

Envisioning the future

Electrical Engineering @ Texas A&M

S&T Landscape changing

— [unprecedented advances in instrumentation

— [increased computational power

— [increased understanding of materials

— [R&D, fabrication down to nanoscale

Goals

— [build nationally prominent presence

— [provide well-rounded education

— [strengthen university-wide initiatives

Meet goals by

— [strengthening and expansion

— [increased connectivity

— [novel approaches to education

— [promote diversity



— [**New Research Opportunities**

— [**Education Innovation**

— [**Growth through diversity**



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— [**Education Innovation**

— [**Growth through diversity**

Faculty distribution



- Analog & Mixed Signal
- Biomedical Imaging and Genomic Signal Processing
- Computer Engineering
- Control Systems
- Electric Power and Power Electronics
- Electromagnetics and Microwaves
- Solid State Electronics, Photonics and Nano Engineering
- Telecommunications and Signal Processing

Opportunities

Where do we go while maintaining current strengths?

Signal

Bio

Computer

Control

Power

EM

Solid State

Telecom

Opportunities

Areas of growth

- [Information engineering
- [Bioelectronic engineering
- [Nanoscale engineering

Signal

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Opportunities

Looming problems

— [Energy crisis

— [End of SC roadmap

Signal

Bio

Computer

Control

Power

EM

Solid State

Telecom

Information engineering

— [Optical switching and signal processing

— [Networking/Communications

— [Multimedia processing

— [Display technology

— [Input technology

Signal

Bio

Computer

Control

Power

EM

Solid State

Telecom

Bioelectrical engineering

— [Physiological signal processing

— [Synthetic sensing

— [Medical electronics

— [OCT

— [Electromechanical cell regulation

— [Biologically inspired electronics

Signal

Bio

Computer

Control

Power

EM

Solid State

Telecom

Nanoscale engineering

— [Electronic properties of nanoscale materials

— [MEMS

— [Quantum devices

— [Molecular scale wires and switches

— [Conductive polymers

Signal

Bio

Computer

Control

Power

EM

Solid State

Telecom

Energy

— [Alternative sources

— [Renewable energy

— [Photovoltaics

— [Drives/actuator design

Signal

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Telecom

Beyond the SC roadmap

What is the next groundbreaking technology?

