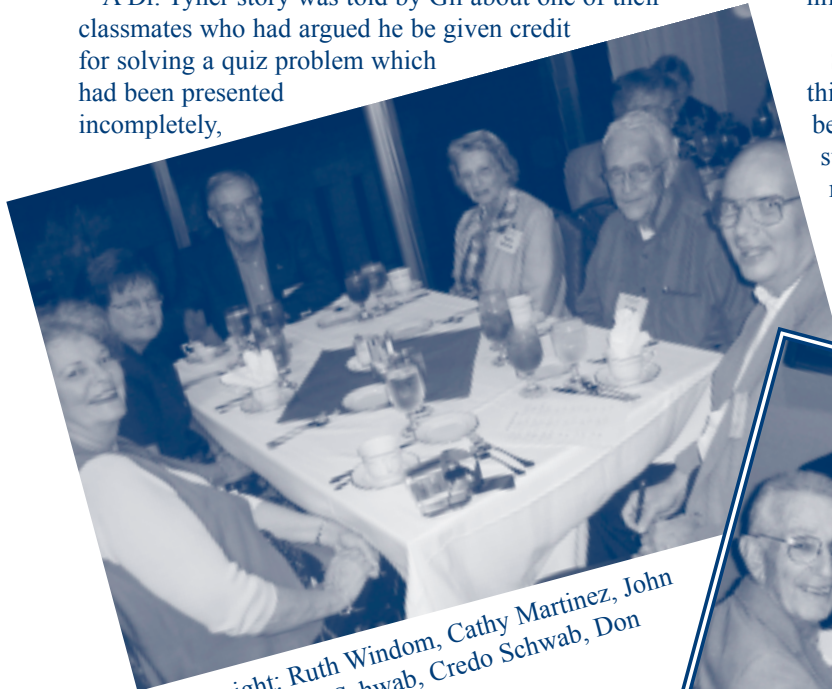
Al Leybourne who teaches at a Mississippi university, and Tom Stewart who is the registrar at a Miami university. When Bob Agee was asked why he still worked full time at the Ethyl Corporation, being the corporation's oldest and longest term employee, he stated it was because of his wife's insistence that "A 100% paycheck and 50% husband is preferable to a 50% paycheck and a 100% husband."

A Dr. Tyner story was told by Gil about one of their classmates who had argued he be given credit for solving a quiz problem which had been presented incompletely,

hence was without solution. Sitting patiently through it all was Dr. Tyner, the classes most liked and respected professor and the reunion's primary calling card. He smiled quietly at times, probably remembering his occasional muttering, "Please, God, help this class, and me." after a student's ridiculous gaffe or goof up almost 50 years earlier. The graduates all remembered he had said at least twice each semester, "This class is like a ton of bricks. I sometimes think I have gotten you to the top of the hill, but by the next week realize you are still at the bottom."

Some who attended the reunion insisted it was the most fun thing they had experienced in several years. Several suggested it be repeated on the 50th year after graduation. Probably what such occasions provide is a pleasing and happy subconscious return to a time of vigor, youthfulness, and optimism, with realistic expectations for a long, happy and productive future. Although consciously, it is sadly realized that after the ages of 70 and above have been reached, none of these is probably any longer truly possible. This may be why reunions and reliving earlier experiences can be so enjoyable, even cathartic.

Reported By Gilbert Brown  
Class of '56



left to right: Ruth Windom, Cathy Martinez, John Martinez, Emily Schwab, Credo Schwab, Don Windom



left to right: Dr. Block, Gil Brown, Barbara Brown, Bob Agee, Telma Agee, Mrs. Block

## Attendees and their wives:

- |                  |         |
|------------------|---------|
| 1. Robert Agee   | Telma   |
| 2. Gil Brown     | Barbara |
| 3. Jack Clement  |         |
| 4. Roland Foster | Ann     |
| 5. Saad Habbaba  |         |
| 6. Kenneth Hall  |         |
| 7. Wendell Hall  |         |
| 8. Al Leybourne  | Cecile  |
| 9. John Martinez | Cathy   |
| 10. Joe Morris   | Judy    |
| 11. Credo Schwab | Emily   |
| 12. Tom Stewart  |         |
| 13. Wally Sumner | Carmen  |
| 14. Don Windham  | Ruth    |

If you are interested in having a reunion with your graduation class, please contact Dr. Seymour Block for guidance at, [block@che.ufl.edu](mailto:block@che.ufl.edu).

