

# The 2014-2015 Paul Weber Award for Departmental Excellence in Teaching

## Stage One Application Cover Page



**Instructions:** Please submit this form via email, along with your application and letter of endorsement, no later than Friday, August 15, 2014 to John Whitney, Program Coordinator, at [john.whitney@louisville.edu](mailto:john.whitney@louisville.edu).

You will receive an email confirmation once your application is received. For complete application information, visit: [louisville.edu/delphi/awards/paulweber](http://louisville.edu/delphi/awards/paulweber)

### Please supply all information requested below.

Name of department/school applying for award: Biology

Name, title, and university address of primary contact person: Ronald D Fell, Chair, 139 Life Sciences

Telephone of primary contact: 852-6771

Email of primary contact: rfell@louisville.edu

100 word summary/abstract of department activities as they relate to the selection criteria (to be used in award promotional materials):

The Biology faculty in the College of Arts and Sciences are actively engaged in the teaching mission of the Department, College of Arts & Sciences, and University. Enhanced student learning experiences are sought in every aspect of the Biology program, from advising to every class in the curriculum. Student learning outcomes and their assessment have become the motivating factors in the Department's goal to enhance student learning experiences. Continued development of a curriculum assessment exam, course evaluations of analytical and writing skills, and the increased incorporation of evidence based learning strategies into the classroom are ongoing efforts to enhance student learning. The long term teaching and learning goals of the Department are to contribute to the guided recruitment and retention of more STEM majors.

August 11, 2014

To: Award Selection Committee  
2014-2015 Paul Weber Award for Departmental Excellence in Teaching

From: Kimberly Kempf-Leonard, Dean  
College of Arts and Sciences 

Re: Application Endorsement

As a discipline central to UofL's STEM education, the Department of Biology is both important and unique. Biology teaches a generous share of general education and has the largest number of majors and intended majors in the College of Arts and Sciences. And the department is attentive to best practices of teaching and learning. As this proposal indicates, the department engages students through study and experience in ways that enable them to apply scientific knowledge to issues of contemporary life. Advising is systematic and personal; technology complements classroom experience; students engage in innovative research; and assessment is efficient and measurable. For these reasons, I endorse this Stage One application for the 2014-2015 Paul Weber Award for Departmental Excellence in Teaching.

## **Biology Department 2014-2015 Paul Weber Award Stage 1 Application**

### **Section 1. Biology Department Profile**

The Biology Department is one of the largest undergraduate and graduate departments at the University of Louisville. The Department had 9016 students enroll in its classes during fall 2012 and spring 2013. Over 40 percent of these students were taking Biology general education classes. It is home to more than 400 approved undergraduate majors with another 400 intended pre-majors. There are currently 53 graduate students in Biology, 19 in the MS and 34 in the PhD programs with 11 in nondegree seeking status. The mission of the Biology Department is to identify and respond to the needs of the Commonwealth of Kentucky by providing premier opportunities in undergraduate and graduate education, by developing and disseminating new biological knowledge gained from research, and by serving as a reliable, independent source of biological information for the public, private, and governmental sectors of our society.

Biology students and faculty are exploring fundamental questions about how living organisms function, reproduce, interact, behave, and evolve. Our faculty engage students in scientific inquiry in the laboratory and in the field and teach students to think critically about issues in biology, particularly as they pertain to our daily life. The Biology program has three primary objectives: to teach students the essential concepts and methods of the biological sciences; to engage students by increasing their abilities to apply and evaluate scientific methods; and through critical thinking, connect the theory of biology with solutions to problems associated with social, cultural, and intellectual issues.

The entire curriculum emphasizes both what is known in the field of biology and how biologists acquire that knowledge through application of the scientific method, the very basis of critical thinking for scientists. Biology courses combine some form of the traditional lecture-based instruction with hands-on learning and field excursions, giving students a well-rounded and rigorous academic experience. The students form hypotheses, design experiments, critically analyze and interpret results, and present their conclusions in professional formats. They thus gain experience in the processes of biological inquiry and in the problem-solving and analytical skills that characterize scientific investigation.