Signal

Bio

Computer

Control

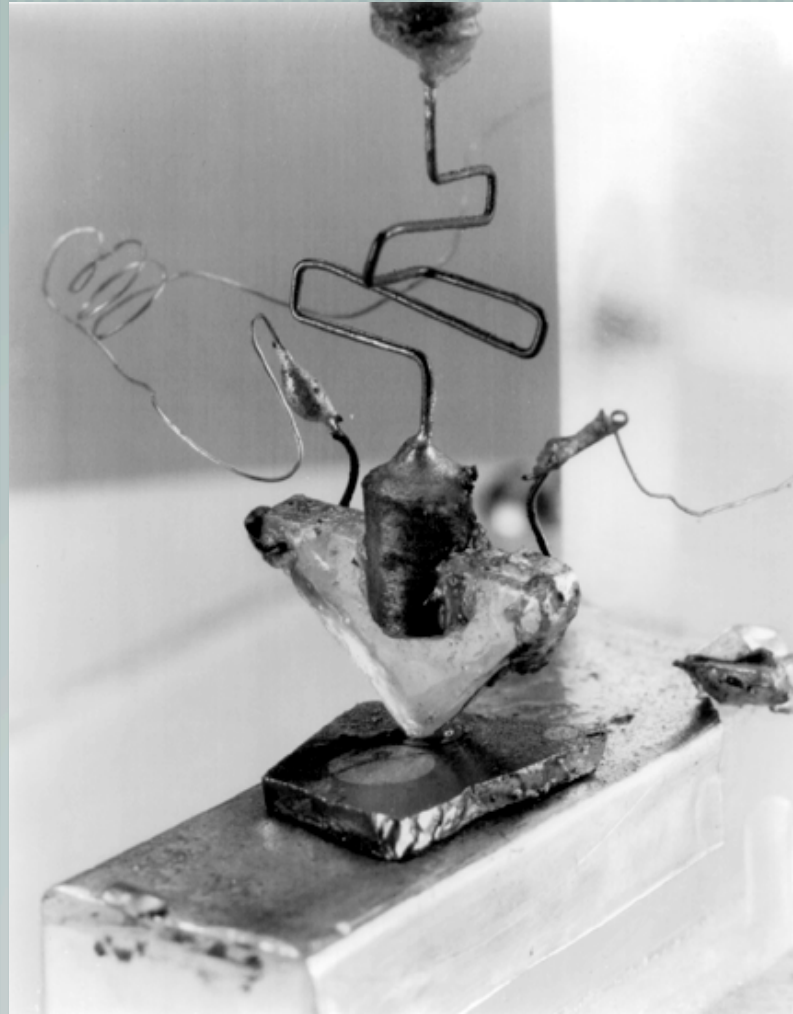
Power

EM

Solid State

Telecom

Beyond the SC roadmap





— [New Research Opportunities

— [**Education Innovation**

— [Growth through diversity

Education

Investing in the future

Education

Let's begin with a lesson from a competing engineering school

Education

students don't necessarily learn what teachers teach

