

# Challenges of Teaching in a Small Computing Department

CCSC: SC 2003

Millsaps College

Jackson, MS

April 12, 2003

10:15 – 11:45 am

# Panelists

- Barbara Boucher Owens, *Southwestern University*
- Adel M. Abunawass, *University of West Georgia*
- Anne Gates Applin, *Pearl River Community College*
- Laura Baker, *St. Edward's University*
- David Luginbuhl, *Western Carolina University*

# Background of the project

- SIGCSE 2001 discussions
- Accreditation problems
- Needs expressed by colleagues
  - Standards by which to compare with other small departments
  - Aids for assessment
  - Help when teaching specialized courses
  - Best practices website
- Formed committee in Feb. of 2002 which met during SIGCSE 2002
- First task was to better understand the audience (i.e. a survey)

# Committee which met at SIGCSE 2002

- Will Mitchell U. Arkansas Little Rock
- Cathy Bareiss Olivet College
- Jim Caristi Valporiso University
- Susan Dean Samford University
- Laurie Smith King Holy Cross
- Rick Koontz Grace College
- Barbara Boucher Owens SU
- Scott Thede Depauw University

# SIGCSE 2003

- Meetings on Friday and Saturday
- Discussed where to go from here

# Future plans

- Define target audience
- Further analyze survey results
- Detail survey get comprehensive data
- Determine future tasks
- Form working committees
- Apply for grants
- Get involvement from SIGCSE and other institutions

# Survey overview [\(link to paper\)](#)

## ■ Sections

- Institutional data (number of students, faculty/student ratio, load requirement, etc.)
- Departmental statistics (faculty, student, majors, hours, department identity and support, lab issues, needs, etc)
- Course information (course name, frequency, comfort level)

# Survey Details

- FTE – 2000 or > 3000
- Faculty/student ratio: 1/17.5
- Load requirement: 22.5 (24)
- Full time faculty in C.S.
  - 31 <= 3 faculty
  - 16 = 4 faculty
  - 20 >= 5 faculty
- Majors: (113 mean, 101 std. dev.)
- Hours in major (30 (30-40), 17 (40-50))

# Survey Details (cont.)

- Campus computerization responsibility (59 out of 62)
- Lab Help
  - Student (3, 10, 8, 10, 10, 11)
  - Faculty with load (3, 18, 10, 6, 6, 3)
  - Faculty without load (3, 16, 10, 5, 6, 3)
  - Department dedicated staff (6, 12, 1, 3, 5, 7)
  - Computer service staff (1, 13, 10, 7, 8, 13)
- Research required (35 out of 65 with 30 allowing educational research)

# Goals – Produce Report

- Contact information of anyone new who wants to get involved
- Areas of need expressed by those at the sessions
- Ideas for the future (if covered)
- Other issues deemed appropriate by the panel members and/or those at the session.

# Challenges in recruiting Computer Science Faculty: The Small Department Experience.

Adel Abunawass; Ph.D.  
Department of Computer Science  
State University of West Georgia  
[adel@westga.edu](mailto:adel@westga.edu)

Presentation site with data <http://adel.cs.westga.edu/ccsc03>

# At the SIGCSE '03

---

- Several items were discussed
  - White Paper
  - Curriculum
  - Survey
  - Panels
  - Showcase of faculty in small colleges work
  - Directory
  - Publicity

# The Shortage

- The Shortage is real (*perhaps easing up a little*)!
- Production of PhDs not keeping up with demands
- Faculty have high demands & higher expectations
- Enrollment in Computer Science is soaring
- More Reliance on Technology in Higher Education

# The Shortage

## ■ By the numbers:

### ■ Ph.D Production:

- 1980- 252 PhD graduates/ 1990- 627 PhD graduates
- 1997- 894 PhD graduates/ 1998- 933 PhD graduates
- 1999- 825 PhD graduates/ 2000- 852 PhD graduates
- 2001- 902 PhD graduates/ 2002- 847 PhD graduates

# The Shortage

- Where do they go?
  - most of graduates are hired in Ph.D. granting departments & industry.
  - small colleges compete with the rest of non-Ph.D. granting schools (*compete over 20+ graduates on the average*).

