

## **5-Year Vision Statement for UTC's Department of Chemistry and Physics**

**Vision:** UTC's Department of Chemistry and Physics is committed to exceptional teaching and scholarship through curricular innovation and undergraduate research. Our graduates will be recognized for their academic preparation and critical thinking, which are paramount in today's scientific arenas.

### **Goals**

**Goal 1: The Department of Chemistry and Physics will engage and inspire students by leading the university in excellence in undergraduate research with our majors.**

This goal ties in with CAS's Strategic Plan Goal 4

GOAL 4: The College of Arts and Sciences cultivates new knowledge through research (theoretical and applied) and creative activities that engage students, faculty, and community partners.

And UTC's Strategic Plan Goal 1

GOAL 1: Transform lives through meaningful learning experiences.

To achieve this goal, our 5-year plan is:

1. Encourage majors to participate in experiential learning opportunities by sponsoring semester information sessions on research experience on and off campus, internships through local institutions, national opportunities, and possible study abroad opportunities.
2. Support the Biophysics research program and collaboration with Health Sciences by hiring tenure track assistant professor in Biophysics/Medical Physics/Health Physics for fall 2018 (or fall 2019).<sup>a</sup>
3. Coordinate our monies from online teaching and summer teaching to provide research release (1 course per semester) to our department members engaged in active undergraduate research agendas.
4. Reinstigate semester banking to support faculty participation in summer undergraduate research and provide support and flexibility for the off-campus research projects.
5. Maintain and expand hands-on use of state-of-the-art instrumentation for chemical analysis.

---

<sup>a</sup> Hiring a tenure track assistant professor in Biophysics/Medical Physics supports all four of our goals and is therefore critical to future development of our program.

6. Support acquisition and maintenance of and/or access to the use of state-of-the-art instrumentation for physics instruction/research (Lasers, computers, telescope time).
7. Encourage intra-Department, inter-Department and inter-University collaborations whenever possible.
8. Support course release time for funded and/or well-received proposals, submitted outside of UTC, in order to provide adequate time for the faculty member to accomplish the funded goals or time to address reviewer comments, respectively.
9. Encourage all faculty members to invite at least one seminar guest per academic year with topics related to chemistry, physics and astronomy. Encourage all research students, as well as potential research students, to attend those seminars.
10. Develop collaborations with local 2-year community colleges (e.g., Chattanooga, Cleveland and Dalton State Community Colleges) through research opportunities for students transferring to UTC.
11. Establish a partnership (student internship) between the Physics program and the Department of Medical Physics of the Erlanger Hospital (contact: Dr. Marian Axente, 2007 UTC Physics graduate).
12. Continue to establish documented partnerships between research at Erlanger Hospital and the Chemistry program to support the university's initiative in health science research.
13. Encourage and support faculty who apply for sabbatical projects with understanding that it will strengthen the research foundation of the department.

**Goal 2: The Department of Chemistry and Physics will engage our students through innovative teaching pedagogy, integrating technology and best advising practices.**

This supports CAS's Strategic Plan Goal 1C & 2B

GOAL 1C: Mindfully integrate up-to-date technology and sustain best teaching practices to provide students in the College with the best possible 21st century classroom and learning experience. This includes increasing the accessibility and modality of courses that make up the General Education curriculum.

GOAL 2B: Provide instruction and enable student learning through innovative teaching strategies, including flipped classrooms, team-based learning, problem-based learning, facilitations and presentations, online and hybrid instructional delivery.

And UTC's Strategic Plan Goal 1

GOAL 1: Transform lives through meaningful learning experiences.

To achieve this goal, our 5-year-plan is:

1. Expand our courses offerings to include the UTC Experiential Learning designation.
2. Hire a tenure-track assistant professor in Biophysics/Medical Physics/Health Physics starting fall 2018 (or fall 2019) to replace a lost tenure line and to provide students

with discipline expertise to support the Biophysics Concentration. Without this hire, we will not be able to continue to offer this innovative concentration.

