Annual Report

Department of Chemical & Biomolecular Engineering

North Carolina State University

Academic Year 2005-2006
Dear Chemical and Biomolecular Engineering Community and Friends,

I am very pleased to greet you and report on the many exciting things happening in our Department. As always, what we value most are our people, the faculty, staff, and students who are the creative engine behind our Department. During the past academic year, we graduated 19 PhD students, the highest number our Department has produced, and placing us in the top 5 nationally. Our faculty continue to receive some of the highest national recognition of their accomplishments. In 2005, Carol Hall and Joe DeSimone were inducted into the National Academy of Engineering, Jan Genzer received the John H. Dillon Prize of the American Physical Society, and Jason Haugh received a Camille Dreyfus Teacher-Scholar Award. In 2006, Keith Gubbins was recognized with the American Chemical Society’s Joel Hildebrand Award in Theoretical Chemistry, an honor rarely awarded to a chemical engineering faculty member, Carol Hall delivered the 2006 Institute Lecture at the AICHE Annual Meeting, Joe DeSimone received the ACS Whalen Award in Business Development, Rich Spontak received the INEER Teaching Award, Orlin Velev received a Camille Dreyfus Teacher-Scholar Award, and many other faculty members received regional and local awards for their outstanding teaching and research accomplishments. We believe these accolades are reflections of the commitments to quality and excellence of our faculty and our students and we are very pleased with our recent collective successes.

Our most valuable resource is people, and our faculty are among the most important and sustained contributors. We are very pleased to welcome Professor Balaji (Bala) Rao to our Department. Bala, who arrived in August of 2006, comes to us from Dane Wittrup and Doug Lauffenburger’s groups at MIT, by way of a two-year post-doctoral appointment with Peter Zandstra at the University of Toronto. Bala’s research focuses broadly on biomolecular engineering, with an emphasis on protein and cell engineering and very specific interests in understanding and controlling the fate of human embryonic stem cells. In his short time here, Bala has already had an impact on the undergraduate curriculum, teaching CBE 446 to our seniors and making some important recommendations for introduction of additional analytical and numerical tools into our coursework. In addition, Bala was the most popular choice of our first year graduate students in selecting PhD advisors.

This past year, the Department hired two additional faculty members. Dr. Michael Dickey was our top choice in a nationwide search of over 140 applicants. He recently completed his PhD degree at the University of Texas at Austin working with Professor Grant Wilson on novel polymeric nanostructures for microelectronics applications. Michael is currently in the midst of a 18-24 month postdoctoral research appointment with George Whitesides at Harvard and will join us in 2008. In addition, the Department extended an offer to Professor Michael Flickinger of the University of Minnesota, and
Michael has accepted our offer to join us in the Fall of 2007. Professor Flickinger is the Founding Director of the Biotechnology Institute at the University of Minnesota, the Founder of the original Fermentation Laboratory at the National Cancer Institute, and the Editor of the Encyclopedia of Industrial Biotechnology. Michael will be jointly appointed as a Professor in Microbiology and in Chemical and Biomolecular Engineering and will serve as the Associate Director of Academic Programs for the Biomanufacturing Training and Education Center. The Department is very fortunate to have attracted both Michael Dickey and Michael Flickinger to join us and we look forward to their arrivals.

Professor Jason Haugh is chairing a Search Committee seeking to fill two additional faculty positions, one in Biomolecular Engineering for the Biomanufacturing Training and Education Center and a second position in any appropriate research area. The Department continues to seek to build strengths in biotechnology and biomolecular engineering, nanotechnology, molecular modeling and thermodynamics, as well as more traditional areas of transport phenomena and chemical reaction engineering, among others.

Our graduate students have also excelled over the last many months. For example, Rajendra Bhat, advised by Jan Genzer, was recognized with the 2005 Nancy Pollack PhD Dissertation Award. Xiaoyu Sun, Julie Crowe, and Angelica Sanchez (advised by Rich Spontak, Jan Genzer, and Saad Khan, respectively), were the finalists for the 2006 Richard Gilbert Award. Michelle Bowman (in Materials Science and Engineering and advised by Rich Spontak) and Tiffani Bailey (in Chemistry and co-advised by Chris Gorman and Jan Genzer) both received NOBCChE Graduate Fellowships. In our own Schoenborn Competition, recognizing the most outstanding PhD work in our Department, Arthi Jayaraman (coadvised by Carol Hall and Jan Genzer) won the oral competition in 2006, with Naresh Chenamsetty (advised by Keith Gubbins) and Dave Frankowski (advised by Saad Khan and Rich Spontak) finishing 2nd and 3rd, respectively. In the poster competition, Suk Tai Chang (advised by Orlin Velev) placed first, followed by Vinnie Verruto (advised by Peter Kilpatrick) and Sachin Talwar (advised by Saad Khan). We are very proud of our graduate students and their collective commitments to excellence.

The 2005-2006 academic year was our first full academic year in our new home, Engineering Building 1 on the Centennial Campus of NC State University, an outstanding facility that was nominated for R&D Magazine's Laboratory of the Year Award and that we share with the Department of Materials Science and Engineering. Our visitors appreciate the opportunities the new facility affords for faculty, staff, and student interactions, as well as the latest in technology-assisted education. Spring 2006 also saw the beginning of construction of the new Biomanufacturing Training and Education Center, a pilot scale facility with 63,000+ square feet of teaching labs. This facility will enable our Department and others on campus to teach cell culture production of commercial proteins and value-added products and all of the attendant unit operations, bioanalytical methods, high throughput screening methods, control, and automation skills associated with these technologies. This added capability greatly enhances our abilities.
to prepare students for important emerging and growing biochemical process and biotechnology industries.

An important development in the area of funding that will enable us to continue to expand and grow our PhD program is the endowment of several new Graduate Fellowships. Our own Professor Hubert Winston (BS NC State 1970, PhD NC State 1975) has pledged $25,000 to seed an endowment for James K. Ferrell, our Department’s very first PhD graduate in 1954, our Department Head from 1966-1980, interim Dean of our College on 3 occasions, and Hubert’s PhD thesis advisor. While Jim passed away a few years ago, his memory will live on through this outstanding gift on Hubert’s part. Several additional pledges have increased the value of the endowment.

In addition to the Ferrell Fellowship, the Milliken Foundation (the charitable arm of the Milliken and Company) contributed $100,000 to endow the Norvin Clontz Fellowship. Norvin holds two graduate degrees from our Department (’65, MS ’67, PhD ’69). Norvin devoted 34 years to Milliken and became President of the Fashion Apparel and Specialty Fabrics business and later President of the Chemicals business. Norvin was named a Distinguished Engineering Alumnus in 1996.

Russ O’Dell (’75, PhD ’78) of Raleigh has pledged $150,000 to create the Francis P. O’Dell Fellowship Endowment. He pledged $50,000 over five years and will increase funding for the Francis P. O’Dell Charitable Remainder Unitrust by $100,000 over that time period. Russ went to work for Fiber Industries in 1978 and worked a total of 23 years for Fiber Industries and its successor companies. He rose to the position of Global Manager of Technology for Hoechst Celanese. Russ has worked for the NC State Engineering Foundation since 2001 as Director of Development for our CBE department. In addition to Russ’ outstanding work as Development Director and his endowment of the O’Dell Graduate Fellowship, he has endowed the naming of several rooms within our building.

These remarkable contributions from our loyal and dedicated alumni promise to maintain and enhance the health and success of our Department, and we are very appreciative of Hubert, Russ, and the Milliken Foundation, for their generous gifts to the Department’s future.

I am optimistic about the future for the department, and I look forward to communicating to you the department’s continued growth and successes in our next annual report.

Sincerely,

Peter Kilpatrick
Head, Dept. of Chemical & Biomolecular Engineering
# Table of Contents

## Undergraduate Program
- Trends in Undergraduate Enrollment 2
- Trends in B.S. Degrees Granted 2
- B.S. Degree Recipients 3
- Undergraduate Scholarships and Awards 4
- Student Organizations and Recognition 6
- Cooperative Education Program 7
- Career Placement 8
- Photograph of May 2006 Graduates 9

## Graduate Program
- Graduate Student Enrollment – Fall 2005 10
- Trends in Graduate Enrollment 10
- Trends in M.S. Degrees Granted 10
- Trends in Ph.D. Degrees Granted 10
- Graduate Students, 2005-2006 11
- Graduate Degree Recipients 2005-2006 14
- Master of Science (M.S.) Degrees 14
- Doctor of Philosophy (Ph.D) Degrees 16
- Trends in Graduate Admissions 19
- Trends in GRE scores of Incoming Graduate Students 19
- Graduate Fellowships and Awards 20
- Research Expenditures 21
- Career Placement 22

## Faculty Activities
- Activities by Faculty Member 23
- Emeritus Faculty 63
- Faculty Awards and Honors 64
- Courses Taught 65

## Visitors and Staff
- Seminars Presented in the Department 2005-2006 66
- Visiting Researchers 68
- Departmental Staff 68

## Research Sponsors
- Department Sponsors 69
Undergraduate Program

Trends in Undergraduate Enrollment

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>1990</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. students matriculated</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>300</td>
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</table>

Trends in B.S. Degrees Granted

<table>
<thead>
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<th>Academic Year</th>
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<th>1995</th>
<th>2000</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>60</td>
<td>120</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>
B.S. Degree Recipients

Summer 2005 graduates:
Jonathan Russell Leerkes
Nathan Philip Ringwall

December 2005 graduates:
Larry Jerome Eason
Michael David Guthrie
Casey Edward Sawyer
Katherine Randall Schadel
Ryan Warwick Sharkey
Sidney Joseph Usry
Brad Urban

May 2006 graduates:
Emily Dawn Aldridge
Mary Constance Andrews
Paul Thomas Antalik
Jeffrey Steven Brumbaugh
Leslie Ann Burke
Anthony John Caronna
Patrick James Cleary
Mesha Nicole Covington
Carl Alan Cox
Jennifer Dawn Filipowski
Aaron Lawrence Fipps
Ryan Kiser Franks
Meredith Rachel Fulp
Benjamin T. Godfrey
Emily Ann Harrell
Maryn Lee Heermann
Adam William Helsel
Eric Francis Hickman
Gina Marie Hicks
Adam Lee Hoffman
Steven Louis Horvath
Brett Alyn Howell
Katherine Marie Jones
Kevin C. Joyner
Tarik Ali Khan
Margaret Corrinne Linak

