

## Evolution of Interdisciplinary Academic Programs

- Evolutionary Trends
- What we have at NC State University
- What we could have at NC State University

BIO

NANO

ENVIRO

ECO

TECH

SYSTEMS

OMICS

SOCIO

STUDIES

GENO

## Evolutionary Trends: Interdisciplinary Academic Programs

- ID academic programs are engaging more traditional disciplines
- ID academic programs are increasing in sophistication
- Live in increasingly complex world
  - World becoming more complex
  - Understanding is becoming more sophisticated
  - Topics fall outside domain of traditional academic departments

**BIO OMICS?**

**NANO SYSTEMS?**

**ECO TECH?**

**SOCIO STUDIES?**

**GENO SYSTEMS?**

## Types of Academic Programs\*



Disciplinary Academic Programs



Multidisciplinary Academic Programs



Interdisciplinary Academic Programs

**\*Modified from Jim Collins, NSF**

## What We Have at NC State University

- Traditional College Structure
- Funding from Provost to colleges, college to department
- Departments administer ID programs
- UCCC for review of courses and curricula
- 900 students currently in ID & IDept. Programs (3% students)
- Little change in enrollments or curricula in six years

**GENOMICS**

**OPERATIONS RESEARCH**

**ENVIRONMENTAL SCIENCES**

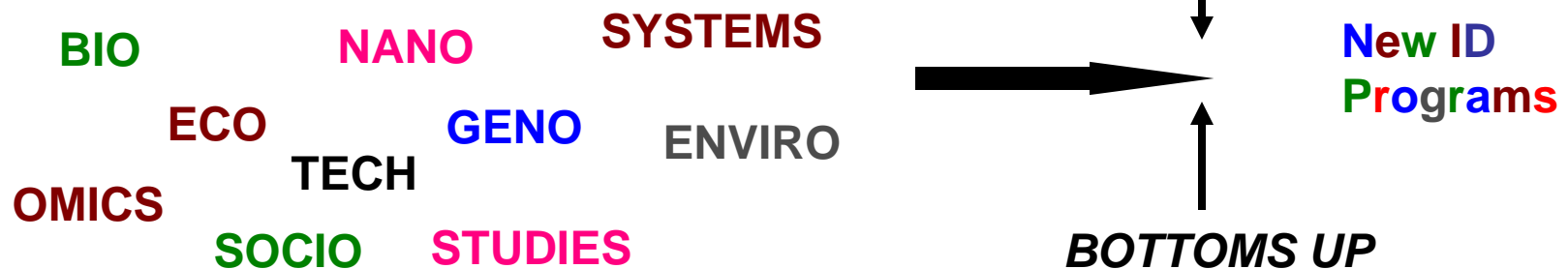
**NATURAL RESOURCES**

**BIOMEDICAL ENGINEERING**

**COMMUNICATIONS, RHETORIC & DIGITAL MEDIA**

## What NC State University Could Have

- Increasing enrollment; 32,000 growing to 42,000
- Increase fraction of graduate students from 23% to 28%
- Guiding Principles
- Flexible, adaptive ID curricula
- New funding and administrative process
- Strategic Planning



## **Interdisciplinary Academic Programs: Guiding Principles\***

- **ID programs must do no harm to existing academic units and programs**
- **ID programs have value for all at NC State**
- **Authority and core funding for ID programs must come from the Provost's Office**
- **A new, centralized administrative framework must be created for ID Programs**
- **There must be multiple pathways to initiate and sustain ID programs**
- **ID programs must provide a secure, stimulating environment for students and faculty members**

