

## School of Biological Sciences (submitted by Rachel M. Bowden, Director)

### I. Accomplishments and Productivity for FY22

#### A. Major School Accomplishments

1. According to the FY21 Research and Graduate Studies Annual report, we submitted 26 grant proposals and brought in over **\$3.8 million in extramural funding**. The faculty in Biological Sciences (BSC) remain steadfast in their commitment to securing resources to support their scientific pursuits and the training of our students. This level of extramural funding far exceeds the preliminary investment in new faculty supplied by ISU as start-up funds and teaching reassignments, and this profit is not only monetary (via IDC funds), but it also allows us to continue to provide high-quality research experiences for our students. Despite having to limit numbers in laboratories during the pandemic, we still offered **99 BSC 290/299 credits** in the past year.
2. Once again, more than half of the publications that come from BSC contain student co-authors (**45 total publications in 2020, 26 contain at least one student co-author**, but most contain two or more).
3. We have high participation in the Honors program, with **96 honors students** declared as BSC majors in Fall 2021.

#### B. Unit's goals and how they support *Educate•Connect•Elevate*

1. Recruit new TT and NTT faculty (ECE Goal 1): The faculty in BSC are committed to offering quality instructional and learning experiences for students, which includes making it possible for many of our students to engage in authentic research experiences. We are also committed to expanding course offerings that are of interest to our students. In order to accomplish these goals, we need to expand our faculty ranks to better meet the needs of our students. We are the **ONLY** unit in the College that consistently generates 20,000 credit hours per year **with only one part-time permanent NTT position**. We continue to have instructional deficits in many sub-disciplines of Biology. We requested three TT positions (Microbiologist, Neuroethologist, Restoration Ecologist) AND three permanent NTT positions last year.
2. Replenish Graduate Assistant budget (ECE Goal 1): We currently offer approximately 200 sections of laboratory courses in BSC each year, with well over half of those sections attributed to general education/service courses including BSC 101, 160, 181, 182 and our introductory majors courses BSC 196 & 197. These courses are taken by students from across the university. During a prior budget recission, we were forced to cut over \$100K from our GA budget, but the *demand for our courses has increased, not decreased*, since those funds were relinquished. Although the funds cut from our GA budget continue to be replaced each year via temporary IC, the lack of fiscal certainty from year to year makes it incredibly challenging to schedule our general education offerings and is taking a critical toll on our graduate program. We cannot recruit new graduate students if we cannot guarantee them support, and all students supported by GAs in BSC are teaching assistants. Important for the University, this pool funds most of the GAs associated with BSC 101 laboratories, which enrolls approximately 2000 students per year.

3. Update aging facilities in FSA (ECE Goals 2 & 4): After several years of increasing undergraduate enrollments and the increased offerings of several lower-level courses, the laboratory classrooms in FSA are in need of updating to provide a better learning environment for our students. At present, all of the teaching laboratory spaces in FSA that are controlled by BSC are outdated (FSA 125, 129, 134, 136), having been designed to function first as a lecture space with fixed benches in long rows, which limits the interactive nature of most laboratory courses. We requested to renovate two of those spaces.
4. Replace/upgrade laboratory equipment (ECE Goals 2 & 4): We continue to make progress maintaining and replacing equipment that was purchased in the 1990s and with the help of the college and university we continue to update equipment at a modest pace. Because we have fostered a highly collegial environment within BSC, many faculty have willingly contributed their extramural grant resources to help finance equipment that can be shared with others in the School, but this equipment is often not available for use in courses outside of BSC 290/299 with direct oversight by the faculty mentor or a graduate student with training on the equipment. To offer our students the best possible training opportunities, we must periodically update equipment as the technology changes and older techniques become obsolete. We also recognize that the emergency power in SLB presents a major issue for many pieces of our equipment. In particular, we have a number of freezers (-20°C and -80°C) and refrigerators that are on the same emergency circuits. In other instances, we have equipment that should be on emergency power, but none is available in the space, or the available emergency power outlets are already occupied. We need to rectify this situation to protect critical samples, or to prevent jeopardizing ongoing research projects of our faculty and students (e.g., undergraduate and graduate thesis/dissertation projects and work on federally funded grants).