Nicholas C. Linn
Brian Thomas Lopatka
William Charles Miatke
Robert Odell Moorefield
Charlie Joseph Hunter Plemons
Samuel Chesson Price
Naityl Ahmad Rashid
Daniel Steven Roten
Brandon Alex Sandy
Jeremy Robert Schwartz
David Brandon Sessoms
Marc Retzer Sloan
Jessica Kelly Stewart
John Karl Stuhmer
Roy Reid Todd
Erin Bass Trimble
Mark Csaba Troester
Devudatta Sanjay Warhadpande
Katherine Jean Watlington
Jerrid Trent Watts
Douglas Neal Way
Sara Rose Welter
Jessica Elizabeth Willems
Pui Lam Yeung
Stephen Charles Young
Robert H. Zehr

1 Double Major
* Cum Laude
** Magna Cum Laude
*** Summa Cum Laude

Statistics

B.S. degrees awarded 61
Double majors 28
Degrees w/ academic distinction 40
Scholarships —2005-2006

ADC Scholarship
Renee Nobles

Alumni Loyalty
Samia Ilias
Lauren Crumpler

Alumni Loyalty Transfer
Kevin Brown

Angelo
Madeha Baqai
Julian Willoughby

Beckman
Corey Allen
Renee Nobles

Ben Franklin
Heather Carroll
Patrick Cleary
Henryk Orlin
Katherine Watlington

Billie Richardson
Madeha Baqai

Boeing
Shannadora Hollis

Caldwell
Aria Behrouzi
Austin Kizzie
Esmeralda Luna
Allison Smith
Jessica Stewart
Cary Strickland
Sara Welter

Clark
Megan Maltai

Daniels
Justin Smith

Dean’s Merit
Ashley Forte
Katherine Fraley
Andrew Covington
Brandon Fincher
Samia Ilias
Chase Nichols
Jessica Stewart

Eastman
Stacy Fields

Engineering Senior Award nominee for Scholarly Achievement
Brett Howell

Engineering Senior Award for Leadership
Robert Moorefield

Engineering Senior Award for Service and Citizenship
Margaret Linak

Engineering Senior Award nominee for Humanities
Jessica Stewart

Exxon
Lauren Crumpler

Fluor Daniel
Carl Cox
Erin Trimble

Forest O. & Sandra Mixon -BS&T
Michael Akerman

Forest O. & Sandra Mixon - RTI
Cheng Lu
Frank and Doris Culberson
   Elizabeth Nance

Henry B. & Virginia Smith
   Katherine Schadel

Henry and Nancy Thomas
   Michael Stewart

Hoffman
   Robert Bradley
   Henryk Orlin

Homeland Defense
   Samia Ilias

Jackson
   Halid Kapanski

James & Laura Johnson
   Stephen Young

Jenkins
   Christine Watson

Johnny Pearson
   Mary Guthrie

Michael B. Christie
   Mesha Covington

Mitchell

National Starch & Chemical
   Lisa Darnell
   Megan Maltais

NCAMP
   Oscar E. Faria

Park
   Jeffrey Brumbaugh
   Margaret Linak
   Brian Lopatka

Robert Moorefield
   Katherine Watlington
   Katherine Fraley
   Ashley Forte

Progress Energy
   Brittany Lanier

Richard M. Jones
   Brandon Fincher

Robert Byrd
   Lauren Crumpler

Russ O’Dell
   Mary Andrews

Russ O’Dell Outstanding Sr Award
   Gina Hicks

Sidney F. Mauney, Jr.
   Lisa Darnell

State Employees Combined Campaign
   Mohamed Seyam

William Jackson Goodrum
   Samuel Rivera
Student Organizations and Recognition

AIChE Student Chapter

*Officers 2005-2006*
President: Megan Maltais
Vice-President: Corey Allen
Corresponding Secretary: Adam Helsel
Treasurer: Leighton Burton
Recording Secretary: Jeremy Schwartz
Chapter Advisor: Dr. John van Zanten

*Activities*
- Membership of 148 students.
- Company sponsored luncheons, fall and spring.
- 20 students attended the national AIChE meeting (November 2005)
- 25 students attended the Southern Regional Student Chapter Meeting in Starkville, MS (March 2006).
- 3 students competed in the Southern Region Student Paper Contest.
- Maintained a powerful website for easy access to information.
- Won 2004-05 Outstanding Student Chapter Award from National AIChE.
- Recognized by AIChE for 10 consecutive years as outstanding chapter
- Expanded community service program.

ISPE Student Chapter

*Officers 2005-2006*
President: Shannon Manning
Vice-President: Lisa Darnell
Secretary: Ryan Hill
Treasurer: Jennifer Lauria
Chapter Advisors: Drs. Steven Peretti, Chris Daubert

*Activities*
- Mentoring undergrads
- Tutoring ChE 205 students
- Assistance with Open House
- Annual Induction ceremony and social
- TA Award (winner Johnny Maury-Evetz)

Chemical Engineering Honors Society
(Beta Omicron Chapter of Omega Chi Epsilon)

*Officers 2005-2006*
President: Tarik Khan
Vice-President: Emily Harrell
Secretary: Lisa Darnell
Treasurer: Samia Ilias
Chapter Advisor: Dr. Peter Kilpatrick

*Activities*
- Mentoring undergrads
- Tutoring ChE 205 students
- Assistance with Open House
- Annual Induction ceremony and social
- TA Award (winner Johnny Maury-Evetz)
Cooperative Education Program

A sound curriculum that combines theoretical and practical training in chemical engineering principles and design coupled with professional work experience is the basis of NC State’s Cooperative Education Program. The Cooperative Education Program at NC State provides outstanding undergraduates with terms of full-time study interspersed with up to five semesters and summer sessions of full-time engineering-related employment.

During the past year, 42 chemical engineering majors participated in the Co-op program. The students are full-time employees of the sponsoring company during their terms of work. During 2005-2006, the average monthly salary for Co-op chemical engineers during their first work rotation was $2,621. A high percentage of Co-op students receive offers of professional employment after graduation. Approximately 350 employers in North Carolina and throughout the nation participate in the Co-op program, thus providing a good cross-section of opportunities for industrial experience.

1. WILLIE JAMES BARTON DUPONT – RICHMOND, VA
2. JOSHUA MICHAEL BEATTY HONEYWELL – RICHMOND, VA
3. LAURA ELIZABETH BLACKWELL GLAXO SMITH KLINE - RTP
4. ANDREW SCOTT BOULTON HONEYWELL – RICHMOND, VA
5. LINDA ANN BRUNER NAT’L STARCH & CHEMICAL – SALISBURY, NC
6. SETH FRANKLIN CARTER NATIONAL GYPSUM – CHARLOTTE, NC
7. ABBE NICOLE COLLINS BEKAERT – RTP
8. LAUREN BLAIR CRUMPLER DOW CHEMICAL – HOUSTON, TX
9. LISA HELEN DARNELL WYETH VACCINES – SANFORD, NC
10. STEVEN JACOB DAVIS WEYERHAEUSER – BENNETTSVILLE, SC
11. JESSE DAYSTAR MEAD WESTVACO
12. EUGENE OSAMU FAHING PERFORMANCE FIBERS – MONCURE, NC
13. DANE ASHTON GRISMER NATIONAL GYPSUM – CHARLOTTE, NC
14. JEREMY ALLAN HADDOCK MEAD WESTVACO – CHILlicothe, OH
15. MARK WILLIAM HEMPEL BIOGEN IDEC – RTP
16. MEGHAN RUSSELL HOWARD DOW CHEMICAL – MIDLAND, MI
17. ANDRESSA VERNALHA HUNGRIA HERsHEY – HERsHEY, PA
18. CHRISTOPHER LEE IMBUS HONEYWELL – RICHMOND, VA
19. ERIN ELIZABETH IRONS NAT’L STARCH & CHEMICAL – SALISBURY, NC
20. HALID KOPANSKI DUPONT – RICHMOND, VA
21. ANDREW ROBERT LAGRANGE NATIONAL GYPSUM – CHARLOTTE, NC
22. HENRY TENTZI LAN NAT’L STARCH & CHEMICAL – SALISBURY, NC
23. CHENG LU PHILIP MORRIS – RICHMOND, VA
24. SHANNON VANN MANNING WYETH VACCINES – SANFORD, NC
25. MATTHEW CURTIS MARKLAND NAT’L STARCH & CHEMICAL – SALISBURY, NC
26. JUSTIN NEWTON MCKENZIE EASTMAN CHEM. COMPANY – KINGSPORT, TN
27. VALERIA ALEJANDRA MEJIA DOW CHEMICAL – HOUSTON, TX
28. CARLA V MEJIA GLAXO SMITH KLINE – RTP
29. ALETA HOPE METZLER NAT’L STARCH & CHEMICAL – SALISBURY, NC
30. RENEE ELIZABETH MITCHELL DUPONT – WILMINGTON, DE
31. JASON BENJAMIN O’NEAL DUPONT – RICHMOND, VA
32. WESLEY THOMAS O’NEAL GILEAD SCIENCE – DURHAM, NC
33. CHARLIE JOSEPH HUNTER PLEMMONS NOVOZYMES – FRANKLINTON, NC
34. DANIEL STEVEN ROTEN PHILIP MORRIS – RICHMOND, VA
35. NICOLE MARIE SEABROOK BIOGEN IDEC – RTP
36. THOMAS GREEN SINODIS BIOGEN IDEC – RTP
37. CHADWICK FOSTER THOMPSON NOVOZYMES – FRANKLINTON, NC
38. JARROD ANTHONY TUCKER MEAD WESTVACO – COVINGTON, VA
39. CHRISTOPHER MICHAEL WHITE WEYERHAEUSER – BENNETTSVILLE, SC
40. STEPHEN CHARLES YOUNG WEYERHAEUSER – BENNETTSVILLE, SC
41. BRENNON QUAY YOUNGBLOOD EASTMAN CHEM. COMPANY – KINGSPORT, TN
42. DANIELLE ANN ZIMMERMAN NOVOZYMES – FRANKLINTON, NC
Career Placement

Employers Participating in On-Campus Interviews for CBEs (BS level) for 2005-2006 academic year. (*) indicates also attended Engineering Career Fair seeking CBEs (BS level).

