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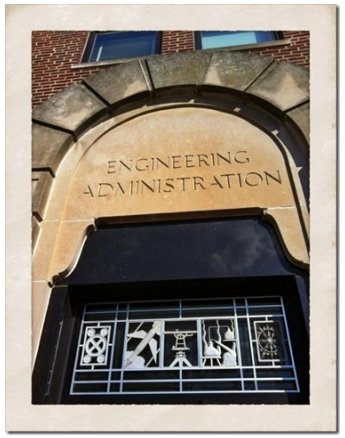

Purdue and Academic CS in the 1960's – *The Birth of the CS Discipline*


Courtesy Purdue University Libraries, Archives and Special Collections

Panel Moderator: Hal Hart

Presenters: Robin Lea Pyle, …

April 6, 2013

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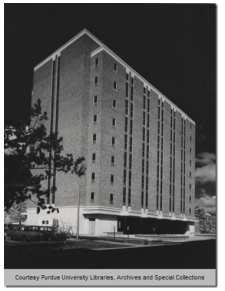
Questions for This Panel to Answer



1. **Evolution of pre-CS in Academia**
   - CS-like Courses developed in other departments?
   - University computing services?
2. **What triggered the formation of CS departments?**
3. **How were the first CS faculty selected? What were they looking for?**
4. **What motivated the early faculty (with degrees in other fields) to apply for CS positions?**

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Evolution of pre-CS in Academia

Prior to Electronic Computers

- **1930's: Computability Theory …**

'Computing is a relatively young discipline. It started as an academic field of study in the 1930s with a cluster of remarkable papers by Kurt Gödel, Alonzo Church, Emil Post and Alan Turing. The papers laid the mathematical foundations that would answer the question "what is computation?" and discussed schemes for its implementation.

These men saw the importance of automatic computation and sought its precise mathematical foundation. The various schemes they each proposed for implementing computation were quickly found to be equivalent, as a computation in any one could be realized in any other. It is all the more remarkable that their models all led to the same conclusion that certain functions of practical interest—such as whether a computational algorithm (a method of evaluating a function) will ever come to completion instead of being stuck in an infinite loop—cannot be answered computationally.

At the time that these papers were written, the terms "computation" and "computers" were already in common use, but with different connotations from today. Computation was taken to mean the mechanical steps followed to evaluate mathematical functions; computers were people who did computations. In recognition of the social changes they were ushering in, the designers of the first digital computer projects all named their systems with acronyms ending in "-AC", meaning automatic computer—resulting in names such as ENIAC, UNIVAC and EDSAC. '

-Peter Denning

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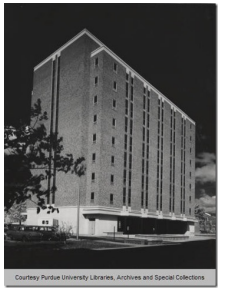
Evolution of Pre-CS at Purdue

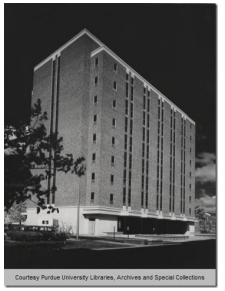


(presented by Duane Pyle's daughter, Robin)

- 1947: punch card equipment, stat lab in Math Dept.
- Early 1950's: Early computer (an IBM card-programmed calculator), paper tapes
- Alan Perlis, Tom Cheatham: The Purdue Compiler; taught programming in Numerical Analysis course
- Mid-1950's: Computing center(s) born *(temporarily run by L. Duane Pyle in late 50's & early 60's as "acting" head)*
- Some faculty & grad students wrote programs – for solving numerical problems, doing statistics, and compilers
- Departmental politics, turf wars for control of computing (statistics, math, engineering…)
- Which-Computer-To-Buy debates, sales jobs, technical vs cost considerations, …

What Triggered the Formation of CS Departments?

(presented by Duane Pyle's daughter, Robin)



- Late 1950's: Multi-year lobbying and building arguments by 1959 Ad Hoc Committee (including L.D. Pyle) for large, central computer purchase & CS curriculum
- 1961: Division of Mathematic Sciences proposed with 4 departments: Math, Statistics, CS, & Math Education *(latter dropped)*.
- 1961-62: 3-expert Advisory Committee
- Pres. Hovde, Dean Hawkins et al were persuaded to hire a person of national stature in computing to take over and "get things in shape" — computer center (CS Center) and academic program (CS Dept.). Felix Haas hired first; pushed.
- 1962: Sam Conte is hired from STL / TRW. Had political clout to bring in "big bucks" from NSF to build the program. Also chose IBM 7090.
- *Competing claim by George Forsythe that Stanford was the first to put in place an academic CS program. A stand-off?*

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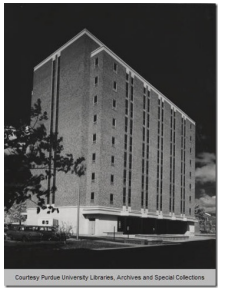
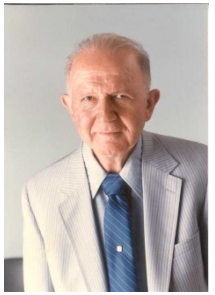
How Were the First CS Faculty Selected?



