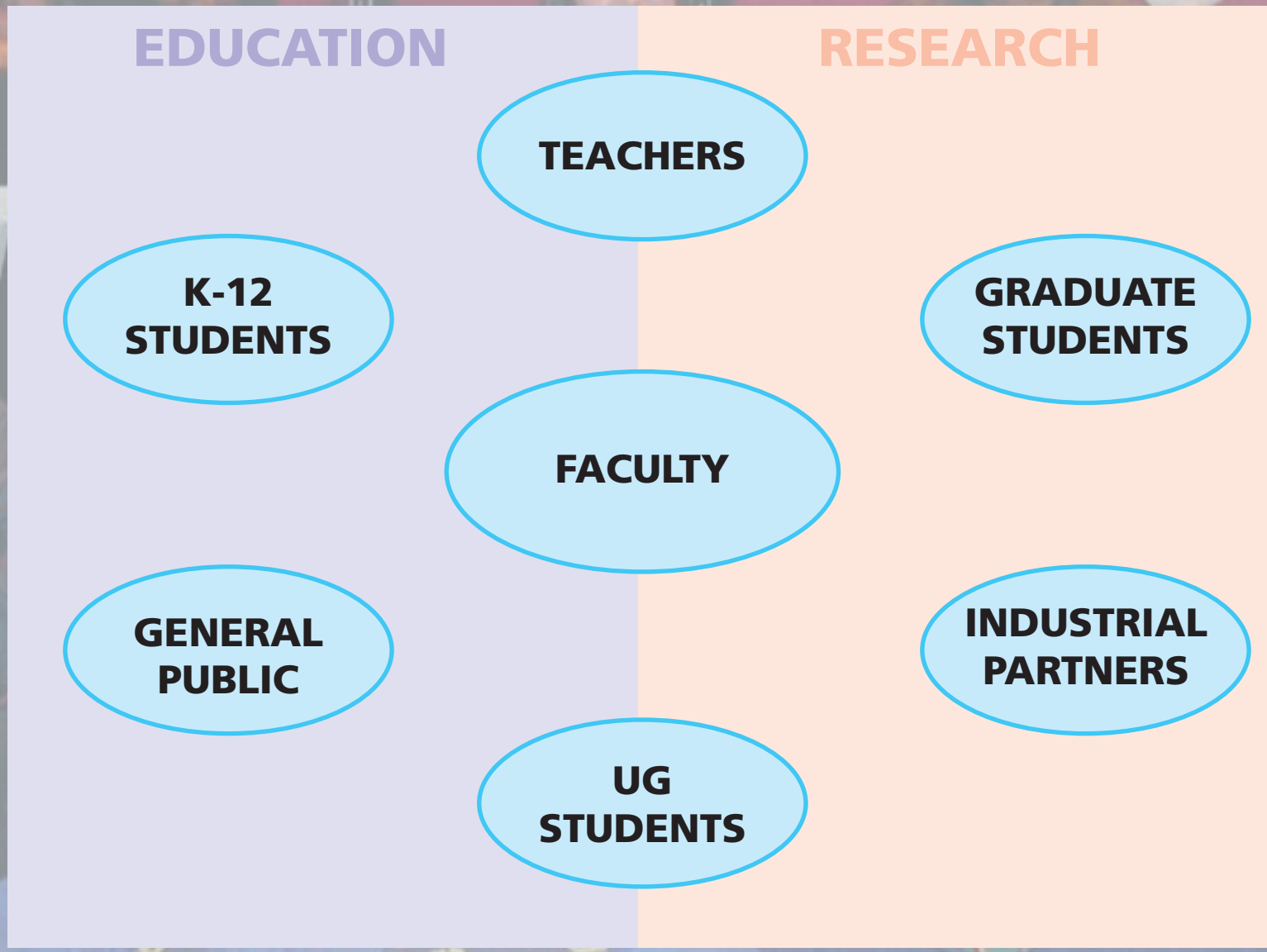
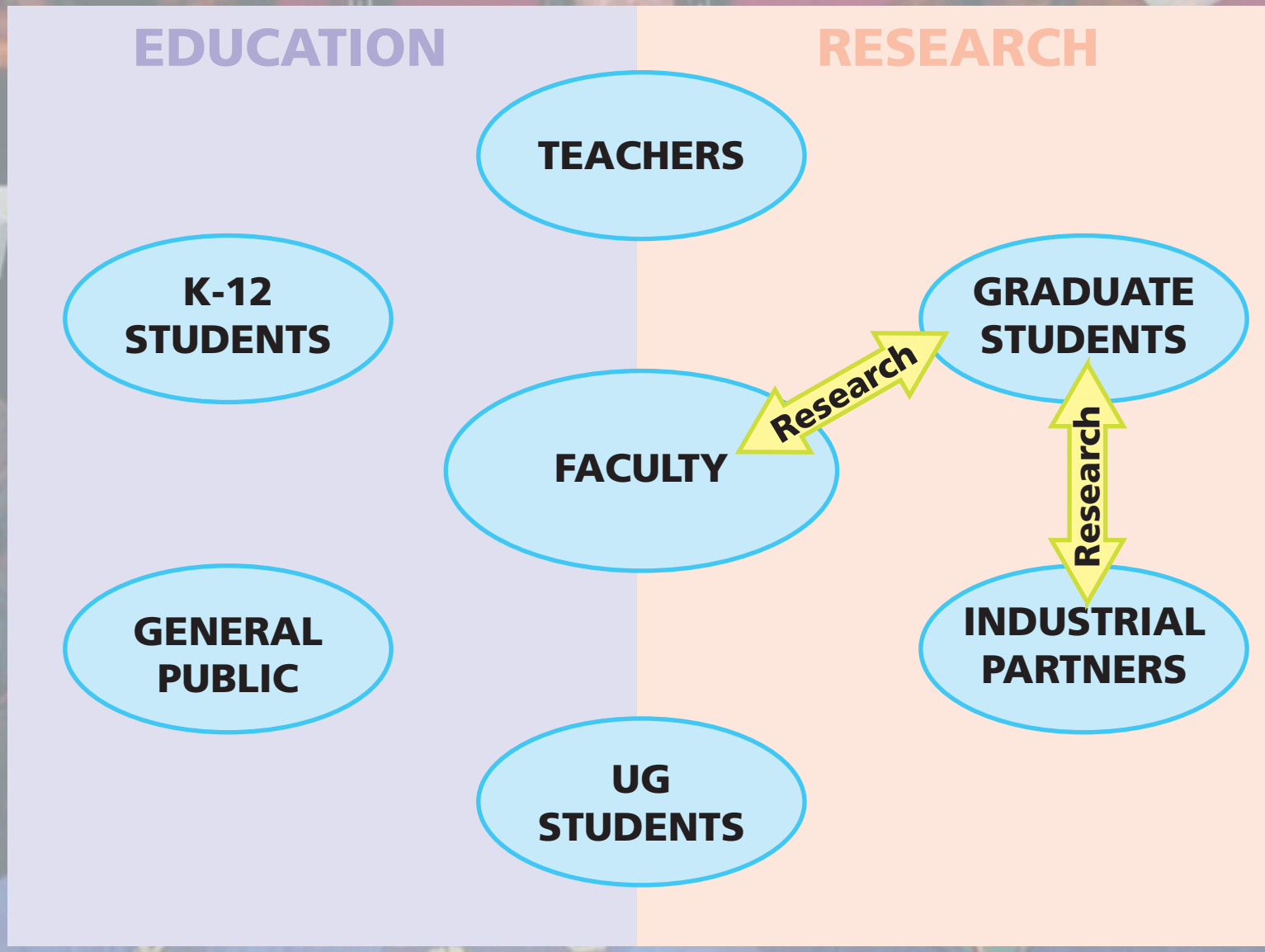
Educational Activities

