

**Illinois State University  
Physics Department  
2017-2022 Strategic Plan**

Physics Department  
Daniel Holland, Chair  
September 1, 2017

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## **Foreword**

This strategic plan was produced by the Physics Department faculty and staff during a departmental retreat on August 16 & 17, 2017. The starting point for this document is the departmental strategic plan from 2006.

## **Illinois State University Physics Department Mission Statement**

*The mission of the Illinois State University Physics Department is to*

- a) Provide a high quality undergraduate physics experience, offering physics, computational physics, and physics teaching degrees as well as a dual degree program in engineering and physics, with the goal of becoming the first choice school in physics for Illinois students.
- b) Carry out research and scholarship that is recognized on a national and international level.
- c) Maintain and expand a vigorous undergraduate research program that is second to none nationally by providing a supportive learning environment in which undergraduate students are active participants in forefront research.
- d) Provide meaningful co-curricular activities, offering students significant experiences applying their skills and knowledge to a variety of out-of-class projects.
- e) Maintain the preeminent undergraduate physics teacher education program in Illinois and further establish its national reputation.
- f) Provide a robust computational physics program, including integration of computational methods into all physics major courses and offering a bachelor's degree in Computer Physics, unique in the nation, focusing on computer simulation of physical systems.
- g) Maintain and continue to develop effective courses that support the University-wide commitment to general education.
- h) Provide a strong outreach and public education program that extends to members of the campus, the wider community, and the profession, and which serves the public interest by sharing our experience and expertise through educational activities, scientific analysis and explanation, and a continuing effort to foster scientific literacy.

### *Discussion*

Based on conferences and publications in the past several years, the department has become aware that our focus area triad of (1) undergraduate research, (2) computational physics, and (3) physics teacher education have become increasingly important on the national scene. The fact that Illinois State was ahead of the game means that we have become one of the leading departments, nationally, in these areas. The department feels strongly that we should continue leadership in these areas while building our expertise and influence in the complementary areas of applied physics and outreach. The mission statement remains general to accommodate both these current and future strengths.

The department also has developed a set of core values (next page), consistent with this mission, designed to provide a foundation for progress in the coming half decade.

**Illinois State University Physics Department  
Core Values Statement**

1. **Student-centered education** – whether in the classroom or in out-of-class research projects and activities, we believe that learning is optimized via close interaction between students and faculty teachers and mentors.
2. **Focused research** – Research and scholarship are central to the academic department. As a small department we will be more effective at generating new knowledge through scientific research by concentrating on a relatively small number of selected research fields rather than dabbling in a wide variety of subfields.
3. **Teacher/scholar model** -- We believe that scholarship informs and motivates teaching and vice-versa.
4. **Collaboration** – We believe that collaboration in scholarship and in teaching can produce synergistic gains that benefit the individuals involved as well as the institution.
5. **Participatory learning** -- involving students in research work, and other out-of-class projects, should be viewed as an integral part of their overall education.
6. **Scientific literacy** – In a democracy in the current technical age, all citizens need to be able to understand basic science and scientific arguments. In addition to training the next generation of scientists and adding to the body of new knowledge, our primary public service is to promote scientific literacy as broadly as possible.
7. **Teacher education** -- Educating future high school physics teachers results in better prepared future college students, future scientists, and citizens.
8. **Flexibility** -- In a rapidly changing society the department needs the ability to adapt planning in response to change and to emerging opportunities.
9. **Collegiality and Diversity** – The Physics Department welcomes individuals with diverse backgrounds and encourages the expression of different perspectives in order to foster a thriving scientific community.
10. **The Honest, ethical practice** of scholarship and teaching are essential in the academic environment and we strive to transmit those principles to our students.

