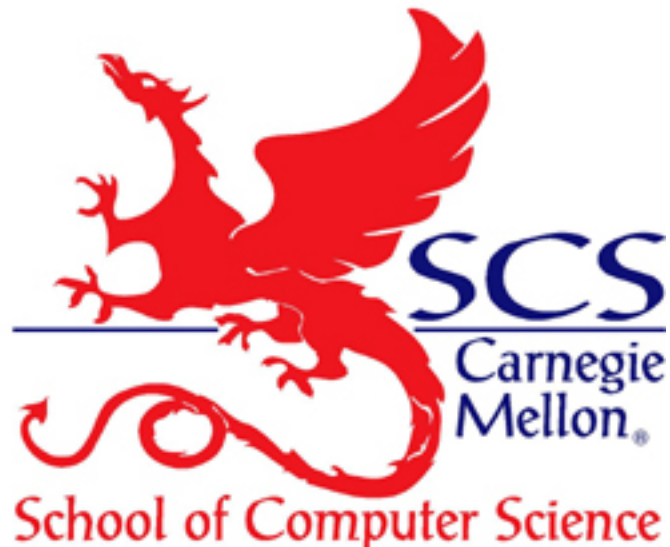# Creating a
School of Computer Science:
The CMU Experience

Randal E. Bryant

School of Computer Science

Carnegie Mellon University

Our Vision of Computer Science

"The theory and design of computers,

    as well as

        the study of all the phenomena arising from them"

  – **Allen Newell, Alan Perlis, Herb Simon** *Science*, **1967**

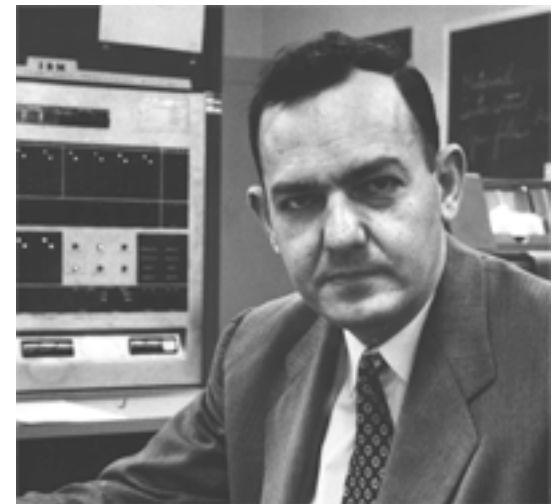# Historical Origins of CS Departments

Engineering

- **Especially from Electrical Engineering**

Science

- **Especially from Math**
- **With physicists and others using computers as tools**

CMU's Roots

- **Herb Simon, Graduate School of Industrial Administration**
- **Management science, behavioral economics**
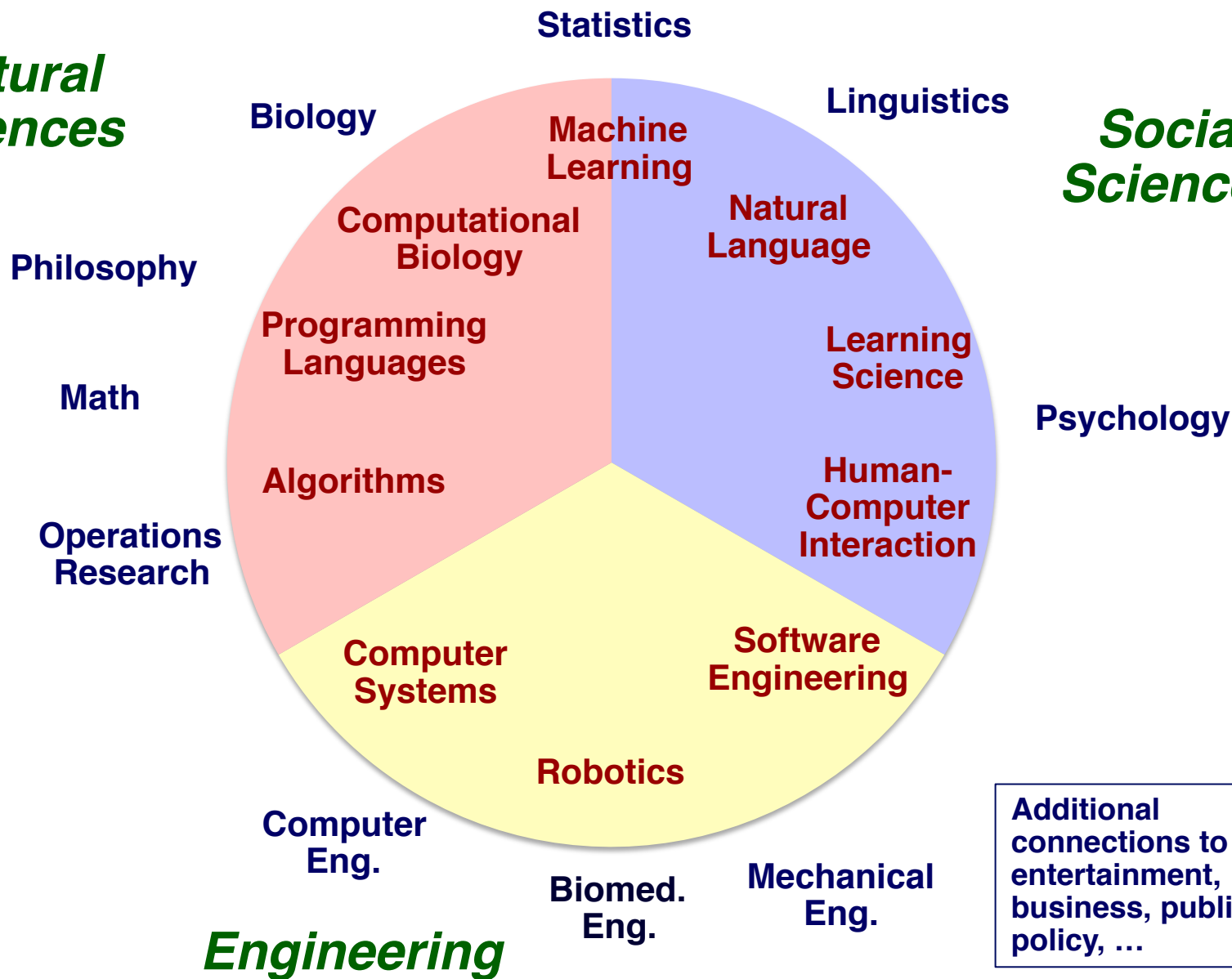- **Cognitive psychology**

