



Welcome to Chemical & Biomolecular Engineering



What is Chemical Engineering?

- ❁ Combines chemistry, biology, physics, & mathematics
- ❁ Focuses on the engineering & processing of materials, from synthesis through purification to end use
- ❁ Earning a BS degree in Chemical Engineering will prepare you for a wide variety of career options.

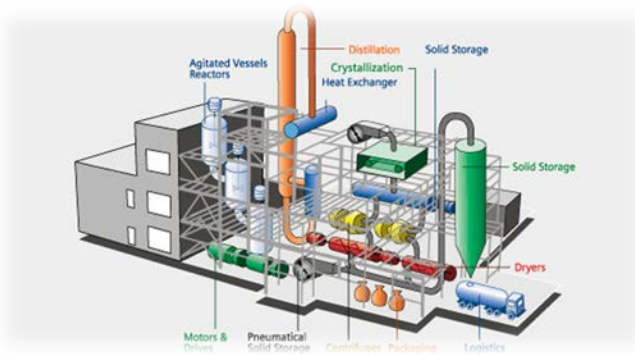
“One thing that makes chemical engineering great is that there are so many things you can do with this degree. The options are almost limitless.”

– Stephen Finley, '07



Careers in Chemical Engineering

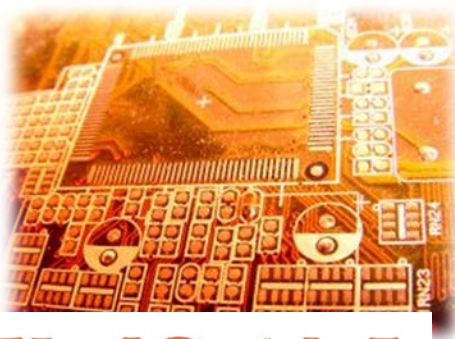
Commodity and Specialty Chemicals



Energy



Electronic & Advanced Materials

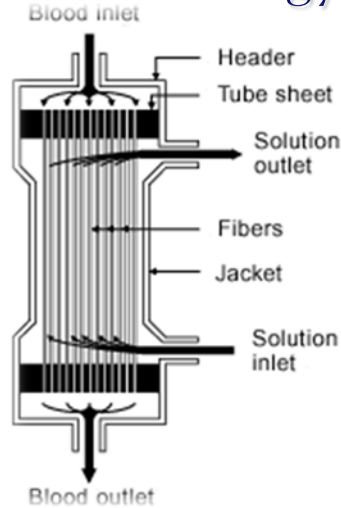


Environmental Sustainability



Careers in Chemical Engineering

Biotechnology



Food



Pharmaceuticals



Careers in Chemical Engineering

Medicine



Law



Business



Research



Academia

Recent Job Stats for Clemson B.S. ChEs

 80% entered full time employment

Average starting salary: \$70,000

(range \$55,000-\$105,000)

 20% continued academic preparation with
graduate work in engineering, medicine, or law

Advanced Career Opportunities

- 🐾 PhD: Usually required for research/development or university teaching
- 🐾 Recent Clemson grads have chosen to continue their studies at some of the following Universities:

MIT

Georgia Tech

Northwestern

UC Berkeley

Clemson

NC State

University of Texas

University of Florida

University of Virginia

- 🐾 Masters Degree: Can be used to become more specialized in a related field such as Business, Biomedical Engineering, Environmental Engineering, or other specialized disciplines. A Masters Degree is not required before a PhD.

Advanced Career Opportunities

🐾 Professional Degrees:

🐾 Medical (MUSC, UNC-Chapel Hill, Columbia U, USC)

🐾 Dental (Columbia U, MUSC)

🐾 Veterinary (UGA)

🐾 Law (USC, Columbia U, UGA)

🐾 Master's in Business Administration (MBA): usually of more value if you get a few years of industry experience first.

🐾 Professional Engineer (PE) – certification based on 5 years experience and a professional exam.

Career Path Forecast

🐾 ChEs are expected to see employment growth for the foreseeable future (US Dept. of Labor, Bureau of Labor Statistics)

🐾 Larger growth opportunities are expected in research and development, particularly in **energy**, **biotechnology**, and **nanotechnology** (Sloan Career Cornerstone Center)

🐾 **Energy, specialty chemicals, and pharmaceuticals** are likely to offer the best manufacturing opportunities for ChEs (Sloan Career Cornerstone Center)



Chemical & Biomolecular Engineering at Clemson

- 🐾 All courses & labs are located in Earle Hall
- 🐾 We occupy all of Earle Hall

We are...

