

PHYSICS DEPARTMENT GROWTH AT TEXAS LUTHERAN UNIVERSITY

MY APPROACH TODAY

- ✘ Minimal self-promotion
- ✘ Full disclosure of our history
- ✘ Some insight into our environment
- ✘ Summary of concepts that worked

HISTORY

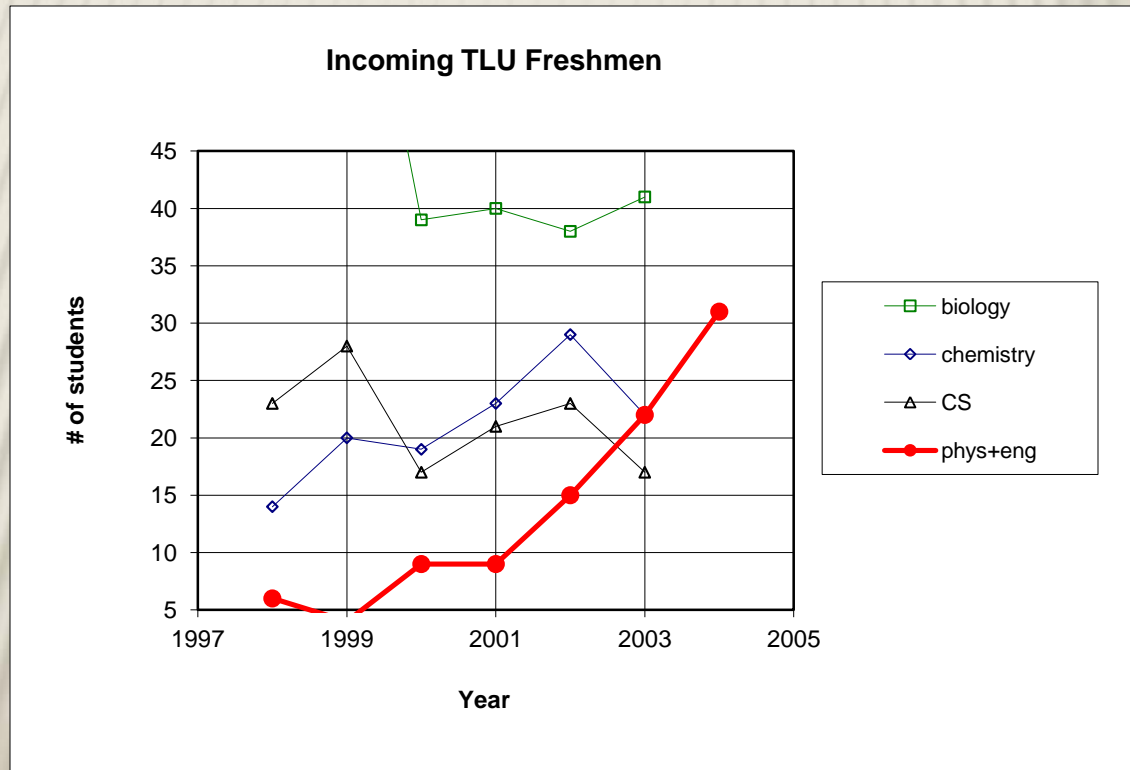
- ✘ I came to TLU in fall 2002
 - ✘ 1340 students, average SAT ~ 1040
 - ✘ TX students are very provincial!
- ✘ My background:
 - ❖ Ph.D. physics – education @ TAMU & Wash U
 - ❖ Texaco 22 years in E&P R&D in Houston
 - ❖ Livermore Professor of Petroleum Engineering
@ Texas Tech for 5 yr
 - ❖ Daughters were graduates of LA schools

WHERE WE STARTED

- ✘ No physics faculty for 2 years (part timers only)
- ✘ Minimal budget for a decade (1,000\$)
- ✘ A long standing belief that “a physics degree could not be supported in this small college”
- ✘ An eight course load per year (labs count $\frac{1}{2}$)
- ✘ Support from the other sciences
- ✘ A collegial atmosphere
- ✘ Failed restart of a pre-engineering $3/2$ prgm in 2000
- ✘ Lots of space in the basement (6 tons of junk)

