TAB L

COLLEGE OF SCIENCE

■ = School ■ = Department ■ = Undergraduate ■ = Graduate program ■ = Interdisciplinary

(x/y) are three-year average (enrollments/graduates)
Based on AY2012-15 Baseline Data

School of Life Sciences

Biochemistry & Biophysics	Integrative Biology	Microbiology	Mathematics	Statistics	Physics	Chemistry	Phasing Out	Interdisciplinary Programs
Biochemistry & Biophysics B.S. (190/23)	Zoology B.S. (266/39)	Microbiology B.S. (304/74)	Mathematics B.S. (164/32)	Statistics M.S., Ph.D (42/18)	Physics B.S. (116/24)	Chemistry B.S. (210/36)	General Science B.S. (677/116)	Environ. Science
Biochem. & Molecular Bio B.S. (NEW)	Biology B.S. (829/120)	BioHealth Sciences B.S. (284/78)	Mathematics M.S., Ph.D (65/18)	Data Analytics M.S., certificate (NEW)	Physics M.S., Ph.D (43/8)	Chemistry M.S., Ph.D (113/19)		Molecular & Cellular Biology
Biochemistry & Biophysics M.S., Ph.D (26/5)	Zoology M.S., Ph.D (50/6)	Microbiology M.S., Ph.D (36/7)						Water Resources

College of Science and OSU faculty involvement in B.S. in Biochemistry and Molecular Biology.

This new undergraduate degree program will involve faculty from all departments in the College of Science as well as faculty from across the university, including:

College of Agricultural Sciences: Botany and Plant Pathology

College of Liberal Arts: School of History, Philosophy and Religion; School of Psychological Science;, School of Language, Culture and Society; School of Public Policy

College of Engineering: School of Electrical Engineering and Computer Science

College of Public Health & Human Sciences; College of Pharmacy; College of Veterinary Medicine; College of Earth, Ocean and Atmospheric Sciences; College of Forestry

Oregon State UNIVERSITY

New Academic Degree Program: BS in Biochemistry and Molecular Biology

BACKGROUND

Program Proposed Start Date

Fall 2016

Program Description

The new degree program proposed is a Bachelor of Science (BS) in Biochemistry and Molecular Biology.

The full proposal is available at: https://secure.oregonstate.edu/ap/cps/proposals/view/92604.

The ability to sequence DNA and clone genes, starting a bit over 40 years ago, gave rise to the field now known as molecular biology, which has grown to become a dominant discipline for which OSU has no specific undergraduate degree. This new degree program addresses this shortcoming and includes options in Advanced Molecular Biology, Computational Molecular Biology, and Pre-Medicine. The first two options serve students interested in careers in the biotechnology and pharmaceutical industries or graduate work in the molecular life sciences, while the second option is designed for students especially interested in computational aspects of molecular biology. The third option is ideal for students interested in careers in medicine.

Program Context

The College of Science School of Life Sciences, comprising the departments of Integrative Biology, Microbiology, and Biochemistry and Biophysics, was formed in 2014. At that time, there were three goals identified to better serve undergraduates pursuing degrees in the life sciences: 1) movement of the Biology major to Integrative Biology; 2) movement of the General Science major to Microbiology and renaming it “BioHealth Sciences”; and 3) creation of a new major focused on “Molecular Biology” within Biochemistry and Biophysics. The first two restructuring goals have been met, and the creation of the new BS degree in Biochemistry and Molecular Biology completes the transition. The Biochemistry and Molecular Biology degree is distinct from and complements current OSU life science undergraduate degree programs by providing a path for students to obtain in-depth understanding of the biochemistry of living systems and the techniques necessary to be successful in a variety of careers as modern molecular biologists, without requiring the in-depth study of physical chemistry and biophysical methods.

The Department of Biochemistry and Biophysics will administer the degree and deliver all new content associated with the major. Additional core courses will be delivered by other College of Science departments. Elective courses as well as the mentoring of students carrying out research projects will be done by faculty from multiple colleges across campus.