NSEC Advisory Board Meeting
14 April 2003

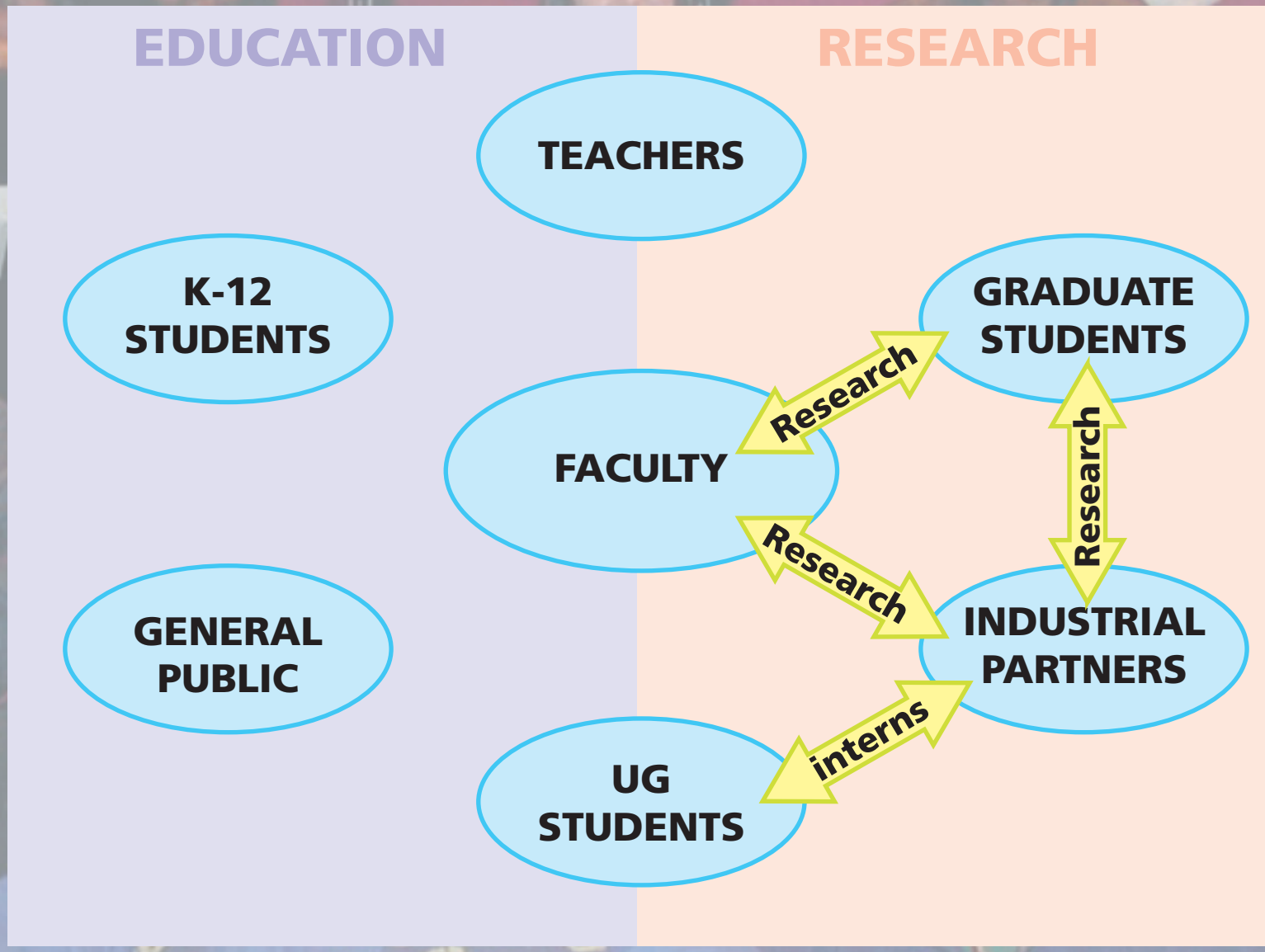
Making connections



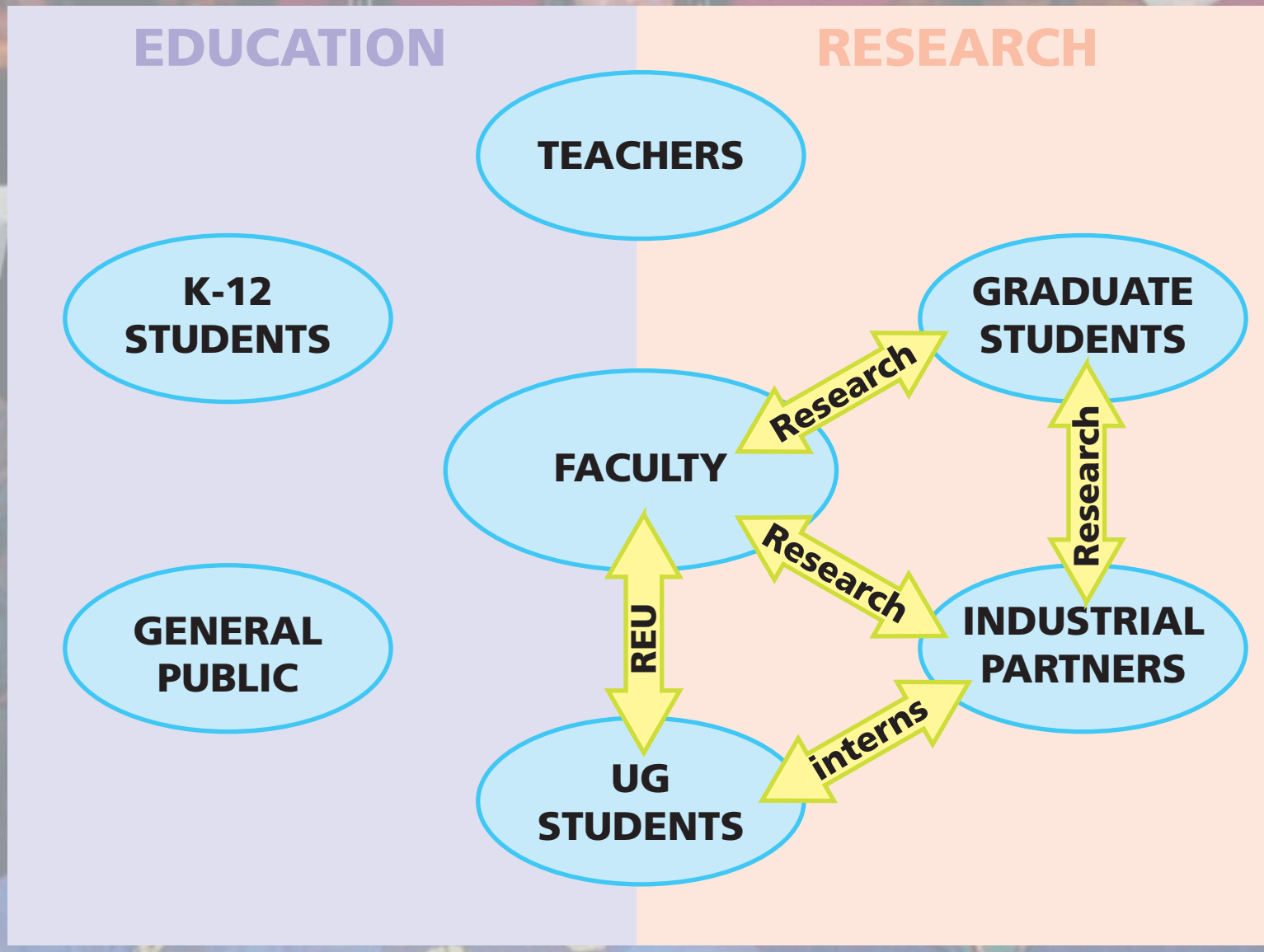