<i>Notes on New Ph.D.'s</i>	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002
Total Ph.D.'s Granted:	933	852	874	933	847
New Ph.D.'s Hired into Ph.D. granting departments:	274	293	273	294	351
New Ph.D.'s Employment Unknown:	144	78	157	180	167
New Ph.D.'s employed in industry/non-academic or non-U.S. positions:	484	454	422	428	316
total:	902	825	852	902	834
Number of New Ph.D.'s in the rest of academia (including small departments):	<b>31</b>	<b>27</b>	<b>22</b>	<b>31</b>	<b>13</b>
Professor Walker's Extrapolations to 100%	<b>45</b>	<b>35</b>	<b>45</b>	<b>50</b>	<b>20</b>
Total Ph.D.s Granted:	1100	1100	1080	1165	1060

-Source: Taulbee Survey (CRA) <http://www.cra.org/>

- Source: Professor Henry Walker ([link to site](#))

# The Competition

- Competitive starting salaries of new Ph.Ds
- Reported mean of salary minimum for a starting salary for 00-02, tenure track position, is \$75,902 (49% increase over 96-97 of \$51,037)
- Table shows the Average of all salaries

	96-97	97-98	98-99	99-00	00-01	01 02
Average of all salaries	\$53,011	\$60,735	\$64,283	\$68,915	\$73,979	\$76,595
Rate of Change		15%	6%	7%	7%	4%

-Source: Taulbee Survey (CRA) <http://www.cra.org/>

# Our Experience...

- Plenty of Faculty positions, but not enough Faculty...
- Faculty retiring/leaving, but no “suitable” replacement can be found...
- Enrollment is soaring, but no classes for students...
- For the most part Faculty are happy with small departments...

# What Can be Done?

- Recruiting...
  - start with the advertisement
  - emphasize “small is good”
  - highlight the Department & the People
  - leverage what your city, community & campus offer
  - strive to attract the best
  - use your students as a recruiting tool

# For more Information...

- *"IT Staffing: Will Higher Education Become a Preferred Destination?"* , By Glen McCandless, Syllabus, April 1999, Volume 12, No. 8.  
[http://www.syllabus.com/apr99\\_magfea3.html](http://www.syllabus.com/apr99_magfea3.html)
- *Taulbee Surveys* <http://www.cra.org/statistics/>
- *"Extrapolation of Taulbee Data"*, by Professor Henry Walker, SIGCSE Listserv, March 2003, <http://www.math.grinnell.edu/%7Ewalker/dept/taulbee-97-02.html>
- *The Incredible Shrinking Pipeline"*, By Tracy Camp, Communications of the ACM, October 1997, Vol. 40, No 10. <http://www.acm.org/>
- *"America's New Deficit: The Shortage of the Information Technology Workers"*, By US Department of Commerce, Office of Technology Policy, 1998.  
<http://www.ta.doc.gov/reports/itsw/itsw.pdf>
- *"The Digital Workforce: Building InfoTech Skills at the Speed of Innovation"*, By Office of Technology Policy, 1999.  
<http://www.ta.doc.gov/reports/itsw/Digital.pdf>
- *"The Supply of Information Technology Workers in the United States"*, Supported by the National Science Foundation (Grant No. EIA-9812240) and published in 1998 by the Computing Research Association. <http://www.cra.org/>
- *"IT worker availability, skill sets, and hot jobs & technologies"* Information Technology Association of America (ITAA), <http://www.ita.org/>

# **Small Departments: The Community College Perspective**

*Anne G. Applin, Ph.D*

*Computer Science Coordinator*

*Department of Science, Mathematics, and Business*

*Pearl River Community College*

*aapplin@prcc.edu*

14th Annual South Central Regional Conference  
Consortium for Computing Sciences in Colleges

Spring 2003  
Jackson, Mississippi

# Overview

- About the College
- About the Department
- Courses / Loads
- Computing Resources
- Physical Facilities
- Faculty Issues
- Budget Concerns

# About the College:

Oldest of the 15 CC/JC s in Mississippi

- Fully articulated and accredited
- Record enrollments every semester for the past several years, currently 3472 (2339 academic)
- Approximately 80 full time academic faculty
  - course load of 15 credit hours/semester
  - can't count a night class as part of the regular load
  - adjuncts teach most of the night classes
- Department Directors to teach reduced loads
  - 12 hours next year - and maybe a shared secretary

