

Education & the Big Crew Change

Lloyd R. Heinze
Texas Tech University

Our Situation

- Employment levels at historic lows
- Aging, highly experience workforce nearing retirement (5 to 7 years)
- Pipeline shortage of new Engineering & Applied Science Majors
- Manpower crisis is on horizon

Petroleum Industry Facts

- Average age of SPE member is 49
- 50% of current workers will retire in 6 years
- 65% reduction in staff in past 20 years
- Companies have closed down in-house training programs along with research
- Independent's access to trained personnel is limited
- Industry is having difficulty attracting & keeping the best engineers

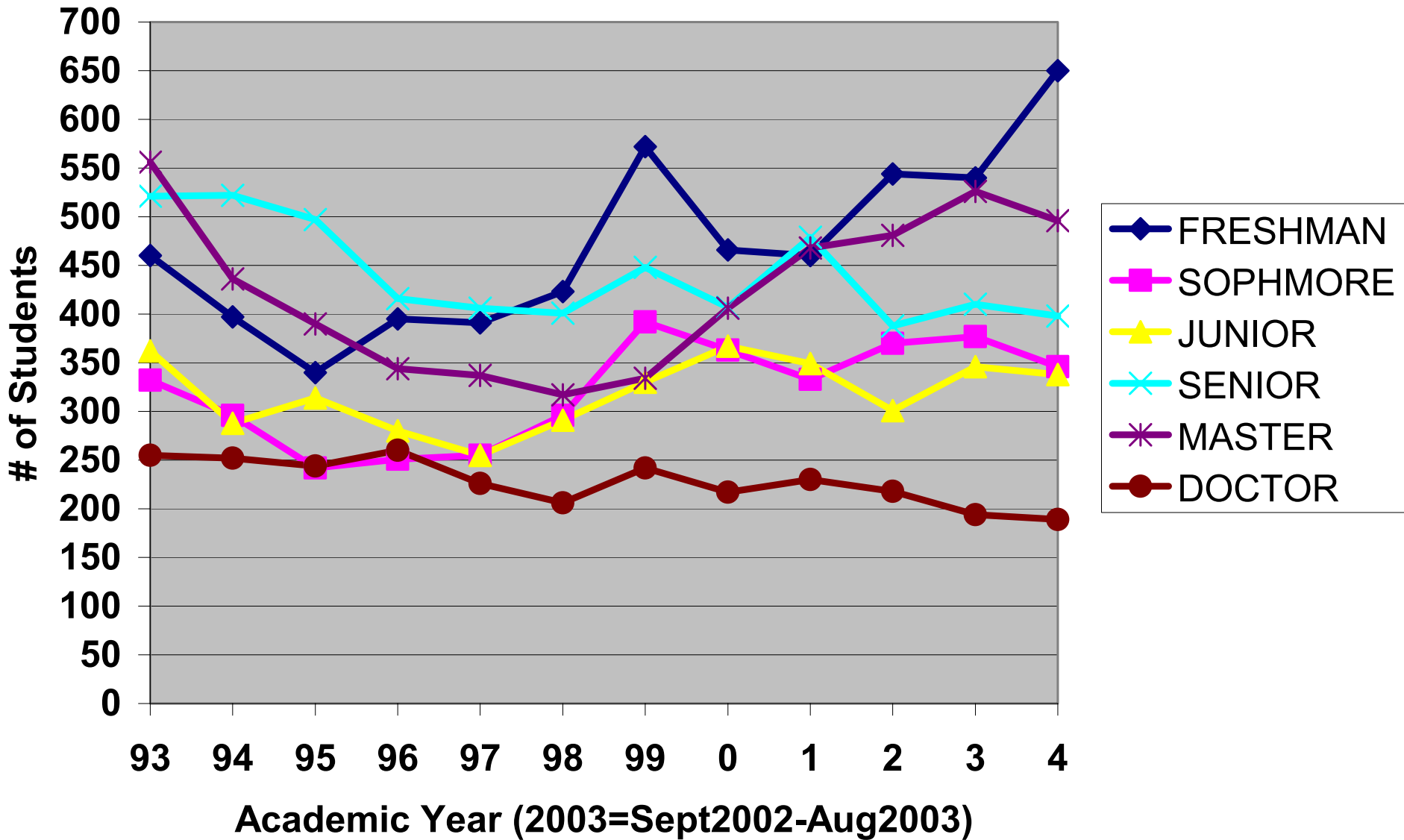
How Did This Happen?

