Annual Report

Department of Chemical & Biomolecular Engineering

North Carolina State University

Academic Year 2009-2010
Dear CBE Community and Friends,

I am pleased to provide the 2009-2010 Annual Report for the Department of Chemical and Biomolecular Engineering at NC State University. Here, you will find a summary of our Department’s accomplishments including statistics on the undergraduate and graduate programs, faculty scholarly publications and presentations, research productivity, sponsors who supported the research, awards and honors received by our faculty, and a compilation of the staff and visitors to the Department. We had a productive year, and it is in large part based upon the dedication and work of all (students, staff, and faculty). I invite you to peruse the document for the standard measures that these reports provide, but I also hope that you review the Report with an eye towards the people who are involved --- these folks enable the Department’s success.

Sincerely,

[Signature]

Peter S. Fedkiw
Professor and Head
Department of Chemical and Biomolecular Engineering
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## Research Sponsors

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Undergraduate Program

Trends in Undergraduate Enrollment

Trends in B.S. Degrees Granted
B.S. Degree Recipients

Summer 2009 graduates:

Jamie Leigh Forbis
Tamara Lynn Robertson
James Michael Williams ***
Melissa Marie Wood

December 2009 graduates:

Amber Cathleen Bruk (1) *
Catherine Audet Currence (1) ***
Andrew Parker Hedgpeth*
Ryan Thomas Kerns**
Mark Austin King (1)
Tony Curtis Marsh, Jr.
Steven Alexander McLaughlin*
Osamede Brendan Ohuoba*
Metts Williams Potter (1) ***
Jannov Rusli
Rebecca Lynn Simmons
Sean Michael Warby (1)

(1) Double Major
* Cum Laude
** Magna Cum Laude
*** Summa Cum Laude
May 2010 graduates:

Ryan Paul Abernathy  
Karen Rose Achtyl **  
Veronica Lynn Adams **  
Christopher David Austin  
Robert Alexander Ballard  
Leigh-Ann Marie Bender ***  
Michaela Rose Bennett **  
Travis Michael Bernard (1)  
Megan Christine Bittner **  
Tobias James Blackburn  
Michael Pahl Brown *  
Steven Kenneth Burgess ***  
Elizabeth Brooks Butler ***  
Juan Camilo Castaño-Moreno  
Kevin Michael Coley  
Timothy John Conaghan  
Zachary Nathan Conrad (1)  
Raleigh Lloyd Davis ***  
Aaron Michael Day ***  
David Benjamin Donnalley  
Matthew Thomas Edds  
Onyinyechi Divine Edem  
Christian Stephen Estes **  
Kendall Alexander Fitzgerald ***  
Kyle Andrew Ford  
Courtney Henrietta Fox ***  
Matthew Allen Gebbie  
Peter Amos Grochowski  
Christopher Allen Hanson ***  
Derek Lee Henderson  
Katherine Page Hoeferkamp **  
Alexander Bruce Hunt *  
Luisa E. Islas *  
Farshid Jafarpour (1) ***  
Lara Jeline Jazmin (1) ***  
Jordan Leigh Jernigan (1) *  
Haoyu Jin (1) ***  
Stacey Danielle King *  
Camille Heather Kump (1)  
Hisako Kurebayashi **  
Emily Victoria Lattimer  
Arouna Liloudini *  
Alexander Anthony Majeska (1)  
Andrew James Martin (1) **  
Peter Charles McAnulty (1) ***  
Tyler Robert McCaw ***  
William Michael McDanel ***  
Zachary Tyler McDowell ***  
Daniel William McIlmoyle ***  
Justin Newton McKenzie **  
Erik Alexander Mitran  
Stephen Winford Morton ***  
Kevin David Nance  
Edward John Osika Jr. *  
Patrick Stephen Parr *  
Natalie Gwen Patterson **  
Scott A. Peacock ***  
Daniel Shawn Pelle (1) ***  
Autumn Rachel Place *  
Jeffrey Gordon Poley ***  
Jeffery Bryan Bill Preece ***  
Yasir Ahmad Rashid ***  
Bradley Dillon Reese  
David Thomas Rhoden *  
Benjamin Michael Roberts (1)  
Carter Tankard Smith (1)  
Jordan Bradley Smith **  
Michael Austin Smith  
Natalie Lynn Soto *  
Lauren Elizabeth Stanulis  
Brendon C. Stout *  
Dustin Michael Stowell  
Jacob Lloyd Thelen (1) ***  
Peter Craig Venema  
Amanda Margaret Vorenkamp  
Andrew Harvey Waltersdorf **  
Cynthia Renee Warren  
Jodi Lyn White **

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

Statistics

B.S. degrees awarded 94  
Double majors 18  
Degrees with academic distinction 56  
Women 30  
Men 64
Graduating Seniors Scholarships and Honors

2009-2010

Scholarships and Awards

Biogen Idec Scholarship:
Tyler Robert McCaw

Caldwell Fellows Scholarship:
Elizabeth Brooks Butler
Luisa Islas
David Thomas Rhoden

Campbell Soup Scholarship:
Michaela Rose Bennett

CH2M Hill Scholarship:
Leigh-Ann Marie Bender

Chancellor’s Leadership Award:
David Thomas Rhoden

Donald C. Martin Scholarship:
Daniel William McIlmoyle

Duke Energy Scholarship:
Stephen Winford Morton

Ecolab Ida C. Koran Scholarship:
Leigh-Ann Marie Bender

Engineering Foundation Scholarship:
Elizabeth Brooks Butler
Daniel William McIlmoyle
Stephen Winford Morton

Engineering Senior Award for Humanities:
Lara Jeline Jazmin

Engineering Senior Award for Leadership:
Kendall Alexander Fitzgerald

Engineering Senior Award for Scholarly Achievement:
Raleigh Lloyd Davis

Engineering Senior Award for Service and Citizenship:
Elizabeth Brooks Butler

Faculty Senior Scholar:
Stephen Winford Morton

Forrest O. and Sandra Mixon BS&T Scholarship:
Christopher Allen Hanson
Jacob Lloyd Thelen

Forrest O. and Sandra Mixon RTI Scholarship:
Stephen Winford Morton

Golden Chain Society:
Kendall Alexander Fitzgerald

Henry B. and Virginia Smith Scholarship:
Daniel Shawn Peele

Henry and Nancy Thomas Scholarship:
Daniel Shawn Peele
Cynthia Renee Warren

James M. and Laura B. Johnson Scholarship:
Justin Newton McKenzie

Littrell-Thorpe Scholarship:
Leigh-Ann Marie Bender
Merck Engineering and Technology Scholarship:
  Christopher Allen Hanson

Michael B. Christie Scholarship:
  Justin Newton McKenzie

Morris K. Udall Scholarship:
  Courtney Henrietta Fox

National Starch Scholarship: Veronica Lynn Adams

Novo Nordisk Scholarship:
  William Michael McDanel

Park Scholarship:
  Raleigh Lloyd Davis
  Kendall Alexander Fitzgerald
  Courtney Henrietta Fox,
  Jordan Leigh Jernigan

Robin Barker Jones Scholarship:
  Stacey Danielle King

Russ O'Dell Senior Award:
  Yasir Ahmad Rashid

S. Frank and Doris Culberson Scholarship:
  Jeffrey Gordon Poley
  David Thomas Rhoden

Wachovia Scholarship:
  Stephen Winford Morton

Honors

Stephen Winford Morton received the 2009-2010 College of Engineering Faculty Senior Scholarship Award

Sindhu Sevala and John Petitte, two Chemical Engineering seniors, were selected to attend the Novartis Biotechnology Leadership Camp. The Camp is a pioneering biotechnology seminar for students who are interested in pursuing a career in biotechnology.

There was 100% success of CBE students who took the recent Fundamentals of Engineering exam.
Student Organizations

AIChE Student Chapter

**Officers 2009-2010**
- President: Dominic Brown
- Vice-President - Operations: Michaela Bennett
- Vice-President - Finance: Michael Brown
- Vice-President - Industry Relations: Allie Landry
- Vice-President - Industry Relations: Justin McKenzie
- Vice-President - Records: Stephen Morton
- Chapter Advisor: Dr. Russ O’Dell

**Activities**
- Membership of 178 students.
- 12 company sponsored luncheons / dinners, Fall and Spring semester.
- 2 tours, one with AIChE Eastern NC Section
- 19 other meetings / student activities
- 30 students attended the AIChE National Student Conference in Nashville, TN (November 2009)
- 2 students competed in the AIChE National Student Conference Poster Competition
- Hosted AIChE Southern Regional Conference on April 9-11 in EBI and EBII with 85 students serving as volunteers. There were 435 students and 17 chapter advisors in attendance.
- 1 student competed in the AIChE Southern Regional Conference Paper Competition
- Upgraded our website using Adobe Flash.
- Community Service Projects: Service Raleigh, Blood Drive, Krispy Crème Challenge, Brentwood Elementary E-Week

Industry Advisors
- David, Smith, Joel Younghood, Shannon Manning, Lisa Saxon, Eric Hickman, Seneca Toms

ISPE Student Chapter

**Officers 2009-2010**
- President: Nick Armstrong
- Vice President: Brandon Berry
- Treasurer: Shahbaz Riaz
- Secretary: Carrie Purvis

**Directors**
- Public Relations: Kristy Layton
- Professional Development: Juan Castano
- Activities: Meredith Root
- Service: Sarah Levinson

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

**Officers 2009-2010**
- President: Garrett Swindlehurst
- Vice-President: Robert Bradley
- Secretary: Cynthia R. Warren
- Treasurer: John N. Petitte
- Chapter Advisor (Pro Tem): Dr. Michael D. Dickey

