

EAU @ CIS: Fairchild Hall, 1971-85

(How CIS began: Beth's pioneering role)

April 28, 2016

**First, Thank You, Beth, for
your contributions to CIS !**

Pre-Kansas

- Beth was born
- B.S., Mech. Engg., Michigan State U., 1961
- M.S., Math., MSU, 1963; worked with a Control Data CDC3600, a big deal in those days....

Beth, 1961



tape, and on the CDC 3600, which soon replaced the MISTIC. She says, "Wayne mentored me in how to be a professional, a manager. He made my career."

Unger moved to Kansas in 1966 with her

FOREGROUND: The Control Data Corporation (CDC) 3600, which used transistors instead of vacuum tubes, was installed in MISTIC's place in June 1963. It was housed on the third floor of the Computer Center. BACKGROUND: Beth Unger loading linear programming codes for researchers in agricultural economics (circa 1964). She says, "That is me with the card tray. I remember that white wool suit."

MSU Currents Magazine 2-2 (2003)

A timely move to Manhattan, Kansas, in 1966...

In support of the anticipated creation of a Department of Computer Science, a series of four eminent computer scientists was brought to the campus by the Department of Statistics and Statistical Laboratory during the period October 12, 1967 through the week of April 15, 1968. Each lecturer spent most of a week on the campus giving at least four lectures and visiting with faculty, students and some administrators about the

The visitors: Alan Perlis (CMU), William Lynch (Case Inst.), Calvin Gotlieb (Toronto), Edward Feigenbaum (Stanford)

1967-68 DEPARTMENT OF STATISTICS & COMPUTER SCIENCE /KAES STATISTICAL LABORATORY

W. JAY CONOVER

ARTHUR D. DAYTON

IVAN N. ERDELYI, PhD, University of Cluj, Romania

ARLIN M. FEYERHERM

✓ PAUL FISHER

HOLLY C. FRYER (Head / Director)

YOUNG OAK KOH

LESLIE F. MARCUS

RAJA F. NASSAR

✓ ELIZABETH A. UNGER, MS, Michigan State University, East Lansing

CHARLES S. WALKER, MS, University of Kansas, Lawrence

RAY A. WALLER, PhD, The Johns Hopkins University, Baltimore, MD

MICHA YADIN, DSc, Technion, Israel

SHELEMYAHU ZACKS

From KSU Statistics Newsletter, 1990

Beth's job history (vita, 1971)

NAME:

Elizabeth A. Unger

YEAR BORN: 1939

RANK:

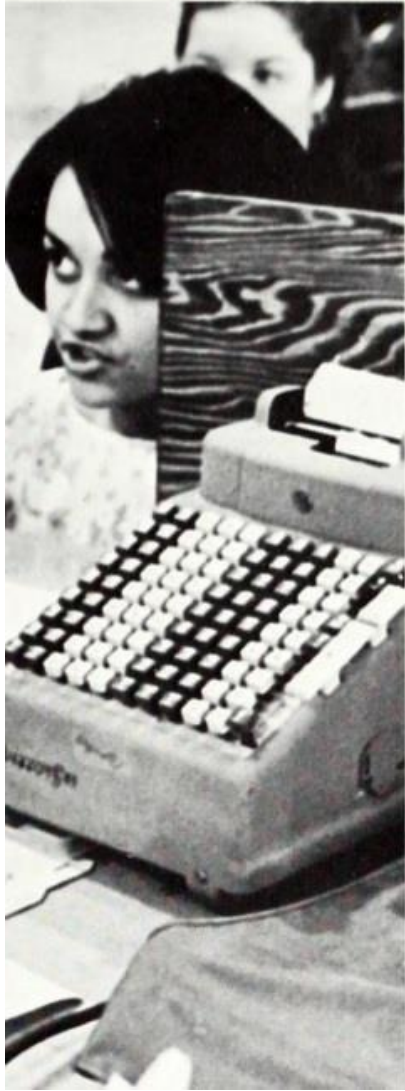
Assistant Professor, Computer Science
Associate Director, Computing Center

DEGREES:

B.S., Michigan State University, 1961
M.S., Michigan State University, 1963

EXPERIENCE:

Laboratory Assistant, Michigan State University, 1957-59
Applied Science Student Trainee, IBM, Lansing, Michigan, 1961-62
Graduate Assistant, Michigan State University, September 1961 -
March 1963
User Services Supervisor and Librarian, Michigan State University, 1963-66
Instructor, Kansas State University, 1966-69
Assistant Professor, Kansas State University, September 1969
to present
Chief Programmer, Kansas State University Computing Center,
1966-67
Assistant Director, Kansas State University Computing Center,
1967-69
Associate Director, Kansas State University Computing Center,
(January through July) 1969
Acting Director, Kansas State University Computing Center,
1969-70
Associate Director, Kansas State University Computing Center,
1970 -



Administrative Heads —
Harold Alford, director of continuing education;
Donald Hoyt, director of educational research;
Elizabeth Unger, acting director of computing center.