- Petroleum Industry Hiring/Layoff
- High salaries don't attract individuals
- Alternate career choices
 - Business
 - Computer, Telecommunication
- Oil Patch – bad reputation

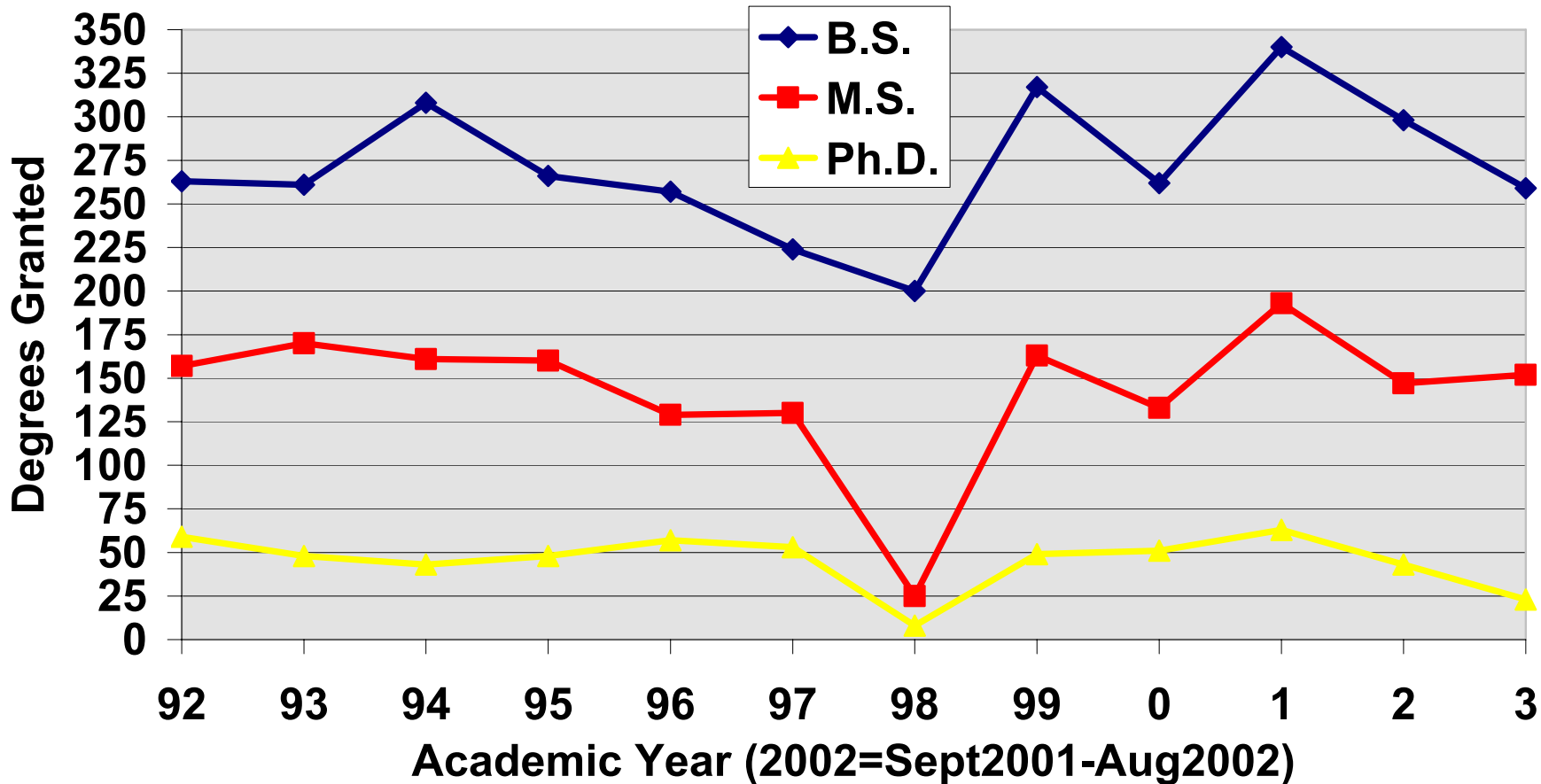
Petroleum Education in USA

- BS programs down 53%
 - 34 in 1983 to 16 in 2004#
- BS enrollment down 85%
 - 11014 in 1983 to 1602 in 2002#
 - Up slightly in 2004 to 1732
- BS degrees granted down 83%
 - 1529 in 1983 to 259* in 2003#
- # Academic year 2002 ends 21 August 2002