# About the Department

**Started in 1982 with 4 Apple computers**

- 1982-1983 Lone instructor
- 1991-1993 L1 3/5 instructors
- 1994-1995 L 2 instructors (I was #2)
- 1997 L became part of the "Dept. of Mathematical Sciences"
- 2002 L became part of the "Dept. of Sciences, Mathematics and Business"
  - Instructional area coordinators
  - 24 declared CS majors - but they don't all declare

# Courses / Loads

Our Dean Counts a Lab as a Class

- Fall - 14 contact hours each
  - 1 section of Intro Programming (3/2) + 3 sections of the Literacy course (9)
  - 1 section of Computer Science I (3/2 ) + 3 sections of the Literacy course (9)
- Spring - 16 & 15 contact hours each
  - 1 section of FORTRAN programming (3) + 1 section of a web applications course (3) + 3 sections of the Literacy course (9)
  - 1 section of Computer Science II (4) +1 section of Discrete Structures (3) 3 sections of the Literacy course (3)

# Computing Resources

We're almost on our own

- 3 technicians for approximately 900 computers
  - Our only support is with campus network issues
  - If we can handle a problem in-house we don't call support
- Faculty installed and maintained network
  - Novell on a 386 server with 24 IBM PS2
- NT 4 on dual PII 266 server
  - Instructor installed / administrated until 1998
  - full-time LAN admin (AA degree) hired 1999 - dropped to part-time in 2000 to go back to school to go back to full time next year
- NT 4 (PIII 350) and RHL servers (PII 266)

# Physical Facilities

No scheduling issues here...

- One classroom equipped with a computer workstation and data projection system.
- One lab of 24 student workstations (WinNT4) used for hands on teaching in literacy course
  - nice because it caps the enrollment for a course required for graduation. All sections are always full
- One lab of everything that still runs (Linux) used for lab component of programming courses and open use for those students
  - Machines are P90 and P120 systems from the teaching lab - so there's no GUI

# Faculty Issues

- Hard to hire new CS faculty.
  - Open position filled by many adjuncts for 2 years
  - Last 2 searches resulted in one qualified applicant each
    - Some high schools pay better than the CCs at the moment
- Advising is difficult -- not mandatory
- Literacy class uses common preps
  - full-time faculty share responsibility for the preps which include: syllabus, rigid schedule, handouts, tests and a lab manual. Night class instructor uses our preps.
  - all students take the same tests & final. SACS likes it, but new faculty take a while to convince

# Budget Concerns

## Statewide Problems

- Budgets have been cut 3 years in a row
  - "base" salary reduced to keep salaries effectively frozen (salary schedule - degree by years of service so the "base" is a Masters with 0 years). Next year?
- Warranties on the computers in the teaching lab will run out in June.
- Software Licensing fees forced the change to Linux for compilers
  - may have the same effect for the entire academic division just so we can all have the same office suite.

# Challenges of Managing a Small CS Department

Laura J. Baker, Ph.D.

Associate Professor

Computer Sciences Department

St. Edward's University

Austin, Texas

lbaker@acad.stedwards.edu

<http://www.stedwards.edu/science/baker/>

# About St. Edward's University

Approx. 4000 students

1200 Graduate students

2800 Undergraduate students

65% full-time

35% working adults

Classes day/evening mixture of both populations

# About the Computer Science Department

270 total majors (approx.)

170 Computer Science

100 Computer Information Science

Offer Day and Evening programs in both majors

Teaching Load 12 hours per semester

# Scheduling Issues

- Scheduling classes (regular offerings, number of sections, rooms, times)
- CS major requirements :  
37 sections of 3 hour classes each semester
- CS non-major requirements :  
18 sections of 3 hour classes each semester  
service level courses
- Total Classes scheduled per semester  
55 sections of 3 hour classes

# Lab Management Issues

- Lab management difficulties
- Supervising full-time lab manager
  - and managing student lab workers
- Overseeing training, equipment maintenance, backups etc.
- Equipment purchases and budget