Accenture
Ajinomoto Aminoscience LLC
Albemarle Corporation
Alliant Techsystems Inc.
Apex Systems Inc.
Babcock & Wilcox Company
Baxter HealthCare Corporation
Blackbaud, Inc.
*Caterpillar, Inc.
Cerner Corporation
Cintas Corporation
Deloitte
Dupont
Eastman Chemical Company
Elkay Manufacturing Company
Energizer Holdings, Inc.
ExxonMobile
Fuji Silysia Chemical USA
GAF Materials Corporation
*General Electric Company
Georgia-Pacific Corporation
Gerdau Ameristeel
GlaxoSmithKline
Goodyear
Hale Enterprises, Inc.
*Halliburton
Heat Transfer Sales of the Carolinas
Hercules, Inc.
IBM
*Infosys Technologies Ltd.
International Paper
Lincoln Electric
*MeadWestvaco Specialty Chemicals
Michelin North America
*Milliken & Company
Nalco
Naval Surface Warfare Ctr/Carderock
*O’Brien & Gere
Procter & Gamble
Progress Energy Corporation
Rayonier
Rhodia
Robert E. Mason Company
Samsung Austin Semiconductor
*Schlumberger
Tencarva Machinery Company
Toshiba Business Solutions, Carolinas

Trane
Trinity Consultants
Tyco Engineered Products & Services
UOP
US Air Force
US Patent & Trademark Office
USFilter Kruger Products
W.R. Grace
Whitman, Requardt and Associates, LLP
York International Corporation
*3V Inc.

Employers Participating in Engineering Career Fair Seeking CBEs (BS Level) 2006, but not included in list above

ARCADIS G&M of North Carolina, Inc.
AREVA Framatome ANP, Inc.
Bechtel Bettis, Inc.
CEI, Inc.
Central Intelligence Agency
Corning Cable Systems
Coty
Cree
Duke Energy Corporation
ENSR International
Hewlett Packard
Jacobs Engineering Group, Inc.
Merck & Company, Inc.
Mohawk Industries
Nan Ya Plastics Corporation America
NAVAIR
NNE
Novo Nordisk Pharmaceutical Industries, Inc.
Teach For America
U.S. Nuclear Regulatory Commission
Unifi, Inc

Avg NCSU B.S. starting salary: $57,507
Avg national B.S. starting salary: $56,549
May 2006 Chemical & Biomolecular Engineering Graduating Class
Graduate Program

The graduate program consists of both formal (classroom) educational activities and a research experience.

Graduate Student Enrollment
-Fall 2005

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>M.S. Candidates</td>
<td>15</td>
</tr>
<tr>
<td>Ph.D. Candidates</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
</tr>
<tr>
<td>Men</td>
<td>77</td>
</tr>
<tr>
<td>Women</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
</tr>
<tr>
<td>U.S. Citizens</td>
<td>59</td>
</tr>
<tr>
<td>Foreign</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
</tr>
</tbody>
</table>

The foreign students come from 12 countries: Bangladesh, China, Egypt, France, Indonesia, Jordan, Kuwait, India, Korea, Taiwan, Turkey, and Venezuela.

Trends in M.S. Degrees Granted

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
</tr>
<tr>
<td>2000</td>
<td>10</td>
</tr>
<tr>
<td>2005</td>
<td>15</td>
</tr>
</tbody>
</table>

Trends in Graduate Enrollment

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>40</td>
</tr>
<tr>
<td>1995</td>
<td>80</td>
</tr>
<tr>
<td>2000</td>
<td>120</td>
</tr>
<tr>
<td>2005</td>
<td>160</td>
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Trends in Ph.D. Degrees Granted

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<th>Number</th>
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<tbody>
<tr>
<td>1990</td>
<td>2</td>
</tr>
<tr>
<td>1995</td>
<td>4</td>
</tr>
<tr>
<td>2000</td>
<td>6</td>
</tr>
<tr>
<td>2005</td>
<td>8</td>
</tr>
</tbody>
</table>
## Graduate Students, 2005-2006

<table>
<thead>
<tr>
<th>Student</th>
<th>Major Professor</th>
<th>Undergraduate School</th>
<th>Matriculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberg, Chris</td>
<td>Spontak</td>
<td>U of Maryland</td>
<td>Fall 2004</td>
</tr>
<tr>
<td>Aguda, Remil</td>
<td>Kilpatrick</td>
<td>U of the Philippines</td>
<td>Fall 2004</td>
</tr>
<tr>
<td>Ahmed, Tamer</td>
<td>DeSimone/Roberts</td>
<td>Cairo University</td>
<td>Fall 2002</td>
</tr>
<tr>
<td>Akad, Aysa</td>
<td>Hall</td>
<td>Bogazici University</td>
<td>Fall 2000</td>
</tr>
<tr>
<td>Arifuzzaman, Shafi</td>
<td>Genzer</td>
<td>Bangladesh University</td>
<td>Fall 2004</td>
</tr>
<tr>
<td>Auernik, Kate</td>
<td>Kelly</td>
<td>Notre Dame</td>
<td>Fall 2004</td>
</tr>
<tr>
<td>Azeez, Fadhel</td>
<td>Fedkiw</td>
<td>Kuwait University</td>
<td>Fall 2003</td>
</tr>
<tr>
<td>Bain, Eric</td>
<td>Genzer</td>
<td>U of Alabama</td>
<td>Fall 2005</td>
</tr>
<tr>
<td>Barua, Dipak</td>
<td>Parsons/Osburn</td>
<td>Bangladesh</td>
<td>Fall 2003</td>
</tr>
<tr>
<td>Bhatt, Ketan</td>
<td>Velev</td>
<td>BITS-Pilani</td>
<td>Fall 2001</td>
</tr>
<tr>
<td>Bhat, Rajendra</td>
<td>Genzer</td>
<td>UDCT</td>
<td>Fall 1999</td>
</tr>
<tr>
<td>Bhattacharya, Supriyo</td>
<td>Gubbins</td>
<td>IIT, Kharagpur</td>
<td>Fall 2000</td>
</tr>
<tr>
<td>Braxton, Jonathan</td>
<td>Grant</td>
<td>USC</td>
<td>Fall 2004</td>
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<tr>
<td>Cain, Nathaniel</td>
<td>Roberts</td>
<td>VCU</td>
<td>Fall 2004</td>
</tr>
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<td>Chang, Alan</td>
<td>Carbonell/DeSimone</td>
<td>UVA</td>
<td>Fall 2000</td>
</tr>
<tr>
<td>Chang, Suk Tai</td>
<td>Velev</td>
<td>Kwangju</td>
<td>Fall 2003</td>
</tr>
<tr>
<td>Chennamsetty, Naresh</td>
<td>Gubbins</td>
<td>IIT, Madras</td>
<td>Fall 2000</td>
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<td>Kelly, M. Jason</td>
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# Graduate Students, 2005-2006

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<th>Student</th>
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<td>Kloxin, Chris</td>
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<td>Prevo, Brian</td>
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<td>Rastogi, Vinayak</td>
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<td>Sanchez, Angelica</td>
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<td>Weaver, Juan</td>
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## Graduate Students, 2005-2006

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</table>
Graduate Degree Recipients 2005-2006

Master of Science (M.S.N.) Degrees

August 2005

Elizabeth L. Morgan
(Course Only)
(Saad Khan)
B.S., N.C. State University

Lindsey B. Jerrim
(Course Only)
(Orlin Velev)
B.S., Clemson University
Ph.D. Program, N.C. State

December 2005

Suk Tai Chang
(Course Only)
(Orlin Velev)
B.S., Chung-Ang University
M.S., Kwangju Institute of Science & Technology
Ph.D. Program, N.C. State

Young Kuk Jhon
(Course Only)
(Jan Genzer)
B.S., Yonsei University
Ph.D. Program, N.C. State

Amit Goyal
(Course Only)
(Carol K. Hall/Orlin Velev)
B.S., I.I.T., Roorkee, India
Ph.D. Program, N.C. State

Erin Phelps
(Course Only)
(Carol K. Hall)
B.S., Rose-Hulman
Ph.D. Program, N.C. State

J. Morgan Harris
(Course Only)
(Robert M. Kelly)
B.S., N.C. A&T University
Ph.D. Program, N.C. State

L. Anderson Strickland
(Course Only)
(Carol K. Hall)
B.S., Univ. of South Carolina
Ph.D. Program, N.C. State

Caryn L. Heldt
(Course Only)
(Ruben G. Carbonell)
B.S., Michigan Tech
Ph.D. Program, N.C. State

Sachin Talwar
(Course Only)
(Saad Khan)
B.S., I.I.T., Roorkee, India
Ph.D. Program, N.C. State

M. Omon Herigstad
(Course Only)
(Ruben G. Carbonell)
B.S., Colorado State University
Ph.D. Program, N.C. State

Vincent J. Verruto
(Course Only)
(Peter K. Kilpatrick)
B.S., University of Delaware
Ph.D. Program, N.C. State
Master of Science (M.S.N.) Degrees

May 2006
Xiaoyu Sun
(Course Only)
(Richard J. Spontak)
B.S., Tsinghua University
M.S., Tsinghua University
Ph.D. Program, N.C. State

Master of Science (Distance Ed)

December 2005
Jason M. Bruce
(Saad Khan)
B.S., N.C. State
BIOGEN

Jeffrey L. Woodhead
(Course Only)
(Carol K. Hall)
B.S., Vanderbilt University
Ph.D. Program, N.C. State

Lawrence David Keyes
(Saad Khan)
B.S., Nat’l Technological
CIBA Vision, Duluth, GA

