Chemistry and Biochemistry
Teaching coupled with Research

Faculty:
- 21 tenure track: (2 Assistant, 4 Associate, 15 Full)
- 3 Lecturers
- 1 MS DE Coordinator
- 1 NMR/MS Director
- 3 lab Coordinators/Instructors

Staff
- 3 Admins

UG and Grad Students
- ~ 200 majors:
  - 60 Graduates / year (45 BS, 15 BA)
- ~ 200 minors
- 75 graduate students
  - 40 in traditional program (11 graduates in 2014/15)
  - 5 in Corporate DE MS (5 graduates in 2014/15)
  - 30 in new Chemical Studies DE MS (14 graduates in 2014/15)

Teaching & Research linked

Department of Chemistry and Biochemistry
Why choose chemistry?

- Challenging and rewarding subject: BS, BA, minor
- Student involvement in research:
  - over 70% of majors participate in research
- Modern and powerful instrumentation accessible to students
- High employment rate after graduation:
  - > 90% of UNCW chem graduates are employed
  - median annual salary $45,000
- Develop important skills:
  - Analytical, technical, communication, teamwork, leadership
- Close mentoring by faculty
- Diverse career opportunities:
  - Industry, medicine, academia, teaching
Major Requirements
first 2 years

- General Chemistry (CHM 101 and 102, 8 cr)
- Calculus (MAT 161 and 162, 8 cr)
- Physics (PHY 101 and 102 or PHY 201 and 202, 8 cr)
- Organic Chemistry (CHM 211 and 212 + lab, 8 cr)
- Biology (BIO 201, 4 cr)
- Quantitative Analysis + lab (CHM 235, 4 cr)

- Chem requirements 40 cr
- General studies 20-24 cr
BS and BA requirements (blue)

BS requirements (teal)
(American Chemical Society certified)

**Juniors**
- MAT 261 and 361 or 335 (4,3)
- P-Chem + lab (CHM 320, 321, 5,4)
- Biochem (CHM 365, 3)
- Adv. Org. Chem (CHM 312, 2)
- Advanced lab (CHML365 or CHML312 (2)
- Intro to Research (CHM 350, 1)
- **Total Cr = 24 BS, 11 BA**

**Seniors**
- Inorganic Chem + Lab (CHM 445, 4)
- Instrumental + Lab (4)
- Senior seminar (CHM 495, 1)
- Elective (3) or
- **Research (DIS or Honors (CHM491 or CHM499, 3-6)**
- **Total Cr = 12-18 BS, 7-13 BA**

**Electives**
- Environmental Chemistry
- Medicinal Chemistry
- Adv. Biochemistry
- Chemical Oceanography
- Forensic Chemistry
- Molecular Modeling
- Industrial Chemistry
- Chemistry Education

Department of Chemistry and Biochemistry
Strengthen your Degree with a
Minor in Chemistry

Requirements: (22 Credits Total)

CHM 101 and 102 – General Chemistry (4, 4 cr)
CHM 211 and CHML 211 – Organic Chemistry I and lab (3, 1 cr)

and

CHML 212 and CHML 212 - Organic Chemistry II and lab (3, 1 cr)

OR

CHM 235 and CHML 235 – Quantitative Analysis and Lab (2, 2 cr)

Plus 6 Credits at the 300 – 400 level:

CHM 312 – Advanced Techniques in Org. Chem. (2 cr)
CHM 320 - Physical Chemistry I:
  Quantum Mechanics and Spectroscopy (4 cr)
CHM 321 – Physical Chemistry II:
  Thermodynamics and Kinetics (3 cr)

CHM 365 – Biochemistry I (3 cr)
CHM 377 – Environmental Chemistry (3 cr)
CHM 380 – Forensics Chemistry (3 cr)
CHM 417 – Medicinal Chemistry (3 Cr)
CHM 425 – Computational Chemistry
CHM 435 – Instrumental Analysis (4 cr)
CHM 475 – Chemical Oceanography
Degrees Awarded

2014/2015 Graduates

**Undergraduates:**
- 42 BS, 17 BA,
- Total: 59

**Masters:**
- 11 MS (local)
- 5 Corporate (DE)
- 14 Chemical Studies (DE)
- Total MS: 30
Chemistry MS: Background, Status and Goals

- Began Distance MS program Fall 2006 with 8 students
  - Initiated to help sustain our traditional MS program by being able to offer more financial support (with tuition and summer funding) to recruit and retain better, full time, graduate students and to enhance our UG, graduate and research programs
- Today ~40-50 DE students, 40 traditional students
  - 12 totally on-line courses developed and taught by UNCW faculty (same depth and breadth as local grad courses)
  - DE Students from all over:
    - U.S. Air Force, USMC, PPD, Exxon Mobil, Pfizer, 3M, BASF, Eisai, Chevron Phillips, HS teachers and from other UNC campuses and other UNCW departments.
    - Truly world-wide; recent graduate from Saudi Arabia
  - Opportunity for partnership with India’s, VSBT (Biotechnology option)
- Only Distance MS in Chemistry program in US.
  - Offers a valuable resource to the professional community (state, national and international) with potential to grow.
DE Corporate vs Chemical Studies Track

• Corporate Track, 30 credits, Students carry out research at their work place, mentored by corporate thesis advisor, write and defend thesis under direction of their committee, 2 UNCW faculty and corporate mentor)