**Activities**
- Membership grew to 31 members, and the group supported the 2009 Centennial Challenge.
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, 37 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 2008-2009, the average monthly salary for Co-op chemical engineers during their first work rotation was $2,720. 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. KYLE ASBURY  
   COVIDIEN – RALEIGH, NC
2. THOMAS BAIADA  
   DUPONT-TYVEK – RICHMOND, VA
3. JASON BAKER  
   EXXON MOBIL – BEAUMONT, TX
4. BRANDON BERRY  
   BIOGEN IDEC - RTP
5. ANDREW BOGGS  
   MWV – RALEIGH, NC
6. GORDON BREZICKI  
   AVID SOLUTIONS
7. DOMINIC BROWN  
   ALBERMARLE CORPORATION – TYRONE, PA
8. CHRISTINE CARCILLO  
   UNC ENERGY SERVICES – CHAPEL HILL, NC
9. ROBERT DEEDRICK  
   MWV – RALEIGH, NC
10. AARON FRYE  
    EXXON MOBIL - BEAUMONT, TX
11. MATTHEW LEE GRAY  
    O’BRIEN & GERE ENGINEERS, INC. – RALEIGH, NC
12. JAMI GUTHRIE (HALL)  
    EXXON MOBIL – BAYTOWN, TX
13. ADRIEN HAUSWALD  
    GENERAL ELECTRIC – GREENVILLE, SC
14. ZHUO HUI JOE HE  
    NASA GLENN RESEARCH CENTER – CLEVELAND, OH
15. KATHRYN HODGES  
    ALBERMARLE CORPORATION – SOUTH HAVEN, MI
16. MATTHEW HUNSUCKER  
    SYNGENTA CROP PROTECTION-GREENSBORO, NC
17. DAVID JACKSON  
    HIGHLAND INDUSTRIES, TAKATA CORPORATION – KERNERSVILLE, NC
18. NEIL C KERN  
    PROGRESS ENERGY COMPANY – RALEIGH, NC
19. AMIR LYALL  
    GOODYEAR TIRE & RUBBER CO – FAYETTEVILLE, NC
20. MEYGAN MCCANN  
    BAXTER HEALTHCARE CORPORATION – MARION, NC
21. WADE MEYERS  
    PCS PHOSPHATE – AURORA, NC
22. DUSTIN NELSON  
    HIGHLAND INDUSTRIES, TAKATA CORPORATION, KERNERSVILLE, NC
23. DECLAN NISHIYAMA  
    EXXON MOBIL – BEAUMONT, TX
24. JOSEPH OGDEN  
    MWV – COVINGTON, VA
25. JONATHAN PAINLEY  
    UNC – ENERGY SERVICES – CHAPEL HILL, NC
26. JAIMIN J PATEL  
    EXXON MOBIL – BAYWATER, TX
27. DANIEL PIEPHOFF  
    KIMBERLY CLARK – LEXINGTON, NC
28. AKEEM ROBINSON  
    O’BRIEN & GERE ENGINEERS, INC. – RALEIGH, NC
29. JOHNNATHAN ROESCH  
    PACKAGING CORPORATION OF AMERICAN – VALDOSTA, GA
30. KATHERINE SCHULZ  
    DOMTAR – BENNETTSTIVILLE, SC
31. DAVID SHANER  
    COVIDIEN – RALEIGH, NC
32. LOGAN SHEARER  
    KIMBERLY CLARK CORPORATION-NEENAH, WI
33. JOSEPH SLEPICTZA  
    EXXON MOBIL - BAYTOWN, TX
34. KOLBY STOCKTON  
    DOMTAR – BENNETTSTIVILLE, SC
35. BRIAN TURPIN  
    NATIONAL GYPSUM-CHARLOTTE, NC
36. ADAM WALLACE  
    KIMBERLY CLARK CORPORATION- HENDERSONVILLE, NC
37. JUSTIN HAROLD ZICKLER  
    AVID SOLUTIONS, INC. – WINSTON-SALEM, NC
Career Placement

Employers Participating in On-Campus Interviewing ChEs (BS level) for 2009-2010 academic year. (*) indicates also attended Engineering Career Fair

Ajinomoto Aminoscience LLC
Apro Resources, Inc.
AREVA NP, Inc.
Avid Solutions, Inc.
Baxter Healthcare
Campbell’s
Caterpillar
Central Intelligence Agency
Crotts & Saunders Engineering, Inc.
Cummins
Danaher Corporation
Deloitte Consulting
Eastern Research Group
Ecolab
EMC Corporation
ExxonMobil
Georgia Pacific, LLC
General Electric
Guilford
IBM
International Paper
Johnson Controls Inc.
Kimley-Horn & Associates, Inc.
Labcorp
Malt-O-Meal
Marine Corps Base Camp Lejeune
MeadWestvaco
MeadWestvaco (Specialty Chemicals)
Merck & Co.
Michelin North America
Microsoft
MicroStrategy, Inc.
MIT Lincoln Laboratory
Monsanto Company
Naval Surface Warfare Ctr/Carderock
Newell Rubbermaid
NewPage Corporation
Norfolk Naval Shipyard
Northrop Grumman
N.C. Department of Transportation
Nucor Steel
Packaging Corporation of America
Procter & Gamble

Progress Energy
RF Micro Devices, Inc.
Tencarva Machinery Company
Tyco Electronics
Westinghouse Electric Co.
Zimmer

Employers Participating in Engineering Career Fair Seeking ChEs (BS Level) 2009-2010, but not included in list above.

Aerotek
Albemarle Corp.
Babcock & Wilcox Co.
Bechtel Marine Propulsion Corporation
Belcan TechServices
Burt’s Bees
Corning
Coty US LLC
CRB Consulting Engineers, Inc.
Cree, Inc.
DAK Americas
Defense Nuclear Facilities Safety Board
Duke Energy
Federal Energy Regulatory Commission
Fluor
Goodyear Tire & Rubber Company
Hazen and Sawyer, P.C.
Heat Transfer Sales of the Carolinas, Inc.
Imperial Sugar Company
Intel Corporation
Kapstone Paper Company
LORD Corp.
Mainstream Engineering
Mohawk Industries
Mustang Engineering
NAVSEA Warfare Centers
NNE Pharmaplan
Novartis Vaccines and Diagnostics
Novo Nordisk Pharmaceutical Industries, Inc.
Novozymes North America, Inc.
Oak Ridge National Laboratory
Oiles America Corp.
Parsons
PCS Phosphate
PotashCorp
Praxair, Inc.
Professional Engineers of NC
R.E. Mason Company
RoviSys
Savannah River Nuclear Solutions
Savannah River Remediation, LLC
SCA Tissue North America
Siemens
Sonoco Products Company
Syngenta Corporation
Syngenta Crop Protection
Tennessee Valley Authority
U.S. Air Force
U.S. Army
U.S. Army Corps of Engineers
U.S. Army Natick Soldier RDE Center
U.S. Patent and Trademark Office
U.S. Navy
URS Corporation

NC State University ChE’s (May 2010)
BS Level NC State ChE Average Salary =
$66,095

National Association of Colleges &
Employers (NACE) Salary Survey
(Spring 2010)
BS Level NACE CBE Average Salary =
$66,437
Graduate Program

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

Graduate Student Enrollment
-Fall 2009

<table>
<thead>
<tr>
<th>M.S. Candidates</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>On campus</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Distance education</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Ph.D. Candidates</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td></td>
</tr>
</tbody>
</table>

| Men              | 84       |
| Women            | 42       |
| Total            | 126      |

| U.S. Citizens    | 72       |
| International    | 54       |
| Total            | 126      |

The international students come from 10 countries: Bangladesh, China, Columbia, Egypt, Kuwait, India, Korea, Panama, Taiwan, and Turkey.

Trends in Graduate Enrollment

Trends in M.S. Degrees Granted

Trends in Ph.D. Degrees Granted

Fall Semester of Academic Year
Graduate Students, 2009-2010

<table>
<thead>
<tr>
<th>Student</th>
<th>Major Professor</th>
<th>Undergraduate School</th>
<th>Matriculated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdelghany, Amr</td>
<td>Rao</td>
<td>Cairo</td>
<td>Fall 2009</td>
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<tr>
<td>Afroz, Taliman</td>
<td>Henderson</td>
<td>Bangladesh</td>
<td>Fall 2009</td>
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<td>Ahmed, Shoeb</td>
<td>Haugh</td>
<td>Bangladesh</td>
<td>Fall 2007</td>
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<tr>
<td>Allen, Joshua</td>
<td>Henderson</td>
<td>NC Wesleyan</td>
<td>Fall 2008</td>
</tr>
<tr>
<td>Arifuzzaman, Shafi</td>
<td>Genzer</td>
<td>Bangladesh</td>
<td>Fall 2004</td>
</tr>
<tr>
<td>Arvidson, Sara</td>
<td>Khan/Gorga</td>
<td>South Carolina</td>
<td>Fall 2006</td>
</tr>
<tr>
<td>Auernik, Kate</td>
<td>Kelly</td>
<td>Notre Dame</td>
<td>Fall 2004</td>
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<tr>
<td>Azeez, Fadhel</td>
<td>Fedkiw</td>
<td>Kuwait University</td>
<td>Fall 2003</td>
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<tr>
<td>Bain, Erich</td>
<td>Genzer</td>
<td>U of Alabama</td>
<td>Fall 2005</td>
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<tr>
<td>Barua, Dipak</td>
<td>Parsons/Osburn</td>
<td>Bangladesh</td>
<td>Fall 2003</td>
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<td>Bernal, Oscar</td>
<td>Flickinger</td>
<td>Colombia</td>
<td>Fall 2008</td>
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<td>Boehler, Emily</td>
<td>Hall</td>
<td>Penn State</td>
<td>Fall 2007</td>
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<tr>
<td>Bonino, Chris</td>
<td>Khan</td>
<td>U of Rochester</td>
<td>Fall 2006</td>
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<tr>
<td>Brown, Eva “Kate”</td>
<td>Henderson</td>
<td>VCU</td>
<td>Fall 2007</td>
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<td>Cai, Xiaojing</td>
<td>Spontak</td>
<td>Nanjing</td>
<td>Fall 2008</td>
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<td>Cain, Nathan</td>
<td>Roberts</td>
<td>VCU</td>
<td>Fall 2004</td>
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<td>Chang, Suk Tai</td>
<td>Velev</td>
<td>Kwangju</td>
<td>Fall 2003</td>
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<tr>
<td>Chu, Hsiao Mei (Annie)</td>
<td>Khan</td>
<td>Connecticut College</td>
<td>Fall 2005</td>
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<td>Cooper, Charlotte</td>
<td>Peretti</td>
<td>USC at Columbia</td>
<td>Fall 2005</td>
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<td>Cirit, Murat</td>
<td>Haugh</td>
<td>Middle East Technical Univ.</td>
<td>Fall 2005</td>
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<td>Cushing, Kerri</td>
<td>Peretti</td>
<td>UFL</td>
<td>Fall 2005</td>
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<td>Genzer</td>
<td>IIT, Bangalore</td>
<td>Fall 2009</td>
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<td>Fall 2009</td>
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<td>Central College</td>
<td>Fall 2008</td>
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<td>Lafayette</td>
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<td>DeSimone</td>
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<td>Velev</td>
<td>NC State</td>
<td>Fall 2005</td>
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<td>Rao</td>
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<td>Parsons</td>
<td>Tianjin</td>
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<td>Hall/Velev</td>
<td>IIT, Roorkee</td>
<td>Fall 2003</td>
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<td>Genzer/Spontak</td>
<td>Bogazici University</td>
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<td>Kelly</td>
<td>UVA</td>
<td>Fall 2003</td>
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<td>Han, Sang Don</td>
<td>Khan</td>
<td>Ajou University</td>
<td>Fall 2009</td>
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<td>Kelly</td>
<td>NCA&amp;T</td>
<td>Fall 2003</td>
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<td>Hassan, Mohammad</td>
<td>Pourdeyhimi/Khan</td>
<td>Cairo</td>
<td>Fall 2008</td>
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<td>Fall 2009</td>
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<td>Pourdeyhimi/Genzer</td>
<td>ECUST</td>
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<td>Heldt, Caryn</td>
<td>Carbonell</td>
<td>Michigan Tech</td>
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<td>Herigstad, M. Omon</td>
<td>Carbonell</td>
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<td>Fall 2005</td>
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### Graduate Degree Recipients 2009-2010

