Department of Chemistry and Biochemistry

Cal State LA New Major Orientation (Transfer, Freshmen)
Dr. Alison McCurdy, Chair

WELCOME!

Updated Summer, 2018
Some Key People:

Department Chair:
Dr. Alison McCurdy
- amccurd@calstatela.edu
- 323-343-2300, BS 336 (Department office)

Department Office Staff:
Ms. Maribel Estrada  Mr. Alex Czerwinski
- 323-343-2300, BS 336 (Department office)
Some Key People:

**Stockroom Manager:**
Mr. Bill Wimberley  
• 323-343-2345, ASCB 251

**Manager of Instructional Labs:**
Dr. Errol Mathias  
• 323-343-5648, ASCL 132

Labs: Goggles, notebook, Breakage card from the cashier!
Some Key People:

Faculty Advisors:
How can I meet with a Chemistry and Biochemistry Faculty Advisor after today?

• Principal Undergraduate Advisor: Dr. Alison McCurdy amccurd@calstatela.edu; appointments through the department office 323-343-2300

• Faculty Advisor: You are assigned based on your last name to a faculty advisor in the department. You can contact them directly by email
Some Key People (outside the Department):

Dean of the College of Natural and Social Sciences:
Dr. Pamela Scott-Johnson
• 323-343-2000, ACSB 223

Provost and Vice President for Academic Affairs:
Dr. Lynn Mahoney

President of Cal State LA:
Dr. William A. Covino
Some Key Places:

Department Office – 3rd floor
Biological Sciences
BS 336

Annenberg Science Complex:
- La Kretz Hall or ASCL (27A)
- Rosser Hall or “Wing B” or ASCB (27B)
Some Key Websites:

Department:
http://www.calstatela.edu/dept/chem

Undergraduate Handbook! – newly revised!

NSS Advisement Center:
http://www.calstatela.edu/nssadvising

E-catalog, myCSULA
Breakout Session #1

In groups of 3-4, introduce yourselves, your major, your career goals, and tell everyone something surprising about you.

(optional!)
Some general advice.....

• Talk to your professors. *Whether or not* you need help in a class!
• You need to think about your GPA (for the next stage in your career), so make sure the *balance of school and other commitments* allows you to focus on *academic success*.
• Develop your peer network – start now! (study groups, etc.)
• Rule of thumb: *Study 3 hours outside of class per unit per week*. More for harder classes!
Some general advice…..

Get involved with extracurricular activities such as:
• Chemistry and Biochemistry Club
• Pre-Pharmacy Club
• SACNAS

Depending on your career goals, there are other experiences outside the classroom:
• Volunteering at a hospital
• Getting involved in research

There is a Health Careers Advisement Office
http://www.calstatela.edu/healthcareers
KH D 1044
healthcareers@calstatela.edu
323-343-5284
Undergraduate Degree Programs

Students graduate with:

1. **Knowledge of the Field** - Theoretical and Practical
   - Chemistry and Biochemistry - the *molecular sciences*
   - New discoveries all the time
     - New molecules
     - New methods
     - Answers to problems in environment, health, etc.

2. **Problem-solving Skills**
3. **Experience with Teamwork**
4. **Effective Communication Skills**
Undergraduate Degree Programs
B.S. Chemistry or B. S. Biochemistry
• Suitable for students seeking:
  • Entry-level jobs as chemists
  • Entry into a graduate research program (M.S., Ph.D., etc)
  • Entry into health professions schools
  • Department web page has a section on careers
• Laboratory-intensive
• Department Honors Program available
• General Chemistry is the foundation; degree then focuses on subdisciplines: Analytical, Biochemistry, Inorganic, Organic, Physical
• Opportunities for Research Experiences!!
Planning for timely graduation - ALL