Making connections



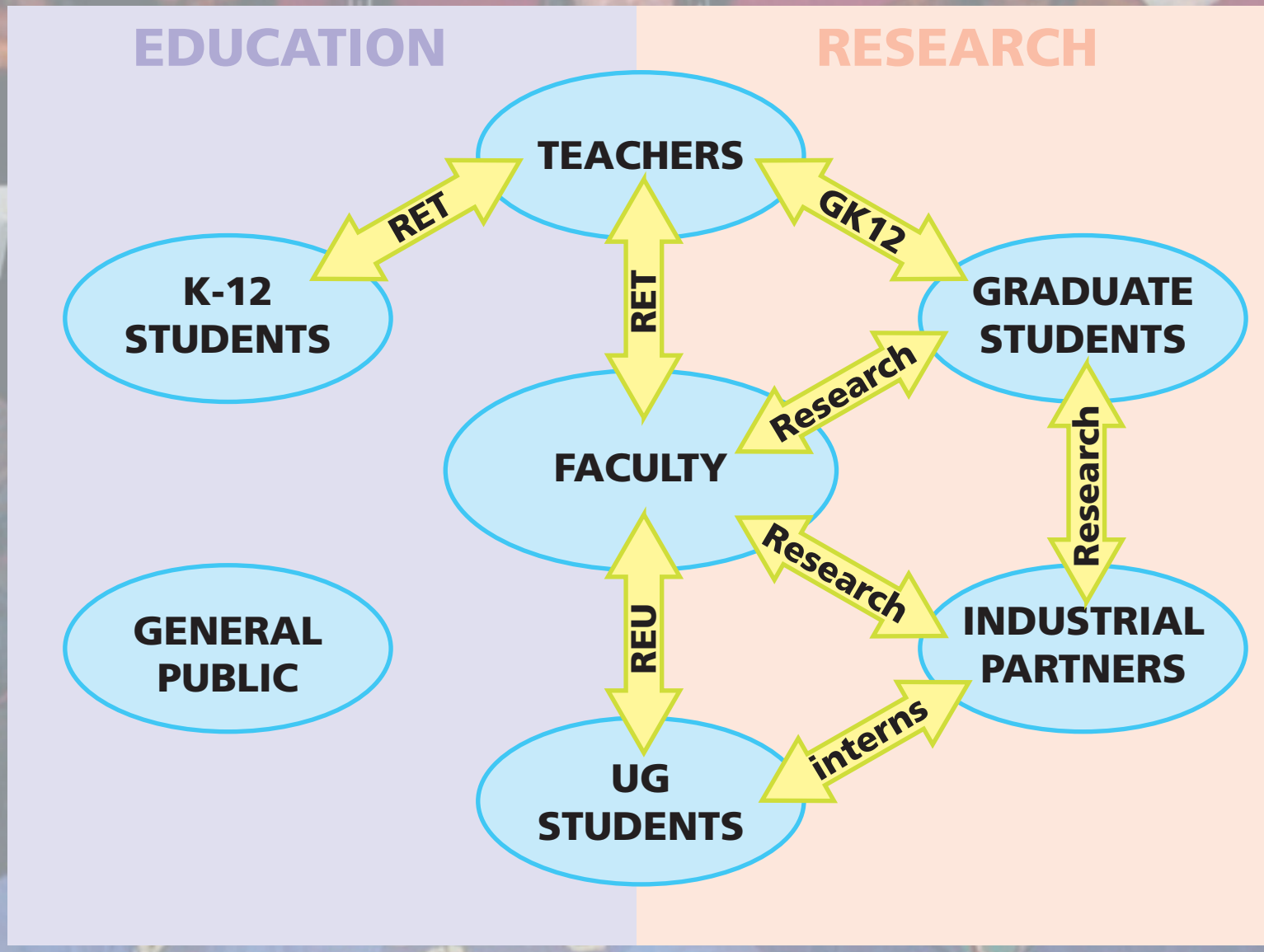
Making connections



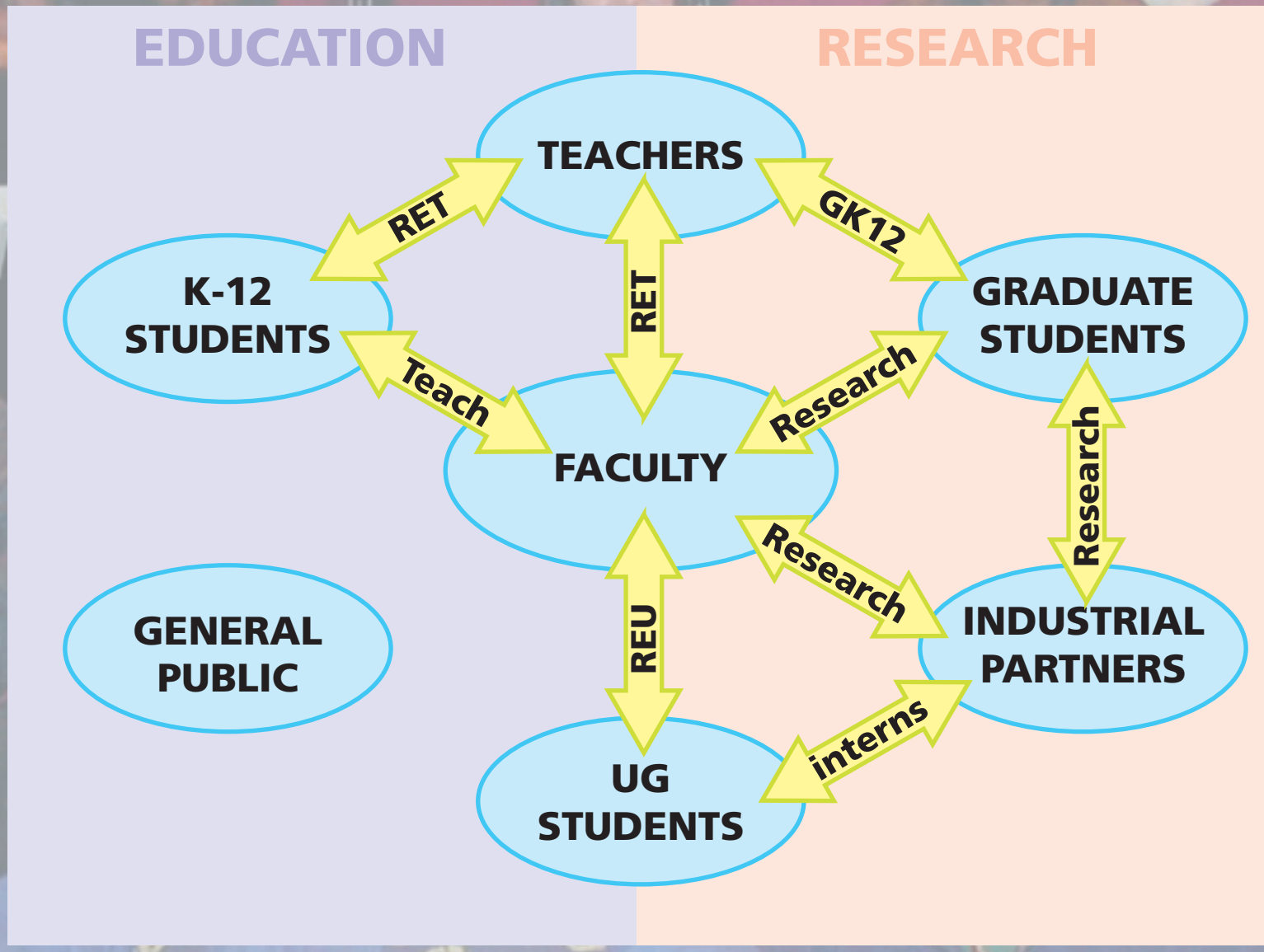
Making connections