Program Purpose/Relationship to University Mission and Strategic Plan

The new Biochemistry and Molecular Biology degree aligns well with OSU’s land-grant status and its strategic plan, especially helping advance the signature areas of “Improving Human Health and Wellness” and “Promoting Economic Growth and Social Progress.” The revolution in molecular biology that has occurred in the last 40 years has brought forward and continues to be the source of major advances in understanding the molecular mechanisms supporting living cells and, associated with that, the development of therapies to promote health and combat

disease and improve the quality/viability of all life forms on the planet. Advances in molecular biology are at the forefront of improvements in fields as diverse as food production and drug discovery and are driving forces expanding biotechnology-related industries. The new major also supports the third signature area, "Advancing the Science of Sustainable Earth Ecosystems," as biochemistry and molecular biology are foundational to key sustainability efforts, such as bioremediation and biofuel development. Finally, this new degree program supports OSU's strong commitment to improving the success of all students by providing students interested in molecular biology both more specific training compared with that of a general Biology degree and a relevant department home with fewer majors and a higher faculty- to-student ratio. Currently there is no optimal home for these students in any program or department at OSU.

Need for the Program

The Oregon Department of Employment has projected an average of 18% growth across 88 STEM (Science, Technology, Engineering, and Mathematics) occupations in Oregon between 2010-2020. National and state data indicate Oregon will have strong demand for STEM-trained professionals that is not being adequately supplied by current STEM-major graduation rates at OSU. This modernization of bioscience STEM training at OSU is therefore of critical importance to help the state staff the biotech industries currently here (e.g., Molecular Probes, Invitrogen, Sarepta Therapeutics) and those that will move here. The recent addition of a Genentech manufacturing center in Hillsboro is but one of what is hoped will be a steady stream of biotechnology companies moving to Oregon. Our Washington and California neighbors have vibrant biotechnology industries, and we expect program graduates will be sought after by these companies as well. The Biochemistry and Molecular Biology degree will prepare students well for six of the top ten biotech jobs that *Genetics and Engineering News* wrote in 2012 would be most in demand over the next decade: medical scientists, biological technicians, medical and clinical lab technologists, biochemists, research and development process development scientists, and regulatory biomanufacturing specialists. The Computational Molecular Biology option is particularly timely as, per a 2014 *Science* article, "big data is pouring out of life sciences research" and "for life scientists with expertise and an interest in bioinformatics, computer science, statistics, and related skill sets, the job outlook couldn't be rosier." Finally, in the February 2015 undergraduate program review of the Biochemistry and Biophysics Department, the number one recommendation from this external review was that the "creation of a Biochemistry and Molecular Biology major was considered to be an excellent and timely idea."

Program Financials

All faculty who are needed to deliver the program are already in place, and the new costs associated with delivering the program are minimal and will be phased in over four years. The personnel costs include 0.5 FTE at an Office Specialist 1 level to provide administrative support for current programs as well as the new major and an estimated 7 terms of new Graduate Teaching Assistants to handle the expected increases in class sizes in our laboratory courses and core Biochemistry lecture courses. There will also be a net cost eventually of ~$8,000 per year associated with expenses for supplies and maintenance for our expanded laboratory courses that exceed the funds collected from course fees. No expenses will be associated with recruitment as recruiting for the new major will be using the same mechanisms already in place for the Biochemistry and Biophysics major. The College of Science has committed to cover the costs associated with the new program.

The budget is summarized in the table below.

	Academic Year 2017	Academic Year 2018	Academic Year 2019	Academic Year 2020
Personnel				
Faculty	$0	$0	$0	$0
Graduate Assistants	$0	$6,375	$32,513	$46,799
Support Staff	$15,375	$16,528	$17,768	$19,100
OPE	$10,455	$16,489	$39,808	$53,980
Personnel Subtotal	$25,830	$39,392	$90,088	$119,879
Other Resources				
Net Supplies and Services	$0	$5,000	$6,000	$8,000
GRAND TOTAL	$25,830	$43,392	$96,088	$127,879

RECOMMENDATION

All appropriate University committees and the OSU Faculty Senate have positively reviewed the proposed program. The Provost recommends that the Academic Strategies Committee recommend to the Board that it approve the establishment of an instructional program leading to a BS in Biochemistry and Molecular Biology, effective Fall 2016, pending the approval of the Higher Education Coordinating Commission and the Northwest Commission on Colleges and Universities.