Students who major in biology first complete a two-year set of introductory core courses that provide a broad content foundation in the discipline. Students can then build upon that foundation, selecting advanced biology course electives to focus on their sub-discipline of interest or to explore a new area. Advanced courses provide depth, and include both taxon-based organismal courses and courses that range widely across the many fields that comprise modern biology.

Students also have many opportunities to participate in experiential learning through participation in research projects or practical work experiences through our internship program. These valuable high impact practices as well as advanced course work prepare students to engage in the wide variety of biological careers available.

Biology student advising is unique for the 400 plus officially declared undergraduate majors. In brief, when a student applies for a Biology major at the end of their first year, a program of study form is filled out by college advisors and sent to the Department. The student is then assigned a faculty advisor and an email notice from the Department is sent to the student indicating whom their advisor is and to schedule an appointment to pick up their program of study form. This procedure results in more students actually meeting with their faculty advisor and an efficient means at helping students know exactly what courses they need to complete the degree. It also allows the Department to efficiently track its majors. Similar procedures are used when a student applies for the preliminary degree check. The preliminary degree check is sent to the student's advisor and the student is contacted by email to arrange another meeting with their advisor to pick up the paperwork. In addition, one faculty advisor is assigned to advise all transfer students; the same individual that approves transfer coursework for the Department. Having these assignments as one faculty member's responsibility maintains consistency in approving transfer classes and

advising this student cohort. In addition, the Department is currently participating in a pilot project resulting from discussions in the Persistence to Graduation advisory committee. The faculty member advising transfer students is working with GradesFirst, a new program designed to enhance communication between advisors and students and also will serve as the main program initiating an early warning alert system to identify students at risk of not meeting their academic goals and then dropping out of school.

## **Section 2. Department activities that promote teaching and learning excellence.**

The Biology Department has long history of promoting teaching and learning excellence. The faculty have always been dedicated to creating a rich educational environment for its students. A brief summary of several activities demonstrates the Department's commitment to learning excellence.

Faculty Associate Appointments – Many Biology faculty have Associate/Adjunct appointments in departments on the Health Sciences campus. Some faculty work through centers of excellence in both ecological and molecular fields, such as the Kentucky Center for Sustainable Development, the Center of Predictive Medicine for Bio-defense and Emerging Infectious Diseases and KIESD. Such collaborative appointments allow faculty to show the students working with them how to engage in collaborative relationships with others in many different learning venues across the University. These faculty collaborations have also given many students experiential learning opportunities in labs outside of their home Biology department.

Faculty Collaborations – Biology faculty have for many years collaborated on projects directly promoting teacher training with CEHD. The NSF LASMARTER grant funded several Biology faculty advisors to work with students and recruit new STEM teachers. This led to an accelerated undergraduate track in Biology that would allow students to count 9 credits of graduate work taken during their undergraduate program of study to count for toward the MAT degree. Faculty collaborated on a PRIMES NSF grant with CEHD that placed qualified undergraduate students in Biology labs as assistants to graduate teaching assistants in an effort to recruit and retain more students in the STEM disciplines. This was a successful program and enhanced both the learning of these undergraduate lab assistants as well as the undergraduate students they helped in the classroom. The Department has made this program sustainable by offering such an experience as a class for credit. Student feedback on their learning experiences has been very positive. In addition, several faculty have recently participated in the 2014 Gulf Coast Summer Institute focused on scientific teaching, active learning assessment, and diversity. They will present their experiences in this institute at a Department faculty retreat in August 2014.