### **C. Major accomplishments for each goal**

1. Recruit new TT and NTT faculty (ECE Goal 1): We were approved for two TT faculty searches, Microbiologist and Neuroethologist, and those searches are ongoing. We were not approved for any permanent NTT positions despite the fact that two of those positions would staff the instruction of BSC 101, including lecture and laboratory coordination. The third NTT request was to provide a permanent coordinator for our Biology Teacher Education program, which has approximately 70 students.
2. Replenish Graduate Assistant budget (ECE Goal 1): We did not receive permanent return of funds to our graduate assistant budget. However, we did receive early assurance from the Provost's office that we would have sufficient funds to support the GTAs needed to cover courses, and this allowed us to better plan our recruiting efforts and to meet instructional needs.
3. Update aging facilities in FSA (ECE Goals 2 & 4): We requested funding for two rooms (FSA 129, 136) and were approved to renovate FSA 136. Because that room is in use both fall and spring semesters, we were set to renovate in summer 2022, but were just informed that the project will be delayed and most likely not be initiated until summer 2023. This is quite disappointing, but we look forward to updating the space as soon as possible.
4. Replace/upgrade laboratory equipment (ECE Goals 2 & 4): We received funding to update the emergency power in SLB, and that project is currently underway with an anticipated completion before the end of the fiscal year. This will provide nearly all research laboratories with two

dedicated emergency circuits and will relocate outlets for those circuits to more functional spaces within the laboratories. We also received funding to update equipment for the physiology labs, including acquiring several new pieces of equipment to allow students to learn electrophysiology and to expand imaging capabilities.

**D. Specific accomplishments related to Academic program development**

1. We worked with MCN, KNR, AGR, and GEO to provide seats in BSC 160, 181, 182, 196, 197, and 201 for students in their programs. This has meant expanding class sizes, including offering additional laboratory sections for several of these courses.
2. We initiated two dual major programs, one with MCN and one with GEO, and both have started enrolling students. We also worked with AGR as they are proposing several new sequences that would require additional courses in BSC, and allow their students to take some additional elective courses in BSC.
3. We updated our Honors requirements to make them more student-friendly with the goal of increasing student participation.
4. We updated the Physiology, Neuroscience, and Behavior sequence to include additional course options – these changes are effective in the 2022 catalog.
5. The Biology Teacher Education program was Reauthorized with Distinction by the IEPP.

**E. Specific accomplishments related to Equity, Diversity, and Inclusion**

1. BSC faculty are leading Howard Hughes Medical Institute (HHMI) grant initiatives to increase retention and success of underrepresented racial minority (URM) students, in collaboration with other STEM units, the Office of the Provost and University College. These initiatives led to two seed grants of \$30K and \$50K. The team is currently working on full proposals of this work to increase retention of diverse students in our programs.
2. We worked with Lisa Mason on the design of our job ads to make them more inclusive and we advertised our positions with goal of promoting a diverse applicant pool.
3. The annual Charles Morris STEM social aims to support diverse students in STEM disciplines broadly, and provide career advice. BSC supports this worthy endeavor financially and through contributions of faculty members that participate in the evening event. Currently a BSC faculty member leads the organization of this event.
4. BSC supports the ISU Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) chapter and University College's STEM Alliance, which provide academic and professional development support, including opportunities to present research at regional and national conferences. Our chapter of SACNAS also engages in science communication to bring the research of ISU STEM students to the broader community. A current PhD student in BSC serves as the founding chapter member and president of the local chapter. BSC faculty members act as mentors for STEM Alliance students in both research and career development.
5. Members of the BSC faculty are part of the STEM Taskforce which promotes EDI policies, procedures, and programs within STEM at ISU.

## **F. Specific accomplishments related to Faculty Success**

1. We continued our efforts to provide solid mentorship for pre-tenure faculty. All new faculty in BSC are assigned two mentors, one more senior and one more junior. I also held several meetings with the pre-tenure faculty to discuss any questions or concerns they had about the ASPT process.
2. After a break in hiring with the pandemic, we are again planning for new faculty hires beyond just the current requests. This process requires faculty from across the breadth of the School to talk about the future and look for points of agreement (& disagreement) and to seek compromise. Importantly, it allows junior faculty to participate in the growth and development of the School.
3. We support a weekly seminar series within the School with speakers coming from across the country to share their research and to interact with faculty and students.

## **G. Specific accomplishments related to Student Success**

1. We are offering more hands-on, inquiry-based laboratories to promote student engagement in the scientific process. These include BSC 220, 311, 353, 354, and 370. Each of these classes allow students to test hypotheses of their own design and provides a larger proportion of our students an opportunity to participate in discovery-based research.
2. We encourage students to participate in at least one semester of independent research through BSC 290/299, and to present their research findings at local or regional meetings as appropriate. This includes presenting at the Phi Sigma Research Symposium, which is organized entirely by our student run local chapter of the Phi Sigma Biological Honor Society.
3. We support several weekly lunchtime seminar series within the School where both undergraduate and graduate students present their work. These seminars provide terrific opportunities for students to practice giving presentations in front of a “friendly” audience and promotes comradery as students learn more about each other’s work.
4. See EDI initiatives above (section I.E) that are also geared towards Student Success.