Know the Degree Requirements
• Know your catalog year (GE vs major)
• Degree Planner (General Catalog)
• ORDER MATTERS! Schematic of pre-requisites in major (handout); Roadmaps (handout)
  • You must finish Gchem II, MATH 2120 and PHYS 2200 before starting physical chemistry (CHEM 4420-thermo)
  • You must finish MATH 2120 and PHYS 2200 before starting physical chemistry (CHEM 4410-quantum)
• Sample 4-year and 2-year plans (department website)
• Some items to highlight in our requirements
  • If you took and passed a year of organic chemistry and lab, you must still take CHEM 3200 (Ochem II Lecture)
  • If you took and passed a year of organic chemistry and lab elsewhere, you may take CHEM 4300 (Introduction to Biochemistry) or CHEM 4310 (Biochemistry I lecture). You may need a permit to do this
• Some items to highlight in our requirements
  • CHEM 2300 (Biomolecules) is a pre-requisite for CHEM 4310 (Biochemistry I lecture)
  • CHEM 3100 (Writing for Chemists) is a pre-requisite for CHEM 4311 (Biochemistry I lab) and for CHEM 4431 (Physical Chemistry Lab)
  • CHEM 4890 (Molecular Science Capstone) counts as Upper division GE Block B- – DON’T TAKE UD GE Natural sciences!
Planning for timely graduation - Changing major

• Some differences between programs
  • While BS BIOL/MICR majors require PHYS 1100+1200, BS CHEM/BIOC majors require PHYS 2100+2200. We will not accept PHYS 1100+1200
  • While BS BIOL/MICR majors take MATH 2040+2050, BS CHEM/BIOC majors require MATH 2110+2120. We will not accept MATH 2040+2050
Planning for timely graduation - ALL

Some of your major courses “double count” for your major and for GE! So….

- BS Biochemistry majors: Don’t take any lower division GE courses in Biological Sciences, Physical Sciences, or Quantitative Reasoning!
- BS Chemistry majors: Don’t take any lower division GE courses in Physical Sciences or Quantitative Reasoning!
- **All majors:** Don’t take UD GE Natural Sciences! Instead, take CHEM 4890 (Molecular Science Capstone)
MATH Sequences for CHEM and BIOC majors

Cal State LA Students
Math Support needed

Math 1082
PreCalculus: Functions, with lab (4)

Math 1083
PreCalculus: Trigonometry (4)

OR

Math 1040
PreCalculus (6)

Cal State LA Students
No Math Support needed

Transfer Students

Equivalent of Math 1081 PreCalculus: Functions (3)

Equivalent of Math 1040 PreCalculus (6)

Equivalent of Math 2110 Calculus I (4)

Equivalent of Math 2120 Calculus I (4)

Math 2110 Calculus I (4)

Math 2111 Calculus I workshop

Math 2120 Calculus II (4)

Math 2121 Calculus II workshop

Math 2130 Calculus III (3)

Math 2131 Calculus III workshop
How do I know what requirements I still need to take?

1. Degree planner in catalog. This is for BS Biochemistry. Use it to check off major requirements as you go....

2. Degree checklist from NSS Advisement Center. Use it to check off major and GE requirements as you go...

(BUT: lists don’t tell you what order you need to do them in!)
How do I know what requirements I still need to take?

There are also Degree planners and checklists for BS Chemistry. Use it to check off major requirements as you go....
How do I know what requirements I still need to take?

3. Academic Requirements in GET. This is what matters!

(BUT: lists don’t tell you what order you need to do them in!)
This scheme shows the **order** of classes – but you must adapt it to YOUR situation (what math are you starting in, etc.)

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**ILLUSTRATION OF WHICH COURSES ARE PRE/CO-REQUISITES FOR OTHERS: BS BIOCHEMISTRY SEMESTERS**

- **Math 1040** → Math 2110 → Math 2120 → Phys 2100 → Phys 2200 → Chem 2300 Biomolecules → Chem 4420 Pchem Thermo → Chem 3600 Inorg
- **Biol 1100** → **Biology I** → Chem 2300 → Chem 3500 Quant → Chem 3500 Gen I → Chem 1110 Gen II
- **Chem 1100** → Chem 2200 Ochem I → Chem 3200 Ochem II → Chem 4310 BiochemI → Chem 4320 BiochemII + 7 units upper division electives distributed between Chem and Biology
- **Chem 3100** Writing → Chem 3100 Ochern Lab I Ochern Lab II

*Solid arrows are pre-requisites (MUST be completed with a C- or better before taking the course)*

*Dashed arrows are co- or pre-requisites (MUST be completed with a C- or better before taking the course OR during the same term as the course)*

*Satisfactory completion of GWAR is a pre-requisite*

***Also requires passing grade on the GWAR, completion of Blocks A and B4, an additional course from Block B, and at least one course each from blocks C and D.***

Remember that if you are a BS Biochemistry major, you should **NOT** take lower division GE Biological Sciences; lower division GE Physical Sciences, or lower division GE quantitative reasoning because your major coursework satisfies these requirements. **CHEM 4890** satisfies Upper division GE Block B.