Making connections



Making connections



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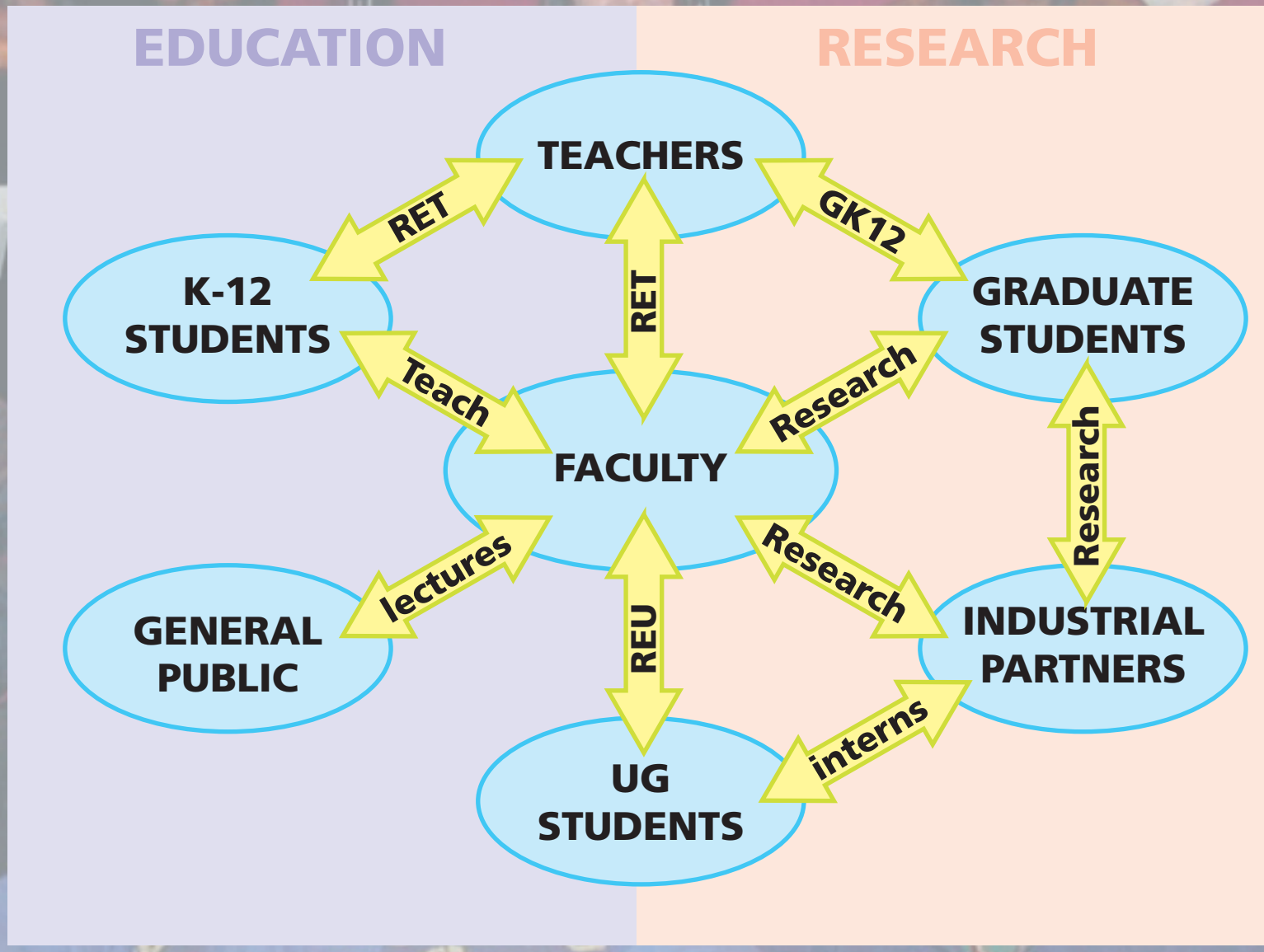