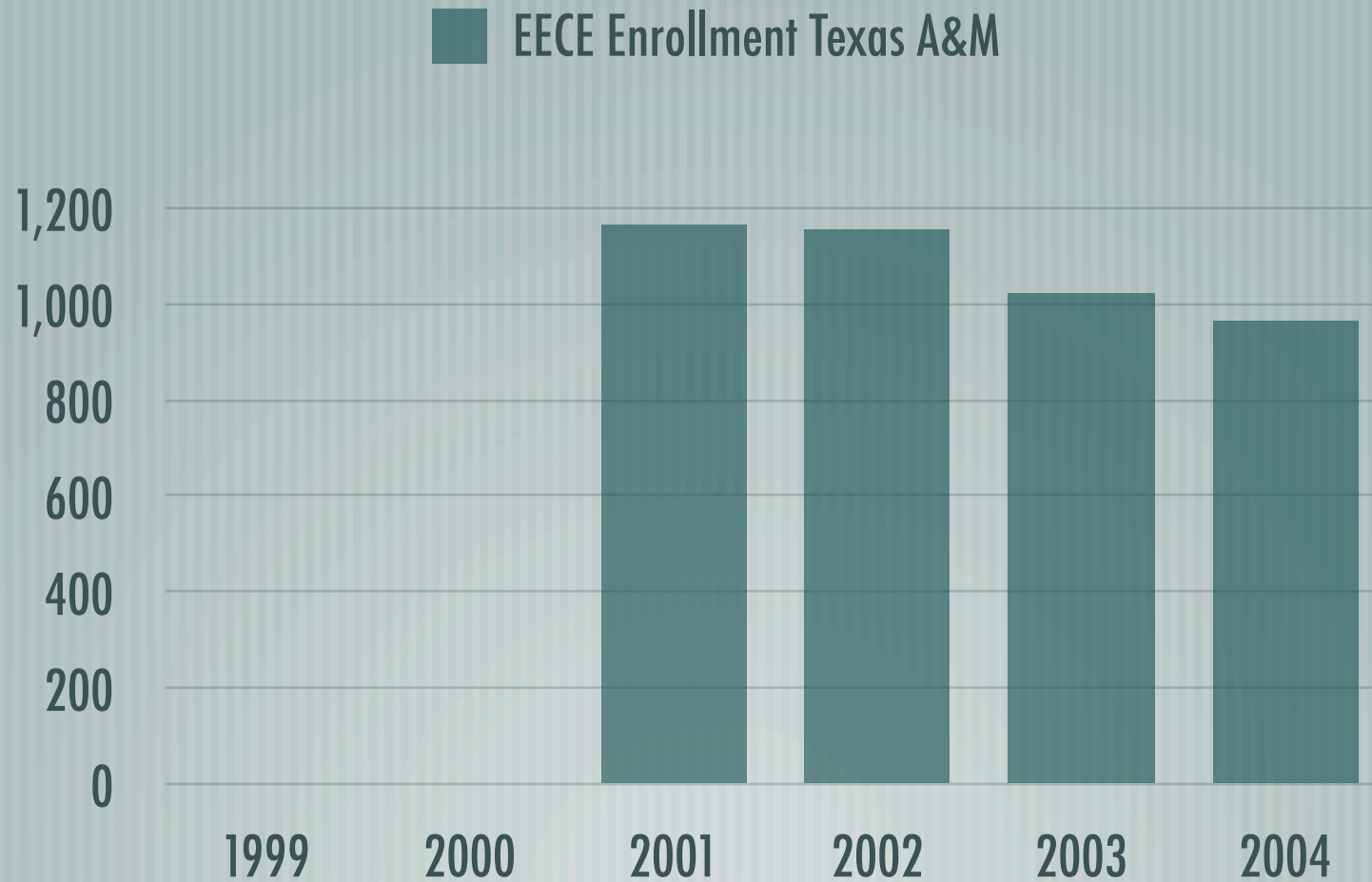
Education

— [Traditional education not effective

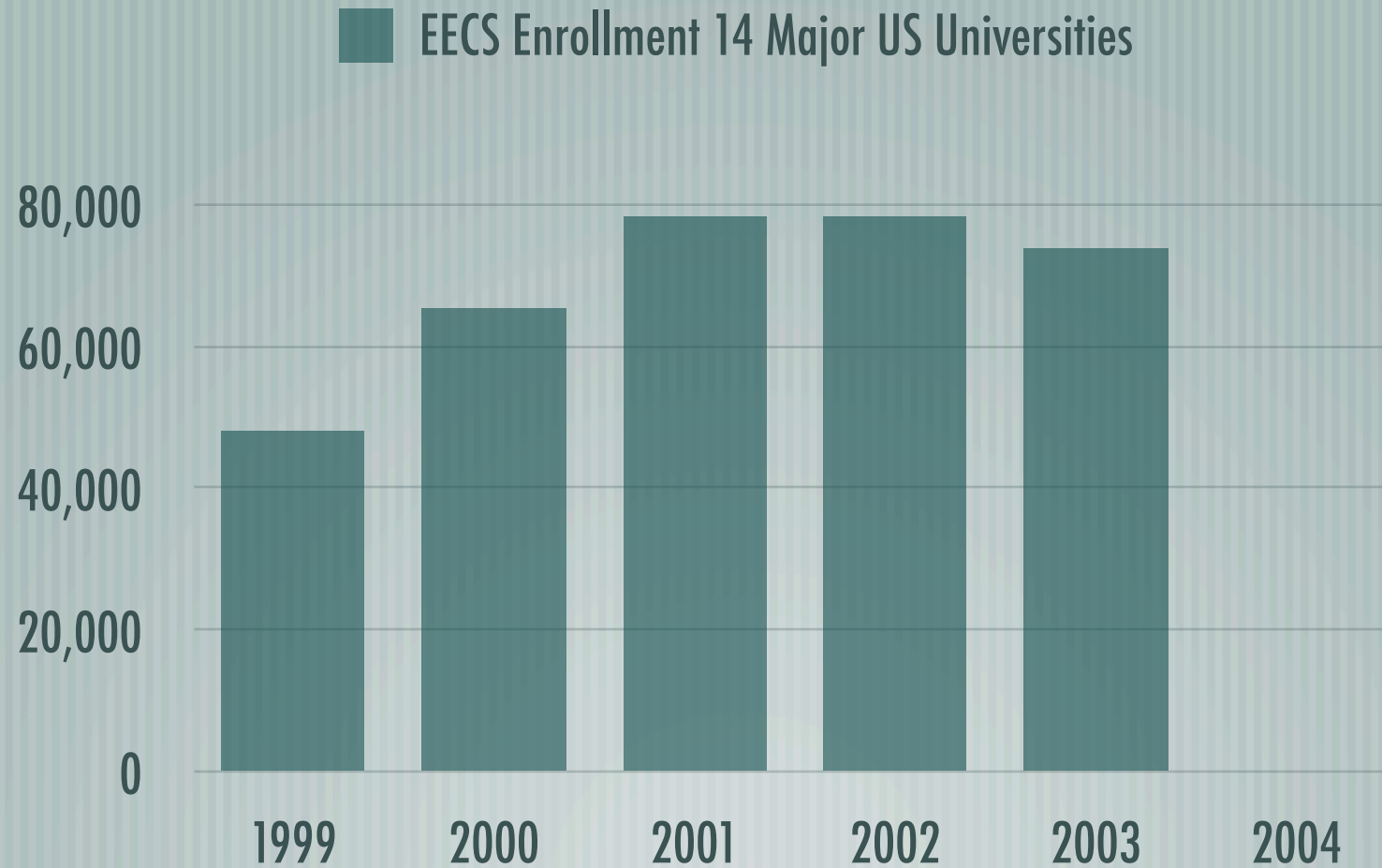
— [Enrollment trends not in line with future needs

— [Skills taught not necessarily meeting demands

Education



Education



Education

- [Outreach to K-12 math and science

- [Bridge/support programs to increase retention rate

- [Active recruitment

Education

What skills should we teach?