Revised 7/17
What should you take this semester?
What to take first - Freshmen

• Start your math right away!
  • Do NOT take GE math classes (MATH 1000, 1020, 1090) – this requirement is covered in your major
  • DO take the math sequence that leads to MATH 2110. (where you start depends on your math placement).
• Start your majors classes right away! (CHEM 1100)
• Take NSS 1001 in your first semester
• Try to complete Block A in your first year as well
  • ENGL 1005AB or ENGL 1010
  • Other Block A: COMM 1100, Critical Thinking
What should **you** take next? **TRANSFER AND CONTINUING**

1. Check off all you have already taken. Example: you are calculus ready and you have taken Gen CHEM II.
What should you take next?
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What should **you** take next?

1. Check off all you have already taken. Example: you are calculus ready and you have taken Gen CHEM II

2. Follow the arrows from these and circle all courses you are able to take.
What should **you** take next?

1. Check off all you have already taken. Example: you are calculus ready and you have taken Gen CHEM II

2. Follow the arrows from these and circle all courses you are able to take. In this example they are Calculus I, Biology I, Quant, Ochem I, and Ochem Lab I. (And any missing GE). Prioritize classes that are pre-requisites to other classes.
BS Chemistry majors can follow the same process to decide what to take (cross off what has been taken, etc).
Planning for timely graduation

- Course offerings: some courses are offered more than once a year, some only once! See Course Offerings Schedule available on the department website.
Planning for timely graduation

If needed classes are closed:
• Come to the first day of class in case instructors can add you due to students dropping
• Sometimes additional sections are authorized, during the first week of classes if the course wait list is long enough, so be alert

As you progress in your studies, you may want to get a minor…Our department offers a Minor in Bioinformatics! There is also a minor in Forensics!
What does 1 unit mean? It depends!
What do the course numbers and number of units mean?
1000-level is Freshmen; 2000-level is Sophomore; 3000-level is Junior; 4000-level is senior. 3000-4000 level is called “upper division”
CHEM 1100† - General Chemistry I (5)

A course may include:
• Just lecture or
• lecture and lab or
• lecture and lab and recitation or
• just lab!

How do you know? Check the catalog!

For General Chemistry, there are 3 lecture units (=3 x 50 minutes of lecture) and 2 lab units (= 2 x 3 hours of lab).
Breakout Session #2

Plan what you will be taking the first two years at CSULA, in your Major.

(Later, please also add in your GE courses)

GE Notes for our major:
Block A4 satisfied by MATH 2110
Block B2 satisfied by Phys 2100
For BS Biochem only, Block B1 is satisfied by Biol 1100
Careers in the Molecular Sciences - Chemistry and Biochemistry

(FYI – only if there is time!)
For Health Professions, go to the experts for more information!

Pre-Health Professionals:
There is a Health Careers Advisement Office
http://www.calstatela.edu/healthcareers
KH D 1044
healthcareers@calstatela.edu
323-343-5284
Skills you develop as a chemistry or biochemistry major:

- Communication
- Recordkeeping
- Theoretical & practical knowledge
- Critical thinking, Problem solving
- Technical skills
- Operation of scientific equipment
- Information handling & organization
- Safety
- Teamwork

These skills prepare you for a wide variety of career choices, including graduate and professional schools!
Chemistry - the central science

• Chemists develop products to sustain/improve quality of life
• Careers cross boundaries (biology, physics)
• Not just bench work -- not working alone!

• Pharmaceutical
• Biotech
• Environment
• Forensics
• Toxicology
• Biomedical Research
• Materials/Polymers
• Education
• Sustainable Energy

http://newellfondamathandscience.blogspot.com/
Careers you may not think of…

- Technical writing
- Science Librarian
- Art restoration
- Cosmetic Industry
- Agriculture/food chemistry
- Consulting
- Intellectual Property Law
- Market Analysis for Investment Firms
- Technical sales and service
Breakout Session # 1

In your group of 3-4, each of you discuss

1. What is your career goal?
2. What motivates you to pursue that goal?
What degree are you seeking ultimately --Bachelor’s? Masters? Ph.D.?