## Strategic Plan 2017

### **Goal 1: Maintain and enhance a high level of research, scholarship, and external funding.**

Strategies:

- a) Increase expectations of research productivity.
- b) Encourage grant applications through release time.
- c) Facilitate connections with granting agencies.
- d) Allocate travel funds for grant writing workshops and meeting with funding agencies.
- e) Investigate and encourage opportunities to partner with other departments and universities
- f) Encourage applications for education grants and REU/RUI grants

### **Goal 2: Enhance undergraduate research and co-curricular projects.**

Strategies:

- a) Encourage increased student research participation with research fellowships and student travel funds.
- b) Encourage student presentations at regional and national conferences.
- c) Investigate possibility of a capstone project for Physics Majors
- d) Provide opportunities for student field trips to regional research centers
- e) Encourage attendance at colloquium by faculty and students
- f) Develop an online storage mechanism for videos of departmental colloquia.
- g) Develop a regional undergraduate research symposium

### **Goal 3: Enhance the computational physics program.**

Strategies:

- a) Maintain faculty expertise and research productivity in computational physics.
- b) Increase awareness of Computational Physics program through increased marketing, particularly to high school and transfer students.
- c) Enhance computational infrastructure (software and hardware)
- d) Include computational projects throughout the curriculum.

### **Goal 4: Enhance student recruitment and retention.**

Strategies:

- a) Improve recruitment of high achieving students through programs such as Physics Discovery Day and Redbird Days and Nights.
- b) Work with University Marketing to develop improved recruitment information.
- c) Work with CAS-IT to improve the Physics Department web presence.
- d) Leverage the Computational Physics program to recruit high achieving students.
- e) Enhance scholarship opportunities for incoming and continuing students
- f) Explore disciplinary programs such as Biophysics, Materials Physics, Pre-professional (include business minor) and applied physics.
- g) Enhance community-building opportunities for physics majors
- h) Improve Adjuvant computer lab space to meet student needs.
- i) Collect and publicize stories of student success.
- j) Establish better relations with community colleges.
- k) Establish guaranteed transfer agreements with engineering programs for Engineering Physics Majors
- l) Install a monitor near the Physics Office to publicize physics events.

**Goal 5: Enhance the experimental and applied physics program**

Strategies:

- a) Upgrade both the lower division laboratory and advanced laboratory experience through the development of new experiments and new equipment.
- b) Explore the development of an engineering and applied physics program.
- c) Support the development of a university-wide maker space

**Goal 6: Strengthen relationships with employers, provide internship opportunities for students and enhance alumni giving.**

Strategies:

- a) Establish an alumni/employer relations liaison
- b) Establish relations with local employers

**Goal 7: Enhance Undergraduate education**

Strategies:

- a) Evaluate assessment mechanisms of teaching
- b) Evaluate upper division elective offerings
- c) Enhance student advisement, including hiring a departmental advisor.
- d) Explore opportunities for team teaching of courses

**Goal 8: Enhance the Physics Teacher Education program.**

Strategies:

- a) Fully endow awards and scholarship for PTE students
- b) Add additional staff as resources allow: a teacher-in-residence, additional student-teacher supervisors, etc.

**Goal 9: Further develop outreach and public education programs.**

Strategies:

- a) Upgrade the planetarium to modern standards
- b) Enhance outreach to high school and community college students through programs such as Physics Discovery Day, Celebrating High School Innovation and STEM related competitions.
- c) Enhance connections with CeMaST
- d) Develop a regional undergraduate scientific research symposium
- e) Deepen our current partnerships with community resources such as the Children's Discovery Museum, the Challenger Learning Center, the Twin City Astronomers. and local businesses and civic groups.
- f) Explore external funding opportunities for outreach and public education projects.

**Goal 10: Maintain flexibility and adaptability.**

Strategies:

- a) Continually evaluate trends in physics to take advantage of emerging opportunities.
- b) Work to get our people into visible and influential positions to help direct opportunities.

**Assessment of Objectives**

We have attempted to write strategies that are clearly measurable. As part of the annual budget process, the department will assess progress in achieving objectives.