**\*From NCSU ID/II Task Force Report, New Horizons and a Framework for Change, 2008**

## Keys to Implementation

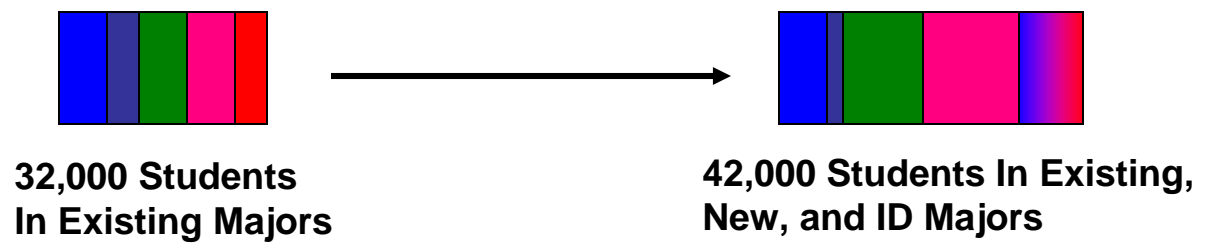
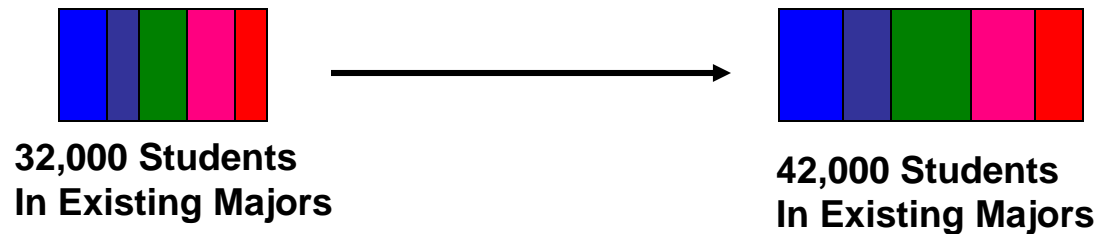
- **Mutual respect for disciplines, colleges, degrees**
- **Trust in colleagues**
- **Less than perfect is OK**
- **Take calculated risks with new courses & curricula**
- **Provide resources for developing instruction**
- **Provide recognition, incentives, and advancement for participants**
- **Provide Faculty Development opportunities**

**Formal Debates**

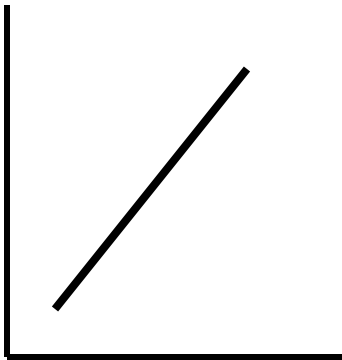
**Case Studies**

**Team Projects**

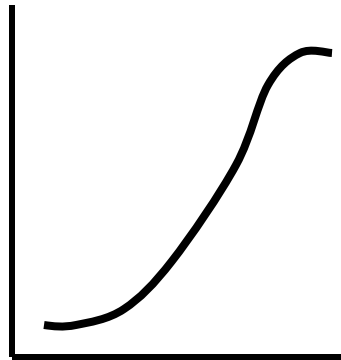
# Enrollment Growth at NC State University: Effects on Majors



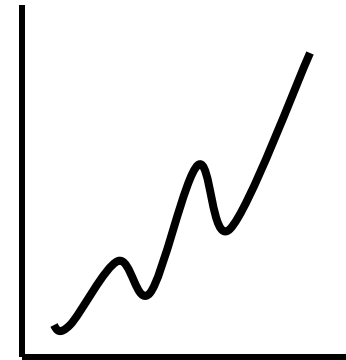
**Enrollment Growth in ID Programs:**  
**Patterns of Change**



**Linear**



**Exponential**



**Polynomial**

## Environmental Sciences and Natural Resources Programs at NC State University: Case Study

### Values and Characteristics

- **Conceptual strength, heart and soul of NCSU**
- **Two degrees with 14 concentrations**
- **Administered in three colleges, six departments**
- **No new courses in 10 years**
- **Poor advising system**
- **Declining enrollment**
- **No conceptual synthesis and integration**

**WHY?**

# Organization of Current ES & NR Degrees

## Academic Colleges

### Natural Resources

ES Hydrology  
NR Ecos. Assess.  
NR Env. Policy

### Agriculture & Life Sciences

ES Ecology  
ES Econ. Policy  
ES Env. Stats.  
ES Soils  
NR Econ. & Manag.  
NR Soil Resources  
NR Soils & Water

### Physical & Mathematical Sciences

ES Air Quality  
ES Geology  
NR Marine & Coast.