Master of Science (M.S.T.) Degrees

December 2005
Fadhel Azeez
Transport Properties of Lithium Bis-
(Oxalato) Borate-based Electrolyte for
Lithium-ion Cells
(Peter S. Fedkiw)
B.S., Kuwait University
Ph.D. Program, N.C. State

May 2006
Effy Karunia Oliver
(Saad Khan)
B.S., Univ. of Alabama,
Huntsville
Diosynth, RTP, NC

Chun-Chao Wang
Crosstalk between phosphoinositide
3-kinase and extracellular signal-
regulated kinase pathways in platelet-derived
growth factor receptor-mediated signaling
(Jason M. Haugh)
B.S., Nat’l Taiwan University
M.S., Nat’l Tsing Hua University
Ph.D. Program, N.C. State

Ronald M. Shewchuk
(Saad Khan)
B.S., Lakehead University,
Thunder Bay, Ontario, Canada
Mitsubishi Chemical America
Chesapeake, VA
Doctor of Philosophy (Ph.D.) Degrees

August 2005

Jaehoon Kim
Deposition of Thin Organic and Metal Films from Carbon Dioxide by Free Meniscus and Solvent Displacement Methods
(Ruben G. Carbonell and Joseph M. DeSimone)
B.S., Hanyang University, Seoul, Korea
M.S., Hanyang University, Seoul, Korea
Post-doc, N.C. State

Matthew R. Johnson
Microbial Physiology and Ecology of Hyperthermophilic Microorganisms
(Robert M. Kelly)
B.S., Cornell University
Wyeth, Sanford, NC

Kie Jin Park
The Atomic Layer Deposition of Noble Metals for Microelectronics Applications
(Gregory N. Parsons)
B.S., Pusan Nat’l University, Pusan, Korea
M.S., Pusan Nat’l University, Pusan, Korea
Post-doc, N.C. State

December 2005

Rajendra R. Bhat
Tailoring adsorption of synthetic nanoparticles and biological species by means of surface-grafted molecular and macromolecular gradient assemblies
(Jan Genzer)
B.S., University Department of Chemical Technology, University of Mumbai

Changwoong Chu
Fabrication and Characterization of Electrical Contacts for Charge Transport Study in Molecular Electronics
(Gregory N. Parsons)
B.S., Kyunghee University
M.S., KAIST
Samsung Electronics, South Korea

Ian Schneider
Engineering analysis of spatial gradient sensing in platelet-derived growth factor-stimulated fibroblasts
(Robert M. Kelly)
B.S., Iowa State University
The Scripps Research Institute, LaJolla, CA

Michael Tomlinson
Surface-grafted polymer and copolymer assemblies with gradient in molecular weight and composition
(Jan Genzer)
B.S., Auburn University
Doctor of Philosophy (Ph.D.) Degrees

May 2006

**Supriyo Bhattacharya**
Molecular Models for Templated Mesoporous Materials: Mimetic Simulation and Gas Adsorption
(Keith E. Gubbins)
B.S., Indian Institute of Technology, Kharagpur, India

**Christopher J. Kloxin**
Investigating Aqueous PEO-PPO-PEO Triblock Copolymer Dispersion Dynamics with Colloidal Sphere Thermal Motion
(John H. van Zanten)
B.S., Univ. of Colorado

**Naresh Chennamsetty**
Molecular Simulation of Surfactant Self-assembly: From Mesoscale to Multi-Scale Modeling
(Keith E. Gubbins)
B.S., Indian Institute of Technology, Madras, India

**Alexander J. Marchut**
Simulation of Polyglutamine Aggregation with an Intermediate Resolution Protein Model
(Carol K. Hall)
B.S., Univ. of Pennsylvania
Bristol Myers Squibb, New Brunswick, NJ

**Aysa L. Galbraith**
Phase Equilibria of Diatomic Lennard-Jones Molecules Using Monte Carlo Simulation
(Carol K. Hall)
B.S., Bogazici University, Istanbul, Turkey

**Brian G. Prevo**
Engineered Deposition of Functional Coatings from Micro- and Nanoparticles Using Convective Assembly
(Orlin D. Velev)
B.S., Univ. of California, Davis, California
Post-doc, Univ. of California Santa Barbara, California

**Arthi Jayaraman**
Computer Simulation Studies of Pattern Recognition in Biomimetic Polymers
(Carol K. Hall and Jan Genzer)
B.S., Birla Institute of Technology and Science, Pilani
Post-doc, University of Illinois, Urbana Champaign, Urbana, IL

**David B. Terry**
A Holistic Investigation of Alternative Gate Stack Materials for Future CMOS Applications
(Gregory N. Parsons)
B.S., University of North Carolina, Wilmington, NC

**M. Jason Kelly**
Reactions of High-k Gate Dielectrics: Studies in Hafnium, Zirconium, Yttrium, and Lanthanum-based Dielectrics and in-situ Infrared Results for Hafnium Dioxide Atomic Layer Deposition
(Gregory N. Parsons)
B.S., Case Western University
Post-doc, N.C. State
Doctor of Philosophy (Ph.D.) Degrees

May 2006

Bin Wei

Modification of Polymer/Polymer Interfaces
Using Block Copolymers and Microgels
(Richard J. Spontak/Jan Genzer)
B.S. Zhejiang University
M.S., Zhejiang University
National Starch & Chemical Co.
Bridgewater, NJ
# Graduate Fellowships and Awards, 2005-2006

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<th>Alumni Association</th>
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<td>Jeremy Immer</td>
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<th>National Science Foundation</th>
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<td>Laura Beth Dong</td>
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<td>Kate Auernik</td>
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<td>Adam Melvin</td>
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<td>Victoria Wagoner</td>
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Research Expenditures

The following graph illustrates the trends in total expenditures from research grants and contracts (not including academic faculty salaries or discretionary funds). These expenditures reflect faculty summer salaries, release time, student salaries (both graduate and undergraduate performing research), equipment, supplies, services, printing, postage, and other operational costs related to research.

CBE Contract and Grant Expenditures

![Graph showing CBE Contract and Grant Expenditures from 1990 to 2006.](image-url)
Career Placement

Employers recruiting MS/PhD students in 2005-2006 academic year

Accenture
ARCADIS G&M of North Carolina, Inc.
AREVA Framatome ANP, Inc.
Bayer Material Science
Bechtel Bettis, Inc.
Blackbaud, Inc.
CEI, Inc.
Central Intelligence Agency
Cerner Corporation
Clariant
Coty
Cree
Deloitte
Duke Energy Corporation
Dupont
Eastman Chemical Company
Elkay Manufacturing Company
ENSR International
Ethos Group
Exxon Mobil
GE Plastics
General Electric Company
GlaxoSmithKline
Hale Enterprises, Inc.
Hercules, Inc.
Hewlett Packard
IBM
Jacobs Engineering Group, Inc.
Johns Manville Technical Center
Lincoln Electric
Merck & Company, Inc.
Michelin North America
Milliken & Company
Mohawk Industries
Naval Surface Warfare Ctr/Carderock
NAVAIR
NNE
Novo Nordisk Pharmaceutical Industries, Inc.
O’Brien & Gere
Procter & Gamble
Progress Energy Corporation
Samsung Austin Semiconductor

U.S. Nuclear Regulatory Commission
US Patent & Trademark Office
UT Space Institute
VA Tech-Wake Forest Univ. School of
Biomedical Eng. & Sciences
3V, Inc

NACE Salary Averages

M.S. $63,875
Ph.D. $70,738
Faculty Activities

The Chemical Engineering faculty at North Carolina State University is an outstanding group of teacher-scholars whose interests encompass most areas of research in chemical engineering. The faculty have strong research associations with not only the traditional academic funding groups in the federal government — NSF, DOE, ARO, NIH, DARPA and others — but also with a number of major corporate sponsors, including DuPont, Mobil Oil, Bayer Corporation, Novo Nordisk, Shell Oil, Exxon, Chevron, Texaco, Hoechst-Celanese, 3M, and Eastman Chemical.

Chemical engineering education has always had a high priority in our department, and our faculty feels a strong sense of responsibility to provide a high quality educational experience for our undergraduate and graduate students. The Department takes great pleasure in providing a scholarly environment where our faculty can develop a balanced approach towards excellence in both teaching and research.

Chemical Engineering Faculty

Lisa G. Bullard, Lecturer and Coordinator of Undergraduate Advising (919/515-7455); PhD, Chemical Engineering, Carnegie Mellon University (1991); multidisciplinary process design, teaching effectiveness, advising, educational outreach to K-12. [lisa_bullard@ncsu.edu]

Ruben G. Carbonell, Frank Hawkins Kenan Distinguished Professor, Co-director of NSF Science and Technology Center for Environmentally Responsible Solvents and Processes, Director of the William R. Kenan Jr. Institute for Engineering, Technology and Science, and Director of the Kenan Center for Utilization of CO2 in Manufacturing (919/515-5118); PhD, Chemical Engineering, Princeton University (1973); biochemical engineering, molecular recognition, bioseparations, immunodiagnostics, colloid and interface science, transport phenomena. [ruben@ncsu.edu]

Joseph M. DeSimone, Co-director of NSF Science and Technology Center for Environmentally Responsible Solvents and Processes and William R. Kenan, Jr. Professor (joint with Department of Chemistry, UNC-Chapel Hill) (919/962-2166); PhD, Polymer Chemistry, Virginia Tech (1990); polymer chemistry and physics, chemistry in compressed media, design of interfacially active agents for near and supercritical fluids, environmentally benign solvents for industrial processes. [desimone@unc.edu]

Peter S. Fedkiw, Associate Department Head and Professor (919/515-3572); PhD, Chemical Engineering, University of California, Berkeley (1978); electrochemical reaction engineering; electrocatalysis, environmental applications of electrochemistry. [fedkiw@eos.ncsu.edu]

Jan Genzer, Associate Professor (919/515-2069); PhD, Materials Science and Engineering, University of Pennsylvania (1995); physics of thin polymer films, interfacial polymer science, morphology control of heterophase polymers, structure/formation of polymer-based nanocomposites. [jan_genzer@unity.ncsu.edu]