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Master of Science (M.S.N.) Degrees
December 2009 (Continued)

Ju-Hee So
(Course Only)
(Michael Dickey)
B.S., Seoul National University
M.S., Seoul National University

Rahul Srinivas
(Course Only)
(Saad A. Khan)
B.S., NC State
M.S., NC State

Keyi Sun
(Saad A. Khan)
B.S., Zhejiang University
M.S., NC State
B.S., Zhejiang University
Ph.D. Program, NC State

Ahmet Burak Ucar
(Course Only)
(Saad A. Khan)
B.S., Bogacizi University
Ph.D. Program, NC State

Master of Science (Distance Education) Degrees
December 2009
Timothy M. Carmann
(Course Only)
(Saad A. Khan)
B.S., Univ. Nebraska Lincoln
Dupont, Wilmington, DE

Jennifer J. Hayes
(Course Only)
Dupont, Wilmington, DE
(Saad A. Khan)
B.S., U of Oklahoma Norman Campus
3M Company, St. Paul, MN

Master of Science (M.S.N.) Degrees
May 2010
Christina Tang
(Course Only)
(Saad A. Khan)
B.S., Havey Mudd College
Ph.D. Program, NC State

Juan Weaver
(Course Only)
(Richard Spontak)
B.S., University of Arizona

Yi Ban
(Course Only)
(Saad A. Khan)
B.S., Zhejiang University

Master of Science (Distance Education) Degrees
May 2010
Charles D. Armstrong
(Course Only)
(Saad Khan)
B.S., West Virginia University
Pregis Innovative Packaging, Inc

Karl E. Counts
(Course Only)
(Saad A. Khan)
B.S., GA Tech
Ciba Vision Corp, Atlanta, GA

Jonathan P. Halter
(Course Only)
(Saad A. Khan)
B.S., OSU
Cargill, Fayetteville, NC

Matthew J. Panning
(Course Only)
(Saad A. Khan)
B.S., Univ. Cincinnati
GlaxoSmithKline, RTP, NC
Doctor of Philosophy (Ph.D.) Degrees

August 2009

James Morgan Harris
Biochemical and Biophysical Characterization of Hyperthermophilic Sugar Isomerases and Epimerases
(Robert Kelly)
B.S., NCA&T

Matthew Omon Herigstad
Hybrid Particle-Nonwoven Membrane Media for Bioseparations
(Ruben Carbonell)
B.S., Colorado State
Bologna, Italy – Postdoc

Jeong-Seok Na
Nanoscale Assembly for Molecular Electronics and In Situ Characterization During Atomic Layer Deposition
(Gregory Parsons)
B.S., Hanyang
M.S., Pohang University of Science & Tech
Novellus Systems, Inc., San Jose, CA

Qing Peng
Nanoscale Engineering Materials with Supercritical Fluid and Atomic Layer Deposition
(Gregory Parsons)
B.S., East China Univ of Science & Tech
M.S., East China Univ of Science & Tech
Argonne National Laboratory, Argonne, IL

December 2009

Fadhel A. Kh A. Azeez
Lithium bis(Oxalato)Borate-Based Electrolyte for Lithium-Ion Cells
(Peter Fedkiw)
B.S., Kuwait University
M.S., NC State
Kuwait University

Steven Randall Gray
Functional Genomics Analysis of Carbohydrate Conversion to Biohydrogen by Pure and Mixed Cultures of Hyperthermophilic Thermotoga Species
(Robert Kelly)
B.S., UVA
M.S., UVA
Postdoc – NC State Food Science

Celia Steward Ponder
Life Cycle Inventory Analysis of Medical Textiles and Their Role in Prevention of Nosocomial Infections
(Christine Grant)
B.S., NCA&T
M.S., UVA
GlaxoSmithKline, RTP, NC

Lawrence A. Strickland
Computer Simulation of the Formation of Mechanically-Assembled Monolayers and and Heteropolymers with Adjustable Monomer Sequences
(Carol Hall and Jan Genzer)
B.S., Univ. S. Carolina at Columbia
Postdoc – Vanderbilt University
Doctor of Philosophy (Ph.D.) Degrees
May 2010

Shafi Arifuzzaman
Application of Functional Polymer Brushes for Nanoparticle Uptake and Prevention of Protein Adsorption
(Jan Genzer)
B.S., Bangladesh University
M.S., The University of Western Ontario
Intel Corporation

Polystyrene Hydrogenation in Supercritical CO2 Decahydro-naphthalene Using Porous Catalysts
(George Roberts)
B.S., Mississippi State University
Albemarle Corp., Baton Rouge, LA

Directed Assembly and Manipulation of Anisotropic Colloidal Particles by External Fields
(Orlin Velev)
B.S., N.C. State
EPA, RTP, NC

Instability and Structuring Phenomena at Immiscible Polymer/Polymer Interfaces via Block Copolymers and Microgel Particles
(Jan Genzer and Richard Spontak)
B.S., Bogazici University
Postdoc – N.C. State, MSE

Liquid-Phase Deoxygenation of Free Fatty Acids to Hydrocarbons Using Supported Palladium Catalysis
(Henry Lamb)
B.S., U of Kansas
Air Products, Allentown, PA

Adam T. Melvin
Relating phosphoinositide 3-kinase (P13k) signaling and cell motility dynamics during PDGF-stimulated chemotaxis
(Jason Haugh)
B.S., U of Arizona
Postdoc – UNC, Biochemistry

Vinayak Rastogi
Developing Quantitative Micro-Bioassays for Biomolecular Detection of Microliter Volumes of Analyte
(Orlin Velev)
B.S., University of Roorkee
Postdoc-NIST, Baltimore, MD

Functional Genomic and Biochemical Characterization of the Biomass-Degrading Extremely Thermophilic Bacterium Caldicellulosiruptor Saccharolyticus
(Robert Kelly)
B.S., University of Delaware
Agrivita, Boston, MA

Amy L. Vanfossen
Chemically Crosslinked Polymer Electrolyte Membranes from Fluorinated Liquid Precursors for Application in Fuel Cells
(Peter Fedkiw and Joseph DeSimone)
B.S., Inst. Of Tech, BHU, Varanasi
New Graduate Student Information
-Fall 2009

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Trends in the Graduate Program

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Trends in GRE Scores of New Graduate Students

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Verbal</th>
<th>Quantitative</th>
<th>Analytical</th>
<th>100 x Analytical Writing</th>
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<tbody>
<tr>
<td>2000</td>
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<td>2002</td>
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<td>2010</td>
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Trends in Average GPA of New Graduate Students

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Average GPA</th>
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</thead>
<tbody>
<tr>
<td>2000</td>
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<tr>
<td>2002</td>
<td>3.4</td>
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<tr>
<td>2004</td>
<td>3.6</td>
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<tr>
<td>2006</td>
<td>3.8</td>
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<tr>
<td>2008</td>
<td>3.8</td>
</tr>
<tr>
<td>2010</td>
<td>3.8</td>
</tr>
</tbody>
</table>
Graduate Fellowships and Awards, 2009-2010

Dean’s Fellowships

Catherine Fromen
David Latshaw
Stephanie Lam
Berc Kalanyan
William Sweet
Phillip Schoch
Marc Kai
Aaron Hawkins
Katherine Phillips
Joseph Eby
Robin Mays
Alina Higham

Provost Fellowships

Marc Kai
Katherine Phillips

Graduate Research Fellowship

Aaron Hawkins

GAANN Biotechnology Fellowships

Aaron Hawkins
Christina Tang

NEEM Fellowship

Robin Mays

GAANN Computational Fellowships

Victoria Wagoner

National Science Foundation

Kristen Roskov

National Institute of Health Biotechnology Traineeship Program

Emily Boehler
Andrew Frock

Graduate Student Awards

Charlotte Cooper was awarded a Student Travel Grant and an Outstanding Student Poster Award for her contribution "Impact of VapBC Toxin-Antitoxin Gene Perturbations on Microbial Fitness of the Extreme Thermoacidophile Sulfolobus solfataricus During Stress Response" presented at the 110th General Meeting of the American Society of Microbiology.

Arjun Krishnan was selected for the 1st place poster award in the Engineering Division of the 5th Annual Graduate Student Research Symposium. Arjun's poster was titled: "Selectively Solvated Block Copolymers upon (Electro)Mechanical Deformation.

Sumit Gangwal was awarded a 1st place poster award for his contribution "Induced-Charge Electrophoresis of Metallodielectric Janus Particles" presented at the AIChE 2009 Annual Meeting.

