Missouri S&T Physics Department
Strategic Plan 2014

I. Department's Mission
The mission of the Physics Department is to educate students in the fundamental principles
and methods of physics. This education is offered to all S&T engineering and science students at
the introductory level, principally to physics majors and minors at the intermediate level, and to
graduate students at the advanced level. In addition, the faculty pursue research activities to
educate the next generation of scientists and educators and to advance science and contribute to
technical knowledge. In all these endeavors the department strives to provide a stimulating and
challenging environment to provide all its students an excellent start toward their professional
development and to help them attain their fullest potential.

II. Department’s Vision
The Missouri S&T Physics Department will be recognized as a premier Missouri university
for physics research and teaching that excels in providing student access to world class research
programs. We aspire to produce graduates who contribute to the profession and to meeting the
scientific and technological needs of our society; to be the home of internationally renowned
faculty; and to provide the highest quality education to all students, majors and non-majors.

III. Department’s Values
1. Student-centered education – We believe that learning is optimized by close interaction
   between students and faculty both in the classroom and in out-of-class research projects.
2. Collaboration – We believe that collaboration in scholarship and teaching produces
   synergistic gains that benefit individuals, the department, and the university.
3. Participatory learning – Involving students in research and other out-of-class projects
   should be viewed as an integral part of their education.
4. Scientific literacy – All citizens must be able to understand basic science and scientific
   arguments. In addition to training the next generation of scientists and engineers and
   adding new knowledge through scientific research, we strive to promote scientific
   literacy as broadly as possible.
5. Collegiality and diversity – We welcome individuals with diverse backgrounds and
   encourage the expression of different perspectives in order to foster a thriving scientific
   community.
6. Honesty and integrity – The honest and ethical practice of scholarship and teaching are
   essential in the academic environment and we strive to instill those principles in our
   students.
IV. Strategy Statement
By 2020 the Physics Department will be the premier department among its comparator group by providing outstanding education to all classes of students it serves, and by common and easy student access to world class faculty and participation in renowned research programs.

V. Departmental Governance
The chair, with the department’s long range planning committee, determines directions for the department but is ultimately responsive to the needs and desires of the faculty. The recommendations of the chair and long range planning committee are subject to the approval of the faculty of the department. The structure is sufficiently flexible that opportunities can be captured when they present themselves.
**Theme 1:** Develop and inspire creative thinkers and leaders for life-long success.

**Lever 1.1:** Require all undergraduate students to participate in some significant experiential learning activity before they graduate.

**Action:** Promote undergraduate research participation on campus, in OUREs and in REUs.

**Metric:** 75% undergraduate research participation of 1 year or more; 100% participation in some form of experiential learning.

**Theme 2:** Enhance reputation and raise visibility.

**Lever 2.2:** Leverage S&T as Missouri’s technological research university.

**Action:** Continue undergraduate enrollment growth.

**Metric:** 100 undergraduates by 2020.

**Action:** Continue graduate enrollment growth.

**Metric:** 40 graduate students by 2020.

**Action:** Increase number of research active faculty.

**Metric:** 75% T/TT faculty with active research grants by 2020.

**Action:** Add NTT positions to facilitate faculty research and enhance teaching.

**Metric:** Add 2 NTT positions by 2020.

**Action:** Continue S&T/UMSL joint Ph.D. program.

**Metric:** 3 Ph.D.’s awarded to students in joint program annually.

**Action:** Continue participation in Missouri Physics Collaboration.

**Metric:** Offer 1 course to group every 2 years; have 5 S&T undergraduates enroll in collaborative courses annually.

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

**Action:** Promote excellence in all three missions of the institution: teaching, research and service.

**Metric:** Department S&W committee continue to determine raises based on excellence in all three missions.

**Action:** Increase scholarly publications and citations.

**Metric:** Five publications and 50 citations per T/TT faculty per year by 2020.

**Action:** Increase grant expenditures.

**Metric:** Average $100k per T/TT faculty per year by 2020.

**Action:** Continue colloquium series to bring in distinguished speakers.

**Metric:** Identify endowment to support series.

**Action:** Expand research opportunities for undergraduates.

**Metric:** 65% of undergraduate population supported by local research funds prior to graduation by 2020.

**Lever 2.5:** Modify our conventional methods of teaching and research to accommodate current and new technology that will enhance student learning and increase faculty productivity.

**Action:** Begin shared graduate course offerings with UMSL as part of our joint Ph.D. program.

**Metric:** Two shared graduate courses by 2020.
**Action:** Continue participation in Missouri Physics Collaboration.

**Metric:** Develop additional course for delivery to collaboration, and increase our undergraduate participation to 5 annually.

**Action:** Modify large enrollment courses to accommodate increasing student demand.

**Metric:** Increase capacity in Physics 23/24 sequence by 25% with no loss in educational quality.

**Theme 3:** Achieve sustainable growth to ensure best return on investment.

**Lever 3.3:** Improve facilities to enhance research and student learning, and expand experiential training.

**Action:** Identify funds for improvement of teaching laboratories.

**Metric:** $100k one-time funds for upgrading undergraduate laboratories.

**Action:** Identify new revenue streams to provide laboratory supply maintenance.

**Metric:** $15k/year identified.

**Lever 3.4:** Promote inclusion and increase diversity of faculty, staff, and students to remain relevant and competitive in a global environment.

**Action:** Increase diversity among faculty.

**Metric:** Increase number of women and underrepresented minorities by 50% by 2020.

**Action:** Increase diversity among students.

**Metric:** Increase number of women and underrepresented minorities by 33% by 2020.

**Theme 4:** Increase and facilitate meaningful access to and interaction with renowned faculty, staff, and services.

**Lever 4.2:** Enhance instructional labs and methods of developing lab experiences.

**Action:** Identify funds for improvement of teaching laboratories.

**Metric:** $100k one-time funds for upgrading undergraduate laboratories.

**Action:** Identify new revenue streams to provide laboratory supply maintenance.

**Metric:** $15k/year identified.

**Lever 4.4:** Ensure renowned faculty teach/interact with undergraduate students.

**Action:** All T/TT faculty interact with undergraduates in the classroom.

**Metric:** All T/TT faculty teach at least one undergraduate course or its equivalent per year.

**Action:** Expand research opportunities for undergraduates.

**Metric:** 65% of undergraduates spend at least one semester doing research with department faculty prior to graduation by 2020.
Best-in-Class and Strategy Targets

1. **Improve comparator score 25% by 2020**
   Score is an equally weighted composite of normalized publications, citations, and grant expenditures on a per T/TT basis. Time period is previous 5 years or whatever Academic Analytics is using.
   (Comparators: Florida Inst. of Tech., Michigan Tech, New Jersey Inst. of Tech., Univ. Alabama-Huntsville, Univ. Texas-Dallas)

2. **Increase undergraduate enrollment to 100 by 2020.**
3. **Increase undergraduate enrollment to 40 by 2020.**
4. **90% placement of undergraduates in graduate school or job within one year of graduation.**