KSU's Computer Science Dept. broke from Statistics in July, 1971

Table 1. Enrollment in Computing Courses 1963-1971

<u>Year</u>	<u>63-64</u>	<u>64-65</u>	<u>65-66</u>	<u>66-67</u>	<u>67-68</u>	<u>68-69</u>	<u>69-70</u>	<u>Estimated 70-71</u>
Under-graduate	111	214	367	443	507	831	1424	1800
Graduate	0	0	0	8	81	165	360	420

Initial CS course listing:

- 1) Introduction to Algorithmic Processes
- 2) Computer Organization and Planning
- 3) Non-numeric Programming
- 4) Algorithmic Languages and Compilers
- 5) Computer and Programming Systems I & II
- 6) Data Reduction and Control Programming
- 7) Computer Logic
- 8) Automata Theory

Computer Science

HAROLD SACKMAN, Head of Department

Professor Sackman; Associate Professors Ahmed, Conrow, Gallagher and Weinberg; Assistant Professors Brewer, Calhoun, Fisher, Miller, Sincovec, Trump and Unger.

UNDERGRADUATE STUDY

The first digital computer, the Harvard Mark I, was demonstrated in 1944. The first electronic digital computer, the ENIAC, was exhibited in 1945. Today there are thousands of digital computers in use in the world. These machines represent what is called the hardware of digital computing.

A computer must be directed to do computations, store information, and produce the final information required in a usable form by means of programs known as software.

The creation and utilization of the best possible hardware and software is, broadly speaking, the field of computer science.

A person seeking an undergraduate degree in computer science must fulfill the general

computer science. If so they may need to take one or more courses for undergraduate credit. They also will take two academic years to complete the requirements for the Master of Science degree unless full use is made of Intersessions and Summer Sessions.

The Doctor of Philosophy degree in computer science is offered jointly by the University of Kansas and Kansas State University so that students will have, to some degree, the benefits to be derived from both faculties. The fields of highest concentration in computer science are divided between the two universities in the following manner:

Identified with Kansas State University

Machine Languages — Language processors, conversational languages, extensible languages