- 🐾 302 Undergraduates
(sophomore, junior, senior)
- 🐾 54 Grad students
- 🐾 20 Faculty & Staff
- 🐾 1 big, happy family



The Curriculum-ChE

Freshman Year

- 🐾 General Engineering
- 🐾 Chemistry
- 🐾 Calculus
- 🐾 Physics
- 🐾 Intro to Chemical Engineering

Junior Year

- 🐾 Physical Chemistry
- 🐾 Basic Electrical Engineering
- 🐾 Statistics
- 🐾 Thermodynamics II
- 🐾 Separations
- 🐾 Biomolecular Engineering
- 🐾 Unit Operations Lab I
- 🐾 Engineering Materials
- 🐾 Emphasis Area

Sophomore Year

- 🐾 Organic Chemistry
- 🐾 Multivariable Calculus
- 🐾 Differential Equations
- 🐾 Physics
- 🐾 Mass & Energy Balances
- 🐾 Thermodynamics I
- 🐾 Fluids/Heat Transfer

Senior Year

- 🐾 Reaction Engineering
- 🐾 Unit Operations Lab II
- 🐾 Senior Process Design
- 🐾 Safety Environmental and Professional Practice
- 🐾 Process Controls
- 🐾 Bioprocess Engineering
- 🐾 Emphasis Area

The Curriculum-Biomolecular Concentration

Freshman Year

- 🐾 General Engineering
- 🐾 Chemistry
- 🐾 Calculus
- 🐾 Physics
- 🐾 Intro to Chemical Engineering

Junior Year

- 🐾 Biomaterials
- 🐾 Biochemistry
- 🐾 Thermodynamics
- 🐾 Separations/Mass Transfer
- 🐾 Biomolecular Engineering
- 🐾 Unit Operations Lab I
- 🐾 Engineering Materials
- 🐾 Physics
- 🐾 Statistics

Sophomore Year



- 🐾 Organic Chemistry
- 🐾 Multivariable Calculus
- 🐾 Biology
- 🐾 Mass & Energy Balances
- 🐾 Thermodynamics I
- 🐾 Fluids/Heat Transfer

Senior Year

- 🐾 Reaction Engineering
- 🐾 Unit Operations Lab II
- 🐾 Senior Process Design
- 🐾 Safety Environmental and Professional Practice
- 🐾 Process Controls
- 🐾 Bioprocess Engineering
- 🐾 Physical Biochemistry

Curriculum Emphasis Areas

Biomolecular Engineering

-  Concentration with the modified curriculum previously shown
-  Students receive a B.S. in ChE with a concentration in Biomolecular Engineering

Environmental Engineering and Science

Polymeric Materials

Business Management

Energy Studies

Applied Engineering, Mathematics, Science

Completion of almost any minor at Clemson

Educational Enrichment: Co-op

🐾 36% of ChBE undergraduates co-op and 49% do an internship

Ascend

BASF

Michelin

Dority & Manning (Attorneys)

Dow Chemical

Eastman Chemical

Exxon

GE

Kimberly-Clark

Milliken

Shaw

...many Others



🐾 The Co-op Program is managed through Clemson's Michelin Career Center (#1 Career Center according to the Princeton Review 2016)