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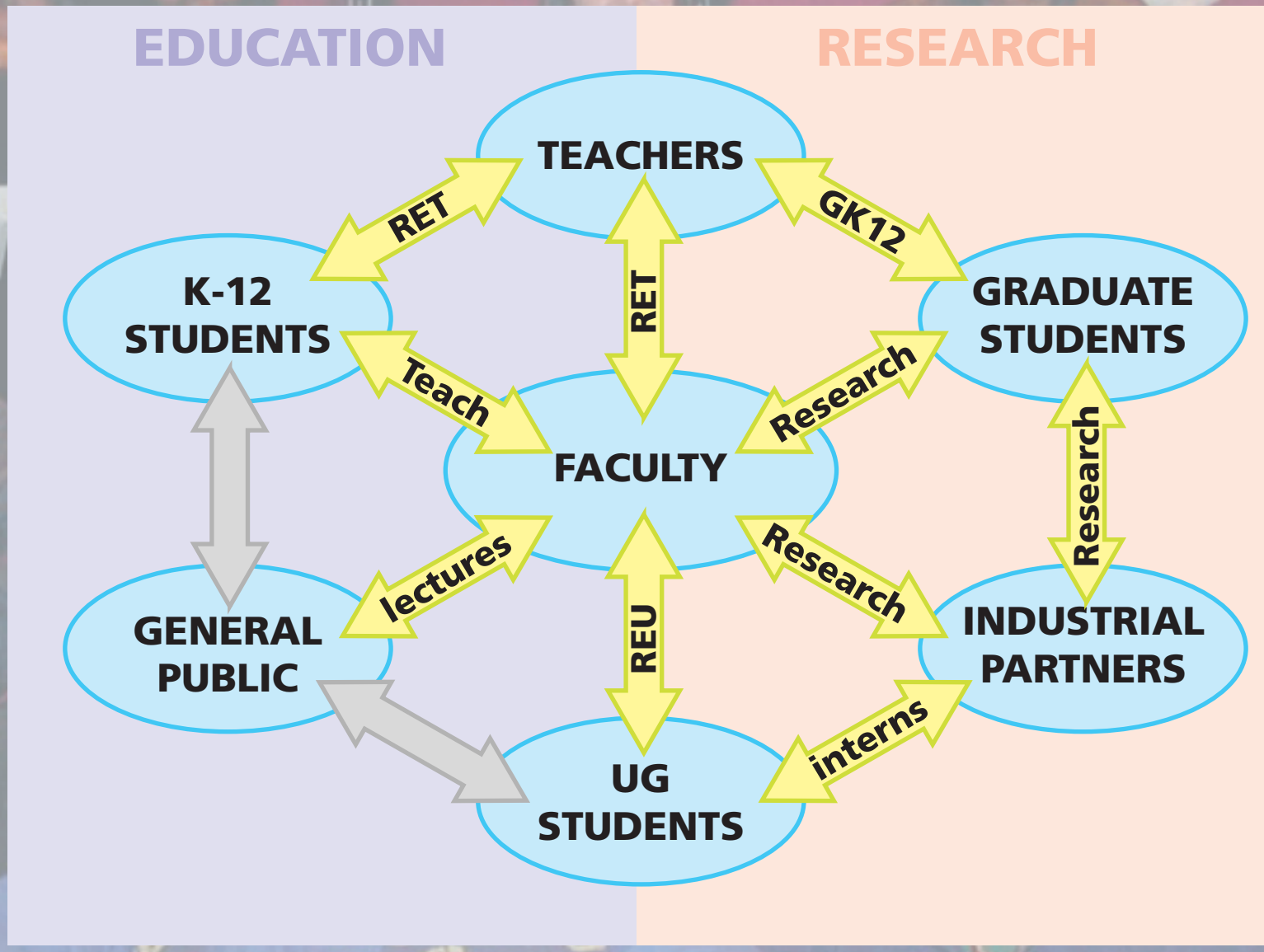
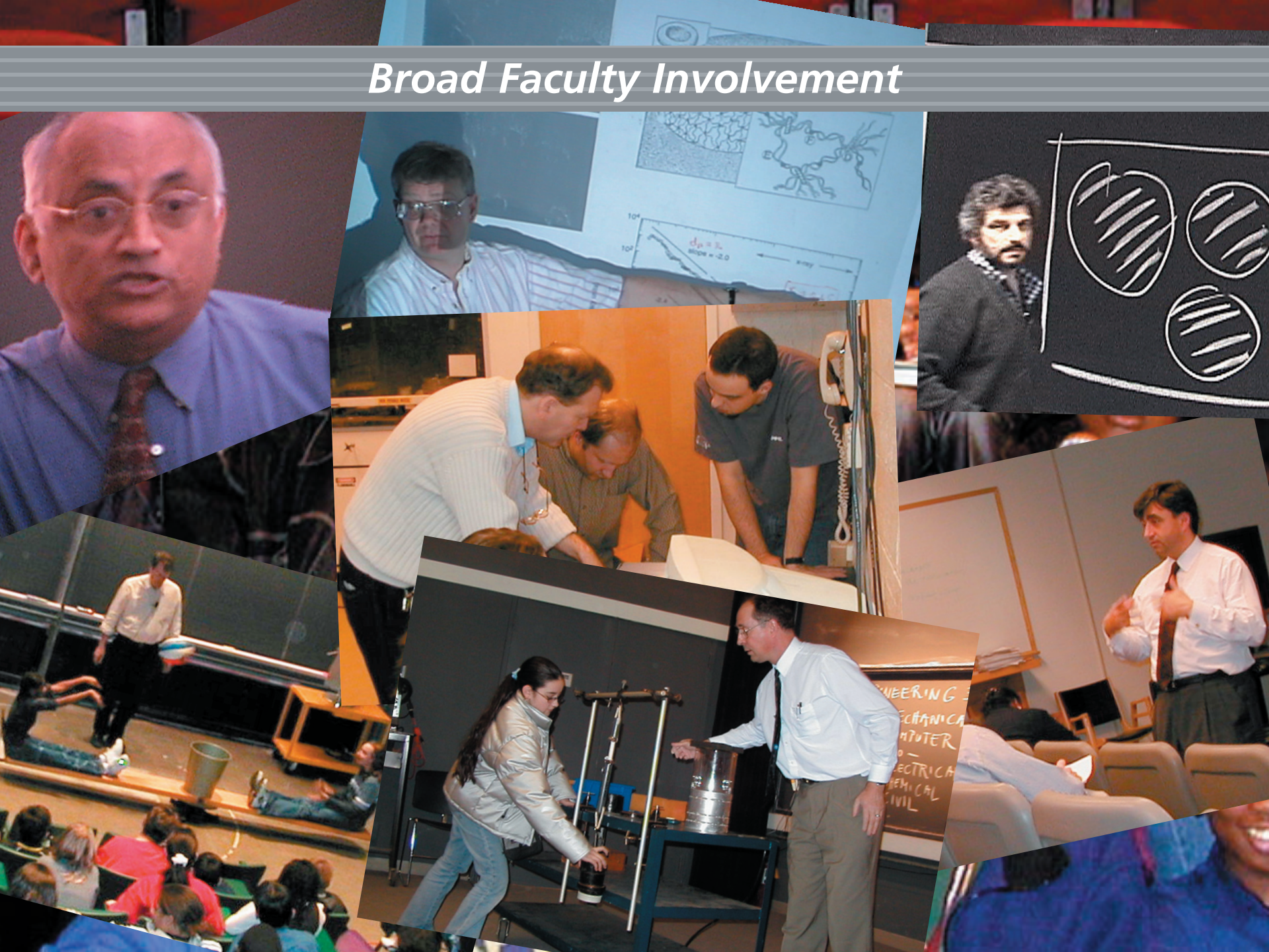