Christine S. Grant, Associate Professor (919/515-2317); PhD, Chemical Engineering, Georgia Institute of Technology (1989); surface and interfacial science, mass transfer, environmental engineering, green chemistry. [grant@eos.ncsu.edu]

Keith E. Gubbins, H. Clark Professor (919/513-2262); PhD, Chemical Engineering, University of London (1962); molecular modeling of nanostructured materials, thermodynamics and rate processes in nanoporous and structured materials. [keg@ncsu.edu]

Carol K. Hall, Alcoa Professor (919/515-3571); PhD, Physics, SUNY Stony Brook (1973); molecular thermodynamics and computer simulation, equations of state, polymer modeling, bioseparations, protein folding. [hall@turbo.che.ncsu.edu]

Jason Haugh, Assistant Professor (919/513-3851); PhD, Chemical Engineering, Massachusetts Institute of Technology (1999); signal transduction networks, intracellular processes, biomedical engineering, theoretical biology. [jason_haugh@ncsu.edu]

Robert M. Kelly, Alcoa Professor (919/515-6396); PhD, Chemical Engineering, NC State University (1981); biochemical engineering, biocatalysis at extremely high temperatures, microbial physiology, enzyme engineering. [rmkelly@eos.ncsu.edu]
Saad A. Khan, Professor and Director of Graduate Program (919/515-4519); PhD, Chemical Engineering, MIT (1985); rheology and microstructure of complex materials - gels, suspensions, associative and biopolymers. [khan@eos.ncsu.edu]

Peter K. Kilpatrick, Professor and Head (919/515-7121); PhD, Chemical Engineering, University of Minnesota (1983); surfactant and interfacial science, fluid microstructure, colloidal aggregates, phase equilibria, biotechnology. [peter-k@eos.ncsu.edu]

H. Henry Lamb, Associate Professor (919/515-6395); PhD, Chemical Engineering, University of Delaware (1988); kinetics, catalysis, electronic materials processing, surface science. [lamb@eos.ncsu.edu]

P. K. Lim, Professor (919/515-2328); PhD, Chemical Engineering, University of Illinois (1979); interfacial phenomena, homogeneous catalysis, free radical chemistry. [lim@eos.ncsu.edu]

David F. Ollis, Distinguished Professor (919/515-2329); PhD, Chemical Engineering, Stanford (1969); biochemical engineering, photochemical engineering. [ollis@eos.ncsu.edu]

Michael R. Overcash, Professor (919/515-2325); PhD, Chemical Engineering, University of Minnesota (1972); cleaner manufacturing technologies, pollution prevention, and environment. [overcash@eos.ncsu.edu]

Gregory N. Parsons, Professor (919/515-7553); PhD, Physics, NC State University (1990); surface reactions and chemical processes in electronic materials synthesis, bonding structure and electronic properties of inorganic semiconductors and insulators, physics of thin film devices. [parsons@ncsu.edu]

Steven W. Peretti, Associate Professor (919/515-6397); PhD, Chemical Engineering, California Institute of Technology (1986); metabolic characterization and manipulation. [peretti@eos.ncsu.edu]

George W. Roberts, Director of Graduate Recruiting, Professor (919/515-7328); ScD, Chemical Engineering, MIT (1965); chemical reaction engineering, applied catalysis, chemical reactor analysis and design, pollution prevention and control, alternate fuels. [groberts@eos.ncsu.edu]

Richard J. Spontak, Professor (joint with Materials Science and Engineering) (919/515-4200); PhD, Chemical Engineering, University of California at Berkeley (1988); polymer microscopy and scattering, morphology/property design and characterization of nano/microstructured polymers and polymer nanocomposites, polymer physics. [rich_spontak@ncsu.edu]

John H. van Zanten, Assistant Professor (919/515-2520); PhD, Chemical Engineering, University of California at Los Angeles (1992); colloidal and macromolecular physics, biophysical phenomena, light, neutron and x-ray scattering. [john_vz@ncsu.edu]

Orlin Velev, Assistant Professor (919/513-4318); PhD, Physical Chemistry, University of Sofia and Bulgarian Academy of Sciences (1996); colloid science and engineering, colloidal interactions, self-assembly and crystallization, nano- and microstructures with photonic, optical and electrical functionality, biosensors. [odvelev@unity.ncsu.edu]

Anka Veleva, Assistant Research Professor (919/515-7176); PhD, Physical Chemistry, Bulgarian Academy of Sciences (1993); biomaterials, tissue engineering of vascular grafts, design of biomimetic surfaces, cell-based bioassays, clinical diagnostics. [anveleva@unity.ncsu.edu]
Activities by Faculty Member

Bullard, Lisa
Lecturer and Director of Undergraduate Studies
B.S. North Carolina State University (1986)

(919) 515-7455
lisa_bullard@ncsu.edu

Interests: Multidisciplinary process design, teaching effectiveness, advising, educational outreach to K-12.

Published (Refereed)


Contributed Presentations


Carbonell, Ruben G.
Frank Hawkins Kenan Distinguished Professor
Director, William R. Kenan, Jr. Institute for Engineering,
Technology & Science
Co-Director, NSF Science and Technology Center for Environmentally Responsible Solvents and Processes
B.S. Manhattan College (1969)
Ph.D. Princeton University (1973)

Interests: Biochemical engineering; molecular recognition; bioseparations; immunodiagnosics; colloid and interface science; transport phenomena

2005-2006 Publications

Published (Refereed)


Invited Presentations

Recovery of Biological Products XII Conference, Phoenix, Arizona, April 2- April 7, 2006. Chaired session on Designing Separations Based on Fundamental Structural or Sequence Information. Presented a poster on Hexamer Peptide Affinity Resins that Bind the Fc Region of Human Immunoglobulin G (with H. Yang and P.V. Gurgel)

8th Conference on Supercritical Fluids and Their Applications, Ischia, Italy, May 28- 31, 2006. Presented three papers: Modeling Solubility Isotherms and Sorption Kinetics of Supercritical Carbon Dioxide in Initially Glassy Polymers (oral, with V. Carla, G. Sarti and F. Doghieri); A New CO₂ Anti-Solvent Precipitation Process to Control the Morphology of Drug Microparticles (poster, with A. Chang, D. Larobina); Influence of the Operational Conditions on Particle Size and Morphology in a Conventional SEDS Process (oral, with A. Chang, D. Larobina).


AIChE Meeting, Cincinnati, Oct. 30 – Sept. 4: Chaired session on Polymer Processing Using High Pressure Fluids, and presented a paper on Particle Formation from Supercritical Fluids (with A. Chang and D. Larobina).
Fedkiw, Peter S.  
Professor                                        (919) 515-3572 
B.S. University of Delaware (1974)                  fedkiw@eos.ncsu.edu  
Ph.D. University of California, Berkeley (1978)     

Interests: Electrochemical reaction engineering; electrocatalysis; environmental applications of electrochemistry

2005-2006 Publications

Published (Refereed)


Contributed Presentations


“LiBOB Based Electrolyte for Li Ion Batteries,” 208th Electrochemical Society Meeting, Los Angeles, October 2005 (with Yangxing Li and Saad A. Khan).

“Nanocomposite Gel Electrolytes for Lithium-Ion Batteries,” 208th Electrochemical Society Meeting, Los Angeles, October 2005 (with Fadhel Azeez and Yangxing Li).

“Electrolytes Based on Fumed Oxides for Rechargeable Lithium Batteries,” University of Kansas, September, 2005.

Invited Presentations


“Electrolytes Based on Fumed Oxides for Rechargeable Lithium Batteries,” Tsinghua University, China December, 2005.

“Electrolytes Based on Fumed Oxides for Rechargeable Lithium Batteries,” Zhejiang University, China December, 2005.

“Electrolytes Based on Fumed Oxides for Rechargeable Lithium Batteries,” Xiamen University, China, November, 2005.
Genzer, Jan  
Associate Professor  
Dipl-ing. Institute of Chemical Technology, Czech Republic (1989)  
Ph.D. University of Pennsylvania (1996)  
jan_genzer@ncsu.edu  

Interests: Behavior of polymers and organic liquids at interfaces and confined geometries

2005-2006 Publications

Publications (Refereed)


Invited Presentations


7th International Symposium on Polymer Physics, Suzhou, P.R. China, June 2006.

Combinatorial surface-tethered polymer assemblies: Formation & selected applications, University of Southern Mississippi, Hattiesburg, MS. April 2006.
Formation, characterization and interfacial properties of random copolymers with adjustable monomer sequence distributions, ACS 2006, Atlanta, GA. March 2006.

Recent advances in orthogonal polymer brushes, ACS 2006, Atlanta, GA. March 2006.

Gradients and Polymer Surfaces, DPOLY Short course “Polymers in Existing and Emerging Patterning Technologies”, APS 2006, Baltimore, MD. March 2006.


**Contributed Presentations**


Tuning the wettability and reconstruction reversibility in siloxane elastomers, Presented at the NCSU chemical engineering Schoeneborn presentation, January 2006, NCSU, Raleigh, NC, (with J.A Crowe).

Mixed monolayers of aromatic and aliphatic silanes on silica, Presented at the NCSU chemical engineering Schoeneborn presentation, January 2006, NCSU, Raleigh, NC, (with M.B. Smith, P.K. Kilpatrick, D.A. Fischer, K. Efimenko).


Polyampholytes, Presented at the NCSU chemical engineering Schoeneborn presentation, January 2006, NCSU, Raleigh, NC, (with J.L. Stone).


Molecular Recognition in Model DNA Microarrays: A Computer Simulation Study, American Institute of Chemical Engineers 2005 Annual Meeting,

Smart Polymeric Surfaces—Responsiveness and Reconstruction, American Institute of Chemical Engineers 2005 Annual Meeting, Cincinnati, OH, November 2005 (with J.A. Crowe).