Yun Long was a recipient of the NC State Graduate Student Association Outstanding Teaching Assistant Award.
Career Placement

Employers Participating in On-Campus Interviewing ChEs (MS & PhD level) for 2009-2010 academic year. (*) indicates also attended Engineering Career Career Fair

Air Products & Chemicals, Inc.  
Apro Resources, Inc.  
BASF  
Campbell’s  
Caterpillar  
Central Intelligence Agency  
Cummins  
Deloitte Consulting  
*Eastern Research Group  
*ExxonMobil  
*General Electric  
General Mills  
Guilford  
Marine Corps Base Camp Lejeune  
*Merck & Co.  
Michelin North America  
*MicroStrategy, Inc.  
MIT Lincoln Laboratory  
Monsanto Company  
Naval Surface Warfare Ctr/Carderock  
*Newell Rubbermaid  
NewPage Corporation  
*Northrop Grumman  
*Procter & Gamble  
RF Micro Devices, Inc.  
Tyco Electronics  
*Westinghouse Electric Co.  
Zimmer

Employers Participating in Engineering Career Fair Seeking ChEs (MS & PhD Level) 2009-2010, but not included in list above.

Aerotek  
Albemarle Corporation  
AREVA  
Bechtel Marine Propulsion Corp.  
Belcan TechServices  
Burt’s Bees  
Corning  
Coty US LLC  
CRB Consulting Engineers, Inc.  
Cree, Inc.  
DAK Americas  
Defense Nuclear Facilities Safety Board

Ecolab  
Federal Energy Regulatory Commission  
Fluor  
Georgia-Pacific, LLC  
Goodyear Tire & Rubber Company  
Hazen and Sawyer, P.C.  
Intel Corporation  
LORD Corporation  
Mainstream Engineering  
Mohawk Industries  
NAVSEA Warfare Centers  
NNE Pharmaplan  
Novartis Vaccines and Diagnostics  
Novo Nordisk Pharmaceutical Industries, Inc.  
Novozymes North America, Inc.  
Oak Ridge National Laboratory  
Oiles America Corporation  
Parsons  
Professional Engineers of N.C.  
Savannah River Nuclear Solutions  
Savannah River Remediation, LLC  
Syngenta Corporation  
Syngenta Crop Protection  
U.S. Air Force  
U.S. Army  
U.S. Army Corps of Engineers  
U.S. Army Natick Soldier RDE Center  
U.S. Patent and Trademark Office  
U.S. Navy  
URS Corporation

National Association of Colleges & Employers  
NACE Salary Survey (Spring 2010)

MS Level ChE = $77,000  
PhD Level ChE = $99,000
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.
Faculty Activities

The Chemical and Biomolecular 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 and others — but also with a number of major corporate sponsors, including DuPont, Eaton Corporation, MeadWestvaco, Novozymes, and Unilever. 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 and Biomolecular Engineering Faculty

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

Ruben G. Carbonell, Frank Hawkins Kenan Distinguished Professor, Director of the Golden LEAF Biomanufacturing Training and Education Center (BTEC) and Director of the William R. Kenan Jr. Institute for Engineering, Technology and Science (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, Chancellor's Eminent Professor of Chemistry, UNC; William R. Kenan, Jr. Distinguished Professor of Chemical Engineering, NCSU; Director, UNC Institute for Advanced Materials, Nanoscience and Technology; Director, Carolina Center of Cancer Nanotechnology Excellence; Director, Institute for Nanomedicine at UNC (919/962-2166); PhD, Polymer Chemistry, Virginia Tech (1990); new strategies for the delivery of detection, imaging and therapeutic agents for the battle against human disease; nanomedicine; interventional oncology; fluoropolymers: photolithography, fuel cells, microfluidics, minimally adhesive surfaces; medical devices; colloid, surfactant and surface chemistry; particle Jamming and un-jamming; polymer synthesis and processing in carbon dioxide: new polymers, interfacial science and colloids, reaction kinetics and engineering, green chemistry [desimone@unc.edu]

Michael D. Dickey, Assistant Professor (919/513-0273); PhD, Chemical Engineering, University of Texas at Austin (2006); patterning techniques, nanofabrication, photosensitive polymers, microfluidics, surface phenomena, photovoltaics, flexible electronics. [michael_dickey@ncsu.edu]

Kirill Efimenko, Assistant Research Professor (919/513-0548); PhD, Material Science and Engineering, Institute of Chemical Technology Prague (1999); functional polymers, chemical/physical modification of polymer films, structural assemblies of macromolecules, responsive polymer coatings. [efimenko@ncsu.edu]

Peter S. Fedkiw, 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]

Michael C. Flickinger, Professor (joint with Microbiology) (919/515-0175); PhD University of Wisconsin (1977); microbial biocatalytic coatings, advanced nanostructured biocatalytic materials, bionanotechnology, bioseparations using inorganic media [michael_flickinger@ncsu.edu]

Jan Genzer, Celanese 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, Professor, Associate Dean of Faculty Development and Special Initiatives, College of Engineering (919/515-2317); PhD, Chemical Engineering, Georgia Institute of Technology (1989); colloid and surface science; environmental engineering, biomedical engineering. [grant@ncsu.edu]

Keith E. Gubbins, H. Clark Professor (919/513-2262); PhD, Chemical Engineering, University of London (1962); molecular modeling of nanostructured materials, multi-scale modeling of materials and chemical reactions, thermodynamics and rate processes in nanoporous and structured materials. [keg@ncsu.edu]
Carol K. Hall, Camille Dreyfus Distinguished University (919/515-3571); PhD, Physics, SUNY Stony Brook (1972); molecular modeling and computer simulation of: protein folding/aggregation, dipolar colloids, polymeric interfaces, liposomal and micellar drug delivery devices, DNA-hybridization, and nucleic-acid-based nanostructures. [hall@ncsu.edu]

Jason Haugh, Associate 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]

Wesley A. Henderson, Assistant Professor (919/513-2917); PhD, Materials Science & Engineering, University of Minnesota (2002); electrolytes for electrochemical energy technologies (batteries, capacitors), ionic liquids, lignocellulosic biomass pretreatment and conversion to fuels and chemicals, polyaromatic hydrocarbon solubility. [wesley_henderson@ncsu.edu]

Jesse S. Jur, Research Assistant Professor (919/515-7189); PhD, Materials Science and Engineering, NC State University (2007); conductive and insulating material nanostructures, electronic properties of thin films, development of novel materials processing techniques, renewable energy devices. [jsjur@ncsu.edu]

Robert M. Kelly, Alcoa Professor (919/515-6396); PhD, Chemical Engineering, NC State University (1981); biomolecular engineering, extremophile biology and biotechnology, biocatalysis at extremely high temperatures, microbial physiology and ecology, functional genomics. [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; functional nanofibers [khan@eos.ncsu.edu]

H. Henry Lamb, Professor (919/515-6395); PhD, Chemical Engineering, University of Delaware (1988); heterogeneous catalysis, surface science, and biochemical engineering. [lamb@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); engineering education. [ollis@ncsu.edu]

Gregory N. Parsons, Professor (919/515-7553); PhD, Physics, NC State University (1990); atomic layer deposition, including fundamental surface reactions and advanced applications; nanoscale materials and device engineering; organic/inorganic materials and interfaces; physics of thin film devices. [parsons@ncsu.edu]

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

Balaji M. Rao, Assistant Professor (919/513-0129); PhD, Chemical Engineering, Massachusetts Institute of Technology (2004); protein engineering, quantitative stem cell biology, stem cell bioengineering [bmrao@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]

Orlin Velev, INVISTA Professor (919/513-4318); PhD, Physical Chemistry, University of Sofia and Bulgarian Academy of Sciences (1996); colloidal nanoscience and nanotechnology, microfluidics and on-chip devices, assembly of nano- and microstructures with photonic, optical, biological and electrical functionality, colloidal interactions, self-assembly and crystallization, biosensors and microrobotics. [odvelev@unity.ncsu.edu]

Phillip R. Westmoreland, Professor (919/515-7121) and Executive Director, NCSU Institute for Computational Science and Engineering; PhD, Chemical Engineering, Massachusetts Institute of Technology (1986); Energy, environmental, and fundamental kinetics; biofuel production and use, molecular-beam mass spectrometry, computational quantum chemistry, Reactive Molecular Dynamics. [phil.westmoreland@ncsu.edu]
Activities by Faculty Members

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

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

2009-2010 Publications

Accepted for Publication (Refereed)

* L.G. Bullard, P.S. Fedkiw, and F.P. O’Dell, “NC State,” Chemical Engineering Education. Accepted for publication.

* L.G. Bullard, “Approaches to Academic Integrity: Confessions of a Reluctant Expert,” Chemical Engineering Education. Accepted for publication.

* L.G. Bullard, “Tips on Efficient, Effective, Student-Centered Teaching,” Chemical Engineering Education. Accepted for publication.

* L.G. Bullard and A.T. Melvin, “Using a Role-Play Video to Minimize Cheating on Assignments,” Advances in Engineering Education. Accepted for publication.

* L.G. Bullard, “Skits, Stockings, and Senioritis Ale: Creative Engineers,” Chemical Engineering Education. Accepted for publication.

Invited 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
Director, Golden LEAF Biomanufacturing Training and Education Center
B.S. Manhattan College (1969)
Ph.D. Princeton University (1973)

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

2009-2010 Publications

Published (Refereed)


Invited Presentations


Invited Lecture, NC State Association of Retired Faculty, BTEC Facilities and Programs, March 17, 2010.


Invited Lecture, Advances in hIgG Purification Using Small Peptide Ligands, SINAFERM, Recife, Brazil, August 1-7, 2009.