CS's Disciplinary Roots

Statistics

Natural Sciences

Biology

Philosophy

Math

Operations Research

Machine Learning

Computational Biology

Programming Languages

Algorithms

Computer Systems

Robotics

Computer Eng.

Biomed. Eng.

Engineering

Linguistics

Natural Language

Learning Science

Human-Computer Interaction

Software Engineering

Mechanical Eng.

Social Sciences

Psychology

Additional connections to arts & entertainment, business, public policy, …

CMU CS History

1960s: Computer Science Department

- **Founded 1965**
- **Simon + Newell + Perlis**
- **Part of Mellon College of Science**
  - **Along with Physics, Biology, Chemistry, Math**

1970s: Flourishing under DARPA Support

- *"My total budget for the department was very simple. It totaled $2 million—in 1971 dollars—$1.8 million from DARPA and $200,000 from CMU."* **– Joseph Traub (CSD Head 1972—1980)**
- **University-level research centers**
  - **Robotics Institute**
  - **Information Technology Center**
  - **Center for Machine Translation**

1980s: Rebellion

1985 research budgets

- **CS-related:** $27.0M (including CSD, RI, ITC)
- **Rest of MCS:** $9.2M
- **All of CMU:** $64.4M

Very different cultures

- **CSD: young, well-funded, complete focus on research**
- **Rest of MCS: tenured, low funding, education focused**

1985: Split CSD off as free-standing department

1988: Formation of School of Computer Science

- **Incorporates CSD, ITC, RI**
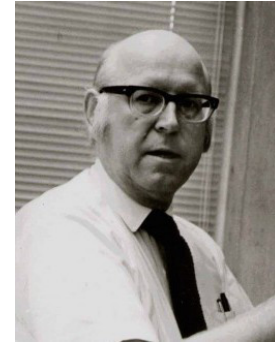- **CS Department eliminated**

Opposition to Change

- *"I'm not in favor of Computer Science becoming a separate unit; in fact, I'm strongly opposed. It would not be good for the university, or the college, the students, or even Computer Science."*
  - **– Robert Sekerka, MCS Dean**
  - **As quoted in CMU student newspaper, Jan. 29, 1985**

- *"RESOLVED, That the Faculty Senate advise the President that in its judgment, to give administrative status to the Computer Science Department independent of the college structure at this time would probably entail more costs than benefits to the University. The Senate therefore recommends against the adoption of the plan."*
  - **Adopted by CMU Faculty Senate, Sept. 19, 1985**
  - **By 20:7 vote**

CMU CS

How Did it Happen?

Strong Advocates

- **Nico Habermann (CSD Head)**
- **Allen Newell**
- **Allies in other departments**

Willing Administration

- **Provost**
- **Senior VP (Pat Crecine, later GaTech President)**

Incremental Approach

- **Two years transition**

2016 Status

School of Computer Science: 7 "departments"

- **Computer Science**
- **Robotics**
- **Human-Computer Interaction**
- **Language Technologies**
- **Machine learning**
- **Computational Biology**
- **Software engineering**

Major Cultural Shifts

- **Many ties to other parts of campus**
- **Strong commitment to undergraduate education (majors + nonmajors)**
- **Many MS students**

Making a Case for Colleges of Computing

Intellectual

$$CS \not\subseteq Science$$

$$CS \not\subseteq Engineering$$

$$CS \not\subseteq Engineering \cup Science$$

- **Especially as computer technology has become pervasive**

Organizational

- **Will allow CS to be more connected and interdisciplinary**
  - **Humanities, business, social science, …**
  - **Faculty must be willing to branch out from core CS**
- **Must overcome barriers**
  - **Zero-sum thinking**
  - **Divergent academic cultures**

CMU CS

Disciplinary Roots

Natural Sciences

Social Sciences

Engineering

Statistics

Biology

Linguistics

Philosophy

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Operations Research

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