# Introducing Roland Foster

*One of the Successful ChE's of the Class of '56*

Roland Foster answered the often-asked question: What do Chemical Engineers do? "We are the boundary spanners, spanning chemistry, mathematics, and physical science to help solve problems in many industries."

Roland is a good example of that definition. At Dow Chemical he helped design fluidized bed hydrochlorination reactors processing 1000 tons/day of metal oxide ore. At Peninsula Chem Research he synthesized hexamethyldisilazane; at Suntex he produced an anti-inflammatory steroid in 20 steps from a wild Mexican root; while at Husky Oil he manufactured activated carbon to purify Smirnoff Vodka and Cutty Sark Scotch. At Albany International he produced "pheromones" used to attract and destroy budworms of tobacco and boll weevils on cotton.

"Over the many years since graduation," Roland says, "I have survived fires, explosions, toxic gases, and exposure to plutonium, beryllium, fluorine, oleum, and hydrogen fluoride. Roland's career has made him a chemical engineer, chemist, entrepreneur, businessman, and consultant. He says, "I traveled to Moscow on business, to South Africa on safari, to Honolulu on business, London to New York on the Concorde, and floated down the Zambezi River amongst the hippos.

Coming to work has been an adventure every day. And best of all-its fun!"

There will be more to follow on Roland Foster and the other successful members of the class of '56 on the Chemical Engineering Web Site's Alumni section (<http://alumni.che.ufl.edu>).



## Calling All Grads

Do you envy the Class of '56, having all that fun at their reunion? You should, but you can do it too. You can come back to the old happy hunting grounds and get together with your old classmates that you haven't seen for years, and party, and party some more. You can even bring your spouses.

If you want to know how to go about it, just contact Joe Morris of '56 ([jm3631@yahoo.com](mailto:jm3631@yahoo.com)) who planned their first reunion 20 years ago, or Gil Brown ([gilfl@aol.com](mailto:gilfl@aol.com)) who planned their recent reunion. And they enjoyed that one so much they are already planning a third one. If you need help from the ChE Department, contact Seymour Block ([block@che.ufl.edu](mailto:block@che.ufl.edu)). We'll be glad to help you get started.

## Dr. Narang Joins Faculty



**Dr. Atul Narang** joined the faculty of the chemical engineering department in August, 1999. He received a BS (ChE) from the Indian Institute of Technology, Delhi, in 1985. He earned his MS (ChE) from the University of Toledo in 1989, and his PhD (ChE) from Purdue in 1994. He worked as a Research Engineer at the Amoco Research Center in Naperville, IL, until 1999.

Atul's research interests are in bacterial growth kinetics and mammalian cell movement. The goal of this work is to understand the intracellular mechanisms by which cells receive signals from the environment and respond to them by growing or moving. An understanding of these mechanisms would lead to better design of certain environmental and biotechnological systems. Atul's group has spent the last three years developing mathematical models of the intracellular mechanisms and designing experiments to test the validity of the models.

## ChE Alumni Website

Many changes have been taking place on the Chemical Engineering Website (<http://www.che.ufl.edu>). One of our newest sections is for ChE Alumni (<http://alumni.che.ufl.edu>). All of the articles you've read in this newsletter edition can now be found online. Online you will also find more pictures from the Class of '56 reunion, the full article of Roland Foster, and more updates as they become available. By February 1st 2003, we hope to expand the alumni website so that you can automatically submit your updates online and other alumni can read all about it instantly! Stay tuned to the alumni website and fill out the online form for what you would like to see on the alumni homepage. Also, please mail in the Alumni Update form with your email address so that we can let you know when we have big changes. Thanks!