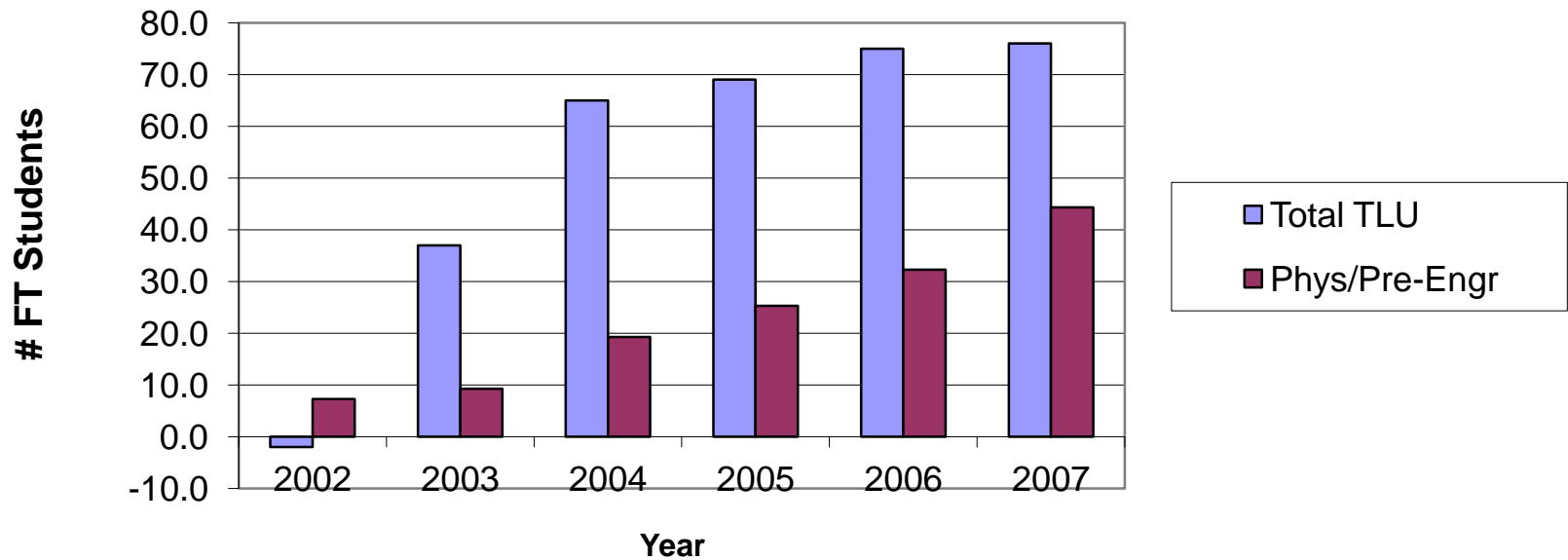
WHERE WE WENT

✘ Freshmen enrollment in fall semester



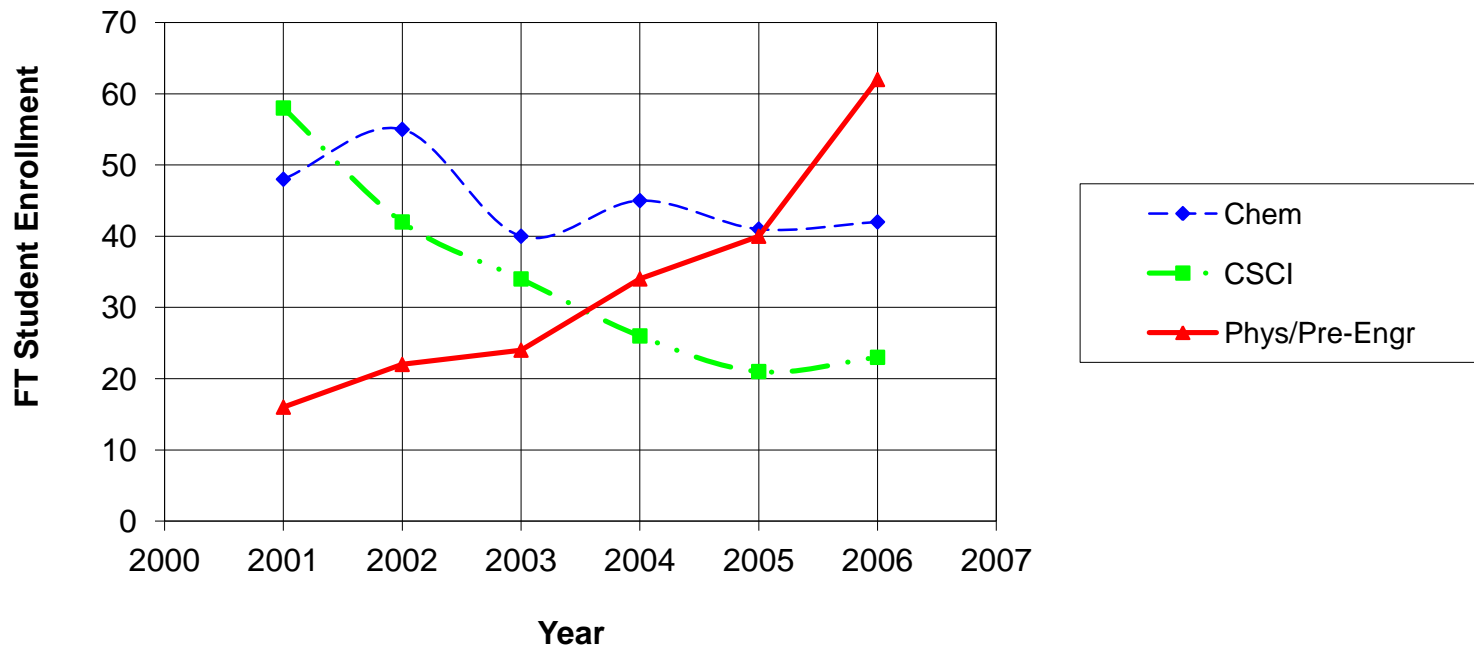
COMPARISON OF ENROLLMENT GROWTH

**Enrollment Growth at TLU:
Base Year 2001**



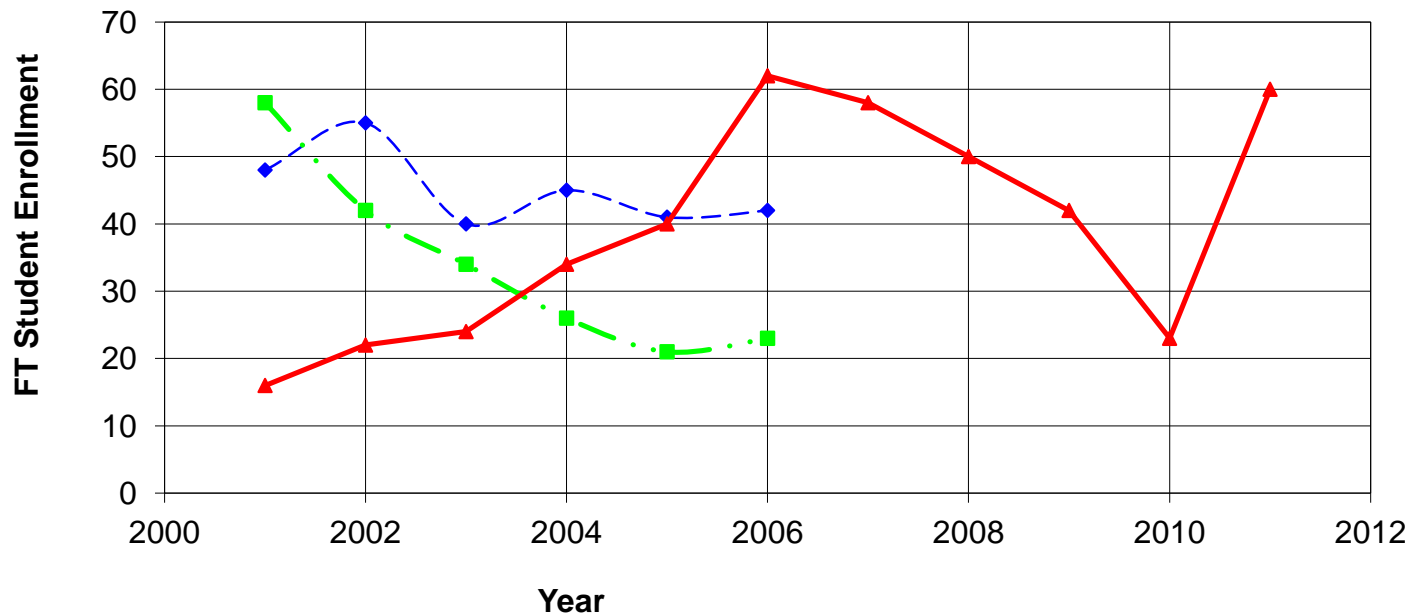
FIVE YEARS OF EXPONENTIAL GROWTH

Department Enrollment by Major



BUT PLENTY OF GLITCHES LATER

Department Enrollment by Major



BUT SURVIVAL CHANCES LOOK GOOD

Table 1: TLU Physics B. A. Graduates by Year

Average of Last Five Years: 5.4

2005	2006	2007	2008	2009	2010	2011
2	1	7	4	6	5	5

Data from AIP Statistical Research Center as supplied by
The TLU Registrar's Office

STUDENT REU EXPERIENCES HAD IMPACT

- ✘ Some internal funding now (2/summer)
- ✘ External
 - + TAMU, SMU, Penn State, U Florida, Nebraska
 - + U Hawaii, Duke, MIT (2)

WHERE ARE OUR GRADUATES?