Invited Presentation, Nonwoven Fabrics for Bioseparations, NCRC Industrial Advisory Board Mtg., Nov. 10-12, 2009.
DeSimone, Joseph M.  
CB #3290, Kenan Laboratories  
(919) 962-2166  
desimone@unc.edu

William R. Kenan Jr. Distinguished Professor of Chemical Engineering (NCSU)  
Chancellor’s Eminent Professor of Chemistry (UNC Chapel Hill)  
B.S. Ursinus College (1986)  
Ph.D. Virginia Polytechnic Institute and State University (1990)

Interests: New strategies for the delivery of detection, imaging and therapeutic agents for the battle against human disease; Nanomedicine; Interventional oncology; Fluoropolymers: photolithography, fuel cells, microfluidics, minimally adhesive surfaces; Medical devices; Colloid, surfactant and surface chemistry; Particle Jamming and un-jamming; Polymer synthesis and processing in carbon dioxide: new polymers, interfacial science and colloids, reaction kinetics and engineering, green chemistry.

2009-2010 Publications

Published (Refereed)


Publications Submitted and In Press


“Multifunctional Shape and Size Specific Magneto-Polymer Composite Particles”; Nunes, J.; Herlihy,


Invited Presentations

Green chemistry and Engineering enabled by new concepts in fluoropolymers, Environmental Science and Technology Symposium, Washington, DC, invited speaker, 08/16-20/2009.


Advanced Applications of Polymers, Turner Alfrey Visiting Professorship Lectures, Midland, MI, invited speaker, 09/13-17/2009.

Development of translational technologies that can impact practical applications in the clinic, NCI Alliance for Nanotechnology, Manhatten Beach, CA, invited speaker, 10/20-22/2009.


Advances in understanding and predicting polymer reliability and in providing properties enabling new and unanticipated applications, DSRC Polymers of the Future Workshop, Arlington, VA, 11/04/09.


Translating promising molecular discoveries into benefits for patients, FDA Lecture with Liquidia, Arlington, VA, keynote speaker, 11/12/09.


Nanomedicine, tissue engineering, nanoelectronics, nanofluids, NIST Lecture, Gaithersburg, MD, invited lecturer, 01/08/10.

Translating the precision of microelectronics to production of uniform carriers for vaccines, biologics and small molecule drugs, Governor's Innovation Council Members, Raleigh, NC, council member, 01/14/10.


Size, shape & Surface properties in particle-based drug delivery, ASME NEMB 2010, Houston, TX, invited speaker, 02/7-10/2010.

PRINT technology, ASGCT, Washington, DC, invited speaker, 05/19-22/2010.
Dickey, Michael D.
Assistant Professor                                          (919) 513-0273
B.S. Georgia Institute of Technology (1999)                  michael_dickey@ncsu.edu
M.S. University of Texas (2004)
Ph.D. University of Texas (2006)


2009-2010 Publications

Published (Referred)


Publications In Press and Submitted


Invited Research Presentations


A Micromoldable Liquid Metal for Ultra-Stretchable Electronics, Sandia National Laboratory, April 12, 2010.


A Micromoldable Liquid Metal for Ultra-Stretchable Electronics, Departmental Seminar, Lehigh University, Spring 2010.


Photocurable Materials for Nanofabrication, University of Southern Mississippi (Department of Polymer Science) Hattiesburg, MS Oct 21, 2009.

A Micromoldable Liquid Metal for Ultra-flexible Electronics, NCSU Physics Department, Raleigh, NC, Sept 17, 2009.

**Contributed Presentations**


Liquid Metal Microvalve, NCSU Undergraduate Research Symposium, April 22, 2010, Raleigh, NC. (poster given by student: Farshid Jafarpour)

Embedding Materials for Nanoskiving, NCSU Undergraduate Research Symposium, April 22, 2010, Raleigh, NC. (poster given by student: Steven Doligalksi)

Reversibly Deformable and Mechanically Tunable Fluidic Antennas, National Academy of Engineering; Grand Summit Challenge, March 4, 2010, Raleigh, NC. (poster given by student: Ju-Hee So)

Efficient Light Harvesting by Organic Photovoltaics, National Academy of Engineering; Grand Summit Challenge, March 4, 2010, Raleigh, NC. (poster given by student: Ying Liu)

Reversibly Deformable and Mechanically Tunable Fluidic Antennas, Young Generation Technical and Leadership Conference (YGTLC) hosted by the Korean-American Scientists and Engineers, January 2010, Washington, DC. (poster given by student: Ju-Hee So)

Reversibly Deformable and Mechanically Tunable Fluidic Antennas, Joint Symposium of the NC Chapter of Materials Research Society, November 2009, Raleigh, NC. (poster given by student: Ju-Hee So)


Characterization of Liquid Metal Alloy (EGaIn) Losses in Coil and Patch Antenna Configurations, URSI, 2009, Boulder, CO. (talk given by student: Gerry Hayes).


Fedkiw, Peter S.  
Department Head and Professor  
B.S. University of Delaware (1974)  
Ph.D. University of California, Berkeley (1978)

**Interests:** Electrochemical reaction engineering; electrocatalysis, environmental applications of electrochemistry.

**2009-2010 Publications**

**Published (Refereed)**

Fadhel Azeez and Peter S. Fedkiw, “Conductivity of LiBOB-based electrolytes for lithium ion batteries,” in press, *Journal of Power Sources*.

**Publications (Submitted)**

Fadhel Azeez and Peter S. Fedkiw, “Electrochemical properties of LiBOB-based gel electrolyte for lithium-ion batteries,” submitted, *Journal of Power Sources*.

Xuedong Wei, Wei Sun, Zheng Fan, Yisheng Yan, Yongning Liu, Hanchen Liu, and Peter S. Fedkiw, “Electrochemical properties of amorphous carbon nanotubes as anodes for lithium-ion batteries,” submitted, *Journal of Power Sources*.

Hanjun Zhang, Xuedong Wei, Khalid Kopanski, Eric Shiue, Peter S. Fedkiw, “Single-ion conductors for lithium batteries via surface-initiated atom transfer radical polymerization,” submitted, *Journal of Nanoscience and Nanotechnology*.

**Contributed Presentations**

“Reversible and Irreversible Capacity of Carbonized Electrospun Nanofibers as Anodes in Li-ion cells,” 216th Electrochemical Society Meeting, Vancouver, Canada, May 2010 (with A. Loebl, J. Thornton, and J. Cuomo).

“Separator-Free LiBOB Based Gel Electrolyte for Li-Ion Batteries,” 215th Electrochemical Society Meeting, Vienna, Austria, October 2009 (with F. Azeez).

“A Candidate Electrolyte for Li-ion Batteries,” 215th Electrochemical Society Meeting, Vienna, Austria, October 2009 (with F. Azeez).
Flickinger, Michael C.  
Professor (Also Professor of Microbiology, CALS)  
Associate Director, Academic Programs  
Golden LEAF Biomanufacturing Training and Education Center (BTEC)  
B.S. University of Wisconsin, Madison (1973)  
M.S. University of Wisconsin, Madison (1975)  
Ph.D. University of Wisconsin (1977)  

Interests: Microbial biocatalytic coatings, advanced nanostructured biocatalytic materials, bionanotechnology, bioseparations using inorganic media

2009-2010 Publications

Published (Refereed)


In Press and Submitted


Invited Research Presentation

“What’s So Interesting About Microbial Coatings”, Science Today - Coatings Tomorrow Symposium, American Coatings Conference, Charlotte, NC.

“What is Biomanufacturing?” North Carolina State University, College of Engineering, Dean’s Seminar on Biotextiles, Biomaterials and Biomanufacturing, Raleigh, NC.

“Nanostructured Microbial Coatings for Biocatalysis and Energy Applications”, Bristol Myers Squibb, East Brunswick, NJ.

“Nanostructured Microbial Coatings for Biocatalysis and Energy Applications”, University of Minho, Braga, Portugal.

“Nanostructured Microbial Coatings for Biocatalysis and Energy Applications”, Department of Microbiology, University of Florence, Florence, Italy.
Contributed Presentations and Posters


M.C. Flickinger, J.L. Gosse, A. Grunden, M. Chinn, S. Peretti, O.D. Velev, J.S. Jenkins, O.I. Bernal “Biocatalytic Coatings” North Carolina State University, College of Engineering, Symposium on Biotextiles, Biomaterials and Biomanufacturing, Raleigh, NC. (Presented by Prof. Flickinger).
Genzer, Jan
Professor
Dipl-Ing. Institute of Chemical Technology, Czech Republic (1989)
Ph.D. University of Pennsylvania (1996)
Professor                                        (919) 515-2069
Dipl-Ing. Institute of Chemical Technology, Czech Republic (1989)                          jan_genzer@ncsu.edu
Ph.D. University of Pennsylvania (1996)
Interests: Physics of thin polymer films, interfacial polymer science, morphology control of heterophase polymers, structure/formation of polymer-based nanocomposites.

2009-2010 Publications

Publications (Referred)


In Press and Submitted


**Publications in non-Refereed Journals**


**Invited Presentations**

Preparation and application of responsive coatings on textile fibers, Smart Polymer System Conference, iSmithers, Atlanta, GA, USA, May 2010.

Formation and application of multivariant assemblies of grafted polymers on flat surfaces, Department of Chemical & Biomolecular Engineering, Tulane University, New Orleans, LA, USA, April 2010.

Surface engineering with soft materials, College of Textiles, NC State University, Raleigh, NC, USA, March 2010.

On preparing tunable random copolymers by “chemical painting” of synthetic homopolymers, Department of Chemistry, University of South Carolina, USA, February 2010.

Interfacial activity of soft polymeric modifiers: From block copolymers to nanogels, Department of Chemical Engineering, Columbia University, New York, NY, USA, September 2009.

On preparing tunable random copolymers by “chemical painting” of synthetic homopolymers, Department of Chemical & Biomolecular Engineering, University of Houston, Houston, TX, USA, September 2009.

**Contributed Presentations**

Polymer Nanotubules Prepared by the Layer-by-Layer Deposition within AAO Membrane Templates with Pore Diameter Less than 100 nm, Spring MRS meeting, San Francisco (with Y. Cho, U. Gösele, Y.K. Jhon, K. Char)

The effects of monomer sequence distribution and isotopic substitution on solution phase behavior of random copolymers, March meeting of the APS, Portland, OR (with Y.K. Jhon, R. Krishnamoorti)

Monte Carlo study of confinement effects on controlled radical polymerization reactions, March meeting of the APS, Portland, OR (with S. Turgman-Cohen)

Development of universal coatings based on functional silicones, March meeting of the APS, Portland, OR (with A.E. Özçam, and R.J. Spontak)

Controlling co-monomer distributions in bulk and surface tethered random copolymers, March meeting of the APS, Portland, OR (with L.A. Strickland and C.K. Hall)


Microscale Patterning And Mechanistic Control of Surface-Grafted Radical Polymerization, Presented at the *NCSU chemical engineering Schoeneborn presentation*, January 2010, NCSU, Raleigh, NC (with E.D. Bain).