-ChE Webmaster

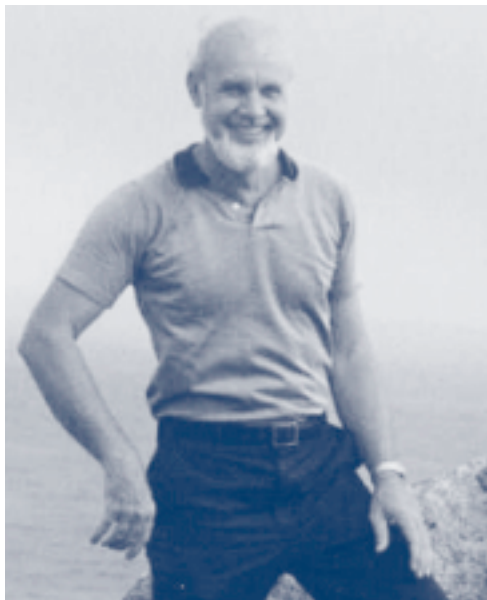
# In Memory of Don Danly

Don Danly received his PhD in 1954 under the supervision of Professor Huckaba. He enjoyed a highly successful career in industry and was a strong supporter of the department, including serving on the department's advisory board.

Dr. Danly developed electrochemical technology that revolutionized chemical processing in the late 1950's and early 1960's. His and his research and development team's technology was first commercialized by Monsanto Company in Decatur, AL in the mid 1960's. The technology to dimerize acrylonitrile to adiponitrile in an electrochemical cell was recognized by the Chemical Engineering profession in 1968 with the Kirkpatrick Award of Excellence.

This step change in chemical reaction engineering resulted in lower energy and material requirements to produce nylon 6,6 and their intermediate chemicals. It also greatly reduced byproduct production improving the environmental posture of the manufacturing processes for nylon 6,6. As the leader in this technology, numerous other electrochemical processes were later utilized by the chemical processing industry thereby conserving raw materials, reducing energy consumption, and reducing environmental pollution worldwide.

Don was the technologist's technologist. But more impor-



tantly, he was a caring soft-spoken leader who led by example. He developed people to their fullest potential, challenged their thinking, and offered a creative environment for them to excel.

His battle with cancer was an inspiration to those who worked with him over the years. He never gave up. Even in periods of severe pain and mental frustration, he offered a warm smile with a subtle sense of humor. His death in August 2002 brought together old friends from around the world and warm greetings from the many who could not attend.

Dr. Don Danly epitomized the principles of a University of Florida graduate. He was highly accepted among his peers, articulate, caring, intelligent, inquisitive, and, most importantly, appreciative of those who pushed the technical envelope. He was a devout Gator fan, counseling his Seminole and Hurricane neighbors when they would become over exuberant about their teams.

Don was an AIChE Fellow as well as Fellow of the Electrochemical Society. Notable among his many honors was his receipt of the Vittorio De Nora Award (1984) from the Electrochemistry Society.

**-Jerry Dickerson (BSCHE 1967)**

## GRACE News

The Graduate Student Association of Chemical Engineers (GRACE) was started several years ago to stimulate intellectual growth and promote fellowship among graduate students in chemical engineering. It now has a membership of nearly 90 students. GRACE held its annual research symposium in January 2002. The symposium featured several student speakers who presented papers on their research and was attended by many faculty members. An event highlight was a presentation by the new Dean of engineering, Pramod Khargonekar, who presented the best paper award to Derya Gulsen, a graduate research student working with Dr. A. Chauhan. A photo of some of the student volunteers and speakers from last year's symposium is shown to the right. The next GRACE symposium will be held in January 2003 and details can be found on the GRACE website at <http://grace.che.ufl.edu>. You are welcome to attend!



*back row left to right:* Kuide Qin, Ozgur Ozen, Nhan-Quye, Subramanian Kasi, Derya Gulsen, Rangarajan Murali, Kivanc Turcoglu, Juan Lopez-Montilla, Omar Bchir  
*front row:* Johnghoon Lee