## **II. Internal Reallocations and Reorganizations in FY22**

### **A. Positions & Personnel funds**

Horticulturalist, Patrick Murphy, resigned in October 2021. We are planning to replace his position with someone that can assist with greenhouse care and campus tree tours as well as with some modest teaching in botanically oriented courses or laboratories. \$70,368 in permanent variance.

### **B. Provost’s Office funds**

RERIP: The School received \$15,000 in RERIP funds for FY22, and \$12,000 will be combined with FY21 AEF funds to renovate FSA 136 since the costs are going to be higher than anticipated. We are currently working with UMC to update some of our marketing materials and will be using much of the remaining \$3000 for design and printing costs.

AEF: The School received \$134,660 to renovate FSA 136. As mentioned above, that project is on hold until SU23. The School received \$91,003 to upgrade physiology laboratory teaching equipment. Those purchases have been made and as of FA21, students were using that equipment in BSC 220 and 283.

Other: We received \$10,571 in IC to support NTTs and an additional \$23,490 to support STS is approved but not yet received, \$126,637 in Gen Ed to support NTTs and GTAs (+ and additional \$70,416 for GTAs is approved but not yet received), \$32,873 in Summer Session funding for 6 courses.

### C. College & School funds

College: We received \$4000 from CAS to purchase new binoculars for BSC 396. This additional equipment allowed us to expand the course from one to two lab sections, accommodating an additional 18 students in this highly popular elective course. We also made several purchases from FY21 funds that were SBC'd due to the pandemic. We purchased 12 laptops and a cart for use in FSA teaching laboratories, 20 stereo microscopes for use in BSC 196, 15 compound microscopes to replace broken scopes, and we requested to shift the use of funds from an incubator shaker to replace a broken refrigerated centrifuge.

CAS holds \$100,000 of the School's funds to support the **greenhouse project** when it is initiated.

School: The School will receive \$29,079 for Dr. Paul Garris' teaching buyout to run the SHEILD lab for Fall 2021 and will receive an additional \$47,457 for Spring 2022. A portion of these funds will be used to pay summer salaries for Associate and Assistant Directors that have on campus service responsibilities throughout the summer. These funds will also be used to pay our BTE advisor for summer advising assistance and to assist in supporting summer salaries and GAs as part of start-up agreements. The remainder will be SBC'd for other teaching and start-up agreement needs in FY23.

We used, or will use, funds from our equipment line to recap computers for 7 faculty in FY22 (\$13,166 estimated) 4075 and requested to move \$12,000 to update technology and furnishings in two conference rooms (SLB 330, 406), and to help cover service contracts for equipment that is used in teaching and research.

Foundation (Unrestricted): We have spent \$4416.16 thus far on supporting seminar speakers, costs related to new faculty recruitment. We spent \$106.61 on printing charges for copies of theses and dissertations. We provided \$213.80 to support the speaker for the Charles Morris STEM social.

Foundation (Restricted): Many of our scholarships and awards are dispersed at the end of the year, but based on FY21, we anticipate spending \$11,000 in undergraduate and graduate awards, which will include travel funds to support presenting work at scientific conferences. We will also be hosting external speakers for the Brockman and Rilett seminars yet this spring, and provided \$250 from the Anderson Fund to support a land conservation seminar hosted by the ISU Hort Center. Funds were used from the Conservation Biology Teaching and Research fund to purchase supplies for the Sugar Creek living learning laboratory project.

External funding: The IDCs generated by our external grants are used to repair or replace broken

equipment, to support start-up requests for new faculty, and to provide bridge funding for research active faculty that are between grants, and can be used support service contracts for shared equipment not used for teaching.

### III. Major Objectives for FY23

1. Recruit new TT and NTT faculty (BSC Goals 1,3 &4; CAS Strategic Focus 1 & 3; ECE Goals 1, 2 &4):  
We continue to lag behind all other state schools with respect to instructional capacity (i.e., number of TT faculty and NTT faculty) in the STEM disciplines despite having higher numbers of majors than all but two other institutions, leading to critical instructional deficits in many subdisciplines of Biology. We have been able to *maintain* our faculty numbers because CAS has ranked Biology highly each year, and we greatly appreciate the support of the College. We also have several active faculty members in administrative positions including, Rebecca Darner (Director of CeMaST), Craig Gatto (Interim Chair of CHE), and Rachel Bowden (Director of BSC). We are asking to address deficits in **Restoration Ecology, Population/Community Ecology, Comparative Animal Physiology (Gletten Endowed Chair)** with TT positions. Importantly, each of these hires target popular areas within our programs and are areas where we anticipate **growth potential** based on student interest and job opportunities. These hires will also foster opportunities for collaborations and provide new areas for engaging students in research.

