Institutional change research
• Emily van Zee has been studying the change process
  http://physics.oregonstate.edu/portfolioswikitoolkit:start

Community college transfer students
• Behind by a few courses when transferring.
• Must be able to finish Physics major in two years.
• Want to reduce extra coursework Fall of junior year.

4-year students
• Challenging transition to upper-division in junior year.

Coupled curricular changes
• Changes in major that could not be made in isolation.

New faculty
• The Paradigms’ success came from faculty buy-in.
• Newer faculty lack an understanding of the curriculum.

Paradigms 2.0 process

Information gathering
• Survey of faculty and students.
• Interviews of faculty teaching existing courses.
• Index cards describing concepts and subjects taught.

Card sorting
• Established dependency relationships between cards
• Sorted concepts and subjects into courses
• This resulted in a proposal for a revised set of courses.

Discussion with faculty
• One-on-one meetings with faculty presenting courses.
• This resulted in several revisions.
• One faculty meeting to present final proposal.
• Hallway discussions over one week.
• Faculty meeting to discuss and vote on the proposal.
• Consensus!

Why reform the Paradigms?!

Research question:

How to develop consensus?

Changes made

Physics of Contemporary Challenges
• Replaces Modern Physics, but taken earlier.
• Focuses on “real-world” topics important to society.
• Teaches estimation and conceptual reasoning skills.

Techniques of Theoretical Mechanics
• Replaces senior-level classical mechanics, but earlier.
• Teaches mathematical reasoning and sense-making.

Math Methods becomes "Math bits"
• Formal course replaced with just-in-time math.

5-week Paradigms
• Previously our junior-year course were 3 weeks long.
• Maintained 7 hour/week daily schedule.
• Three 2-credit courses → Two 3-credit courses.

Computational Laboratory
• Require our 1-credit computational lab.

Less Electronics required
• From 6 credits to 3 credits of electronics required.

More electives
• From 3 credits to 6 credits of upper-division electives.

Additional courses for transfer students

Year 1
Fall
• Differential calculus
• Freshman seminar

Winter
• Integral calculus
• Calculus-based physics I

Spring
• Multivariable calculus
• Calculus-based physics II

Year 2
• Linear algebra
• Differential equations

Year 3
• Vector calculus
• Theoretical mechanics

Year 4
• Computational Physics
• E&M capstone

Thesis Research
• Quantum capstone

Thesis Research
• Particle physics

Biophysics

Astrophysics

Computer interfacing