What will the physics department of 10 years from now look like?

Reimagining Physics Departments as Trends in Higher Education

Break the Mold for Past Designs

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2015 Physics Department Chairs Conference

Why are you here?
Recruiting and Retaining Faculty Colleagues
Recruiting, retaining and mentoring students
Getting resources for faculty members
Managing colleagues
Managing the curriculum and the physics co-curriculum
Optimizing pedagogical approaches
Finding resources for research
Facilities, Labs, ...
What Most Shapes Physics Departments and what they do?

Teaching non-physics students (e.g., for pre-med, chemistry, engineering, ...);

Preparing students for graduate study;

Preparing students who want to teach physics;

Cultivating physical intuition;

Advancing research in physics;

Serving the common good.
What mold defines physics departments?
(is it global or local)
Lectures, labs, textbooks;
Developing reasoning and problem solving;
Exploring canonical knowledge;
Hiring and retaining faculty members with research specialties;
Adding new courses on special topics or electives;
Serving non-physics majors with gen-ed and pre-X surveys;
Vertical/sequential structure to the curriculum -- spiral
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Trends in Higher Education
(and physicists have been leaders in education reforms)

Interdisciplinarity, using latest discoveries,
Addressing student experience and community relevance;
Real world problem solving;
Team teaching; linking different courses in different fields;
Focus on outcomes/testing;
Group work, student-centered instruction; use of technologies
What has changed for physics?

Declining numbers of majors and enrollments in some cases;
Wider diversity of students and their preparations;
Pressure to close upper level classes with low enrollments;
Harder to find external funding for research;
More new discoveries and understandings with no time in the curriculum to cover them all;
Technology eases data acquisition, analysis, and presentation;
Increasing need to indicate to students what physicists do and why they enjoy it.
Opportunities for the Future of Physics and Physics Departments

Include nonlinear dynamics, single atom trapping, complexity;
Include fundamental forces, big bang, elementary particles;
Include macroscopic quantum mechanics;
Explore organic materials and their properties;
Introduce doubt;
Mentor new faculty members as teacher/scholars;
Address topics relevant to students’ lives.
My Advice on Planning and Change

When planning, imagine the future 20+ years away when all current personalities and barriers may be gone; while you develop action steps for the next few years.

Cast out the template; Break the mold.

Make it exciting; cultivate discovery and innovation.

As you add, subtract.
Resources beyond those in Physics:

Council on Undergraduate Research and the National Conferences on Undergraduate Research

Project Kaleidoscope

NRC: Committee on Undergraduate Science Education

American Association of Colleges and Universities