Dr. Cynthia Moore (retired May 2020) was our Biology Teacher Education (BTE) Coordinator and the **only** faculty member that contributed to this program; that is, *BSC does not have a single TT faculty member that can fill this gap*. We believe that the School and the BTE students would be well served by a permanent NTT position to replace Dr. Moore because that individual could be fully dedicated to teaching the required courses and serving as the BTE Coordinator. However, if such an appointment is not possible, we would request a TT faculty line to immediately replace this sole position that serves our BTE program which currently has 71 majors.

We are anticipating the 3 retirements of three ecology-oriented faculty over the next 2 years, and additional retirements in other areas in the next 4 years, including several senior faculty members across the subdisciplines of the School. If we are to continue our commitments to **individualized attention** to our students, **high-quality instruction** in the classroom, and maintaining **cutting-edge research programs**, we cannot afford to lose ground with our instructional capacity. This becomes even more acute if we are to maintain current enrollments, let alone take on additional majors. While some of these needs must be met with new TT positions, we recognize that others can be well met by having permanent NTTs. This is particularly true for some of our non-majors courses, and specifically, BSC 101 Fundamental Concepts in Biology, which enrolls approximately 2000 students per year.

2. Graduate Assistant budget (BSC Goal 1; CAS Strategic Focus 3 – Goals 1 & 2; ECE Goal 1): We currently offer approximately 200 sections of laboratory courses in BSC each year, with well over half of those sections attributed to general education/service courses including BSC 101, 160, 181, 182 and our introductory majors courses BSC 196 & 197. These courses are taken by students from across the university. During a prior budget recission, we were forced to cut over \$100K from our GA budget, but the *demand for our courses has increased, not decreased*, since those funds were relinquished. Although the funds cut from our GA budget continue to be replaced each year via temporary IC, the lack of fiscal certainty from year to year makes it

incredibly challenging to schedule our general education offerings and is taking a critical toll on our graduate program – we cannot recruit new graduate students if we cannot guarantee them support, and essentially all students supported by GAs in BSC are teaching assistants. Important for the University, this pool funds most of the GAs associated with BSC 101 laboratories, which enrolls approximately 2000 students per year.

As part of this request, I would like to increase our GTA allocation by two individuals to allow us to assign a dedicated TA to BSC 196 and 197 lectures with the goal of increasing **student success**. Although faculty currently offer office hours, we have found that students are often more comfortable asking questions of their laboratory TAs, but those TAs are not directly involved in the lectures. We hope that, by offering students access to a TA that is directly familiar with the lecture content, they will be more likely to reach out for help which will translate into better academic outcomes. These lecture TAs would hold regular office hours, run frequent review sessions, and could be an important point of contact for students that are finding the course content challenging.

3. Update aging facilities and equipment (BSC Goals 1 & 2; CAS Strategic Focus 2, 3 & 4; ECE Goals 2 & 4): All of the teaching laboratory spaces in FSA that are controlled by BSC are outdated (last renovated sometime in the 1980's), and includes FSA 125, 129, and 136 (*scheduled to be renovated*). Renovation of these spaces will provide students with a better environment for learning, and for FSA 125 and 129 which are used for lecture and discussion courses in addition to laboratories, will allow these rooms to better serve varied instructional needs by removing fixed low benches and replacing them with tables or pods that can be rearranged as needed. Similarly, we are continually faced with the need to update equipment as it reaches the end of its useful lifespan or as techniques in modern biology change. We offer a number of popular majors and sequences within BSC for undergraduate and graduate students, and part of the reason these programs are sought after is that *students have the opportunity to participate in hands-on learning experiences in both research and teaching laboratories*. While faculty are principally responsible for acquiring new equipment for their research programs, the School/College/University provides support for equipment needed for teaching laboratories. As part of this request, we would like to update equipment associated with the biotechnology (BSC 220, 353, 354) and microbiology (BSC 260, 363/463) laboratories. We are also requesting funds to update equipment for use by Biology Teacher Education students (BSC 161, 231, 307), and to purchase new equipment for Avian Biology lab (BSC 396).

#### **IV. Tentative SBC plans**

We were able to expend funds carried over from FY21 to fulfill start-up requests for Drs. Comte, Dahl, Dugas, Engelke, and Nietlisbach. This included equipment, personnel, contractual, and travel requests. At this point, we estimate that we will be requesting to SBC, \$95,751 in personnel, \$163,108 in start-up commitments for current and pending hires, and \$227,393 in equipment sustainability. We will also SBC \$308,610 in IDC funds.