A higher degree means…
• Higher paying jobs, lower unemployment
• Different career options
  • Teaching at a university vs. high school
  • Having a management position or not
• Different responsibilities and rewards
• Will you *be paid* for getting the degree?
Unemployment among ACS members is low.

### Table 5: Employment Status
(% of All ACS Workforce Chemists)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondents n=</td>
<td>37.9k</td>
<td>34.2k</td>
<td>44.1k</td>
<td>41.9k</td>
<td>31.0k</td>
<td>29.3k</td>
<td>18.8k</td>
</tr>
<tr>
<td>Full-Time</td>
<td>94.9</td>
<td>95.0</td>
<td>91.0</td>
<td>92.9</td>
<td>90.8</td>
<td>88.1</td>
<td>90.7</td>
</tr>
<tr>
<td>Part-Time</td>
<td>1.5</td>
<td>1.5</td>
<td>2.7</td>
<td>3.0</td>
<td>4.1</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Post-Doctoral</td>
<td>2.0</td>
<td>2.3</td>
<td>3.7</td>
<td>2.1</td>
<td>2.0</td>
<td>4.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Seeking Employment</td>
<td>1.6</td>
<td>1.2</td>
<td>2.5</td>
<td>2.0</td>
<td>3.1</td>
<td>3.8</td>
<td>3.1</td>
</tr>
</tbody>
</table>

Note: A long dash within a cell indicates summary data are unavailable.
Typical Salaries...

NOTE: Figures are median salaries for chemists who work full-time.
What are typical employers?

Industrial Chemistry Careers
• Industrial R&D (develop new technologies) and Production (translates research into scaled up manufacturing process)
• Industrial Sales, Marketing, Technical Service

Academia
• Faculty position (HS, community college, university, etc)
• Support positions (lab technicians, stockroom managers, safety officers)

Government
• National Labs
• Regulatory bodies (EPA, FBI, FDA, ATF)
What are typical employers?

UP WITH ACADEMIA More ACS members now come from academia than in 1985, but incomes in academia continue to lag behind those in industry and government.

<table>
<thead>
<tr>
<th>Year</th>
<th>Employment Type</th>
<th>Percentage</th>
<th>Median Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>Government</td>
<td>10%</td>
<td>$50,000a</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
<td>1%</td>
<td>$40,000a</td>
</tr>
<tr>
<td></td>
<td>Academia</td>
<td>22%</td>
<td>$33,700a</td>
</tr>
<tr>
<td></td>
<td>Industry</td>
<td>67%</td>
<td>$42,500a</td>
</tr>
<tr>
<td>2015</td>
<td>Government</td>
<td>7%</td>
<td>$109,000a</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
<td>2%</td>
<td>$108,000a</td>
</tr>
<tr>
<td></td>
<td>Academia</td>
<td>37%</td>
<td>$78,000a</td>
</tr>
<tr>
<td></td>
<td>Industry</td>
<td>54%</td>
<td>$115,000a</td>
</tr>
</tbody>
</table>

a Median salary for full-time employees in current dollars.
Choosing a Career…

Find a career that matches your skills, values, and interests!

1. Learn about the Job Market

• American Chemical Society (ACS) Web page, Chemical and Engineering News. Shifting economy; increased Globalization
American Chemical Society website has resources....
American Chemical Society website has resources....

http://www.acs.org/content/acs/en/careers.html
Choosing a Career…

Find a career that matches your skills, values, and interests!

1. Learn about the Job Market (continued)

  • American Society for Biochemistry and Molecular Biology (ASBMB) web page

  http://www.asbmb.org/
ASBMB Website also has resources…
Choosing a Career…

Find a career that matches your skills, values, and interests!