3. Hire another Physics lecturer starting the fall of 2019 to support offering General Education service courses and bring Physics program in proportion with UTC growth the last 20 years. This person would be primarily responsible for introductory courses in physics, general science and astronomy.
4. Review the chemistry curriculum to ensure measureable student learning outcomes that align with ACS program outcomes.
5. Expand offerings of chemistry upper-level electives (only two electives CHEM 4030 and CHEM 4220 currently exist) in innovative areas, perhaps offer as Special Topics Courses that could cross list with Physics.
6. Review and update Scientific Communication (CHEM 2810), Chemical Literature (CHEM 3820), and Chemistry Seminar (4830).
7. Provide easily accessible advisement information to students via complete renovation of department website (updating structure, ensuring information is current, annual review) and creation of a department-specific advisement guide for students (e.g. see Duke Chemistry's Handbook for Majors and College of Charleston Handbook for Majors).
8. Support faculty travel to conferences or workshops on chemical and physics education such as the Biennial Conference on Chemical Education and Building Thriving Physics Programs Workshops.
9. Apply research examples in the classroom from either faculty's own work or published work, and encourage open student discussion to promote critical thinking and encourage students to pursue post-graduate studies.
10. Encourage faculty to develop courses with a study abroad component.

**Goal 3: The Department of Chemistry and Physics will collaborate with UTC colleagues and the community to initiate strong research connections in health science.**

This supports CAS's Strategic Plan Goal 4

GOAL 4: The College of Arts and Sciences cultivates new knowledge through research (theoretical and applied) and creative activities that engage students, faculty, and community partners.

This supports UTC's Strategic Plan Goal 2

GOAL 2: Inspire, nurture and empower scholarship, creativity, discovery, innovation and entrepreneurial initiatives.

To achieve this goal, our 5-year-plan is:

1. Strengthen the Biophysics (Medical Physics) concentration, which in the past produced excellent majors accepted in top tier graduate schools (Yale University,

- Vanderbilt University) by establishing partnerships with the community and providing opportunities for student learning experiences.
2. Hire a tenure-track assistant professor in Biophysics/Medical Physics/Health Physics to replace a lost tenure track line and to provide students with expertise in this emerging research area. Without this hire, we will not be able to continue to offer this innovative concentration
  3. Develop new special topics courses that will link biophysics courses with biochemistry courses to encourage students to double major in the biophysics and biochemistry concentrations.
  4. Outreach to medical physics program at Erlanger to promote student internship program.
  5. Edit website to include focus on pre-professional support (advising, research, courses) within the department.
  6. Develop possibilities for team-teaching with other departments and cross-listing of other courses that focus on health science and other areas of interdisciplinary research.
  7. Invite medical researchers to classes to tie health research to chemistry and physics.

**Goal 4: The Department of Chemistry and Physics will grow its majors by expanding its recruitment and retention efforts.**

To achieve this goal, our 5-year plan is:

**Recruitment:**

1. Use spaces in the building to showcase the department, including hallways and first floor display cabinets.
2. Invite students who do well in our introductory courses to participate in a freshman spring seminar (both physics and chemistry combined) to learn more about our programs and research opportunities. Support these students through tailored advising and mentoring.
3. Develop degree track in chemistry to focus on pre-professional students, such as BS Chemistry: Pre-professional.
4. Hire a tenure track assistant professor in Biophysics/Medical Physics/Health Physics to advise our majors on this emerging career path
5. Review and update promotional materials that are designed to explain our programs to new and continuing students.
6. Participate in area science fairs to recruit high school students both to UTC and to the Department.
7. Advertise the accomplishments of the chemistry and physics students beyond research-related activities (e.g., fellowships, graduate schools, medical schools, industry, etc...) using our hallways in Grote Hall.
8. Increase our participation in the Honors program teaching.

9. Develop advisory group of industry professionals and alumni to help direct future progress in chemistry and physics.

**Retention:**

1. Increase our out of classroom interaction with our students by offering receptions twice a semester to highlight department activities.
2. Celebrate our students who have won awards and scholarships through the spring awards ceremony and social media.
3. Expand opportunities for student-faculty interaction and networking outside the classroom (e.g. aggressively recruiting for student based clubs in both chemistry and physics).
4. Evaluate retention through a data-supported study which includes factors such as gender, race, major migration, GPA, ACT, and graduation rate to help determine areas in which we can affect improvement in retention.
5. Work closely with professional advisors and reach out to our freshman and sophomore students to make sure they stay in touch with the department.
6. Designate a faculty member in the Physics program who will coordinate departmental advising for the physics majors.
7. Introduce students to professional opportunities as early as possible, such as using gift funds to sponsor free introductory memberships in ACS and future memberships in APS.
8. Partner with University Career Services to make students aware of career opportunities that do not necessarily involve graduate, professional school or STEM education.
9. Encourage and support student and faculty participation in the local chapter of ACS, local chapter of the SPS, volunteering at the Observatory, and outreach programs at the Creative Discovery Museum.
10. Develop a database of department alumni in order to solicit involvement through information exchange and mentorship.