Computer Design and Architecture — Computer logic, switching theory

Programming Systems

Biological and Ecological Systems
Simulation

Key CS Faculty

Harold Sackman (Fordham), Dept. Head

Myron Calhoun (Arizona State), joint with EE

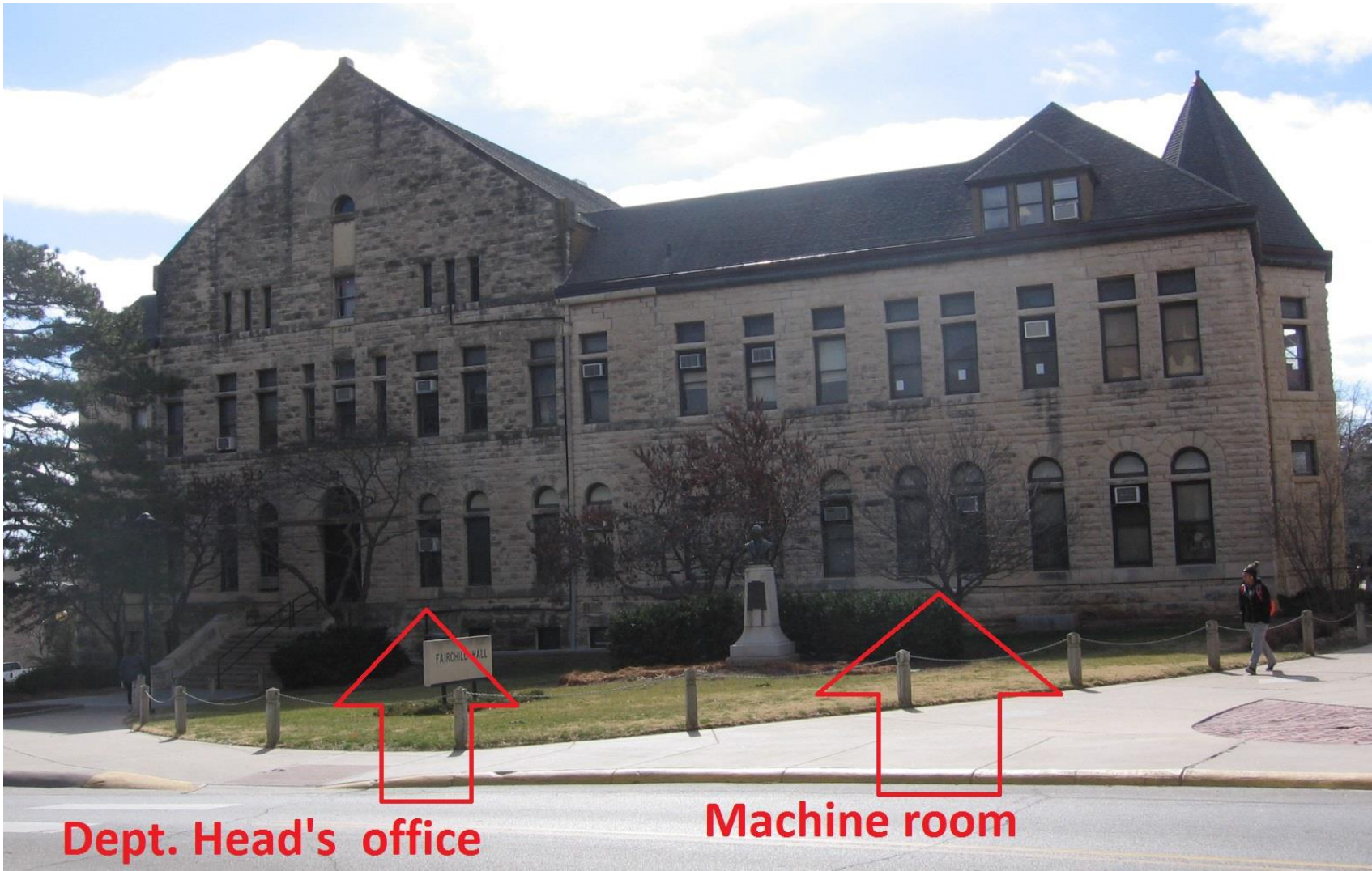
Paul Fisher (Arizona State)

Richard Sincovec (Iowa State)