Grant, Christine
Professor
M.S. Georgia Institute of Technology (1986)
Ph.D. Georgia Institute of Technology (1989)

Interests: Surface and Interfacial Science, Transport Phenomena, Pollution Prevention, Tribology: lubricants for MEMS and extreme environments

2005-2006 Publications

Publications (Refereed)


Invited Presentations


J. Braxton and C. Grant, “Environmentally Benign Polyspartic Acid as a Cleaning Agent for Calcite and Barite Deposits”, Fouling and Cleaning in Food Processing ’06, Jesus College, Cambridge, UK, April 2006.

Y. Hussain, C. Grant, V. Carla, and R. G. Carbonell, “Studying Thin Polymer Films under High Pressure Carbon Dioxide Using the Quartz Crystal Microbalance", American Institute of Chemical Engineers; Cincinnati, OH; November 2005.

Y. Hussain and C.S. Grant, “The Applications of Quartz Crystal Microbalance in High Pressure Carbon Dioxide”, International Symposium on Supercritical Fluids (Spring 2005).
**Gubbins, Keith**

Ph.D. University of London (1962)

W. H. Clark Distinguished University Professor

B.S. Chemistry, University of London (1958)

**Interests:** Confined materials; adsorption; molecular stimulation; surface properties

**2005-2006 Publications**

**Publications (Refereed)**


**Invited Presentations**


American Institute of Chemical Engineers, Cincinatti, Ohio, October 30-November 4, 2005.


Hall, Carol  
Alcoa Professor  
B.S.  Physics, Cornell University (1967)  
M.S.  Physics, S.U.N.Y. at Stony Brook (1969)  
Ph.D.  Physics, S.U.N.Y. at Stony Brook (1972)  

2088F EB1  
(919) 515-3571  
hall@turbo.che.ncsu.edu

Interests:  Statistical thermodynamics and computer simulation, polymers, proteins

2005-2006 Publications

Publications (Refereed)


Invited Presentations

“Molecular Dynamic Simulations of Protein Fibrillization,” 5th International Discussion Meeting on Relaxations in Complex Systems, Lille, France July 2005.

“Molecular Dynamic Simulations of Protein Fibrillization,” University of Tennessee Medial Center, Knoxville, August 2005.

Computer Simulations of Protein Aggregation,” Chemical Engineering, Purdue University, September 2005.


“Computer Simulations of Protein Aggregation,” Area 1A Keynote Lecture, AIChE Annual Meeting, Cincinatti, November 2005.


“Computer Simulations of Protein Aggregation,” GE Global Research, Schenectady, January 2006.

“Computer Simulations of Protein Aggregation,” Chemical Engineering, Case Western Reserve University, April 2006.

“Computer Simulations of Protein Aggregation,” Chemical Engineering, University Minnesota, April 2006.

“Computer Simulations of Protein Aggregation” DIMACS Center ( Discrete Mathematics and Theoretical Computer Science), Rutgers University, New Brunswick, April 2006.

“Computer Simulations of Protein Aggregation,” Chemical Engineering, University Wisconsin, April 2006.
“Computer Simulation of Protein Fibrillization; Poly alanine, Poly glutamine and Beta Amyloid,” CECAM Workshop on Protein Aggregation, Lyon, France, May 2006.

Contributed Presentations


“Computer Simulation of fibril Forming Peptides, AIChE Annual Meeting, Cincinnati, November 2005. [with V. Wagoner, presented by V. Wagoner.]
Haugh, Jason M.  
Assistant Professor  
B.S. North Carolina State University (1994)  
Ph.D. Massachusetts Institute of Technology (1999)  
Assistant Professor (919) 513-3851  
jason_haugh@ncsu.edu

**Interests:** Biomedical and biochemical engineering; signal transduction networks; mammalian cell engineering

**2005-2006 Publications**

**Publications (Refereed)**


**Invited Presentations**

“Quantitative analysis and modeling of signal transduction processes.” Department of Environmental & Molecular Toxicology, North Carolina State University, Raleigh, NC, 1/2006.


“A distinct mechanism of spatial gradient sensing in fibroblasts.” Department of Cell & Developmental Biology, University of North Carolina-Chapel Hill, Chapel Hill, NC, 10/2005.

**Contributed Presentations**

“Dynamic relationships among PI 3-kinase signaling, contact area spreading, and cell polarization following the attachment of fibroblasts to surfaces.” Contributed talk, American Institute of Chemical Engineers Annual Meeting, Cleveland, OH, 11/2005 (delivered by Michael Weiger).

“Signal transduction reactions at cell membranes: comparison of continuum theory and Brownian dynamics simulations.” Poster, American Institute of Chemical Engineers Annual Meeting, Cleveland, OH, 11/2005 (w/ Michael Monine).

“Signal transduction at point-blank range: a Brownian dynamics study.” Contributed talk, American Institute of Chemical Engineers Annual Meeting, Cleveland, OH, 11/2005 (w/ Michael Monine).

“Elucidation of the spatial PDGF gradient sensing mechanism in fibroblast chemotaxis.” Contributed talk, American Institute of Chemical Engineers Annual Meeting, Cleveland, OH, 11/2005 (w/ Ian Schneider).


Kelly, Robert M.
Suite 3309, Partners II
(919) 515-6396
rmkelly@eos.ncsu.edu

Alcoa Professor
Director of NCSU Biotechnology Program
B.S. University of Virginia (1975)
M.S. University of Virginia (1976)
Ph.D. North Carolina State University (1981)

Interests: Biochemical engineering; biocatalysis at extremely high temperatures; microbial physiology; enzyme engineering; functional genomics

2005-2006 Publications

Publications (Refereed)


Invited Presentations


Kelly, R.M., Hyperthermophilic Microorganisms: Genes, Genomes and Genomics, Department of Chemical Engineering, University of Illinois (Champaign-Urbana), October, 2005.


Khan, Saad
Professor
B.S.E, Chemical Engineering, Princeton University
Ph.D., Chemical Engineering, Massachusetts Institute of Technology.

Interests: Rheology & Structures of Complex systems: Gels, Suspensions, Nanocomposites, Associative polymers & Biopolymers

2005-2006 Publications

Publications (Refereed)


Invited Presentations


Hong Kong University, Jun 2005: Nanoparticulate Gels and Asssociative Polymer Networks with Tailored Functionalities.
Contributed Presentations


ACS Spring Meeting, Atlanta GA, March 2006: Melt intercalation dynamics of polystyrene into clay after thermal oxidative chain scission. (by D. Frankowski).


PACIFICHEM 2005, Honolulu, HI, Dec. 2005: Understanding molecular architecture of scCO$_2$ and conventionally polymerized PVDF through rheological measurements. (by A. Sanchez).


208th Meeting of the Electrochemical Society, Los Angeles, CA Oct. 2006: Nanocomposite Gel Electrolytes for Lithium-ion Batteries. (by Y. Li).
Kilpatrick, Peter K.

Department Head

B.S. Occidental College (1978)
Ph.D. University of Minnesota (1983)

**Interests:** Surfactant and interfacial science; fluid microstructure; colloidal aggregates; phase equilibria; biotechnology.

### 2005-2006 Publications

#### Publications (Refereed)


#### Invited Presentations

79th ACS Colloid and Surface Science Symposium, Clarkson University, Potsdam, NY, June 12-15, 2005, *Comparison of SANS Models for Asphaltene Aggregation*


#### Contributed Presentations

AICHE Annual Meeting, Cincinnati, OH, October 31-November 4, 2005, *Controlled Dielectrophoretic Assembly of Bio-inorganic Composite Materials using Live Cells and Functionalized Particles (with S. Gupta, OD Velev, R. Agarzova)*


ISPE Annual Meeting, Biotechnology Community of Practice, Scottsdale AZ November 2005, *The North Carolina Biomanufacturing Training and Education Center (BTEC): A New Pilot Scale Paradigm in (Bio-)Pharmaceutical Education*

Drexel University, Philadelphia, PA, May 5, 2006, *Self Assembly of Ordered Mixed Monolayers and Bilayers*

Antigen/Antibody Detection (with S. Gupta, OD Velev)


AICHE Annual Meeting, Cincinnati, OH, October 31-November 4, 2005, Probing Asphaltene/Resin Competitive Adsorption at the Oil/Water Interface with Dilatational Rheology (with V. Verruto)

AICHE Annual Meeting, Cincinnati, OH, October 31-November 4, 2005, Asphaltene-Stabilized Emulsion Characterization by Small Angle (SANS) and Ultra Small Angle Neutron Scattering (USANS) (with V. Verruto)
Lamb, H. Henry

Associate Professor
B.S. North Carolina State University
Ph.D. University of Delaware

Interests: Heterogeneous Catalysis; Microelectronics; Surface Science

2005-2006 Publications

Publications (Refereed)


Invited Presentations


“Probing the Chemistry and Physics of Supported Pt Catalysts Using *In Situ* X-ray Absorption Spectroscopy,” Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA; October 2005.

Contributed Presentations

S. Sigmon, B. Silletti, X. Wang, H. H. Lamb, and J. J. Spivey, “NO Decomposition over Supported Pd Catalysts,” 4\textsuperscript{th} International Conference on Environmental Catalysis, Heidelberg, GERMANY, June 2005 (by J. Spivey).

R. T. Adams, B. A. Silletti, S. M. Sigmon, A. Nikolopoulos, J. J. Spivey, and H. H. Lamb, “A Novel Pd/MgAlO\textsubscript{x} Catalyst for NO\textsubscript{x} Storage Reduction,” 19\textsuperscript{th} North American Meeting of the Catalysis Society, Philadelphia, PA, May 2005 (by H. Lamb).
Lim, P. K.  
Professor  
B. S. Cornell University (1975)  
M.S. University of Illinois (1978)  
Ph.D. University of Illinois (1979)  

Interests: Kinetics, catalysis and reaction engineering; environmentally benign synthesis

2005-2006 Publications

None
Ollis, David F.
Distinguished Professor
B.S. California Institute of Technology (1963)
M.S. Northwestern University (1964)
Ph.D. Stanford University (1969)
(919) 515-2329
ollis@eos.ncsu.edu

Interests: Photochemical and Biochemical technology; First-year engineering

2005-2006 Publications

Publications (Refereed)


Invited Presentations

“Research and Proposal Writing: Art and Architecture” NCSU New Faculty Workshop (For COE and PAMS, with R.Felder, R.Brent, NCSU), August, 2005, NCSU.