# Budgetary Issues

- Departmental budget, separate from lab budget
- Hardware/software purchases
- Student workers for lab and for grading

# Student Advising

- Degree plan advising for students
- Degree audits
- Graduate School planning/advice
- Letters of Recommendation
- Internship coordination
- Independent study and special projects

# Student Advising

- Time to meet with prospective students including preview days, parent weekends
- Selecting scholarship candidates and outstanding students

# Managing Faculty

- Curriculum revisions and adjustments to maintain current and credible programs
- Managing full-time and adjunct faculty within department
- Reaching consensus on major decisions
- Scheduling meetings
- Offices scattered in different buildings
- Philosophical differences among faculty

# Challenges of a Small Computing Department



David R. Luginbuhl  
Dept of Mathematics  
and Computer  
Science

Western Carolina  
University  
CCSC-SC

Jackson, MS

April 11, 2003

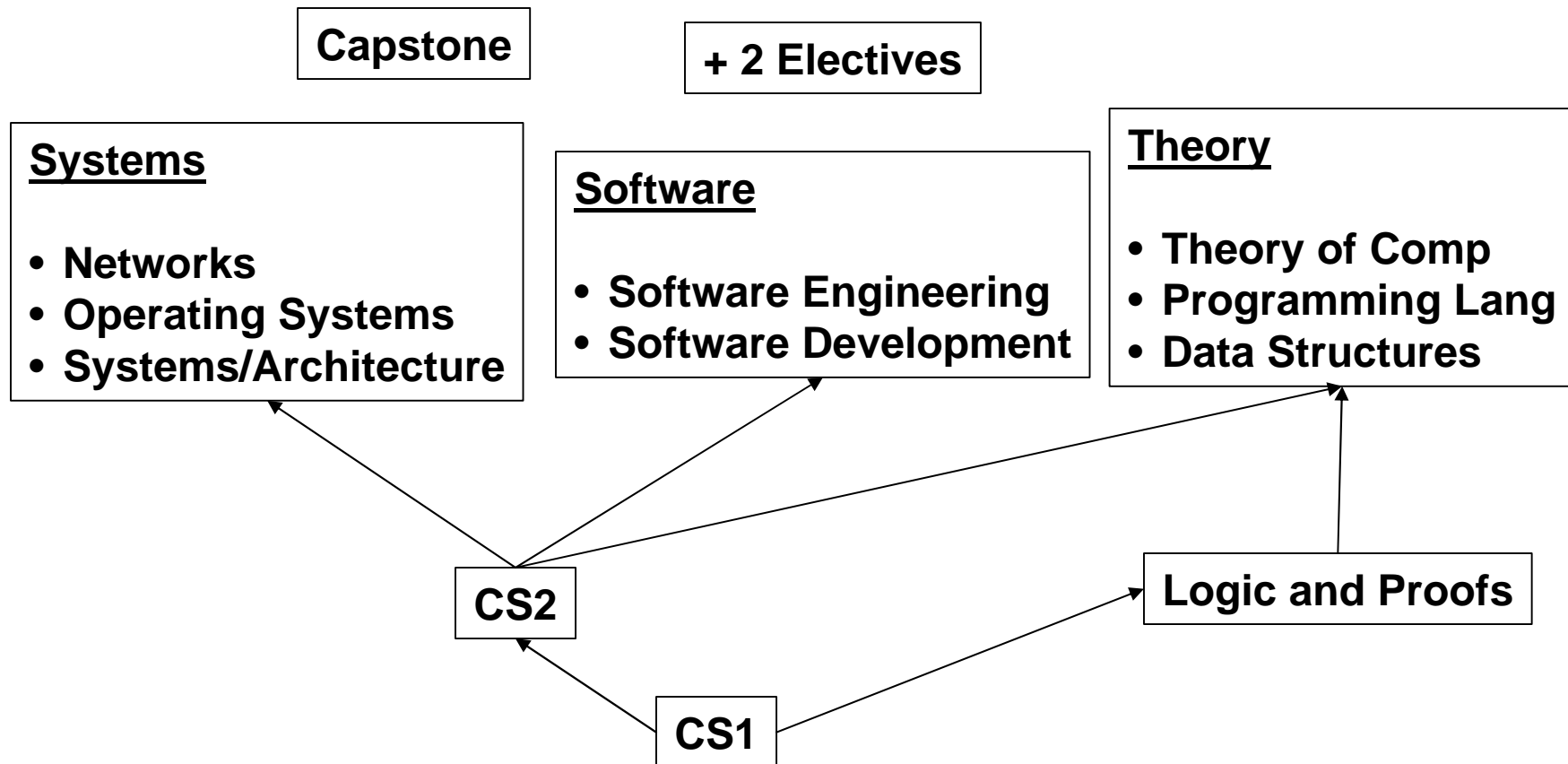
# Overview

- Profile of Western Carolina's CS Program
- Problem: Bench Depth and Curriculum Coverage
- Challenges
- Solutions/Discussion

# Western Carolina University and Computer Science

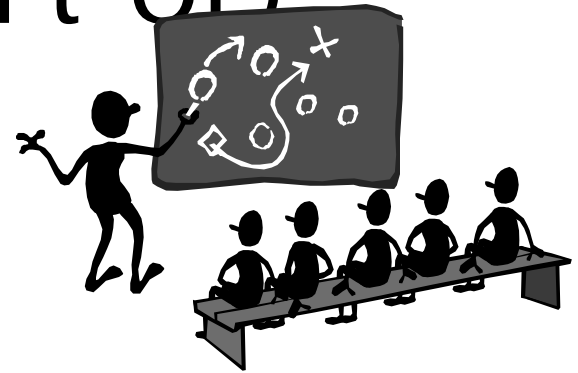
- Westernmost campus in the UNC System
- 7000 Students, undergraduate/graduate
- CS Program resides in the Mathematics and CS Department, College of Arts and Sciences
  - **CS is Undergraduate only**
- CS Faculty
  - **2000-2001: 3 full-time CS faculty members**
  - **2001-2002: 3.5 full-time CS faculty members**
  - **2002-2003: 4.5 full-time CS faculty members**
  - **No 5<sup>th</sup> faculty position in sight**
- Course load: 3 courses per semester

# Problem: Curriculum Coverage



# Bench Depth – Current Configuration (sort of)

- Prof A: Systems
