Department of Biological Sciences

Mission Statement

To promote learning and discovery in the biological sciences while functioning as an inclusive academic community that is supportive, collegial, challenging and rewarding, and that values the personal and professional development of all its members (students, faculty, and staff).

Specific goals:

- Fostering the biology education of all students (majors and non-majors), and increasing the general public's awareness of contemporary issues related to biology;
- Facilitating students' mastery of biological knowledge, engaging them in the process

Strategic Plan 2014-2020

Strategy Statement:

To become the school of choice for 450 biology majors by 2020 by offering outstanding learning and research opportunities and career preparation in an inclusive and interactive academic community.

The S&T Bio Advantage (i.e., why we will be able to successfully implement this strategy):

The BioSci faculty at S&T has an explicit and fundamental commitment to the ideal of an Academic Community. By this we mean, that the faculty and students are here for the same two reasons: to learn and to discover. Accordingly, we work closely together in a supportive, collegial, challenging and rewarding community that values the personal and professional development of all its members.

By its very nature, this Community engenders close interactions between student and faculty that is the basis for student engagement, satisfaction and success. The BioSci community will encompass:
- Close interactions of students with passionate faculty members
- Experiential learning (>>100%)
- Service learning (100%)
- Research (86.3%; ≈30% OURE)
**Theme 1. Involve all students in experiential learning**

**S&T Lever 1.1:** Require all undergraduate students to participate in some significant experiential learning activity before graduation

- **Lever 1.1** Encourage student participation in research OUREs, REUs, summer internships. Support Open Lab program.
- **Lever 1.2** Provide scholarships or awards to recognize student leadership (4 BioSci-related student clubs; BioStar awards)
- **Lever 1.3** Require Biological Sciences students take Bio 310, a Service Learning course
- **Lever 1.4** Employ students as TA’s lab assistants, graders, recruiters
- **Lever 1.5** Expand field course options

**Metrics:**
- Number of students participating in:
  - research
  - OURE’s
  - REUs and internships
  - service learning course
  - departmental employment
  - Open Lab program
- Number of field courses
- Number of student research/leadership awards

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**Theme 2. Increase number of students (226 to 450 by 2020)**

**S&T Lever 2.2.1:** Increase S&T’s undergraduate enrollment by 500 by 2020

- **Lever 1.1** Work with admissions, student recruiters, faculty interviews, high school counselors, PLTW teachers: build relationships
- **Lever 1.2** Establish a nursing school articulation
- **Lever 1.3** Exploit Project Lead The Way as recruitment tool
- **Lever 1.4** Reduce S:F ratio to 17:1

**Metrics:**
- Number of students
- Number of inquiries
- Number of applicants
- Number of admits
- Yield (1st year students/admits)
- S:F ratio
Theme 3.  Increase research productivity

**S&T Lever 1.2:** Foster innovation and creativity for faculty, staff and students

**S&T Lever 2.3:** Develop a culture of excellence in research, scholarship and creative activity among faculty, staff and students

**Lever 3.1**  Encourage students participation in OUREs, REUs, internships

**Lever 3.2**  Establish doctoral training in life sciences

**Lever 3.2**  Promote interdisciplinary Bio research initiatives

**Lever 3.3**  Internal peer review of colleague proposals

**Lever 3.4**  Reward proposal submission

**Lever 3.5**  Provide travel funds to attend regional and national meetings

**Lever 3.6**  Expand faculty research accounts (now $6,500/FTE) biotech income, alumni support, summer teaching, PLTW profit

**Lever 3.7**  Recruit additional faculty

**Lever 3.8**  Explore possibility of establishing field research station (Mill Creek or Bray CA)

**Lever 3.9**  Reward publication ($500/article)

**Lever 3.10**  Improve infrastructure: lab space; analytical equipment, etc.; establish core analytical and imaging facilities

**Metrics:** (per T/TT faculty). Source: Academic Analytics

- Number of publications
- Number of citations
- Number of conferences
- Research expenditures
- Establishment of doctoral training in the Life Sciences at S&T

Theme 4.  Improve teaching by enhancing instructional labs, incorporation of active learning strategies and educational innovations in delivery and assessment

**S&T Lever 2.5:** Modify our conventional methods of teaching

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**S&T Lever 3.1:** Evaluate current academic programs ...