Elizabeth Unger, joint with KSU Computing Center

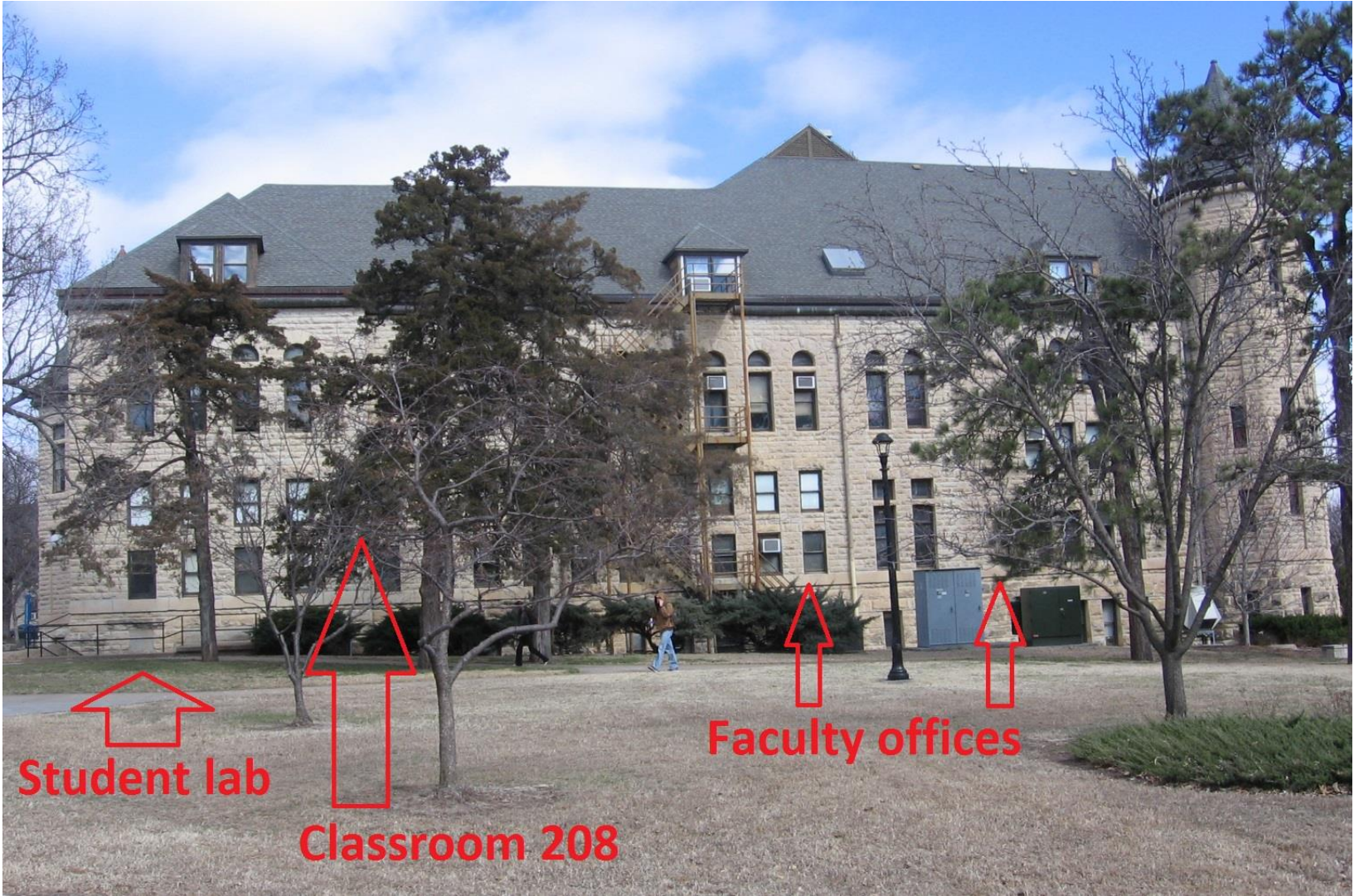
Also joint with computing center: Ken Conrow,
Richard Gallagher, Mike Miller

The department was situated in Fairchild Hall....



Dept. Head's office

Machine room



Student lab

Classroom 208

Faculty offices



The Fairchild “dungeon” lab

(Tom Gallagher, just below...)

From Department brochure, 1975

**Seaton Hall
basement lab
(it had windows)**



The first few years were rocky...

Sackman was the head for only two years, succeeded by Paul Fisher in 1973. (Fisher said to me: "You don't let an engineer run a computer science department.") Weinberg, Trump also left. Fisher was an "entrepreneur," often at odds with central administration.

Several people were hired: Bill Hankley, Virg Wallentine, Fred Maryanski, Linda Shapiro. And several people left: Sincovec, Shapiro, then Maryanski.

Beth kept her job at the Computing Center till 1974, when she moved to CS full time. *That year, she also became a PhD student in CS at KU.*

Faculty stayed constant around ten people --- not enough to handle student load, let alone foster research.



Paul S. Fisher received a B.A. in Mathematics from the University of Utah in 1963, an M.A. in the same field in 1964, and a Ph.D. in Computer Science was awarded him by Arizona State University in 1967. From 1967 to 1972, he worked as an Assistant Professor in the Department of Computer Science at Kansas University and was thereafter advanced to the position of Associate Professor. His current position as

Head of that Department was presented him in 1973, and he was awarded a full professorship in July, 1978. Dr. Fisher has served as a reviewer for *Computer Reviews*, *ACM*, *CACM*.

Fisher promoted contract work for the army. In 1975, this led to a two-year, \$265,000, USARO contract for implementing a mini-computer network using Per Brinch-Hansen's Concurrent Pascal.



Virg Wallentine was the lead on the networking project.

Functionally Distributed Systems for Software Development and Production
US Army \$190,000

Abstract

The purpose of this 20-month effort is to examine, develop and test where feasible, ideas and concepts surrounding functionally distributed networked computing systems. Development will consider use of back-end minicomputer concepts and bear on portability of programs. Advantages in the use of host/back-end systems for supporting data bases will be considered. Known technical difficulties inherent in this investigation are: multiple systems architecture within a network, accessibility of data bases within networks, mixture of hardware within networks, and communications (message control) within networks. Using state-of-the-art techniques, a prototype solution of these technical problems will be developed and delivered. This effort is on-going with completion scheduled for October 1977.