“Research and Proposal Writing: Art and Architecture” NCSU New Faculty Workshop (For other colleges, with T. Stewart, Philosophy and Religion, NCSU), August, 2005, NCSU.


Chin, P and Ollis, D., “Formaldehyde removal from air via a rotating adsorbent combined with a photocatalyst reactor: Kinetic modeling”, United Technologies Research Center, Hartford, CT January 2006.

Presentations at ASEE Annual Meeting, Chicago, IL (June, 2006):

HANDS-ON ACTIVITIES FOR TECHNOLOGICAL LITERACY
John Krupczak, Hope College, David Ollis, North Carolina State University.

TEACHING TECHNOLOGICAL LITERACY AS A QUEST, OR "SEARCHING FOR SELF IN THE ENGINEERING COSMOS"
David Ollis, North Carolina State University.

TECHNOLOGICAL LITERACY AND ENGINEERING FOR NON-ENGINEERS: LESSONS FROM SUCCESSFUL COURSES.
John Krupczak, Hope College
David Ollis, North Carolina State University.

MAKING MULTIDISCIPLINARY TEACHING COMMONPLACE
David Ollis, North Carolina State University.

ASSESSING TECHNOLOGICAL LITERACY IN THE UNITED STATES
John Krupczak, Hope College
Greg Pearson, National Academy of Engineering
David Ollis, North Carolina State University.
TEACHING TECHNOLOGY LITERACY: AN OPPORTUNITY FOR DESIGN FACULTY?
David Ollis, North Carolina State University
John Krupczak, Hope College
Overcash, Michael  
Professor  
B.S. North Carolina State University (1966)  
M.S. University of New South Wales (1967)  
Ph.D. University of Minnesota (1972)  

Interests: Design for Environment, Life Cycle Studies, Manufacturing and Supply Chain, Pollution Prevention

2005-2006 Publications

Publications (Refereed)


Contributed Presentations


Invited Presentations

"Life cycle research and health care textiles”, Univ. of California, Davis, Jan. 23, 2006.

"Life cycle research and approaches for textiles”, Donghua University, Sept. 11, 2005.
Parsons, Gregory N. 2032 EB1
Professor (919) 515-753
Ph.D.  Physics, North Carolina State University (1990)
gregory_parsons@ncsu.edu

Interests:
Plasma-enhanced deposition of semiconducting and insulating thin films, including silicon, high-k dielectrics. Fundamental modeling and experiments of surface reactions in thin film deposition. Nano and Molecular Electronics.

2005-2006 Publications

Publications (Refereed)


M. Jason Kelly, Joseph H. Han, Charles B. Musgrave and Gregory N. Parsons “In-situ infrared spectroscopy and density functional theory modeling of hafnium alkylamine adsorption on Si-OH and Si-H surfaces” Chemistry of Materials 17, 5305-5314 (2005).


Assembled Monolayers for Patterning and Work Function Tuning” Proceedings of Semicon Korea (2005).


Invited Presentations


G.N. Parsons “Materials and Interfaces for Improved Low Temperature OLED Barriers” Dow Corning, Midland Michigan, October 2005.

G.N. Parsons “Atomic Layer Deposition of High Workfunction Metals for PMOS Gate Electrode Applications” University of Tokyo, Tokyo Japan, Sept. 12, 2005

G.N. Parsons “Batch and Alternating Layer Deposition of Metal and Metal Oxide films from Precursors in sc-CO₂ Solution” Micell Inc, April 11, 2005.


G.N. Parsons “ALD Metals and reactions at metal/dielectric interfaces” Gate Stack Working Group, Austin Texas, Feb 14, 2005.


G.N. Parsons “Organic/Inorganic Integration: Ruthenium Atomic Layer Deposition on Self-Assembled Monolayers for Patterning and Work Function Tuning” Hanyang Univeristy, Seoul, Korea Feb 1, 2005


Kie Jin Park and G. N. Parsons “ALD of high work function metals on high-k dielectrics for metal gate electrode applications” Oral presentation at the 2005 ALD Conference, San Jose CA Aug 2005.


Gregory N. Parsons and Changwoong Chu“Molecular Contact Resistance and Hierarchical Assembly in Nanoparticle-Bridge Electrical Test-Beds” poster at the 2005 Gordon Conference on Chemistry of Electronic Materials, July 2005

**Contributed Presentations**


K.J. Park G.N. Parsons, D.B. Terry, “Electrical Characterization of Ru and Rh PMOS Gate Metals by
Peretti, Steven
Associate Professor
2069 EB1
(919) 515-6397

B.S. Yale University (1979)
Ph.D. California Institute of Technology (1987)

peretti@eos.ncsu.edu

Interests: Biocatalysis, bioreactor dynamics, bioremediation, combinatorial molecular biology

2005-2006 Publications

Publications (Refereed)


Invited Presentations

Alex Hobbs, Steven Peretti, “Use of biomass for power, fuel and products in North Carolina”, Duke University Energy Group, Nov. 3, 2005
Roberts, George  
Professor  
B.S. Cornell University (1961)  
Ph.D. Massachusetts Institute of Technology (1965)  

**Interests:** Kinetics, Reaction Engineering, Applied Catalysis, Pollution Prevention

**2005-2006 Publications**

**Publications (Refereed)**


Liu, T., DeSimone, J. M., and Roberts, G. W., “Cross-linking Polymerization of Acrylic Acid in Supercritical Carbon Dioxide, accepted for publication in Polymer.


**Contributed Presentations**


**Invited Presentations**


Roberts, G. W., “Hydrogenation of Polymers in Solvents Expanded with Supercritical Carbon Dioxide”, INCO Research Laboratories, Mississauga, CN, July 15, 2005 (invited).
Spontak, Richard J.
Professor                         Rich_Spontak@ncsu.edu
B.S. Penn State University (1983)  (919) 515-4200
Ph.D. University of California at Berkeley (1988)

Interests: Polymer science and engineering; morphology of nanostructured soft-condensed matter; molecular and nanoscale self-assembly; physical gels; electron microscopy techniques

2005-2006 Publications

Publications (Refereed)


Harton, S.E., Stevie, F.A., Spontak, R.J., Koga, T., Rafailovich, M.H., Sokolov, J.C., and Ade, H., "Low-Temperature Reactive Coupling at Polymer-Polymer Interfaces Facilitated by Supercritical CO₂," Polymer, 46, 10173 (2005).


Invited Presentations

"Modification of Polymer/Polymer Interfaces Using Block Copolymers and Microgel Particles," Corporate Research Division, Procter & Gamble, Cincinnati, OH, 2006.

"Modification of Polymer/Polymer Interfaces Using Block Copolymers and Microgel Particles," Department of Chemical and Biomolecular Engineering, Ohio State University, Columbus, OH, 2006.


"Modification of Polymer/Polymer Interfaces Using Block Copolymers and Microgel Particles," Theoretical
Division, Los Alamos National Laboratory, Los Alamos, NM, 2005.


**Contributed Presentations**


"Formation of Novel Nanostructures from Block Copolymers Dissolved in Supercritical Carbon Dioxide," International Symposium on Supercritical Fluids, Orlando, FL, 2005.

"Thermodynamics and Phase Equilibria of Poly(dimethylsiloxane) and Carbon Dioxide Systems," International Symposium on Supercritical Fluids, Orlando, FL, 2005.
van Zanten, John H.  
Assistant Professor  
B.S. UCLA (1986)  
Ph.D. UCLA (1992)  
2100D EB1  
(919) 515-2520  
john_vz@ncsu.edu

**Interests:**  Complex Fluids; Colloidal and Macromolecular Physics; Biophysical Phenomena; Lipid, Peptide and Polymer-Based Drug and Gene Delivery Systems; Submicron Particle Sizing; Light, Neutron and X-Ray Scattering

**2005-2006 Publications**

**Publications (Refereed)**


**Contributed Presentations**


Velev, Orlin D.
Assistant Professor
M.Sc., University of Sofia, Bulgaria (1989)
Ph.D., University of Sofia, Bulgaria (1996)

**Interests:** Colloid science and nanoscale engineering. Assembly of microstructures with photonic, optical and electrical functionality. Chemical and biological sensors.

**2005-2006 Publications**

**Publications (Refereed)**


**Invited Presentations**

Pan American Advanced Study Institute Summer School, San Jose, Costa Rica, June 2006. (Lectures on dielectrophoresis, microfluidics, DEP assembly of nanoparticles and manipulation of droplets).


Sandia National Laboratory, Livermore, CA, April 2006 (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and cell collection and assembly).


Department of Materials Science, Massachusetts Institute of Technology, Boston, MA, March 2006. (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and self-propelling devices).

Department of Chemical Engineering, Virginia Tech., Blacksburg, VA, March 2006. (On-chip droplet and particle manipulation by electric fields: Application in microbioassays and self-propelling devices).

Gordon Research Conference on Colloidal, Macromolecular & Polyelectrolyte Solutions, Ventura, CA, February 2006. (On-chip manipulation and assembly of nanoparticles, microparticles and live cells by electric fields).

Nanobiotechnology in North Carolina meeting, RTP, NC, January 2006. (Assembly of bionanocomposite materials from live cells and functionalized particles).

Nisshin Engineering Particle Technology International Seminar (NEPTIS 14), Hakone, Japan, December 2005 (Controlled deposition of functional nano- and microparticle coatings for photonics, electronics and biotechnology applications).


Department of Chemical Engineering, University of Notre Dame, IN, November 2005 (On-chip electric field manipulation and assembly of nanoparticles, live cells and droplets).

China/USA/Japan Joint Chemical Engineering Conference, Beijing, China, October 2005 (keynote, Electrically controlled microchips for manipulation and assembly of nanostructures and biomaterials).

Department of Chemistry, University of Sofia, Sofia, Bulgaria, July 2005 (Colloidal engineering on a chip: Examples of nanoscience research and education directions in USA).

79th ACS Colloid and Surface Science Symposium, Potsdam, NY, June 2005 (keynote, Strategies for on-chip assembly of sensors and biomaterials from live cells).