  - Networks, O/S
  - Database (a popular elective)
- Prof B: Systems
  - Architecture, Systems elective
- Prof C: Software/Theory
  - Software Development, Data Structures, Logic and Proofs
- Prof D: Software/Theory
  - Theory, Software Engineering, Capstone
- Prof E: Half-time
  - Programming Languages, Advanced Programming (Elective)





# Other Courses



- CS1 – Intro to Java
  - 2 or 3 sections taught by a subset of CS faculty
- CS0 – Intro to Computing: HTML and JavaScript
  - Popular service course
  - 2 to 4 sections taught by a subset of CS faculty
- Two or three other electives taught by Math faculty
- Math requirements taught by Math faculty



# Challenges

- Need for a backup plan
  - We are one faculty departure away from radical restructuring
- Faculty talents & strengths drive curriculum
  - Always with accreditation and CC2001 in mind
  - And of course, state and university requirements...
  - A balancing act, to say the least
- Lack of ability to offer many electives



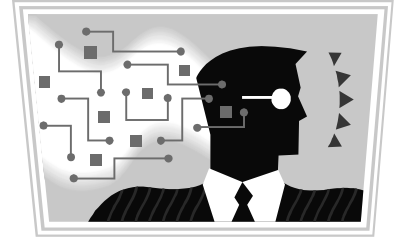
# Solutions



- We have begun to identify “backups” for each course
- Rely on:
  - part-time help or Mathematics graduate students for service and CS1 courses
  - Mathematics faculty for math-related courses
- “Creative” course substitutions for students

# Rewards

- Increased breadth of teaching experience
- Ability to determine program direction
  - Changes to curricula
  - Changes to courses
- Contact with students in multiple settings



# Edge of the Box Thought

- Is there a more robust structure to a CS curriculum to inoculate against the bench-depth problem?
  - Cross-cuts?
  - Mini-courses (half/third semester)?
  - Component-based curriculum architecture?
- Something is needed to allow for real-time flexibility
- Ideas?

Questions?