Functional Coatings Based on Protein Denaturation and Adsorption, Presented at the *NCSU chemical engineering Schoeneborn presentation*, January 2010, NCSU, Raleigh, NC (with K.K. Goli).

Development of universal coatings based on functional silicones, Presented at the *NCSU chemical*
Tunable Elastomeric Substrates for Studying Adhesion and Migration of Living Cells, 2009 Chemical and Biological Defense Science and Technology Conference, Dallas, TX, November 2009 (with H. Yang, S. Ahmed, A.E. Özçam, J. Haugh).


Asymmetric Block Copolymers at Immiscible Polymer/Polymer Interfaces: Thin Film Instability Induced by “Crew-cut” Micelles, Fall 2009 ACS meeting, Washington, DC, August 2009 (with A.O. Gozen and R.J. Spontak).

Surface Modification of PET Fibers with PNIPAAm Brushes, Fall 2009 ACS meeting, Washington, DC, August 2009 (with K.E. Roskov, A.E. Özçam, and R.J. Spontak).

Phase Behavior of Random Copolymer Solutions with Adjustable Co-monomer Sequence Distribution, Fall 2009 ACS meeting, Washington, DC, August 2009 (with J.K. Jhon, R. Krishnamoorti).
Grant, Christine                      2088B EB1
Professor                              (919) 515-2317
Sc.B.  Brown University (1984)          grant@ncsu.edu
M.S.   Georgia Institute of Technology (1986)
Ph.D.  Georgia Institute of Technology (1989)

Interests: Colloid and surface science; environmental engineering, biomedical engineering

2009-2010 Publications

Publications (Refereed)

S.L. Ma, Y.T. Wu, M.L. Hurrey ML, S.L. Wallen,  


In Press and Submitted

P. Mousavi, D. Wang, C. S. Grant, W. Oxenham and  

J. Braxton and C. Grant, “Dissolution of Barite – Fouling Deposits”, invited paper in Transactions of the IChemE Part C: Food and Bioproducts Processing, the journal of the European Federation of Chemical Engineers (EFCE) Cambridge, UK – under review.

Contributed Presentations


Invited Presentations

Grant, C.S., “Ethics in Engineering Research”, Marathon Diversity Awareness in Engineering
**Gubbins, Keith**
W. H. Clark Distinguished University Professor  
Ph.D. University of London (1962)  
B.S. Chemistry, University of London (1958)

**Interests:** Molecular modeling of nanostructured materials, multi-scale modeling of materials and chemical reactions, thermodynamics and rate processes in nanoporous and structured materials.

**2009-2010 Publications**

**Publications (Refereed)**


M. Jazdzewska, M. Sliwinska-Bartkowiak, A.I. Beskovynny, S.G. Vasilovsky, K.-Y. Chan, L.L. Huang and K.E. Gubbins, “Melting Behavior of Water


**In Press and Submitted**


**Invited Presentations**


“Slow and Fast (Fickian) Diffusion Modes for Argon Confined in BPL Activated Carbon”, Joshua D.


“Water Dissociation over Ti-Decorated C60”, Ying-Chun Liu, Liping Huang, Keith E. Gubbins and Marco Buongiorno Nardelli, 10th Symposium of Computational Chemistry in China (SCCC2009), Hangzhou, China, October 23-25, 2009.


Papers Presented at National and International Conference


“Water Dissociation over Ti-Decorated C60”, Ying-Chun Liu, Liping Huang, Keith E. Gubbins and Marco Buongiorno Nardelli, 10th Symposium of Computational Chemistry in China (SCCC2009), Hangzhou, China, October 23-25, 2009.


“Anomalous and Fickian Diffusion of Fluids Confined in Activated Carbon, a Carbon Replica of Zeolite and Carbon Nanotube Bundles”, Joshua D.


**Invited Seminars**


“Molecular Modeling of Matter at the Nanoscale: Impact and Prospects”, Hong Kong University, Public Lecture, Hong Kong, December 8, 2009.


“Molecular Modeling of Matter at the Nanoscale: Impact and Prospects”, Chiba University, Chemistry Department, December 17, 2009.

“Thermodynamics and Dynamics of Confined Nano-Phases”, Quantachrome Instruments, Boynton Beach, FL, April 20, 2010.
Hall, Carol  
Camille Dreyfus Distinguished University 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)  

Interests: Molecular modeling and computer simulation of: protein folding/aggregation, dipolar colloids, polymeric interfaces, liposomal and micellar drug delivery devices, DNA-hybridization, and nucleic-acid-based nanostructures.

2009-2010 Publications

Publications (Refereed)


In Press and Submitted


Invited Presentations

“Thermodynamic and Kinetic Origins of Alzheimer’s and Related Disorders, Role Model Lecture, Mathematics , University of Saskatchewan, September 2009

“Self Assembly of Dipolar Colloidal Particles: Designing Smart Materials,” Role Model Lecture, Mathematics, University of Saskatchewan, September 2009

"Confessions of an Ordinary Teacher---Dealing with the Big Fish", Chemical & Biomolecular Engineering, North Carolina State University, September 2009.

“Self Assembly of Dipolar Colloidal Particles: Designing Smart Materials,” Alumni Lecture, Chemical Engineering, University Of Massachusetts, Amherst, September, 2009.


“Self Assembly of Dipolar Colloidal Particles: Designing Smart Materials” A Chemical Engineer’s Perspective,” Katz Lecture, Chemical Engineering, University Of Michigan, Ann Arbor, April 2010.

“Thermodynamic and Kinetic Origins of Alzheimer’s and Related Disorders: A Chemical Engineer’s Perspective, Academy of Chemical Engineers Lecture,” Chemical and Biological Engineering Department, Missouri Institute of Science and Technology, Rolla, April, 2010.

“Confessions of an Ordinary Teacher---Dealing with the Big Fish,” Academy of Chemical Engineers Lecture, Chemical & Biological Engineering Department, Missouri Institute of Science and Technology, Rolla, April, 2010.


Contributed Presentations


“Molecular Simulations of Liposomal Anticancer Drug Carriers,” AIChE Annual Meeting, Nashville, November 2009. [ with E. B. Curtis, presented by E. B. Curtis.]

“Computer Simulation of Protein Aggregation Using an Intermediate Resolution Model,” AIChE Annual Meeting, Nashville, November 2009. [ with V. Wagoner presented by V. Wagoner.]
Haugh, Jason M.
Associate Professor

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

2009-2010 Publications

Publications (Refereed)


In Press and Submitted


Contributed Presentations


“Stochastic models of integrin-mediated signaling and adhesion dynamics at the leading edges of migrating cells: Focus on paxillin-mediated GEFs.” Poster, Cell Migration Consortium Annual Meeting, Reston, VA, 10/2009 [with Erik Welf, Murat Cirit, Matej Krajcovic, Colin Choi (Univ. of Virginia), and Alan F. Horwitz (Univ. of Virginia); delivered by Erik Welf].


Henderson, Wesley Averett  
Assistant Professor  
B.S. University of California-Santa Barbara, CA (1996)  
Ph.D. University of Minnesota (2002)  
2088F EB1  
(919) 513-2917  
whender@ncsu.edu  

Interests: electrolytes for electrochemical energy technologies (batteries, capacitors), ionic liquids, lignocellulosic biomass pretreatment and conversion to fuels and chemicals  

2009-2010 Publications  


Regular Contributed Research Presentations  


Contributed Research Presentations by Students, Postdocs and Collaborators  


Combination of Ionic Liquid Dissolution with Alkali Extraction for Biomass Pretreatment. ACS Southeastern Regional Meeting (SERMACS), San Juan, Puerto Rico, Oct 21-24, 2009 (with X. Geng).  

Publications in Proceedings Volumes and Marginally Refereed Journals  


Invited, Keynote and Plenary Research Presentations and Seminars  


Ionic Liquid Electrolytes for Electrochemical Capacitors: Influence of Solvent Additives on PY\textsubscript{15}TFSI Viscosity, Density, and Thermal Behavior. 216th Meeting of The Electrochemical Society, Vienna, Austria, Oct 4-9, 2009 (with E. Paillard).

(Poster) Phase Behavior, Thermal Stability, and Conductivity of Ionic Liquid-LiTFSI (IM\textsubscript{10R}TFSI and PY\textsubscript{18}TFSI) Mixtures. 216th Meeting of The Electrochemical Society, Vienna, Austria, Oct 4-9, 2009 (with Q. Zhou, K. Fitzgerald).
Kelly, Robert M.
Alcoa Professor
Suite 3309, Partners II
(919) 515-6396
rmkelly@eos.ncsu.edu
Director of NCSU Biotechnology Program
University of Virginia (1975)
University of Virginia (1976)
North Carolina State University (1981)

B.S.
M.S.
Ph.D.