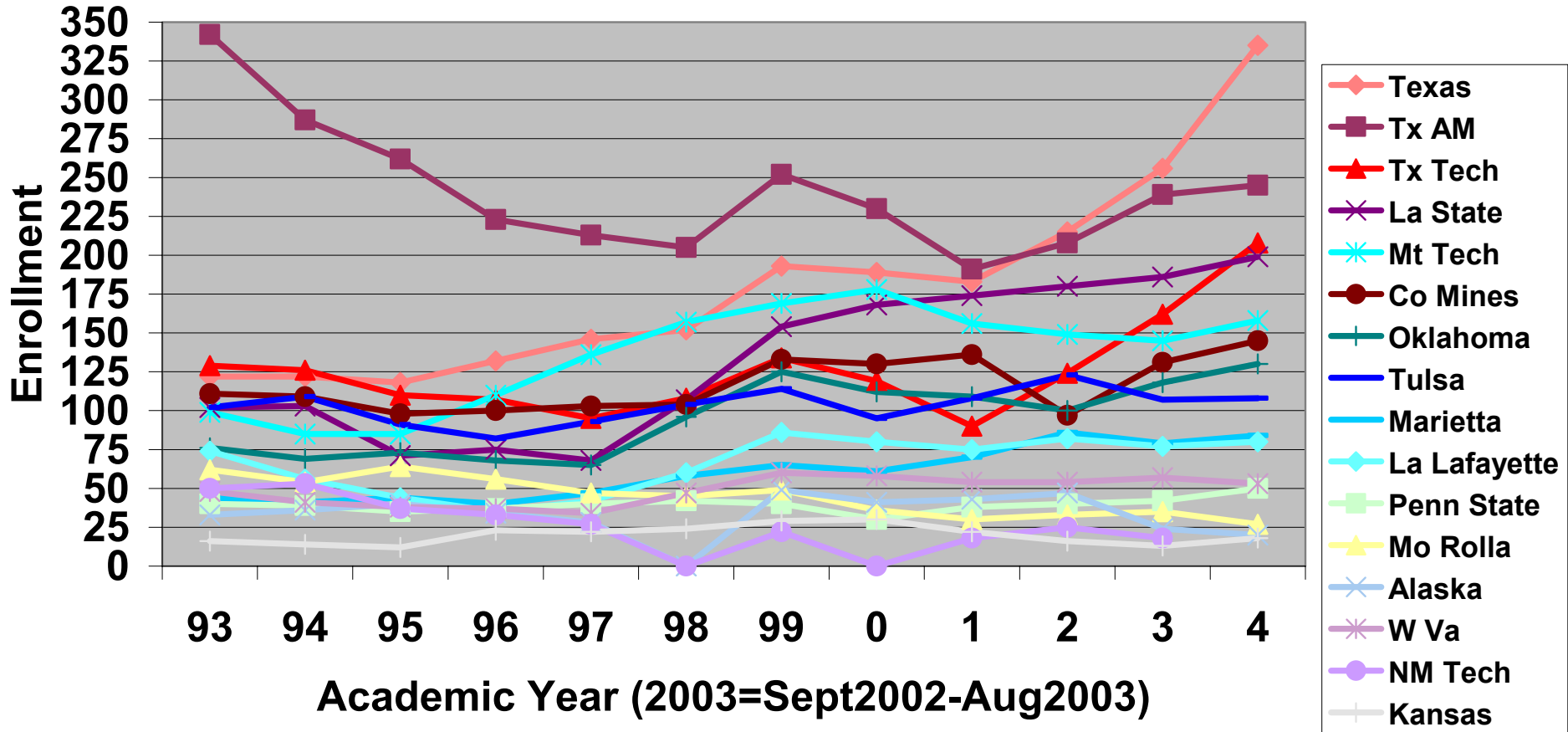
US Petroleum Engineering Enrollment



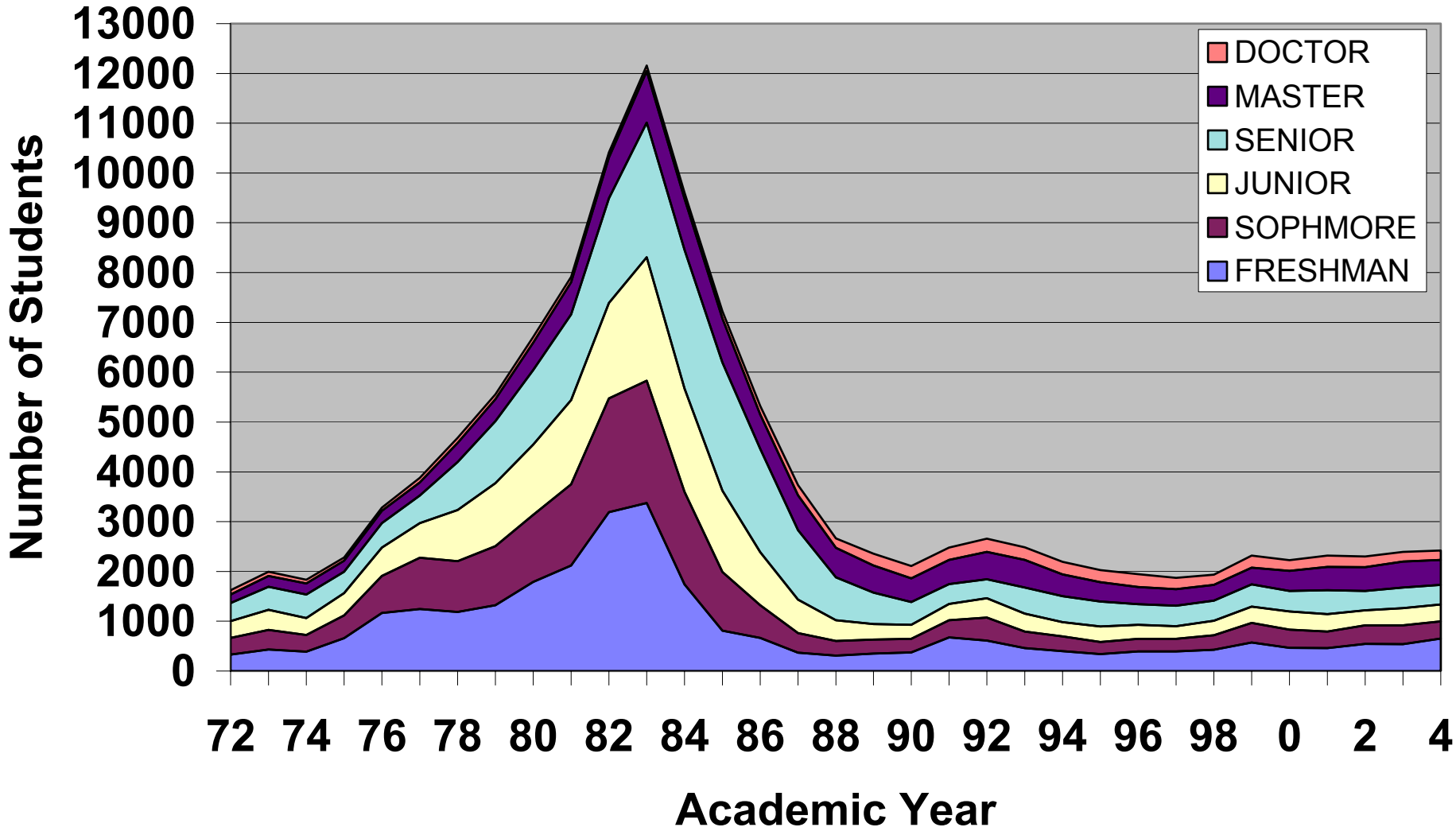
US PE Degrees Granted



Undergrad Enrollment US PE

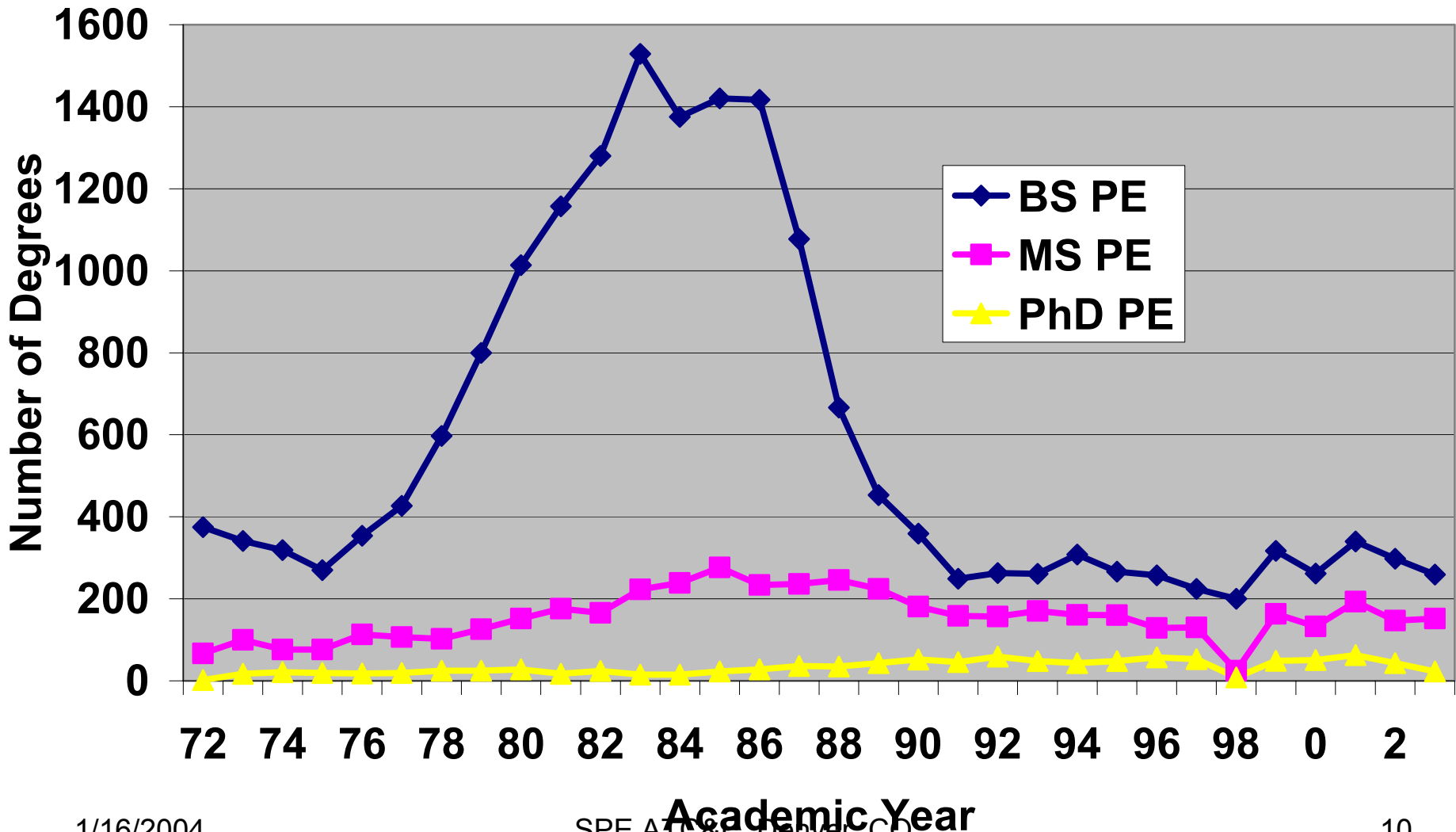


US Petroleum Engr Enrollment

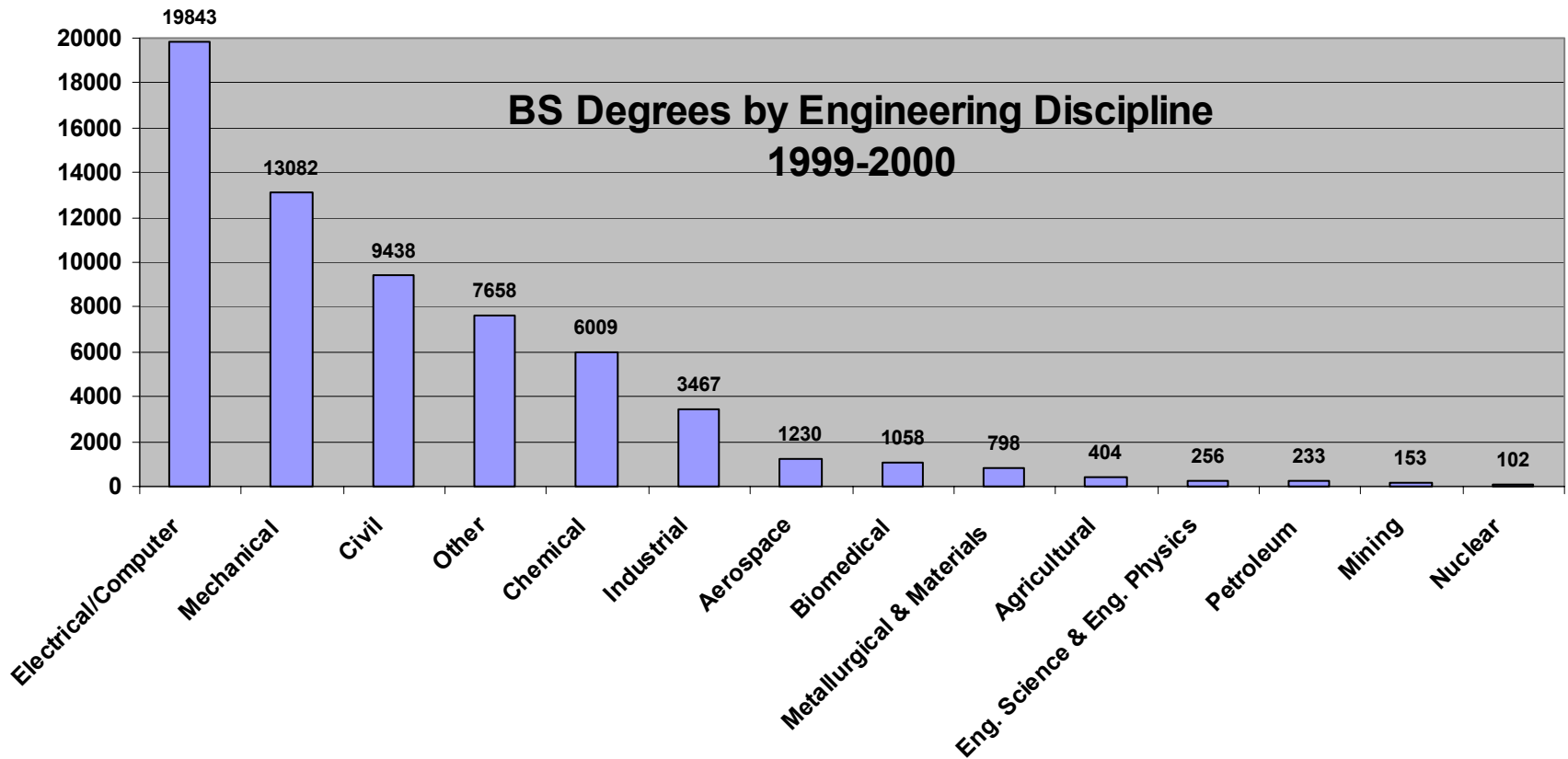


BS PE degrees shown, however
Total BS Engr degrees has similar shape
1975 low of 37,000; 1985 peak of 78,000; 2000 value of 64,000

Petroleum Degrees Granted in USA



from US dept of Education (SPE reported 245 PEs)



Why don't more good students join the Petroleum Industry?

- Job prospects
 - ~100% placement for the past 12 years
- Salaries
 - Highest major in engineering for new hires