Broad Faculty Involvement



Science presentations

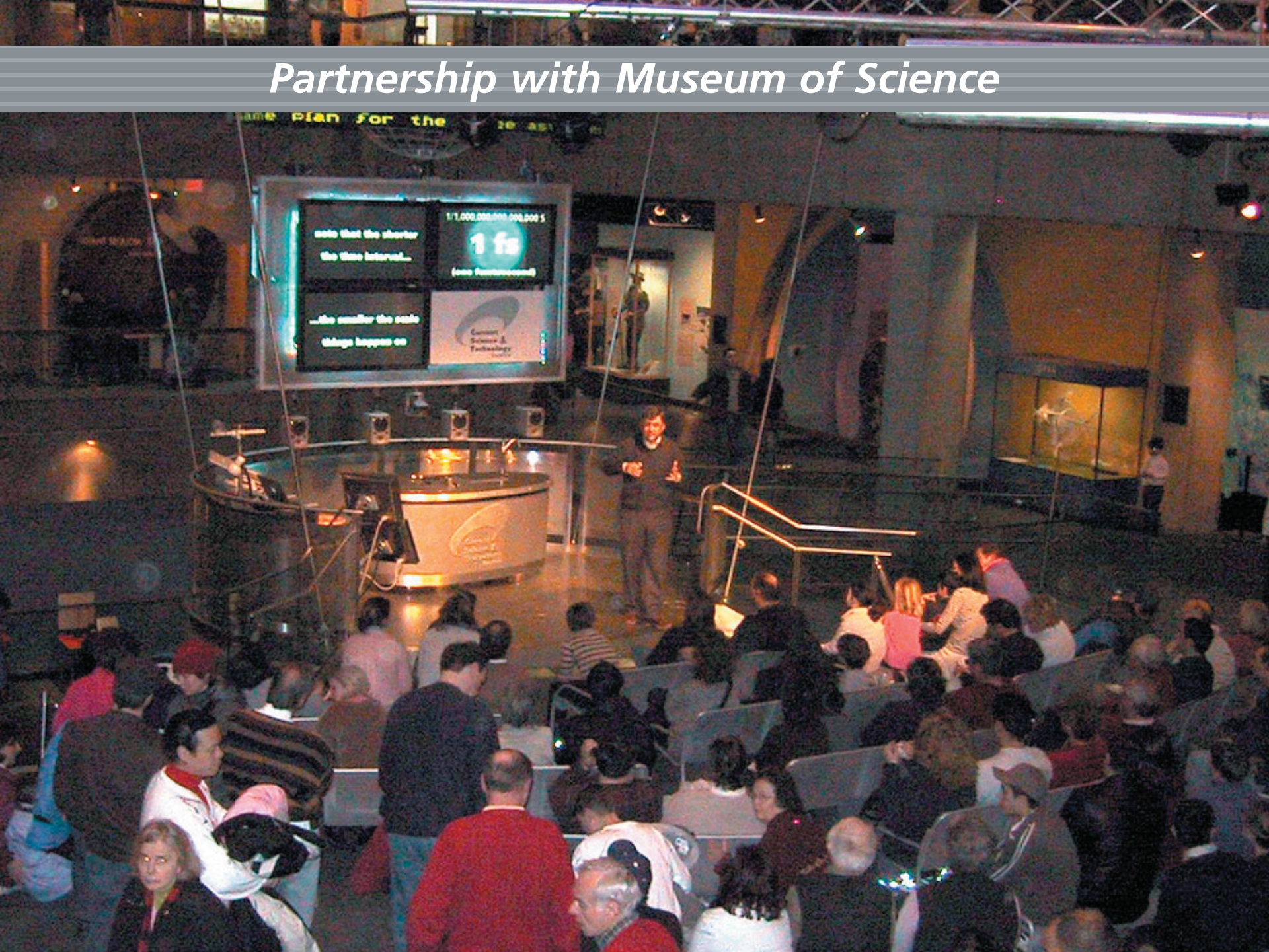
Science presentations

Workshops for teachers

GK-12 Fellows Program

GK-12 Fellows Program

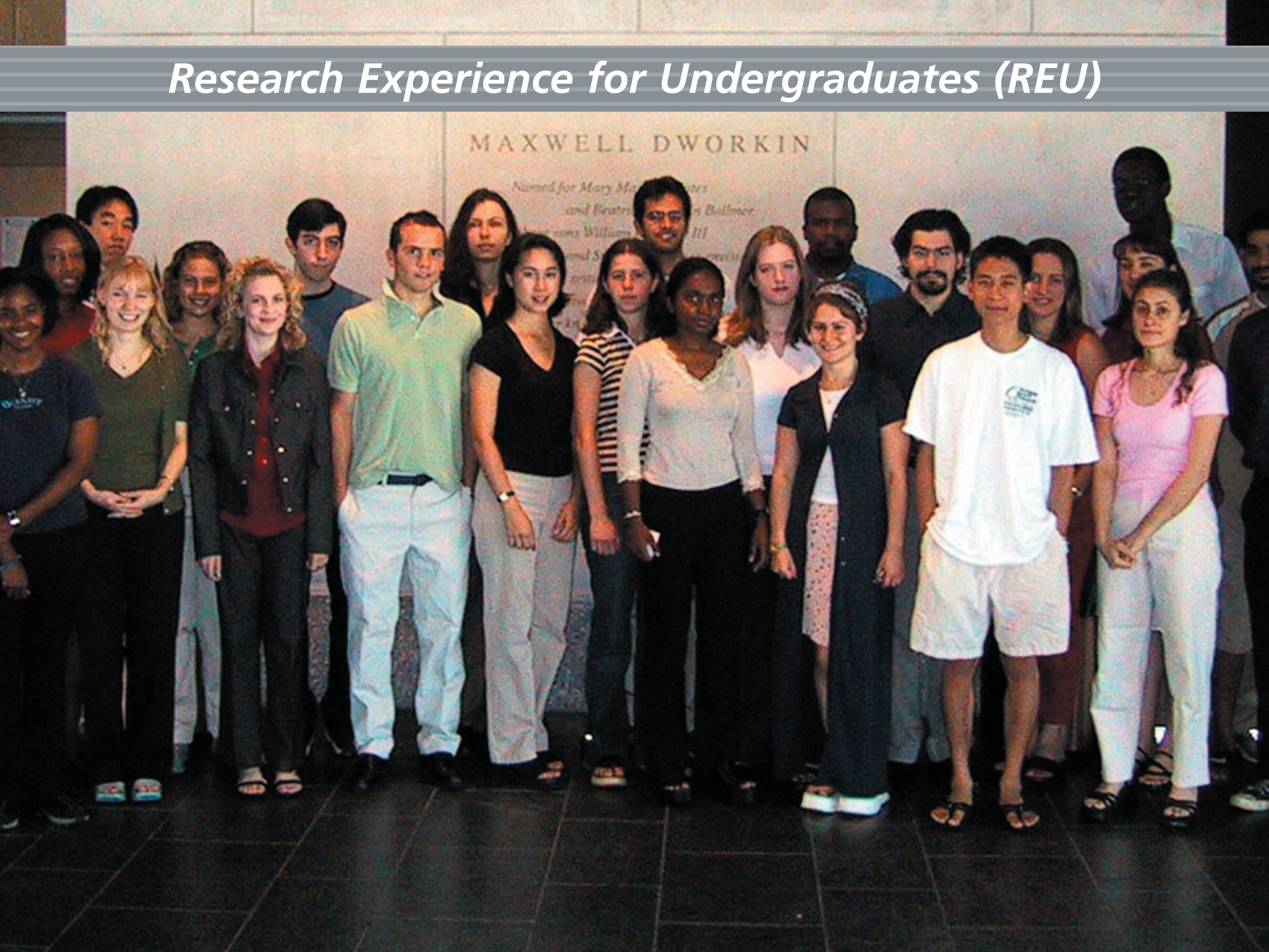
Partnership with Museum of Science



Research Experience for Undergraduates (REU)

- Summer research projects for undergraduates
- Matching funds provided DEAS and College
- Interdisciplinary research environment
- Use of shared experimental facilities

Research Experience for Undergraduates (REU)



Research Experience for Teachers (RET)

- Summer project for teachers
- Direct exposure to research environment
- Development educational activities
- Joint activities with REU participants

Interactions

Undergraduate

Nadya Mason

Harvard College, Stanford University

Junior Fellow


The CNA Corporation
Harvard University

RET participant

Jim McNeil

Geology

Middle School

Project (Stone Group):

Research: Effect of bubble size on foam drainage

REU participant

Tanya Hadzic

Eckerd College

Now: University of Iowa (Immunology)

Project (Whitesides group):

Research: Self-assembly of mesostructures

7 MAY 1999 VOL 284 SCIENCE www.sciencemag.org

Design and Self-Assembly of Open, Regular, 3D Mesostructures

Tricia L. Breen, Joe Tien, Scott R. J. Oliver, Tanja Hadzic, George M. Whitesides*

Self-assembly provides the basis for a procedure used to organize millimeter-scale objects into regular, three-dimensional arrays ("crystals") with open structures. The individual components are designed and fabricated of polyurethane by molding; selected faces are coated with a thin film of liquid, metallic alloy. Under mild agitation in warm, aqueous potassium bromide solution, capillary forces between the films of alloy cause self-assembly. The structures of the resulting, self-assembled arrays are determined by structural features of the component parts: the three-dimensional shape of the components, the pattern of alloy on their surfaces, and the shape of the alloy-coated surfaces. Self-assembly of appropriately designed chiral pieces generates helices.