- ✘ Rice, TAMU, UTSA, TSU (physics)
- ✘ Duke (DOE Comp. Fellow – engineering)
- ✘ UT, TAMU, LSU, TTU, TAMU-Kingsville, U Alaska (engineering)
- ✘ San Diego State, UTHSC SA (med phys)
- ✘ TAMU (meteorology, astronomy)
- ✘ Pro baseball, football, golf
- ✘ Texas Industry

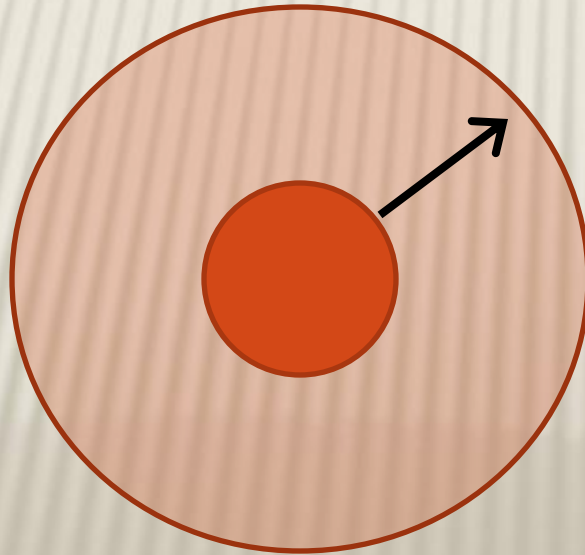
HOW COULD THIS HAPPEN?

- ✘ My 'out-of-the-box' background
- ✘ Collegial atmosphere among faculty/staff
- ✘ Administration wanted growth + little paperwork

- ✘ Insights
 - + SPIN-UP project report for best practices
 - + Local & national demographics
 - + Listen, observe, formulate, try, fail, adapt

WHAT CONCEPTS WERE USED THAT COULD HELP ME? THE BIG ONE!

- ✘ Enlarge your circle. The enrollment ratios of physics to hyphenated physics to engineering are **1:1:8** (for comparison, chemistry is 3).



CONCEPT --- A BLENDED CURRICULUM

- ✘ We fired the imagination with applied physics and modern engineering skills and concepts.
 - + MATLABTM computation skills (Backstrom, U SE)
 - + Linear systems & signals (HARVEY MUDD)
 - + Transport phenomena (my applications experience)
 - + SimulinkTM systems modeling
 - + Design concepts (my experience + ME, SMU)
 - + Billy V. Koen's philosophy of engineering (UTA ME)

RESPECT YOUR STUDENTS

- ✘ They are your children.
- ✘ Be the role model that only you can be.
- ✘ We do NOT manipulate the pre-engineering students into becoming physics majors.

CONCEPT: NETWORK WITH EVERYBODY

- ✘ Ditch your narcissism. Our job is teaching physics, not generating carbon-copies of ourselves.
- ✘ Exemplify the advantages of life-long learning. Learn and teach new things.
- ✘ Work with/for your Admissions office.
- ✘ Our job is to create good engineering students, *not* good engineers. What is wanted by the engineering schools?

CONCEPT: SKUNKWORKS FIRST

- ✘ Operate a ‘Skunkworks’. Money, support, or whatever you need, comes *after* your success. It is not the needed prerequisite for your success. Improvise first.
- ✘ Cope with it. Our job is to optimize the result within the limits of our resources. Ingenuity and extra effort can carry us for a while.

CONCEPT: IT'S ALL ABOUT HUMANS

- ✘ *Motivation* is everything in human endeavor. Respect your students' dreams. (But keep them in reality.) Make sure that your student retention rate in school (not in your department) is up to your school's norm (72%+, 52%+ for our first two years).
- ✘ Our job is to guide and mentor students toward their chosen vocation. If you do this, you will have enough: enough students, enough graduates, enough personal satisfaction.

IN SUMMARY

- ✘ **It's all about attitude.**
- ✘ In a school with very modest resources and no physics history, we have added \$200,000 in endowments, 2 new science annex labs, all new teaching lab equipment and a \$250,000 research lab. Moreover, our students have succeeded. And we are averaging over 5 graduates/year with 3 faculty.

A PROGRAM SWOT ANALYSIS

- ✘ Strengths, Weaknesses, Opportunities, Threats
- ✘ We now are a Hispanic serving institution.
- ✘ Student funding has temporarily shifted to a less advantageous model for us.
- ✘ Physics B.S. degree added for 2012-13.

A PARTING *SWOT* ANALYSIS

✘ The coming year, 2012-13, is critical for us.

We must refill a currently vacant position and hire the replacement for our department Chair. (We only have 3 faculty positions.)

Lorne Davis

NSF SPIN-UP, Austin 5/5/12