Minicomputer Diagnostic Routines
Unified Industries Inc. \$25,612

Abstract

The objective of this study was to design computer routines that would effectively and efficiently test the operation of a NOVA 840 computer. Specific tests were designed to test the CPU's efficiency and ability to decode and execute a broad spectrum of program instructions. Routines were developed to test memory and memory addressing under dynamic load. Routines were written to test arithmetic/logic unit, real time clock control, floating point arithmetic and general logic and arithmetic functions. After validation of support test modules, a generalized diagnostic test was developed to perform a fast automatic check of the NOVA 840 main frame computer, providing diagnostic messages of test results. The resulting general diagnostic program was delivered to the grantor at the conclusion of the project, March, 1975.

Research Into and Development of a Low-Cost Hardware Monitor
US Army \$29,690

Abstract

The objective of this research was to design a hardware monitor, its controlling software and the user instructions needed to analyze the data collected by the monitor. The research took into account the various monitors that are currently available from commercial sources. The shortcomings of the existing monitors were analyzed so that a new design would alleviate those shortcomings. In the design, a need for a user-oriented monitor was recognized. The design concept centered on the use of a minicomputer to control data collection and data display. The report provides a complete specification for the monitor including the specification for a computer language for users of the monitor. The recommendations were provided to the U.S. Army Computer Systems Command, Ft. Belvoir, Va. Grant No. DAHC04-74-G-0103, July 1975.

From Dept. brochure, 1975

**Hardware
room,
Fairchild
Hall, 1975
(Linda
Shapiro
and Earl
Harris)**

(all the
Department's
hardware was
moved into the
room's NE corner
for this photo!)



The department was developing expertise in networking, concurrency theory, and database systems.

But not everything went well...

Software Engineering: An Example of Misuse

PAUL S. FISHER

Department of Computer Science, Kansas State University, Manhattan, KS 66502, U.S.A.

AND

JACOB SLONIM

NDX Corporation, Toronto, Canada



Scientific and Technological Information, Israel; and research assistant and instructor at Kansas State University. He is a

Jacob Slonim received a B.S. in Computer Science and Mathematics from the University of Western Ontario in 1971, an M.S. in Computer Science in 1973, and a Ph.D. in the same field was awarded him by Kansas State University in 1978. His professional experience includes the following: system designer, programmer, and project manager for Canadian Jurimetrix Limited; international project manager for the National Center of

INTRODUCTION

An interesting trend current in many large, diversified organizations is the writing and testing of software systems upon large, central computer facilities, with distribution of that software to numerous sites for execution upon other computers or minicomputers. As price performance ratios of minis and micros continue to improve along with the high cost of software development, the trend of central software production and distribution to remote sites will continue at an increasing rate.

The porting of software from one machine to another gives rise to many problems. This paper describes an inventory control system consisting of more than 150,000 lines of COBOL. It currently runs on a large computer and will at some point be ported to more than 100 minicomputer sites for actual utilization. However, all maintenance and any further development will occur only at the large computer site, which is managed by the central development group. This permits concentration of skilled personnel resources, as well as large scale machine resources.

The remainder of this paper examines the problems encountered in the software engineering approach adopted by the sponsoring organization. Two significant problems encountered are next discussed. These two problems deal with redundancy and complexity. The next section details the authors' experience with the actual porting activity of the system. The last section contains the conclusions derived from this effort.

A highly experienced PhD student, Jacob's database expertise strengthened the department's commitment to database research.

What was Beth doing during this time (1974-78)?