We describe a procedure that uses self-assembly of patterned, three-dimensional (3D), mesoscale (millimeter- to centimeter-scale) objects to generate open, regular, 3D structures. These types of structures may eventually find use as the cores of densely interconnected, 3D electronic and optical elements for high-performance computation and

Department of Chemistry and Chemical Biology, Harvard University, 12 Oxford Street, Cambridge, MA

“my experience that summer helped me decide that I truly loved research and that I wanted to do research full time”

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Department of Chemistry and Chemical Biology, Harvard University, 12 Oxford Street, Cambridge, MA

RET participant

Kristy Lenihan

Physics

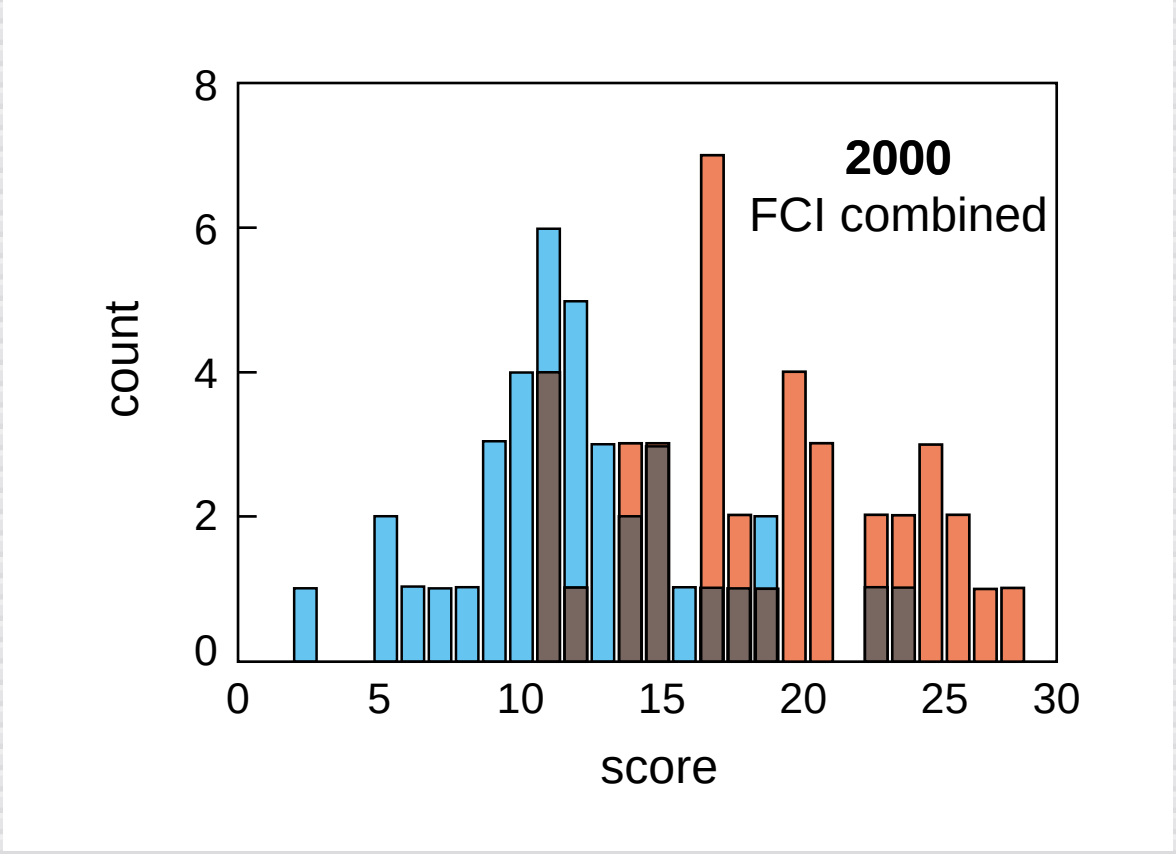
High School

Project (Mazur Group):