• “Chemical Studies” developed to attract DE students from industrial and educational settings who do not have the opportunity to do research project with a corporate mentor.
  • Non-Thesis, requires 36 credits (vs. 30 for thesis based corporate and traditional tracks).
  • 9 credits must be taken from Clinical Sciences, Education or Business DE graduate courses. (Six 2 credit BUS courses earns a Business Foundations Certificate)
  • Capstone: CHM 597, Literature Review
    17 students took CHM 597 in summer 2014, 14 in summer 2015, transferring from corporate DE track.
  • 14 new Graduates in 2014/2015
  • Currently, 35 students in Chemical Studies track

• Opportunity for partnership with India’s, VSBI (Biotechnology option)
Chemistry and Biochemistry: Research

- Refereed publications
  - 2015: 20 (17 student co-authors)
  - 2014: 30 (23 student co-authors)
  - 2013: 31 (21 student co-authors)

- Grants 2010-15:
  - $5,359,000 (NSF, NIH, DOE)
  - Active: $3,623,219
  - New (2014/2015): $1,298,000

- Undergrad research students
  - DIS: 71 (14/15)
  - (Directed Independent Study)
  - Honors: 13 (14/15)

- Graduate Students
  - Local: 40
  - On-line total: 39

Department of Chemistry and Biochemistry
Research

Tom Coombs, NSF ($320,000)
“Catalytic Methods for the Enantioselective Synthesis of Enolizable Alpha-Amino and Alpha-Azido Aldehydes and Novel Applications”

Paulo Almeida and Antje Almeida: NSF ($240,000)
“Cholesterol-Phospholipid Interactions in Membranes”

Jeremy Morgan, NIH ($322,591)
“Enantioselective Synthesis of Nitrogen-Containing small Molecules”

MACRL; Kieber, Avery, Mead, Willey, NSF ($313,872)
“Ramifications of Ethanol Usage as a Biofuel: Quantifying Sources and Impacts on the Light Absorbing Properties of Rainwater”

Sridhar Varadarajan (P2D, Alzheimer's of NC)

Nathan Grove (NSF; Chemistry Education)

Rob Hancock (DOE), Ralph Mead (NSF-MRI)

Department of Chemistry and Biochemistry
Careers in Chemistry

- Agricultural Chemistry
- Analytical Chemistry
- Biochemistry
- Biotechnology
- Catalysis
- Chemical Education
- Chemical Engineering
- Chemical Information Specialists
- Chemical Sales
- Chemical Technology
- Colloid and Surface Chemistry
- Chemistry Consulting
- Consumer Product Chemistry
- Crime Lab Analyst
- Environmental Health
- Environmental Engineer
- FDA Inspector
- Food Scientist
- Teaching

- Forensic Chemistry
- Geochemistry
- Hazardous Waste Management
- Industrial Hygienist
- Inorganic Chemistry
- Materials Science
- Medicinal Chemistry
- Organic Chemistry
- Oil and Petroleum
- Plastics Engineer
- Pharmaceutical synthesis
- Pharmaceutical Sales Physician
- Product Tester
- Polymer Chemistry
- Pulp and Paper Chemistry
- R&D Management
- Science Writing
- Textile Chemistry
- Toxicologist
- Water Chemistry
Student success stories

Marco Martinez
Data Analyst
iPlant Collaborative
2014: BA Chemistry
BA Math

Kelly Mastro
Engineering Chemist
Southern Research Inst.
2009: BA Chemistry
2012 MS Chemistry

Jon Walters
Clinical Research Assoc.
Covance Pharmaceuticals
2009: BS Chemistry
2012 MS Chemistry

Sonia Gregory
Scientist II.
Glaxo Smith Kline Vaccines
2005: BS Chemistry
2007 MS Chemistry

William Kish
PhD candidate
Chemical Engineering, NC State
2012: BS Chemistry

Heather Lewis
Scientist (Synthetic Chemistry)
Ventana Medical Systems
2005: BS Chemistry
2007 MS Chemistry

Jonathan Walston
Assistant Scientist
AAIPharma
2014: BS Chemistry
Current: MS DE Chemistry

Department of Chemistry and Biochemistry
Student success stories

Lacie Chauvigne-Hines
Senior Chemist
Eli Lily Pharmaceuticals
2006: BS Chemistry
2008 MS Chemistry

Ben Stelling
PhD Student, U Florida
Quality Chem, Wilmington.
2010: BS Chemistry

Teresa Dinio Abad
Scientist, Product R&D.
Bio-Rad Laboratories
2012 MS Chemistry

Brett McCraney
Clinical Research Assoc.
INC Research, Raleigh NC
2012: BS Chemistry

Thomas Williamson
Lead NMR Director
Merck, New Jersey
1994 BS Chemistry
1996 MS Chemistry

Kim Jones
Alganomics LLC
Chair, Mathematics and Science
Brunswick Community College
1993 MS Chemistry

Charisse Stephens
Chemistry Instructor
Cape Fear Community College
2000: BS Chemistry
2005: MS Chemistry

Department of Chemistry and Biochemistry
Chemistry Summer Camps

COMPOUND CHAOS! Chemistry Camp
ages 7-10

CRIMINAL SOLUTIONS Forensics Camp
ages 7-10

THE BIG BANG Chemistry Camp
ages 11-14

FORENSICS: PORT CITY CSI Camp
ages 11-14

GIRLS IN CHARGE Chemistry and Biochemistry Camp for girls
ages 8-12

BOND GIRLS Forensics Camp for girls
ages 8-12