- Teaching a lot of courses (including CIS200)
- Writing a CIS200 text (see next slide)
- Commuting to Lawrence for PhD coursework
- Completing her PhD dissertation:

Mathematics Genealogy Project

Elizabeth A. Unger nee Buschlen

Ph.D. University of Kansas 1978



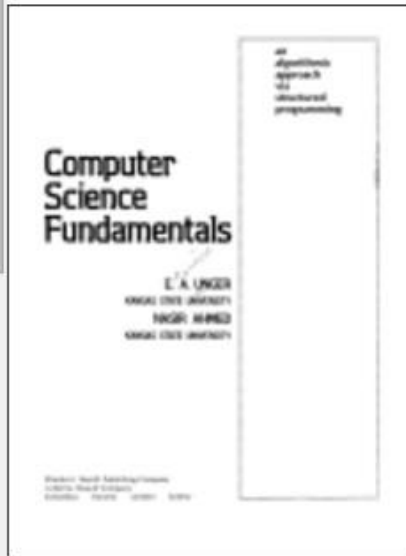
Dissertation: *A Concurrent Model*

Mathematics Subject Classification: 68—Computer science

Advisor 1: [Earl Justin Schweppe](#)

<http://www.genealogy.ams.org/>

Computer science fundamentals: an algorithmic approach via structured programming



Elizabeth A. Unger, Nasir Ahmed

Merrill, 1979 - Computers - 387 pages



Common terms and phrases

actual parameters Additional learning objective arithmetic assigned Assume average binary search calculate called character string constants **COBOL** columns computer memory COMPUTER SOLUTION computer system consider consists corresponding COUNTER data processing **DATA STRUCTURES** decimal number definite loop Develop device digits **EBCDIC** element **END-OF-FILE** Endbal evaluated example executed external sorts field width fixed decimal flowchart language formal parameters **FORTRAN** function given hexadecimal illustrated initial solution input data input stream input/output integer invoking algorithm label list argument machine magnetic tape Memory contents memory location number system operations **output** Payt PL/I business PL/I scientific pointer programming languages punched card Repeat Steps RETURN RETURN statement robot roman numeral Scan score search argument **SELECTED EXERCISES** sequence shown in Figure Sinking sort sort statement storage stored structured algorithm structured flowchart student **subalgorithm** Symbol trace table

From GoogleBooks

I know about this stuff, because I was there (from Jan. 1976...)



David A. Schmidt was born in Colby, Kansas on May 10, 1953. He received the B.A. degree (Mathematics) from Fort Hays (Kansas) State University in 1975 and the M.S. degree (Computer Science) from Kansas State University in 1977, where he is currently working towards the Ph.D. degree. His research interests include denotational semantics and computational complexity. Mr. Schmidt is a member of the IEEE Computer

The joint PhD program almost *killed* off graduate CS at KSU and KU

PROPOSAL FOR THE OPERATION OF A PH.D. PROGRAM IN COMPUTER SCIENCE
OFFERED JOINTLY BY THE
UNIVERSITY OF KANSAS
AND
KANSAS STATE UNIVERSITY

*This statement resulted
from a meeting of
both faculties
Jan 30, 1971*

INTRODUCTION

The following is pursuant to "A Plan for an Inter-University Ph.D. Program in Computer Science," issued by the Council of Chief Academic Officers (COCAO) of the Regents' institutions, January 1971. The determining principle for such a joint undertaking is that there is to be a single program operating on and making use of the resources of both campuses. The marshalling of talent under the plan will afford the student a much wider range of educational opportunity than either school would be able to provide separately. Moreover, the plan has great future significance in view of increasing emphasis on coordination of and cooperation between programs among the several institutions.

In planning for optimal use of the resources of the University of Kansas and Kansas State University at the doctoral level, an important consideration is the division of labor within the field of computer science so that expected development may proceed without overt and wasteful duplication. A blueprint for such a division, arrived at by the faculties from the two campuses, serves as the point of departure for the doctoral program. Every effort has been made to achieve a rational differentiation of research specialties. The division of the field is neither unique nor exhaustive, however; but it illustrates agreement upon *areas* *to be covered* *by the two*

Identified with Kansas State University

Machine Languages — Language processors, conversational languages, extensible languages

Computer Design and Architecture — Computer logic, switching theory

Programming Systems

Biological and Ecological Systems Simulation

Data Organization and Manipulation — File management and data processing, information storage and retrieval, text processing.

Areas of Current and Essential Interest to Both Campuses

Numerical Analysis

Artificial Intelligence

Identified with the University of Kansas

Formal Language Theory — Theory of grammars, formal languages, formal semantics

Natural Languages and Symbol Systems — Computational linguistics, pattern generation in the humanities and fine arts, sound synthesis and analysis

Automata and Mathematical Logic — Theory of automata, computability, recursive function theory

Machine Systems

Information Systems Theory and Design — Analysis of information networks, information acquisition, social implications of information systems.

From KSU General Catalog, 1971

Q: why a joint PhD program?