1. Learn about the Job Market
   - [www.onetonline.org](http://www.onetonline.org)
   - U. S. Bureau of Labor Statistics, at [www.bls.gov](http://www.bls.gov) has the Occupational Outlook Handbook. For example:

Biochemists and Biophysicists

Summary

Quick Facts: Biochemists and Biophysicists

- **2012 Median Pay**: $81,480 per year, $39.17 per hour
- **Entry-Level Education**: Doctoral or professional degree
- **Work Experience in a Related Occupation**: None
- **On-the-job Training**: None
- **Number of Jobs, 2012**: 29,200
- **Job Outlook, 2012-22**: 19% (Faster than average)
- **Employment Change, 2012-22**: 5,400

**What Biochemists and Biophysicists Do**

Biochemists and biophysicists study the chemical and physical principles of living things and of biological processes, such as cell development, growth, and heredity.

**Work Environment**

Biochemists and biophysicists typically work in laboratories and offices to conduct experiments and analyze the results. Most work full time.

**How to Become a Biochemist or Biophysicist**

Biochemists and biophysicists need a Ph.D. to work in independent research and development. Most Ph.D. holders begin their careers in temporary postdoctoral research positions. Bachelor’s and master’s degree holders qualify for some entry-level positions in biochemistry and biophysics.

**Pay**

The median annual wage for biochemists and biophysicists was $81,480 in May 2012.
Choosing a Career…

Find a career that matches your skills, values, and interests!

1. Learn about the Job Market (continued)
  
  • State of California Employment Development Department
  
Chemists in California

May also be called: Research Chemists; and Research and Development Chemists

Specialties within this occupation include: Analytical Chemists; Environmental Chemists; Inorganic Chemists; Materials Chemists; Organic Chemists; and Physical Chemists

What Would I Do?

Everything in the environment, whether naturally occurring or of human design, is composed of chemicals. Most Chemists are involved in research and development, production, or chemical analysis. In research and development, Chemists study the composition, structure, and properties of substances and the interactions between them. They search for new information about materials and look for ways to put this knowledge to practical use. They apply scientific principles and techniques using specialized instruments to measure, identify, and evaluate changes in matter. Chemists working in applied research use their knowledge to improve and create new products.

Chemists also work in production and quality control in manufacturing plants. They prepare instructions for plant workers that specify ingredients, mixing times, and temperatures for each stage in the manufacturing process. They also monitor automated processes to ensure proper product yield and test samples of raw materials or finished products to make certain that they meet industry or government standards.

Chemists often specialize in one of the following areas:
Choosing a Career...

Find a career that matches your skills, values, and interests!

2. What are your strengths and values?

• Reflect on your education, your skill set

• It is best to avoid conflicts between your job responsibilities and your values (what you feel is important)
Choosing a Career…

Think about the 6 values shown below, and do your best to rank them by importance (1 is most important)

* **Advancement** (the need for an opportunity for promotion and recognition)
* **Autonomy** (the desire for freedom and ability to be self-directed)
* **Challenge** (the drive to overcome obstacles and solve difficult problems)
* **Security** (the need for stability and predictability)
* **Balance** (the desire for equilibrium between personal and business)
* **Altruism** (the opportunity to contribute to the welfare of others)
Choosing a Career…

Advancement
Autonomy
Challenge
Security
Balance
Altruism

- What does your ranking suggest about the kind of career you would be best working in?
- What does it suggest about the type of employer (large or small; academic or industry?)?
- What does it suggest about the kind of role you might best play (research, management, project leader, other)?
Some other considerations

• What do you like to do? What energizes you?
• Do you want to do lab work/research?
• Where do you want to work?
• What do you want to wear to work?
• How often do you want to change projects?
• What sorts of hours do you want to work?
• Are you willing to travel?
• What sort of funding situation do you want to be in?
• What nonscience interests or skills do you want to use?
• How important is your income level?
• What sort of stress levels do you want to deal with?
• Would you like to work independently or as part of a team?
Choosing a Career…

Do you have the skills to do successfully what you want to do? If not, what is needed?

Can you do a particular job you’re considering? If not, what training or skills do you need to develop?

GET SOME EXPERIENCE:
Work in a research lab; do an internship at a company, volunteer at a hospital, etc.!
Breakout Session # 3

In your group of 3-4, each of you discuss:

1. What is your career goal?
2. What motivates you to pursue that goal?
While you are at CSULA, you will discover/confirm what you love to do and what your strengths are.

Combine these with your degree in Chemistry or Biochemistry and pursue a satisfying and rewarding career!

Thanks and good luck!