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

2009-2010 Publications

Publications (Refereed)


Submitted


Book Chapters


Invited Presentations


**Contributed Presentations**


Ozdemir, I., S.E. Blumer-Schuette, and R.M. Kelly. Role of S-layer domain proteins during growth of the extremely thermophilic bacterium *Caldicellulosiruptor saccharolyticus* on cellulose and hemicellulose. DOE BESC Retreat, Asheville, NC (June, 2010).
Khan, Saad  
Professor  
B.S.E, Chemical Engineering, Princeton University (1980)  
Ph.D., Chemical Engineering, Massachusetts Institute of Technology.(1985)  
Professor                                        (919) 515-4519  
khan@eos.ncsu.edu

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

**2009-2010 Publications**

**Publications (Refereed)**

S. Mahammad, G.W. Roberts, S. A. Khan,  


*J. Mater. Chem.*, (2010) DOI: 10.1039/c0jm00355g

C. Appaw, R.D. Gilbert, S.A. Khan, J.F. Kalda,  
“Phase separation and heat-induced gelation characteristics of cellulose acetate in a mixed solvent system “, *Cellulose* (2010), 17:533–538 DOI: 10.1007/s10570-010-9406-x

S.A. Arvidson, S.A. Khan, R.E Gorga,  


**Contributed Presentations**

5th Intl. Symp. On Food Rheology & Structure,  
Zurich International Fiber Society Mtg, Bursa Turkey, May 2010: Spontaneous ZnO Nanoparticulation on the Surface of ZnO Nanofibers via Sol-Gel Electrospinning (Yakup Aykut)

International Fiber Society Mtg, Bursa Turkey, May 2010: Electrospun Nanofibrous Structures with Live Yeast Cells (Fatih Canbolat)


IDEA Conference, Miami April 2010: Structure Property Process Relationships for Melt-blowing (Mohammad Hasan)

IDEA Conference, Miami April 2010: Electrospun Nanofibers of Enzyme-modified Guar Galactomannan (Annie Chu)

IDEA Conference, Miami April 2010: Novel Needleless Electrospinning Techniques for Simultaneous Production of Multiple Fibers (Alina Higham)

Invited Presentations and Courses

2010 ACC Meeting of the Minds, April 2010, Atlanta, GA. "Novel Biopolymer-Based Nanofibers for Regenerative and Therapeutic Medicine" (Brinda Monian)

239th ACS Spring Mtg., San Francisco, CA March 2010: “Chitosan-alginate polyelectrolyte electrospun nanofiber for tissue engineering.” (by M.D. Krebs, collaboration with Case Western)


MRS Fall Meeting, Boston Dec 2009: “Electrospun Nanoparticle-Nanofiber Composites via a Novel One-Step Synthesis” (by Sara Arvidson)

MRS Fall Meeting, Boston Dec 2009: “In Situ Crosslinking of Electrospun PVA Nanofibers.” (Christina Tang)


MRS Fall Meeting, Boston Dec 2009: “Composite Tin-Carbon Electrospun Nanofibers for Use as Lithium-Ion Battery Anodes.” (by Chris Bonino)

MRS Fall Meeting, Boston Dec 2009: “Electrospun Alginate-Based Nanofibers for Use as Tissue Scaffolds: Investigation of Single and Coaxial Needle Approaches.” (Chris Bonino)


238th ACS Fall Mtg., Washington DC, Aug 2009: “Alginate-Based Nanofibers via Electrospinning for Use as Tissue Engineering Scaffolds.” (by Chris Bonino)

Lamb, H. Henry
Professor
B.S. North Carolina State University (1982)
Ph.D. University of Delaware (1988)

Interests: Heterogeneous catalysis, surface science, and biochemical engineering

2009-2010 Publications

Publications (Refereed)


Submitted Publications


Invited Publications

“Process Analytical Technology (PAT) for Bioreactor Monitoring and Control,” Pfizer (Sanford, NC), BTEC, December 18, 2009.

Contributed Presentations


Lim, P. K. 2040 EB1
Professor (919) 515-2328
B. S. Cornell University (1975)
M.S. University of Illinois (1978)
Ph.D. University of Illinois (1979)

Interests: Interfacial phenomena, homogeneous catalysis, free radical chemistry.
Ollis, David F.
Distinguished Professor
B.S. California Institute of Technology (1963)
M.S. Northwestern University (1964)
Ph.D. Stanford University (1969)

distinguishedprofessor@ncsu.edu

Interests: Photochemical and biochemical technology; first-year engineering.

Presentations


Contributed Presentations

“Language, Culture and Technology in a Global World, Monique Granger and D. F. Ollis, 43rd Foreign Language Association Conference (FLANC), September, 2009, Raleigh, NC.

Parsons, Gregory N.  
Professor  
Ph.D.  Physics, North Carolina State University (1990) 

Interests: Atomic layer deposition, including fundamental surface reactions and advanced applications; nanoscale materials and device engineering; organic/inorganic materials and interfaces; physics of thin film devices.

2009-2010 Publications

Publications (Refereed)


Jesse S. Jur, Joseph Spagnola, Kyoungmi Lee, Bo Gong, Qing Peng, and Gregory N. Parsons “Temperature-Dependent Sub-Surface Film Growth during Atomic Layer Deposition on Polypropylene and Cellulose Fibers” Langmuir 2010, ASAP.


Giovanna Scarel, Jeong-Seok Na, Bo Gong, and Gregory N. Parsons “Phonon response in the infrared region to thickness of oxide films formed by atomic layer deposition” J. Appl. Spectroscopy, 64 120-126 (2010).


Submitted Publications

Qing Peng, Bo Gong, Gregory N. Parsons “Amino Functionalized Inert Fiber Mats Formed using Atomic/Molecular Layer Deposition” submitted.

Bo Gong, Qing Peng and Gregory N. Parsons “Rapid Self-Catalyzed Epoxide Ring-Opening Molecular Layer Deposition of Stable Hybrid Organic-Inorganic Network Polymer Thin Films” submitted.

Invited Research Presentations


Gregory N. Parsons “Reactions during inorganic ALD on polymer fibers” Telluride Conference on Semiconductor Surfaces and Processes, July 2010.


Gregory N. Parsons “Modulation of Surface Wetting Phenomena on Fibrous Materials Using Atomic Layer Deposition” Dept. of Physics, James Madison University, Harrisonburg VA October 29, 2009.


Invited Public Presentations


Contributed Presentations

Joseph Spagnola, Bo Gong, Jess Jur and Gregory N. Parsons “Surface and Sub-Surface Reactions During Aluminum Oxide ALD on Fiber Forming-Polymers ” 2010 International ALD Conference, Seoul, South Korea, June 21-23, 2010.


Qing Peng, Bo Gong, Gregory N. Parsons “Amino Functionalized Inert Fiber Mats Formed using Atomic/Molecular Layer Deposition” 2010 International ALD Conference, Seoul, South Korea, June 21-23, 2010.


Peretti, Steven
Associate Professor
B.S. Yale University (1979)
Ph.D. California Institute of Technology (1987)

Interests: Biofuels and bioproduct synthesis; metabolic engineering and biosystems analysis; biocatalysis

2009-2010 Publications

Presentations

Rao, Balaji
Assistant Professor
B.S. University of Mumbai (1999)
Ph.D. Massachusetts Institute of Technology (2004)

Interests: Protein engineering, quantitative stem cell biology, stem cell bioengineering

2009-2010 Publications

Publications (Refereed)

Collier, T. Sarkar, P., Rao, B. and Muddiman, D. C. 


Invited Research Presentations

Spontak, Richard J.  
Professor  
B.S.  Penn State University (1983)  
Ph.D. University of California at Berkeley (1988)  

Professor  (919) 515-4200  
Rich_Spontak@ncsu.edu  

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

**2009-2010 Publications**

**Publications (Refereed)**


**Submitted manuscripts**


**Book chapters and invited reviews (refereed)**


**Invited, keynote and plenary research presentations and seminars**

Smart Polymer Systems 2010 - iSmithers Conference, Atlanta, GA, May 2010 (New Microfluidic Elastomer Composites with Switchable Shape, Stiffness and Color).


MRS National Spring Meeting; San Francisco, CA, April 2010 (A new class of programmable microfluidic materials with switchable shape, stiffness and color).

Department of Chemical Engineering, University of New Mexico, NM, February 2010 (Colloidal electronics: Electrically active structures from water-based particles and gels).

CFDRC research corporation, Huntsville, AL, November 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).

Department of Chemical Engineering, Texas A & M University, October 2009 (On-chip Liquid and Particle Manipulation by AC Electric Fields: Applications in Colloidal Assembly and Microfluidics).
14th UK Polymer Colloids Forum, University of Hull, September 2009 (*Keynote talk:* Programmed Assembly of Janus, Patchy and Dipolar Particles by Electric and Magnetic Fields).

**Regular Invited Presentations**


**Contributed research presentations by students, post-docs and collaborators**

MRS National Spring Meeting; San Francisco, CA, April 2010 (2 talks by Jairus Kleinert, talk by Jessica Jenkins).


238th ACS National Meeting, Washington, DC, August 2009 (talk by Jessica Jenkins).

14th UK Polymer Colloids Forum, University of Hull, September 2009 (talks by Elizabeth Melvin and Jairus Kleinert).
Westmoreland, Phillip R.
Professor and Executive Director, NCSU Institute for Computational Science and Engineering
B.S. North Carolina State University (1973)
M.S. Louisiana State University (1974)
Ph.D. Massachusetts Institute of Technology (1986)

**Interests:** Energy, environmental, and fundamental kinetics; biofuel production and use, molecular-beam mass spectrometry, computational quantum chemistry, reactive molecular dynamics.

**2009-2010 Publications**

**Published and In-Press (Refereed)**


**Publications Submitted**


**Book chapters and invited reviews (refereed)**


**Invited Research Presentations**

Case Western Reserve University, Department of Chemical Engineering, Cleveland OH (2010).

Rice University, Department of Chemical Engineering, Houston, TX (2010).

University of Pittsburgh, Center for Modeling and Simulation, Pittsburgh PA (2010).

University of Pittsburgh, Department of Chemical and Petroleum Engineering, Pittsburgh PA (2010).

North Carolina State University, Department of Material Science and Engineering, Raleigh NC (2010).
University of Texas, Austin, Institute for Computational Engineering and Sciences, Austin, TX (2009).


Posters and conference presentations


N. Labbe, P.R. Westmoreland. "Understanding Polymer Pyrolysis through Advances in Reactive Molecular Simulation," Fall Technical Meeting, Eastern Section of the Combustion Institute, Univ. of Maryland, College Park, October 18-21, 2009.

Emeritus Faculty

Beatty, Kenneth O.  
R.J. Reynolds Professor Emeritus  
B.S., Lehigh University  
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  
B.Ch.E., City College of New York  
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  
S.B. Massachusetts Institute of Technology  
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.