- 300 grads per year is right number?
- Perceptions???

The Oil Patch Perceptions?

- Not high tech or creative
- Running out of oil & gas
- No industry growth or advancement opportunity
- Not enough jobs for graduates
- PE is a narrow discipline
- E&P industry has a hire & fire mentality
- E&P industry is environmentally unfriendly & unpopular

What do we do?

- Get the message out:
 - Stable jobs for the future
 - Jobs are high tech & exciting
 - Fossil fuels will continue to play a central role in our energy future
 - PE is a core engineering discipline that can handle a broad array of subsurface problems
 - Fiscally & environmentally responsible use of fossil fuels is our best energy option
- Prove it!

Alternatives Considered

- Retain current employees
 - Change layoff practices, Packages
 - Work environment
- Hire more non traditional employees
- Rehire as Consultants
- Engineers & Applied Science from outside oil industry
- Foreign Nationals as employees
- Computer / high tech will take up slack
- Pump up Engineering Enrollments

Dilbert's "Salary Theorem" states that

"Engineers and scientists can never earn as much as business executives and sales people."

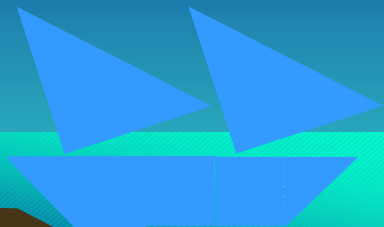
- This theorem can now be supported by a mathematical equation based on the following two postulates:
- Postulate 1: Knowledge is Power.
- Postulate 2: Time is Money.
- As every engineer knows $\text{Power} = \text{Work} / \text{Time}$
- Since $\text{Knowledge} = \text{Power}$
- $\text{Time} = \text{Money}$
- $\text{Knowledge} = \text{Work} / \text{Money}$.
- Solving for Money, we get:
- $\text{Money} = \text{Work} / \text{Knowledge}$.
- Thus, as Knowledge approaches zero, Money approaches infinity, regardless of the amount of work done.
- **Conclusion: The less you know, the more you make.**

Managing Knowledge on a High-Turnover Environment

- Age Demographics, in few years cause
 - rapid loss of highly experienced personnel
 - replaced by people new to the workforce
- Transition harder to manage than past
 - higher level of technical expertise
 - more complicated business

Issues

- What are the major impacts of this change in personnel?
- What actions can/should the industry take now to prepare for this change?
- How can the industry develop the actions required to manage this transition?
- What should University Role be?



Models and Trends in Continuing Education

- Decreased in-house training activities
- Ever-increasing workload
- How to stay current or improve our skills?
- Core Competencies
- Is Professional Registration important?
- How to project education needs?
- Engineer Development from outside N. American and Europe

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