ACS National Spring Meeting, San Diego, CA, March 2005 (Scalable synthesis, alignment and applications of a new class of polymer microrods).

Department of Chemistry and Center for Nanotechnology, University of Washington, WA, May 2005 (On-chip dielectrophoretic manipulation and assembly of nanoparticles, live cells and droplets).

Sandia National Laboratory, Albuquerque, NM, May 2005 (Controlled assembly of materials and devices from nanoparticles, microparticles and live cells).

Department of Chemistry & Chemical Biology, Stevens Institute of Technology, NJ, April 2005 (On-chip manipulation and assembly of nanoparticles, microparticles and live cells).


Contributed Presentations


AIChE Annual Conference, Cincinnati, OH, November 2005 (2 talks: Self-propelling semiconductor devices demonstrate new electroosmotic motility principles & Graduate and undergraduate teaching of colloid science and nanoscale engineering - combining fundamentals with emerging technologies).

79th ACS Colloid and Surface Science Symposium, Potsdam, NY, June 2005 (Controlled deposition and modification of conductive and antireflective nanoparticle coatings).

MRS National Spring meeting, San Francisco, CA, April 2005 (Assembly of complex microparticle and nanoparticle structures in on-chip microdroplet reactors).
ACS National Spring Meeting, San Diego, CA, March 2005
(Engineering of SERS substrate structure for chemical sensors: Role of micro- and nanoporosity).

(poster presented by Suk Tai Chang)

AIChE Annual Conference, Cincinnati, OH, November 2005
(2 talks presented by Brian Prevo and Shalini Gupta).
MRS National Fall Meeting, Boston, MA, December 2005
(poster presented by Daniel Kuncicky).
Emeritus Faculty

Beatty, Kenneth O.
R.J. Reynolds Professor Emeritus 919-515-6398  
B.S., Lehigh University kobeatty@eos.ncsu.edu  
M.S., Lehigh University  
Ph.D., University of Michigan  
**Interests:**  Heat transfer, thermodynamics, biomedical engineering, fire cause and origin

Felder, Richard M.
Hoechst Celanese Professor Emeritus 919-515-2327  
B.Ch.E., City College of New York rmfelder@mindspring.com  
M.S., Princeton University  
Ph.D., Princeton University  
**Interests:**  Learning and teaching styles in engineering education, active and cooperative learning methods, engineering curriculum integration

Hopfenberg, Harold B.
Camille Dreyfus Professor Emeritus 919-515-2318  
S. B. Massachusetts Institute of Technology hbb@ncsu.edu  
S. M. Massachusetts Institute of Technology  
Ph.D. Massachusetts Institute of Technology  
**Interests:**  Transport and phenomena in polymeric materials applied to pharmaceutical formulations for sustained and controlled release.

Hubert Winston
Associate Professor Emeritus 919-515-4471  
B.S. North Carolina State University winston@eos.ncsu.edu  
M.S. North Carolina State University  
Ph.D. North Carolina State University
## Faculty Awards, Honors, and Distinctions

**Peter Fedkiw**
- Completed term as Treasurer, Electrochemical Society (2002-2006)
- Keynote lecture, Chinese Society of Electrochemistry National Meeting

**Jan Genzer**
- NSF Special Creativity Award

**Carol Hall**
- Area 1A Keynote Lecture, AIChE Annual Meeting, Cincinatti
- Richard H. Wilhelm Lectureship in Chemical Engineering, Princeton University
- Camille Dreyfus Distinguished University Professor

**Saad Khan**
- Alumni Distinguished Graduate Professorship Award

**Peter Kilpatrick**
- Conference Chairman for 7th International Conference on Petroleum Phase Behavior

**Gregory Parsons**
- Fellow American Vacuum Society

**George Roberts**
- Alcoa Foundation Distinguished Engineering Research Award

**Orlin Velev**
- Camille Dreyfus Teacher-Scholar Award
- NCSU Academy of Outstanding Teachers and COE Outstanding Teacher Award
- 3M Nontenured Faculty Award
## Courses Taught

### Fall 2005

<table>
<thead>
<tr>
<th>Course</th>
<th>Title/Instructor</th>
<th>Enroll</th>
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<td>205-2</td>
<td>Chem Process Principles/Felder</td>
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### Summer Session I 2006

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### Spring 2006

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</table>

### Summer Session II 2006

No lecture courses were offered.
Visitors and Staff

Seminars Presented in the Department 2005-2006

**Fall 2005**

August 29
Warren L. McCabe Lecture
"Field-based simulations for the design of polymer nanostructures"
Glenn H. Fredrickson
Department of Chemical Engineering & Materials
University of California - Santa Barbara

September 12
"Signal integration in developing tissues"
Stanislav Y. Shvartsman
Lewis-Sigler Institute for Integrative Genomics and Department of Chemical Engineering
Princeton University

September 19
"The Critical-Direction Theory for Robust Control Engineering"
Oscar D. Crisalle
Department of Chemical Engineering
University of Florida

September 26
"Microrheometry: Measuring the Very Small and Very Sticky!"
Gareth H. McKinley
Department of Mechanical Engineering
Massachusetts Institute of Technology

October 3
"Did Amyloid Seed the Origins of Life?"
David Lynn
Department of Chemistry
Emory University

October 10
"Dynamics of Polymers Adsorbed on Lipid Bilayers"
Sanat K. Kumar
Department of Chemical and Biological Engineering
Rensselaer Polytechnic Institute

October 24
Warren L. McCabe Lecture
"Metabolic Engineering"
Gregory Stephanopoulos
Department of Chemical Engineering
Massachusetts Institute of Technology

November 7
"Structure - Property Relationships in Polymer Nanocomposites"
Tim Fornes
Lord Corporation

November 14
David Myers
Engineering and Technology Division
Research Triangle Institute (RTI)

November 21
"Nanospheres of Pt and Pt/Ru for Fuel Cells"
William H. Smyrl
Department of Chemical Engineering & Materials Science
University of Minnesota

November 28
"Putting the Fizz Into Chemistry"
Steven M. Howdle
School of Chemistry
The University of Nottingham
Spring 2006

January 9
"Alternative Patterning Strategies: Imprint Lithography and Electric Field Assisted Assembly"
Michael Dickey
Department of Chemical Engineering
University of Texas at Austin

January 30
"The Science of Heterogeneous Catalysis: A Retrospective"
Gary McVicker
Corporate Research Laboratories
ExxonMobil Research & Engineering Company

February 6
"Molecular Engineering Strategies for the Design, Assembly, and Purification of Biological Therapeutics"
Kaushal Rege
Surgery-Massachusetts General Hospital,
Harvard Medical School

February 15
"Organic-inorganic hybrid materials: from biominerals to bioinspired functional materials"
Xiaoxia (Julie) Sheng
Department of Materials Science and Engineering
Massachusetts Institute of Technology

February 20
"Studies of Biointerfaces for Applications in Biosensors and Biomaterials"
Patrick A. Johnson
Department of Chemistry and Chemical Biology
Rutgers University

February 27
"pH dependent mechanism of asparagine deamidation: implications for chemotherapy and monoclonal antibodies & Reaction coordinates directly from transition path sampling"
Baron Peters
Department of Chemical Engineering
Massachusetts Institute of Technology

March 15
"Towards predictable computer-aided designs for synthetic gene circuits: Application to gene-metabolic oscillator in bacteria"
Jason K. Suen
Department of Chemical & Biomolecular Engineering
University of California, Los Angeles

March 20
"Directed Self-Assembly of Block Copolymers for Two- and Three-Dimensional Nanofabrication"
Mark P. Stoykovich
Department of Chemical & Biological Engineering
University of Wisconsin-Madison

March 27
"Photopolymer technology and materials applied to construction of micro- and nanofluidic components and integrated systems"
J. Brian Hutchison
Analytical Chemistry Division
National Institute of Standards and Technology

April 3
"Biodiesel Synthesis Using Heterogeneous Catalysts"
James G. Goodwin
Department of Chemical and Biomolecular Engineering
Clemson University

April 10
"The Rheology of Colloidal & Nanoparticle Dispersions "STF Armor"-Nanoparticle Composites for Flexible Ballistic Materials"
Norman Wagner
Department of Chemical Engineering
University of Delaware

April 24
"Complex Supramolecular Self-Assembly: A tool to generate novel Nano-Materials and Printing Techniques"
Francesco Stellacci
Materials Science and Engineering
Massachusetts Institute of Technology
Visiting Researchers

Dr. Anka Veleva

Staff

Ms. Sandra Bailey
Ms. Saundra Doby
Ms. Diane Harper
Ms. Sheila Hayes
Ms. Gwen Johnson
Ms. Shirley Kow
Dr. Jeng Leng
Ms. June McKoy
Dr. Russ O'Dell
Ms. Rajani Verghese
Ms. Clarice Whitmarsh
Mr. Kit Yeung
Research Sponsors

The Department of Chemical Engineering gratefully acknowledges the support in 2005-2006 provided by the industries, government agencies, and foundations listed below:

American Red Cross  NC Biotechnology Center
Army Research Office  NCSU National Textile Center
Arkema Inc.  NCSU Southeast Dairy Foods Research Center
Becton Dickinson Company  National Institutes of Health
Biopraxis Inc  National Science Foundation
Camille & Henry Dreyfus Foundation  Ohio State University
CCL Biomedical, Inc.  Semiconductor Research Corporation
Champion Technologies  Shell Global Solutions
ChevronTexaco  Sumitomo Electric Industries, Ltd.
Clemson University  UNC - Office of the President
Conoco Phillips Company  University of Delaware
Department of Energy  University of Florida
ExxonMobil Upstream Research Company  University of Georgia
Georgia Institute of Technology  University of North Carolina, Chapel Hill
Genencor International, Inc  University of Virginia (US Dept. of Health
Integrated Laboratory Systems (ILS) Inc.  US Air Force
Lawrence Berkeley National Laboratory  US Department of Agriculture
Nalco Energy Services  US Department of Commerce
National Aeronautics & Space Administration  US Department of Transportation
National Institute of Standards & Technology  US Navy