A: computing hardware was expensive, and the State wanted the two grad programs ``on the cheap”!

November 17, 1972

The Joint Faculty weren't so joint...

John Chalmers, Vice President
Campus

Dear Vice President Chalmers:

We are writing to formally ~~state the opinions of the~~ KSU contingent of the Steering Committee. The Steering Committee met November 15 here at KSU and by the conclusion of that meeting it was again clear that the developing joint program can not follow the guidelines outlined within the originally approved document (1). given the attitudes of the KU representatives.

We sincerely believe that a program as outlined is in fact a workable plan which could be made acceptable to both faculties, if that was the goal of all concerned. We firmly believe that if such a program could be implemented then it would have direct benefit to both students and faculty of both departments. The course which the program has taken to date is one consisting of actions maintaining separation. Let us hasten to add that we do not feel that a program so conceived (1) is necessarily easy to implement, but if both departments were in fact committed to it then a workable program could be well underway at this point in time.

We believe that ~~there are several courses of action which are open at this time.~~ We believe that continuing on the present basis would be a serious mistake. The other extreme possibility is that which simply does away with the program, and we consider this an equally serious mistake. ~~Between these two possibilities there must be other courses which would improve the situation.~~ We formulate this letter to solicit help in

The Board of Regents weren't so helpful (from Feb. '72 minutes)

4. Some COCAO members expressed surprise and dissatisfaction when told it was possible for a student to obtain a Ph.D. degree entirely on one campus (with no course work at the other institution). The co-chairmen were surprised by this and reacted by asking for COCAO's definition of "jointness." COCAO's answer was that they intended for every student to have some formal contact (preferably course work) on both campuses and that this would be achieved by a) transporting students; b) transporting faculty; c) courses offered via telecommunications network; d) specially scheduled courses, seminars, and colloquia. The ensuing exchange brought out two points
- i) forcing people to commute against their will is not viable
 - ii) a multilevel communications network would permit achieving COCAO's intent

COCAO = Council of Chief Academic Officers

SUMMARY OF VIEWS
DOCTORAL PROGRAM IN COMPUTER SCIENCE
University of Kansas and
Kansas State University

Life got worse...

(from Feb. '73 report to
Regents)

General Philosophy	One PhD program divided between two campuses but with a single faculty.	Coordinated but separate PhD programs on the two campuses with a sharing of resources. Considerable autonomy maintained by the separate faculties.
Steering Committee	Responsible for maintaining uniformity* of policies and practices; previews courses and specialties of faculty appointees to determine appropriateness with respect to differentiation.	May make recommendations which take effect upon ratification by faculty on each campus. Reviews courses, faculty appointments after they have been established to determine extent of differentiation of specialties.
Faculty decisions in relation to PhD program	Effected by the total faculty as they determine academic policies and requirements of the program with individual members voting in the usual manner.**	Since there are two degree programs, institutional autonomy must be retained, and the collective vote of the combined faculty cannot bind either constituent. Questions should be decided by unit voting with consensus sought in case of deadlock.
Reciprocity in admissions, examinations	Applications screened by faculty on both campuses. Graduate faculty members of each institution belong to the graduate faculty of the other. Candidacy established on one campus recognized by the other.	

STATE OF KANSAS
BOARD OF REGENTS

The Regents got mad

April 26, 1973

Ms. Sally Yeates Sedolow
University of Kansas
Mr. Richard Sincovic
Kansas State University
Co-Chairmen
Steering Committee for the
Joint Doctoral Program

If the issues hereby identified in the "Summary of Views" are not resolved in the context of the above referenced documents by the Steering Committee in a written report to COCAO at its May 24 & 25 meeting, it will be COCAO's plan to recommend to the Council of Presidents that no additional students be admitted into the Joint Ph.D. Computer Science program until such time as all issues are resolved."

Dear Mr. Sincovic:

I am writing at the request of the Council of Chief Academic Officers to inform you of the Council's action in regard to the Ph.D. Computer Science program and to forward to you copies of materials pertinent to action they are requesting you to take.

The minutes of the last COCAO meeting which pertain to the Ph.D. Computer Science program read as follows:

"COCAO reviewed separate reports from the co-chairman of the Ph.D. Computer Science Steering Committee at K.U. and K.S.U. These reports were in response to COCAO's request at the February meeting that "the Steering Committee identify basic questions regarding the Committee's role and authority that are unresolved and submit these questions to COCAO for review and resolution by COCAO." COCAO does not view the reports submitted to be responsive to the points in question or to identify issues unresolved with the Steering Committee.