Faculty Classroom Efforts - Biology faculty use a variety of classroom techniques to help students develop discipline competencies. Faculty have “flipped” a large first year Biology course to include more student interactions during lecture meetings. This “flipped” classroom involves moving students from simply acting as an audience for an instructor's lecture to more integral participation in learning the material. The lecture on “flipped” course meeting days is available digitally (Tegrity lecture) and students read the material and watch the lecture presentation before coming to class. During class the instructor provides problems, questions, activities and real-life scenarios to which the material for that day is relevant, and provides time to discuss the material and promote student centered learning. It also provides the instructor a valuable means of assessing the degree to which students have mastered the material. Other Biology faculty review current research papers in class in order to introduce and discuss new scientific findings. This enhances a student's ability to critically read and interpret scientific data in current research. Continued development of writing skills is encouraged to a greater extent in the smaller upper division classes. Writing skills are needed for answering essay questions, writing research papers, independent study projects, honors projects and seminar summaries.

Biology faculty have participated or are currently involved with a number of committees and projects that play a role in promoting teaching and learning excellence. These include the “Tuning

Kentucky” and Quality Collaboration projects sponsored by the AAC&U and Kentucky CPE. These projects have resulted in a uniform set of student competencies and learning outcomes in Biology across all state institutions. They have also resulted in curriculum alignment with LEAP standards and the DQP developed by the AAC&U. Faculty are participating on the Senate Bill 1 Steering Committee with the goal of aligning general education courses with the Common Core standards adopted by the Kentucky legislature. Lastly, the Department awards a faculty and graduate student teaching awards from an endowment specific for that purpose each year. This award must be student selected with no administrative input.

### **Section 3. Department assessment of learning**

Assessment of learning competencies and application of knowledge has been done through the development and sustained use of a specific assessment exam. Ten years ago, graduating seniors were given an exit interview in order to assess their experiences throughout their University tenure. The results were valuable but not easy to quantify. Some curricular changes were modified as a result of these interviews; however, the Department wanted better ways to assess learning. In the very first year the Weber Award was initiated, Biology submitted a proposal to develop an assessment exam that could be administered efficiently and would provide valuable information about the specific learning that occurs in our curriculum. Despite not being awarded the Weber grant, the Department found a way to make the exam sustainable through Blackboard and have used it ever since. In brief, it is an exam set up in Blackboard and given to students four times during their program of study. First as a new student at the beginning of their first semester in a Biology course, second at the end of the second semester Biology course, third after the second year in the curriculum (coincides with completion of the structured core curriculum) and fourth as a graduating senior. This assessment exam randomly draws 30 multiple-choice questions from 10 pools, each pool made up of 15-20 questions in major areas of Biology. This assessment exam has been valuable at evaluating the progress students make in their growth of Biology content knowledge and application skills. Results have been used to modify the curriculum in ways to clarify some topics, expand discussions in certain areas, address some content in multiple classes, etc. This assessment is now being used by Admissions as a placement test for entering Biology majors. It has also become part of the assessment of transfer students coming in from the community colleges and other four-year institutions. ECTC, JCTC, and Big Sandy are using this assessment as a means of helping their students prepare for the transfer to a four-year institution. In addition, faculty at the community colleges are helping develop additional questions to add to the assessment and are now developing an essay question bank that will expand the assessment tool to better assess analytical and writing communication skills.

In addition to the Biology assessment exam, many upper division elective courses also provide valuable assessment information about student learning. Our CUE courses include Undergraduate Research, Independent Study, Biology Internship, and our WR courses all directly assess student critical thinking, analytical skills, communication skills, and the ability to apply content information. At an annual faculty retreat, these evaluations are discussed and how improvements can be made at the class level or curriculum level to enhance student learning. The changes that are taking place because of these retreat discussions include the addition of more research or evidence-based instructional strategies such as: active learning, collaborative learning, inquiry learning, problem-based learning, peer instruction (undergraduate lab assistants), and case-based teaching. A composite list of student learning outcome assessments will be made and discussed at the faculty retreat during August 2014. Lastly, the Department has recently hired a new faculty member specializing in Biology Education. This faculty member will be a significant resource for all faculty wanting to enhance the classroom learning for their students.