Research: Micromachining of transparent materials

Education: Development of optics curriculum

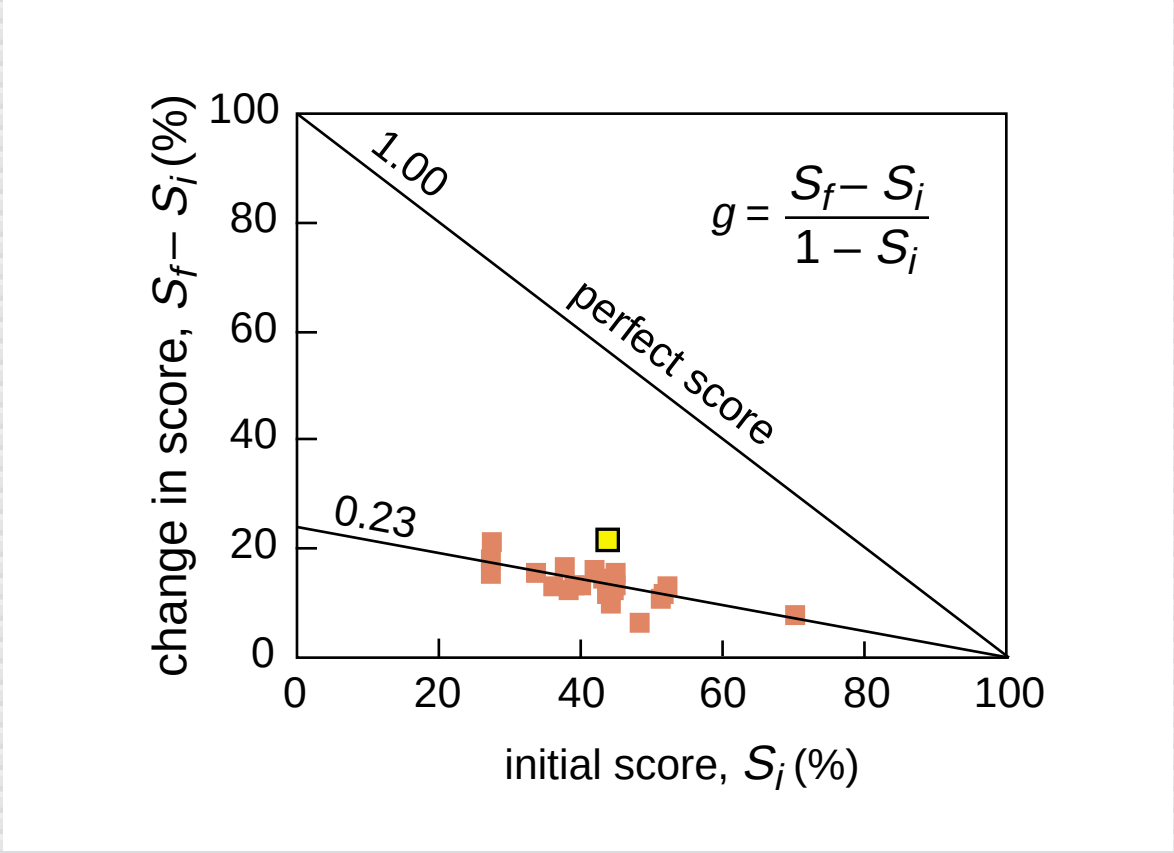
FCI data



gain: 22%

FCI data

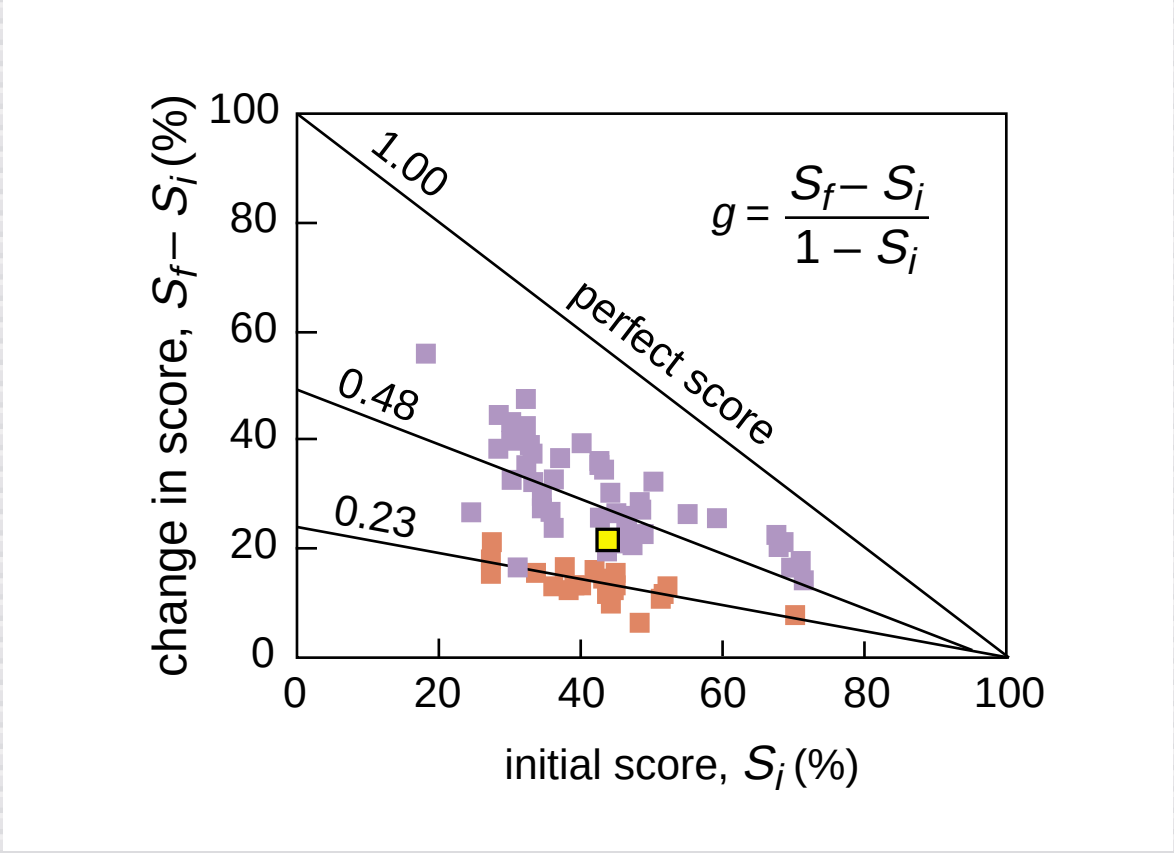
traditionally taught courses



R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

FCI data

interactively taught courses



R.R. Hake, *Am. J. Phys.* 66, 64 (1998)

Undergraduate

Andrea Kurtz

Harvard College

Now: Stanford University (Chemistry)

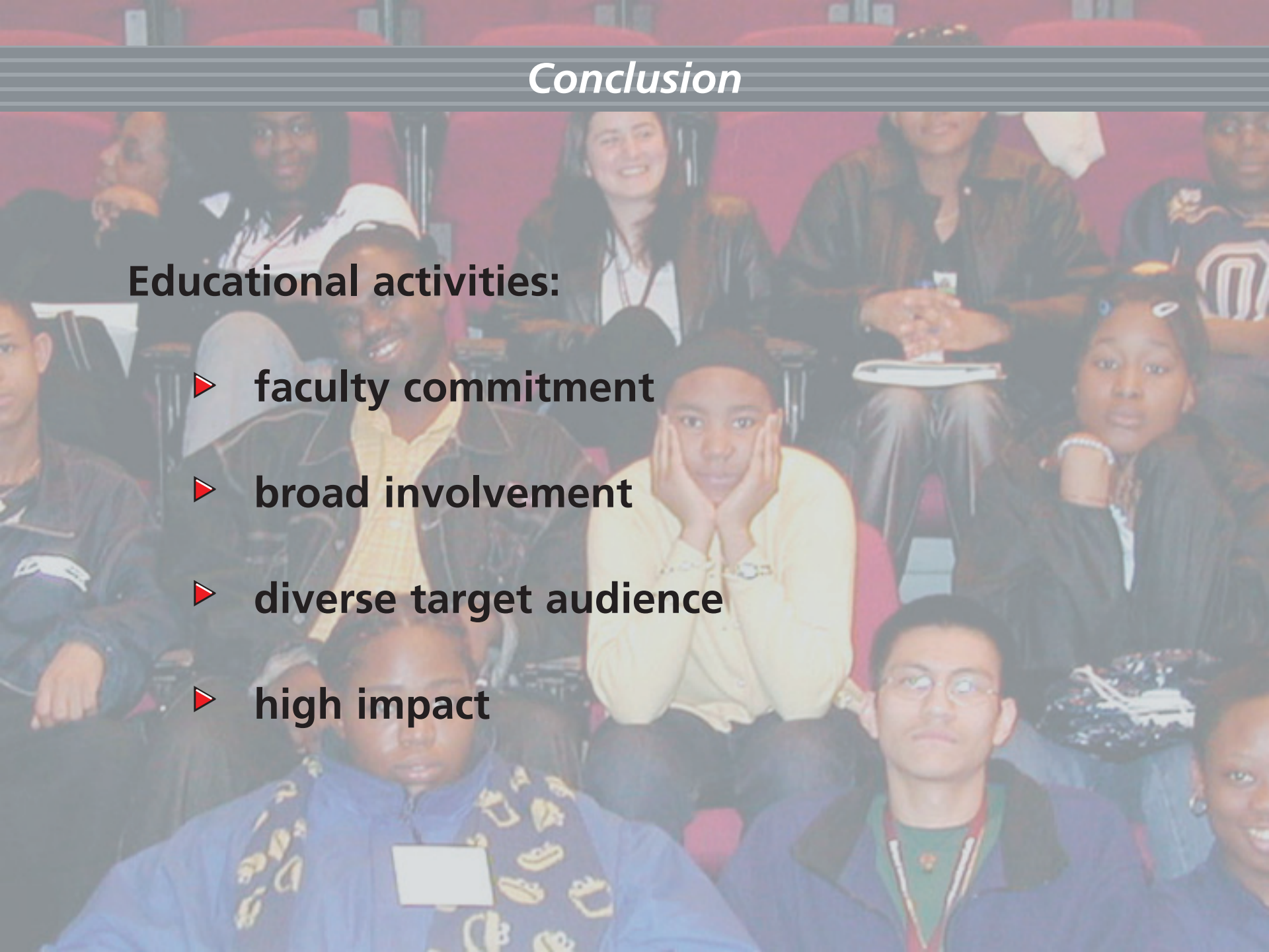
Senior Thesis (Hongkun Park):

Research: Colloidal nanotube catalysts


BERKELEY
PHYSICS


"communication is such a big part of science: in order
to convey the interest in science you need
to be able to present it clearly"
BERKELEY
PHYSICS

Conclusion



Educational activities:

- **faculty commitment**
- **broad involvement**
- **diverse target audience**
- **high impact**