



Molecular Biology

> COLLEGE OF HEALTH AND SCIENCES



Unique among universities, ECU has made a commitment to supporting undergraduate research. ECU is the only regional university in Oklahoma to have a dedicated research facility for undergraduates. The Center for Undergraduate Research and Learning (CURL) laboratories houses a collaborative network of laboratories, including the Cellular and Molecular Research laboratory. These facilities host multiple active projects from the Molecular Biology department including research on Human T-cell Leukemia Virus type-1 proteins and regulation of sugar genes in bacteria.

> What is Molecular Biology

Molecular Biology is the study of life in its smallest forms. It looks at the macromolecular pieces that make up what we see around us, including DNA, RNA, proteins and lipids. Molecular biologists study the mechanisms governing molecular control of cellular processes and the interactions between various cell systems.

From the study of life, to the application of cutting edge technologies to the life sciences, molecular biologists provide the link and tie between multiple branches of the STEM fields. It has been integrated in fields such as physics and chemistry to field biology, genetics and of course, medicine.

> Faculty Mentorship

Students in the Molecular Biology program at ECU work along side faculty members within the biology department. For more information on the Molecular Biology degree, please contact these faculty members:



Dr. Alisha Howard
ahoward@ecok.edu
580-559-5792
Room 168 PES

Dr. Howard's research concerns viral mechanisms to manipulate transcription. She works with the viral oncoprotein Tax from Human T-cell Leukemia Virus to identify new host-virus interactions important in viral gene activation.

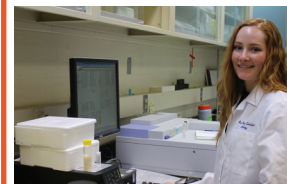


Dr. April Nesbit
anesbit@ecok.edu
580-559-5501
Room 170 PES

Dr. Nesbit's research includes studying the ability of E. coli bacteria to use various sugars. She is also studying bacteria found in the Blue River.



What can I become?



Research Scientist
(Basic, Biomedical)
Clinical Research Associate
Forensic Scientist
Scientific Laboratory
Technician
Toxicologist
Biotechnologist
Science Writer

Typical Employers

Research Institutions
Universities
Government Offices
National Institutes of Health
Center for Disease Control
Agricultural Research
Stations & Industry
Forensic Science Services
Diagnostic Laboratories
Environmental Agencies
Pharmaceutical Companies
Biotech Companies
& Startups



Show Me the Money!

Graduates with a molecular biology degree typically earn between \$33,000 and \$41,000 for entry level jobs. As a college graduate, you can earn an average of 75% more than those with only a high school degree, per *The Chicago Tribune!*

(NACE 2018 Salary Report)

East Central
University
1100 E. 14th St.
Ada, Oklahoma 74820

www.ecok.edu/molecularbio
580-559-5792



Campus Tours:
ecok.edu/take-a-tour
Begin at ECU Admin, 102
580-559-5628
admissions@ecok.edu



Molecular Biology

> DEGREE OPTIONS



Molecular Biology

Dean: Dr. Ken Andrews,
College of Health and Sciences
Chair: Dr. Mike Bay
Degree: Bachelor of Science
Concentrations: 7
Minor: 2
Faculty: 8 full-time & 2 part-time
Organizations: 4
Scholarships: 25
Location: 158 P&ES



ECU at a Glance

Undergraduate Enrollment: 3,500+
Undergraduate Majors: 70+
Student to Faculty Ratio: 18 to 1
Average Class Size: 22
Faculty with PhDs: 65%
States Represented: 28
Countries Represented: 30+
Year Founded: 1909
Campus Size: 140 Acres
Area Location: Ada, Oklahoma



Tiger Spirit

Mascot: Roary the Tiger
School Colors: Orange & Black
Student Organizations: 60+
Athletics: NCAA Division II

Men's:	Football Baseball Basketball	Cross Country Track & field
Women's:	Basketball Volleyball Softball	Soccer Cross Country Track & field

✓ What do Molecular Biologists do?

> DRUG MANUFACTURE AND DESIGN

Development of targeted drugs based on molecular mechanism and production of vaccines. Design of new or improved tools for diagnosis and detection of disease.

> MEDICINE AND HEALTH

May go on to train as physicians, dentists, veterinarians or genetic counselors. Molecular Biology provides a basis to understanding genetic mutations, protein functions, signaling pathways and applications for disease.

> BIOTECHNOLOGY OR RELATED AGRICULTURAL INDUSTRIES

Creation of genetically modified organisms such as crops that are more resistant to frost, drought, disease or pests. Develop bioremediation tools and organisms through pathway biosynthesis.

> FORENSIC SCIENCE

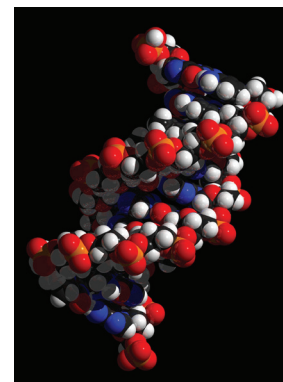
Work on criminal investigations through examination of various biologicals.

> EDUCATION

Science educators are in high demand in schools across the country. Or work as a curator in a museum.

> OTHER INDUSTRIES

Sectors such as science policy, science writing, and schematic illustration.



✓ Techniques of Molecular Biology

- ▶ DNA Sequencing
- ▶ Gene quantification
- ▶ Protein Engineering
- ▶ Molecular Cloning
- ▶ Genome Editing
- ▶ RNA interference

- ▶ Forensic Profiling
- ▶ Immunoprecipitation
- ▶ In vitro DNA synthesis (PCR)
- ▶ Site-directed Mutagenesis
- ▶ Directed Evolution
- ▶ Molecular Painting

✓ Department of Biology

The Department of Biology offers majors in four bachelor degree concentrations. A Bachelor of Science is designed for students who plan to become practicing biologists in industry or government, or plan to pursue a graduate degree in biology.

This degree concentration is usually chosen by those students who need pre-professional training before entering the schools of medicine, dentistry, veterinary medicine, or other health-related professional schools. A Bachelor of Science for Teacher Certification gives a prospective science teacher an appropriate academic background in biology and in the methods of teaching. The Bachelor of Science for Molecular Biology prepares students for graduate

research, medical school and admission exams, and/or employment in the rapidly growing fields of biotechnology, agribusiness, industry, law enforcement, and molecular biology.

A Bachelor of Science for Clinical Laboratory Science prepares students to conduct and supervise complex medical tests, clinical trials, and research experiments; manage clinical laboratories; and consult with physicians and clinical researchers on diagnoses, disease causation and spread, and research outcomes. This degree concentration requires three years of prescribed study on campus followed by a year of clinical training in an approved hospital School of Clinical Laboratory Science.