Early 60's: Sam Conte recruited faculty to teach MS- & PhD-level courses

- Goal was a strong group in Num. Analysis & Applied Math, and a similar group in Math Logic & Advanced Programming + access to large-scale computing equipment. Conte taught *Numerical Analysis.*
- Saul Rosen, whom Conte had know up to 1956 at Wayne State: taught *Computing and Programming Systems*.



- Robert Korfhage, new U.Michigan PhD in Information Sciences: taught *Algorithms & Automata*
- L. Duane Pyle & Richard Kenyon *(Purdue Math & EE PhD's in ~ 1960)* were incorporated from the Computational Division, and initially devoted a major part of their time to the *Computer Sciences Center*.

Altogether, these 5 were able to deliver ~20 courses the first year.

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How Were the First CS Faculty Selected? (2)

Mid-late 1960's: Conte recruited more faculty to teach MS- & PhD-level courses, plus new undergraduate CS program

- 1963-64: Hired Richard Buchi *(Automata)*, Walter Gautschi & John Rice *(Numerical Analysis)*
- 1966: Carl de Boor *(Numerical Analysis),* the first young PhD
- 1967: Hired Maury Halstead, a senior person in *Programming Systems*
  - Taught *PILOT* language compiler-compiler (or self-compiler) development, based on his NELIAC language compiler experience at Navy Elec. Lab
  - later invented Softw*are Physics*, which became *Halstead Complexity Measures,* which became *Software Metrics*, later evolved as part of *SW Engineering*

- 1967: Robert Lynch *(Numerical Analysis),* Paul Young *(Theory)*
- 1968: Jay Nunamaker *(Business Applications)*
- 1969: Vincent Shen & Victor Schneider *(both Systems)*

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Some Purdue CS Department Milestones

1962: **Department formed, MS & PhD programs started; IBM 7090 acquired**

1964: **First MS degrees awarded (3)**

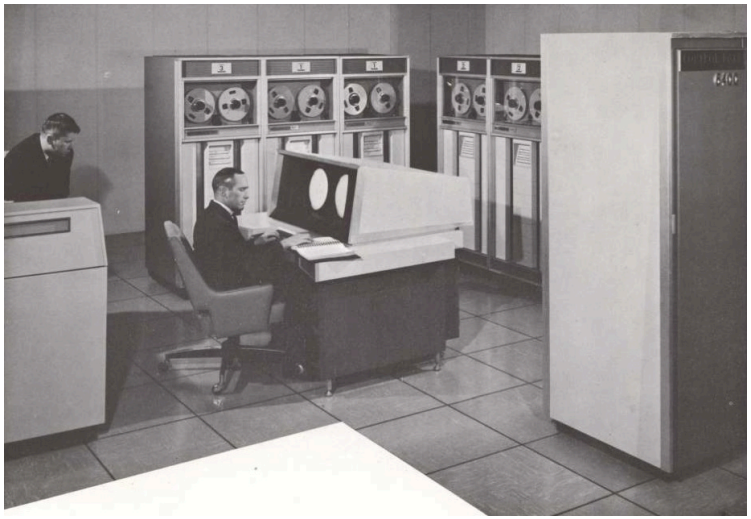
1966: **First PhD degrees awarded (2)**

1967: **Move from ENAD to Math Sciences Building; CDC 6500 acquired**

1968: **Undergraduate CS program started; first BS degrees awarded**

100th MS degree awarded

Regular faculty size reaches 10



1970: 200th MS degree awarded

1972: Regular faculty size reaches 20

1973: 200th BS degree awarded

1977: 500th MS degree awarded

1978: 500th BS degree awarded

CS Dept. acquires first computer facility — VAX 11/780

1979: Conte retires as CS Dept. head; Denning appointed

1981: Crisis: Enrollment explosion arrives

1982: 100th PhD awarded

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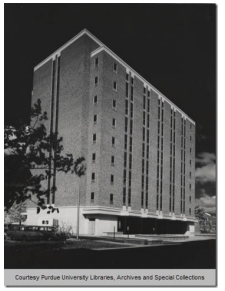
What Motivated the Early Faculty to Apply for CS Positions?

(Some speculations)



- They had programmed computers as part of their PhD research and appreciated that it was being established as an academic discipline of its own?
- They had supported computer development and programming projects, or computing centers, as grad students…?
- Came from programs that essentially were Computer Science in everything but name?
- Came from industry where computing had gained a strong presence?
- Easier to be hired than in the fields of their degrees?

John Rice: The real answer was that Purdue had the only real CS program at the time!

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