Education

— [Systematically review curriculum

— [Implement effective practices

— [Facilitate experiential learning

— [Utilize advanced technology

— [Apprenticeships

Education

Integrated Teaching and Learning Laboratory

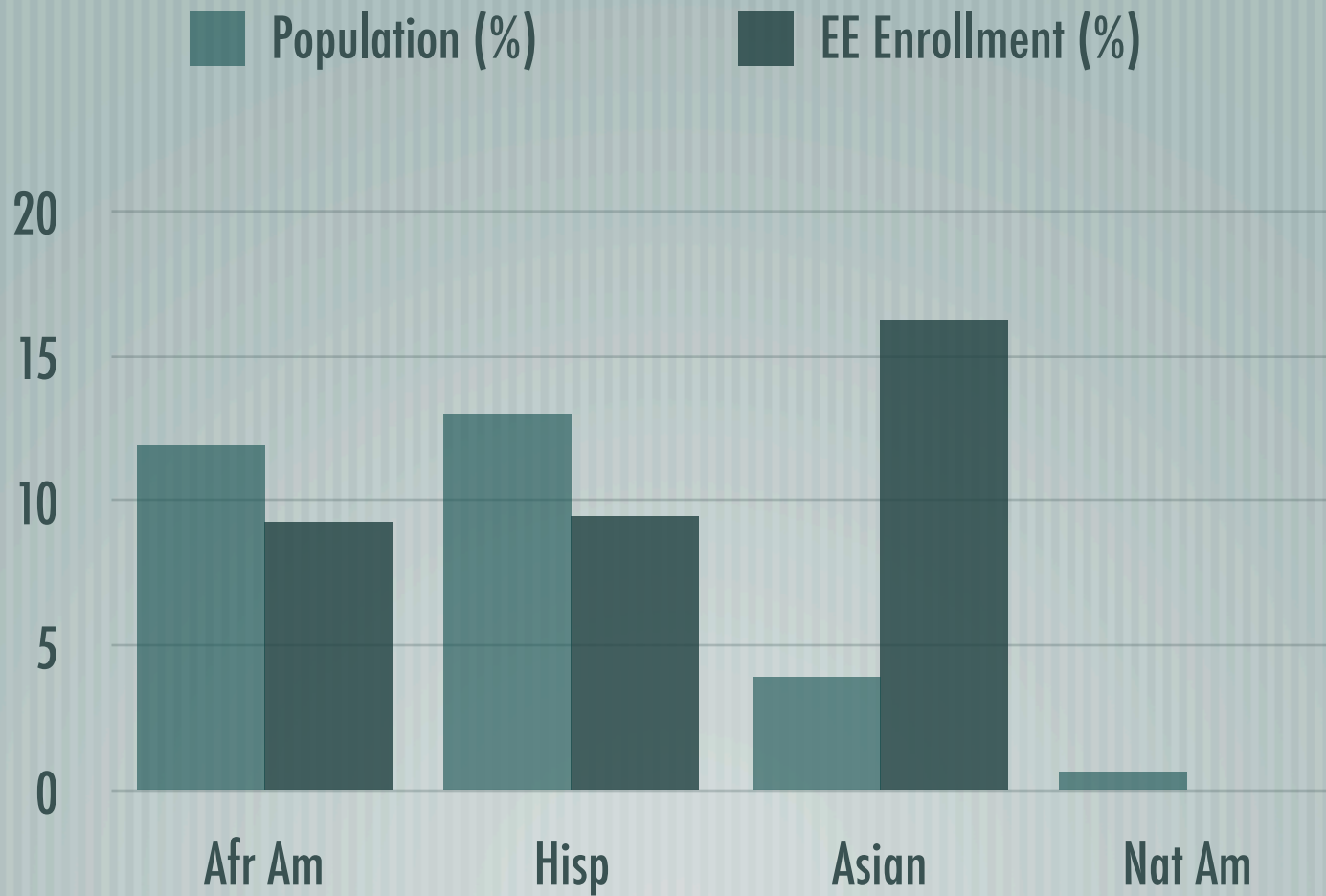


— [**New Research Opportunities**

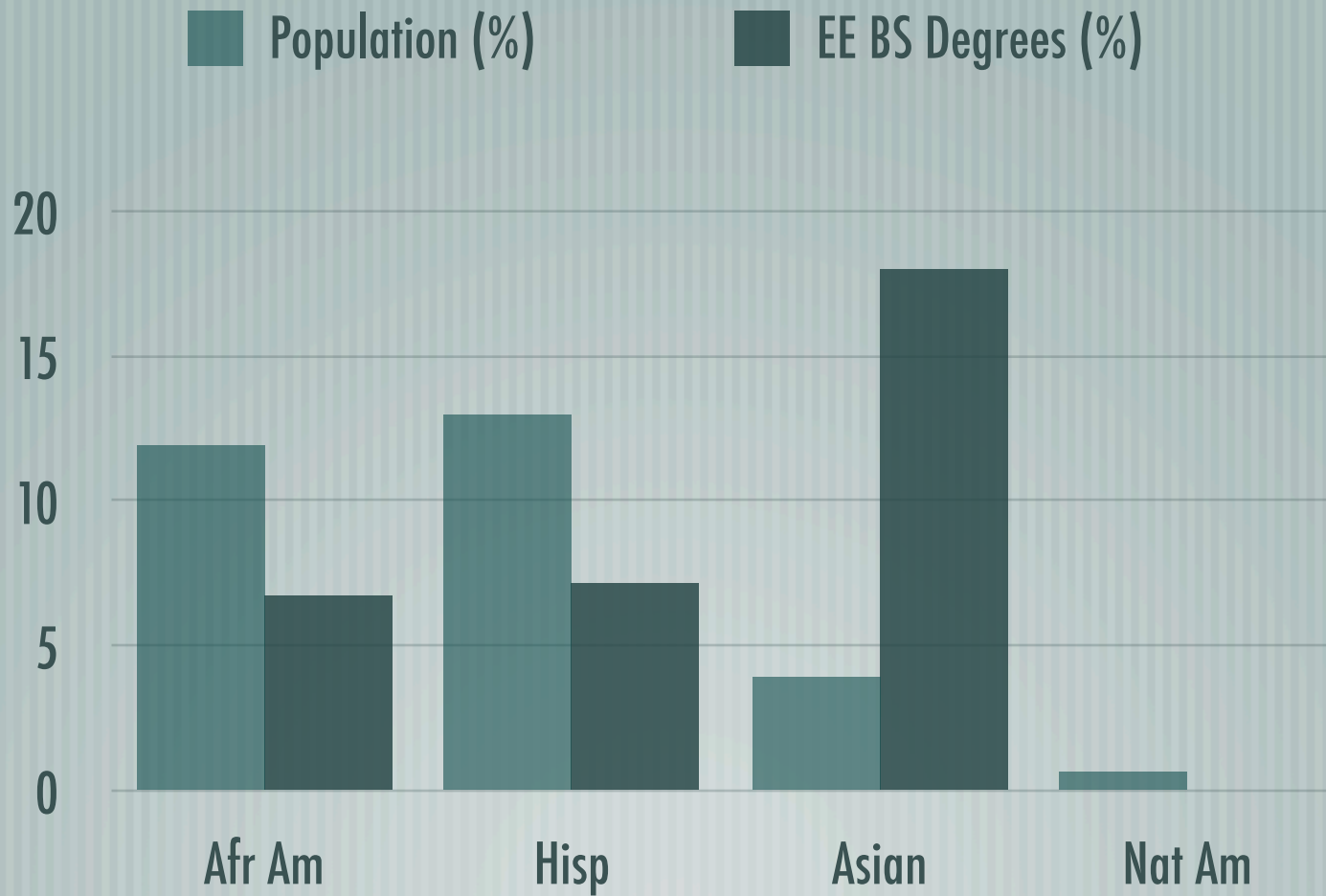
— [**Education Innovation**

— [**Growth through diversity**

Diversity



Diversity



Diversity

Women represent less than 20% of undergraduate enrollment

Diversity

- [Actively recruit women and under-represented minorities
- [Cooperate with admissions office to increase enrollment
- [Build/strengthen support groups
- [Structure programs so as to avoid isolation
- [Fight stereotypes/provide role models

Planning for the future



— [New Research Opportunities

— [Education Innovation

— [Growth through diversity

Goals

Strengthen department's leadership in:

— [research

— [education

— [diversity

Approach

—— [C8 committee; develop 5- and 10-yr plan

—— [curriculum review committee

—— [diversity task force

Fundraising

Improving education/education facilities sells!

<http://mazur-www.harvard.edu>