Educational Enrichment: Research

About 58% of ChBE undergraduates participate in research

🌸 Departmental Research

Advanced Materials

Biofuels

Biological Separations

Biomaterials

Molecular Modeling and Simulation

Polymer Science and Engineering

Protein & Drug Delivery

Kinetics and Catalysis

Supercritical Fluids

Surface Engineering/Science

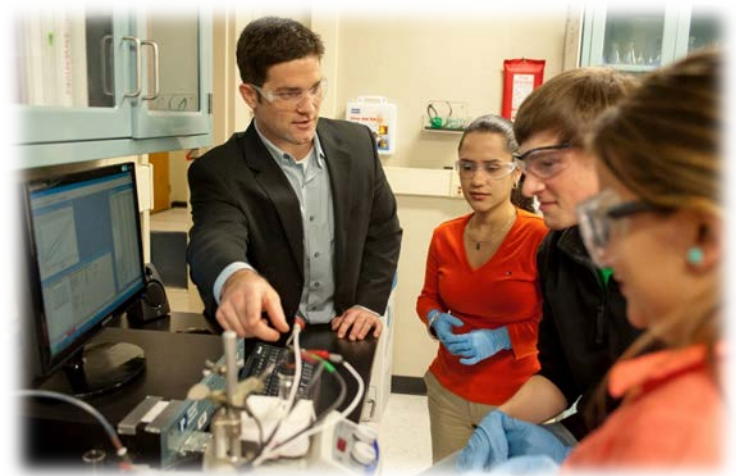
Nanomaterials

🌸 Cross-Departmental Research

🌸 Creative Inquiries

🌸 Summer REU Programs

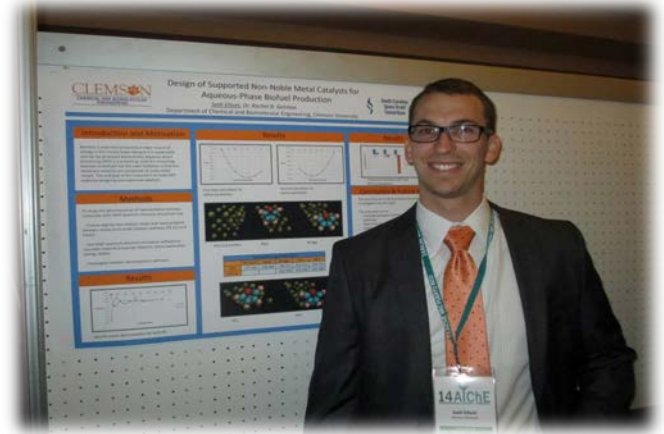
🌸 Departmental Honors



Get Involved Locally!-AIChE

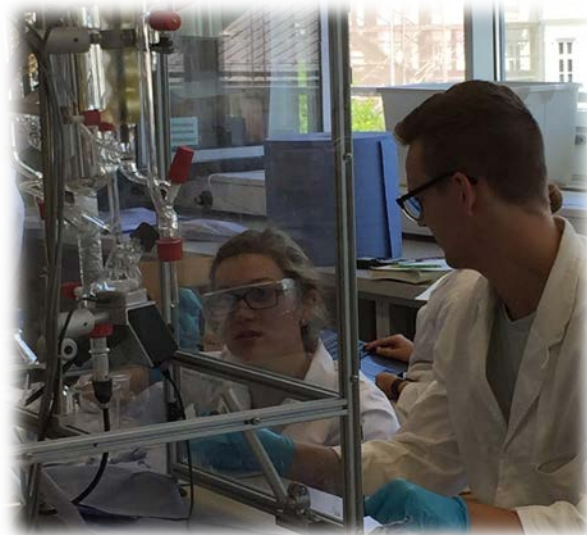
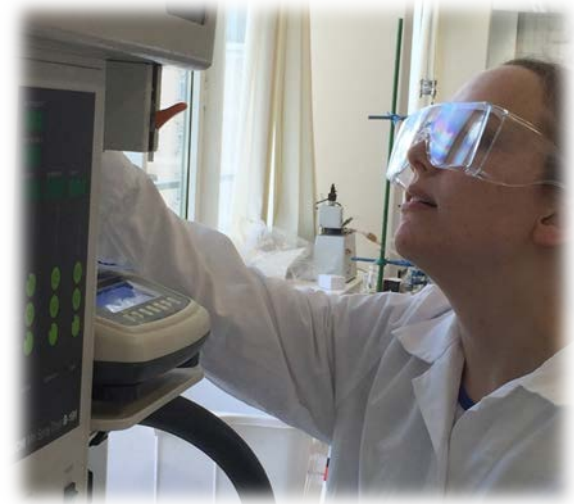
Clemson has an active Student Chapter of the American Institute of Chemical Engineers (AIChE)

- 🌸 Mentor Mentee Program
- 🌸 Industry Visits and Meetings
- 🌸 Social Events
- 🌸 National Conferences



Get Involved Abroad!

- 🐾 Department Study Abroad Program: Unit Operations II
Lab in Copenhagen, Denmark
 - 🐾 Summer before Senior Year
 - 🐾 4 week program
- 🐾 Engineers Without Borders
- 🐾 Other study abroad opportunities are coordinated through the CECAS



Department Contacts

Department Undergraduate Program Coordinator: Dr. Chris Kitchens

ckitche@clemson.edu

Undergraduate Student Services Coordinator: Joy Rodatz

jrodatz@clemson.edu

Clemson AIChE President: Olivia Layman

olayman@clemson.edu

Taylor Johnson

tmj2@clemson.edu

Shannon Roberson

slr@clemson.edu

Zander Barth

zlb Barth@clemson.edu

Coleman Gilstrap

cpgilst@clemson.edu

Alexis Cocolas

acocola@clemson.edu

Jenna Foote

jfoote@clemson.edu

David Cuntapay

dcuntap@clemson.edu

Ashleigh Helms

achelms@clemson.edu