### All Other Colleges

None

Total ES Majors, 2007: 31

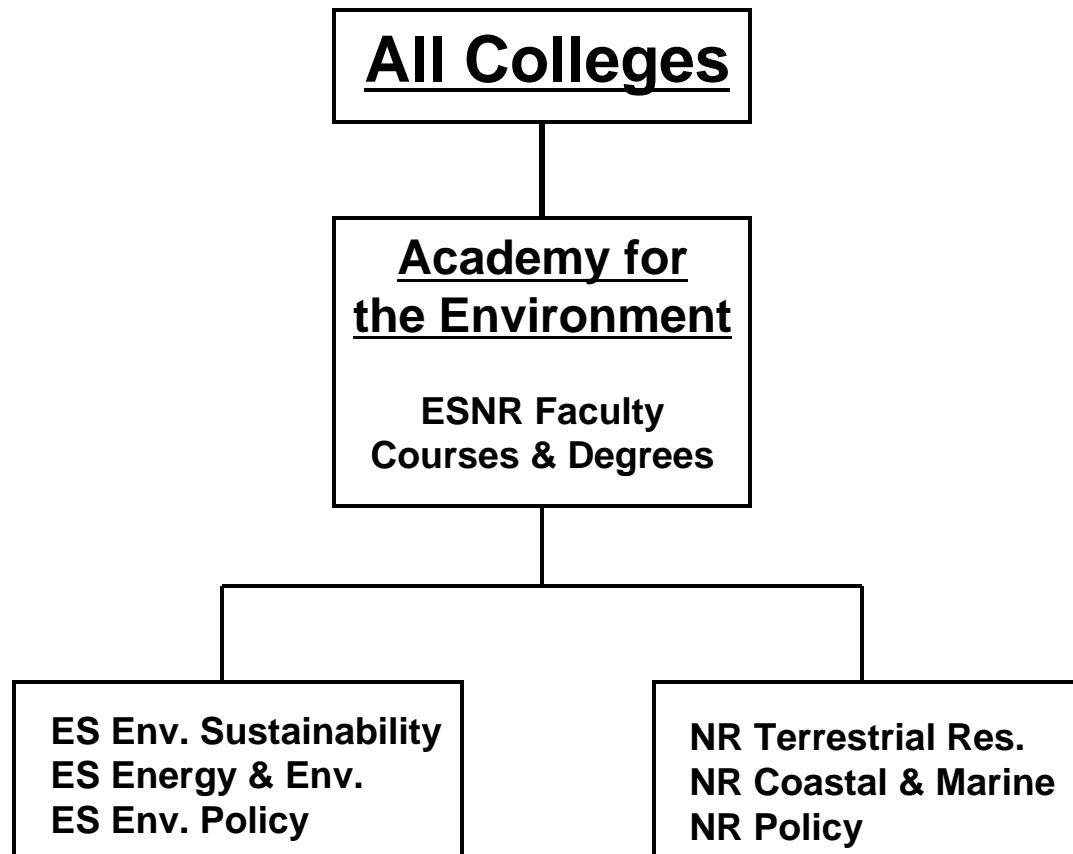
Total NR Majors, 2007: 41

## Academy for the Environment: Goals

- **Strengthen current ESNR & energy programs**
- **Coordinate and creating new, interdisciplinary courses and curricula**
- **Increase ESNR student enrollments**
- **Engage colleges and departments not currently involved**
- **Provide a “Front Door” and visibility to environmental programs**
- **Link energy themes to the environment**
- **Create an Environmental Sciences Graduate Program**
- **Promote environmental research for undergraduate students**
- **Enhance service-learning & extension on environmental topics**
- **Engage a global context with international ESNR & Energy activities**

**HOW?**

**Academy for the Environment:**  
**Hypothetical Approach**



## Current Programs and Future Options

- **NCSU is falling short with most existing ID academic programs**
- **ESNR issues suggest university-wide changes are needed**
- **Other academic institutions are changing**
- **NCSU must adapt to compete**
- **CUE can provide leadership needed to create ID courses & curricula**

**“...Skate to where the puck will be.” Wayne Gretzky**

**Council of Undergraduate Education:**  
**Leadership Opportunities**

- **Stimulate generation of ID courses for the new GEP**
- **Stimulate creation of ID courses for existing curricula**
- **Stimulate generation of ID courses for new, emerging ID programs**
- **Facilitate new expertise by encouraging Faculty Development efforts**

**“Play hard, play smart, play as a team.” Larry Brown**