**Lever 4.1**  Increase lab space; update lab equipment
Lever 4.2  
Encourage continuing professional development: CERTI (participation and presentation), eFellows grants, Provost grants, Biology Scholars, publication in education journals

Lever 4.3  
Continue faculty meetings to discuss instructional alignment, adoption of concept inventories, and assessment techniques

Lever 4.4  
Assess the BioSci curriculum for alignment with the Vision and Change guidelines; apply for Vision and Change certification.

Metrics:
- Number of research labs
- Lab area per T/T faculty
- CERTI programs attended
- CERTI presentations by faculty
- Number of eFellow
- Number of Provost grants for teaching
- Number of Biology Scholars (professional society)
- Final report and action on instruction alignment committee report
- Adoption of concept inventories
- Review, modification and adoption of new assessment techniques
- Curriculum assessed for Vision and Change guidelines

BioSci Best-In-Class (BIC) performance
S&T will be the top school of choice for Biology majors based on:
1) superior engagement of students in a dynamic, challenging and rewarding academic community
2) student satisfaction
3) student success

Metrics:
- student success
- student satisfaction (exit interviews)
- student outcome (5 year)
- student engagement (experiential learning measure)
- admissions and retention
- recruitment yield (are we the institution of first choice for BioSci students)
- graduate school placement rates
- professional school placement rates
- number of significant student/faculty interactions
- target of graduate school recruitment
Appendices

Appendix A: Departmental Organization

Department of Biological Sciences

Departmental Administration:

- Staff: Pelc, Willyard
- Chair: Aronstam
- Faculty: curriculum, recruitment, planning
  - UG Studies — Shannon
  - Graduate Studies — Huang

Faculty committees:
- Recruitment: Aronstam
- Development: Thimgan
- Seminar: Niyogi
- Fac. Recognition: Mormile
- Scholarships: Hou

Institutional resources:
- BioSafety: Aronstam
- Animal quarters: Huang
- Pre-Med: Westenberg
- cDNA Center: Aronstam

Student organization advising:
- Helix: Mormile
- Scrubs: Westenberg
- Phi Sigma: Frank
- iGEM: Westenberg
- Shannon
Appendix B: Growth in the BioSci Program

December Admissions data.
Source: Registrar.
The number of first year inquiries, applicants and admits has grown steadily, and will set new records this year. The number of BioSci undergraduates has doubled in the last 7 years.

Notes:
65-70% of all first year BioSci applicants and admits are female.
BioSci is the 3rd or 4th most popular undergraduate major in the US.
Comprehensive colleges with 6,000 – 9,000 students in Missouri (N≈6) have 400-800 biology students).
Internal transfer students accounted for 41% of graduating S&T BioSci majors in CY2013; transfers from other schools accounted for 23% of graduating S&T BioSci majors in CY2013. I.e., first year students are only part of the story; BioSci is an attractive alternate major for our own students as well as for students from other institutions.

For all of these reasons, a goal of 450 BioSci majors (up from 236) by 2020 is an achievable (if definitely aspiration) goal.
Appendix C

Interdisciplinary nature of the Biological Sciences, and contribution of BioSci to doctoral training in other departments.

Chart emphasizing the applied and interdisciplinary nature of the life sciences. The nexus between BioSci and the other departments frequently defines disciplines that can be independent academic entities in their own right. This diagram is not exhaustive; possible interactions with other departments are not illustrated (e.g., with Mathematics to define Computational and Theoretical Biology). Engineering departments in particular would benefit from access to a large cadre of US-trained students in the biological sciences for doctoral training.