Winston, Hubert  
Associate Professor Emeritus  
B.S. North Carolina State University  
M.S. North Carolina State University  
Ph.D. North Carolina State University
Faculty Awards, Honors, and Distinctions

**Lisa G. Bullard**

2010 Raymond Fahien Award from the Chemical Engineering Division of the American Society for Engineering Education

Alumni Distinguished Undergraduate Professor by the NC State Alumni Association

**Ruben Carbonell**

Recognized for patents issued during 2009 by the NC State Office of Technology Transfer and the Council for Entrepreneurial Development

Honored for his role with a start-up company by the NC State Office of Technology Transfer and the Council for Entrepreneurial Development

**Joseph DeSimone**

2011 Harrison Howe Award of the Rochester section of the American Chemical Society

2009 North Carolina Award for Science

National Institutes of Health (NIH) Pioneer Award

2010 Founding POLY Fellow, Division of Polymer Chemistry, American Chemical Society

2010-2011 Aggarwal Lectures in Polymer Science, Department of Chemistry at Cornell University

2010 President’s Council Symposium Lecturer, Cold Spring Harbor Laboratory

2010 Danny Thomas Lecturer, St. Jude Children’s Research Hospital

2010 Dow Lecture, Northwestern University

2010 Lecturer, Novartis Institutes for Biomedical Research

2010 NIST Colloquium Series Lecturer

Plenary Speaker, 10th Annual Oncology Research Symposium at MIT’s Koch Institute for Integrative Cancer Research (2010)

2009 Ullyot Lecturer sponsored by the Delaware and Philadelphia Sections of the ACS, University of Pennsylvania and the Chemical Heritage Foundation

**Michael Dickey**

Faculty Early Career Development Award from the National Science Foundation

**Peter Fedkiw**

Honored for his role with a start-up company by the NC State Office of Technology Transfer and the Council for Entrepreneurial Development
Richard Felder
Honorary doctorate of engineering from the University of Illinois at Urbana-Champaign

Michael Flickinger
Fellow of the American Chemical Society.

Jan Genzer
Named the Celanese Professor of Chemical and Biomolecular Engineering

Christine Grant
Inducted into Sigma Xi Scientific Research Society
American Institute of Chemical Engineers (AIChE) Minority Affairs Committee: Eminent CHE Award

Keith Gubbins
Awarded Honorary Professor position, Nanjing University of Technology, China
Taylor & Francis Molecular Physics Lecturer (biannual lectureship award), Imperial College London

Carol K. Hall
Elected to the Board of Directors of the American Institute of Chemical Engineers

Orlin Velev
Named the INVISTA Professor of Chemical and Biomolecular Engineering
2010 Alcoa Foundation Distinguished Engineering Research Award given by the NC State College of Engineering.

Phil Westmoreland
Board of Directors of the American Institute of Chemical Engineers
# Courses Taught

## Fall 2009

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<tr>
<th>Course</th>
<th>Title/Instructor</th>
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<tr>
<td>205-001</td>
<td>Chem Process Principles/Dickey</td>
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<td>205-002</td>
<td>Chem Process Principles/Bullard</td>
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<td>205-P-401</td>
<td>Chem Process Principles/Staff</td>
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<td>205-P-402</td>
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<td>Transport Processes II/Kelly</td>
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<td>Thermodynamics I/Hall</td>
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<td>Thermodynamics II/Lim</td>
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<td>435</td>
<td>Proc Control/Jasper</td>
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<td>446/546</td>
<td>Chem Reaction Design/Parsons</td>
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<td>447</td>
<td>Bioreactor Engineering/Lamb</td>
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<td>Chem Design I/Peretti/Bullard</td>
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<td>Ferm Recom Microbes/Flickinger</td>
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## Summer Session I 2009

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## Spring 2010

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<td>Chem Process Principles/Staff</td>
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<td>225</td>
<td>Chem Process Systems/Genzer</td>
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<td>Transport Processes I/Efimenko</td>
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<td>Thermo II/Hall-Phelps</td>
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<td>Thermo II/Spontak</td>
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<td>596-015</td>
<td>Engr Challenges Energy/Henderson</td>
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<td>596-016</td>
<td>Biodiesel Production Tech/Peretti</td>
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<td>597</td>
<td>CHE Projects/Khan</td>
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<td>601/801</td>
<td>Seminar/Rao</td>
<td>9/55</td>
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<td>797</td>
<td>Proposition/Ollis</td>
<td>19</td>
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<td>798</td>
<td>Adv Chem Engr Proj/Khan</td>
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## Summer Session II 2009

No lecture courses were offered
Visitors and Staff

Seminars Presented in the Department 2009-2010

**Fall 2009**

August 24
"Engineering education in five years (or sooner)"
Dr. Richard Felder
Chemical and Biomolecular Engineering
North Carolina State University

August 31
"Development and Application of Chemical and Instrumental Approaches Directed at Biomarker Discovery"
Dr. David Muddiman
Department of Chemistry
North Carolina State University

September 14
"Confessions of an Ordinary Teacher - Dealing with the Big Fish"
Dr. Carol Hall
Chemical and Biomolecular Engineering
North Carolina State University

September 23
"Dissecting the hierarchy of cellular processes underpinning recombinant monoclonal antibody production by mammalian cells"
Dr. David James
University of Sheffield, UK

September 24
"Tuning the chemical properties of thin film surfaces: From solid inorganic films to biosensors"
Dr. Andrew Teplyakov
University of Delaware

September 28
"Advances in Organic Device Design: from light collection to light emission"
Dr. David Carroll
Physics
Wake Forest University

October 5
"Allosteric modulation of Ras: a novel role for Q61 in catalysis"
Dr. Carla Mattos
Department of Biochemistry
North Carolina State University

October 12
"Aerosol Filtration"
Dr. David Ensor
Research Triangle Institute

October 19
"Programmable Molecular Self-Assembling for Nanoelectronics and Nanomedicine"
Dr. Thom LaBean
Duke University

October 26
"Nanostructures cleaved from fiber self-assemblies"
Dr. Orlando Rojas
Forest Biomaterials Sci. & Engineering
North Carolina State University

November 16
"The Importance of Being Modified: Nature’s chemical engineering of RNA"
Dr. Paul Agris
Department of Biochemistry
North Carolina State University

November 23
"The Climate Change Challenge: Modeling Technological Pathways for Mitigation"
Dr. Dan Loughlin
Environmental Protection Agency

November 30
"The river within: Measuring and mimicking the physics of mucus clearance in the lung"
Dr. Rich Superfine
Department of Physics and Astronomy
University of North Carolina, Chapel Hill

**Spring 2010**

February 3, 2010
"Analysis and Separation of Cells using Microfabricated Devices"
Dr. Nancy Allbritton
Department of Biomedical Engineering
University of North Carolina - Chapel Hill/North Carolina State University
February 8
"Anisotropic Soft Materials Structures for Photonics"
Dr. Chekesha Liddell
Department of Materials Science and Engineering
Cornell University

February 15
"Engineering bacterial population dynamics"
Dr. Lingchong You
Department of Biomedical Engineering
Duke University

February 19
"Molecules and Materials for 21st Century Needs"
Dr. Tina Salguero
Department of Energy Technologies
HRL Laboratories, LLC

February 22
McCabe Lecture
"Process Intensification (PI) at Eastman Chemical Company"
Dr. Victor Agreda
Eastman Chemical Company

March 1
"Nanostructured Block Copolymers: A Molecular and Systems Design Approach"
Dr. Richard Spontak
Departments of Chemical and Biomolecular Engineering, and Materials Science and Engineering
North Carolina State University

March 22
"Exposure Science for Chemical Risk Management: Does Exposure Imitate Art?"
Dr. Elaine Cohen Hubal
Environmental Protection Agency

March 29
"Photonic Crystal Geometry for Organic Solar Cells"
Dr. Edward Samulski
Department of Chemistry
University of North Carolina - Chapel Hill

April 12
"Entrepreneurial Innovation Based on Supercritical Fluid Coating Technology: Design, Fabrication and Pre-clinical Evaluation of a Novel Drug-eluting Stent"
Dr. James McClain
Micell Technologies

April 19
"Mechanically Adaptive Polymers"
Dr. Stephen Craig
Department of Chemistry
Duke University

April 26
"Organic and Flexible Electronics"
Dr. Jay Lewis
RTI International

May 3
Ollis Lecture
"Body-On-A-Chip: Using Biochemical Engineering Ideas For In Vitro Evaluation of Drugs"
Dr. Michael Shuler
Departments of Biomedical Engineering, Chemical and Biomolecular Engineering
Cornell University
Visiting Researchers
Michele Bruni
Hoshin Kim
Hyunjung Kim
Yoon-Mo Koo
Kyoung Wan Park

Tahira Pirzada
Daniel Ricca
Young Kuk Jhon
Yong Zheng

Post-Doctoral Researchers
Elena Blanco
Sara Blumer-Schuette
Sharvil Desai
Amit Goyal
Arif Gozen
Yazan Hussain
Ying Chun Liu
Amit Naik

Christopher Oldham
Elie Paillard
Cristelle Portet
Carl Saquing
Xuhai Wang
Erik Welf
Xingqing Xiao
Hyun-Kwan Yang

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Kirill Efimenko
Jesse Jur
Stoyan Smoukov

Laboratory Managers
Xing Lian Geng
Dhanalekshmi Sairthri

Staff
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Saundra Doby
Angela Efimenko
Diane Harper
Sheila Hayes
Gwendolyn Johnson (Retired)

Shirley Kow
Russ O'Dell
Rajani Verghese
Clarice Whitmarsh
Hubert Winston
Kit Yeung
Research Sponsors

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Battelle (US Army Soldier Systems Center)
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CFD Research Corporation (US Army)
Defense Threat Reduction Agency (DTRA)
Diosynth Rtp Inc.
Dupont
Golden LEAF Foundation
Lawrence Berkeley National Laboratory (DOE)
MeadWestvaco
National Academies – Keck Futures Initiative
National Institutes of Health
National Science Foundation
NC Biotechnology Center
NC State Faculty Research and Professional Development
NC State Nonwovens Cooperative Research Center
Nonwoven Cooperative Research Center
Novozymes
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Ohio State University CAPPS
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Universit of New Mexico (NSF)
University of Utah (DOE)
University of Virginia (DHHS)
US Air Force Office of Scientific Research
US Army
US Army Research Laboratory
US Department of Agriculture
US Department of Energy (DOE)
US Navy - Office of Naval Research