Life smoothed over by 1975, when Bill Hankley and Neil Jones headed the Joint Faculty Steering Committee

The point: It's hard to build a research program (or anything else) when energy is sapped by fighting.

Practical consequences of the joint program:

- Each term, one dept. offered an evening grad course for students in other dept. to attend
- Each PhD student had a committee member from the other school on her POS

In the meantime...

- Beth was admitted to the joint PhD program (whew!), finished her PhD in 1978, and within the month was promoted to the KSU graduate faculty and to Associate Professor.
- Beth started teaching PhD-level courses in concurrency and databases.
- She quickly became central to the research arm of the Department.

Beth attracted lots of students --- she was caring and conscientious. ("Beth gets you out!" one grad student told me.)

Since Beth was herself a student (and teacher and mother), she remembered how students worked and felt.

In 1983, Beth was made Professor, and Virg was made Dept. Head. They propelled the Department forward.

Virg, Beth, Dave Gustafson, and Bill Hankley built the "Summer on Campus" program for Western Electric/ATT. The program generated quality MS students from 1979 into the 1990s.



DR. ELIZABETH A. UNGER

Professor

Department of Computer Science

Kansas State University

Manhattan, Kansas 66506

Office Tel. (913) 532-6350

**Beth's research
program (from
vita, 1983)**

Education:

1961	B.S.	Mechanical Engineering	Michigan State Univ.
1963	M.S.	Mathematics	Michigan State Univ.
1978	Ph.D.	Computer Science	University of Kansas

Teaching and Interests:

1. Research Interests

- a) Programming Languages
- b) Information Retrieval Systems of Behavioral Science
- c) Computer Libraries

2. Courses Taught

- a) Data Base Management at B.S., M.S. and Ph.D. levels
- b) Programming Languages at B.S. and Ph.D. levels
- c) Computational Structures at Ph.D. level
- d) Data Structures at B.S. level
- e) Introductory Computer Science and Computer Literacy
- f) Distributed Systems at M.S. and Ph.D. levels
- g) Computing Service Center Management at M.S. level
- h) Numerical Analysis at B.S. level

Research Interests:

The focus of all my research is distributed systems and the potential of operations that can be expressed within those systems. Currently, there are three active areas of research which are all interconnected.

1. The development of a model for the description of information within a computer environment. This model is called an object. The study of the properties of the data and the development of a calculus to manipulate and build new objects is the objective of this effort.
2. The use of the object in a language to allow the expression of concurrency without explicit action by the programmer. The language model exists and it is used to express office procedures in a current research project.
3. The use of the concept of an object (simplified) from the focus number one above, to implement a dynamic active data dictionary is the third area. An active dynamic dictionary has the advantage of making the physical structure and data completely invisible to user application programs. Currently, we can do this statically, but often programs must be recompiled for even minor changes in data storage or data constraints. Theoretically, this would allow two things: a) complete freedom of the DBA to change the data base and DBMS, and b) the integration of heterogeneous data base systems within a distributed environment.

Key early research pubs



dblp
computer science bibliography

<http://dblp.uni-trier.de/>

[+] Elizabeth A. Unger [download] [share] [comment]

> Home > Persons

[+] Person information

▪ *affiliation:* Kansas State University, Manhattan, KS, USA

1984

■ [j3] [document] [download] [share] [comment] Ariel Pashtan, Elizabeth A. Unger:
Resource Monitors: A Design Methodology for Operating Systems. Softw., Pract. Exper. 14(8): 1

1982

■ [j2] [document] [download] [share] [comment] Elizabeth A. Unger, Paul S. Fisher, Jacob Slonim:
Evolving to distributed database environments. Computer Communications 5(1): 17-22 (1982)

■ [j1] [document] [download] [share] [comment] Jacob Slonim, L. J. MacRae, Richard A. McBride, Fred J. Maryanski, Elizabeth A. Unger, Paul S. Fisher
A throughput model: sequential vs concurrent processing. Inf. Syst. 7(1): 65-83 (1982)



Information Systems

Volume 7, Issue 1, 1982, Pages 65–83



A throughput model: Sequential vs concurrent processing

Jacob Slonim, L.J. MacRae, R.A. McBride

F.J. Maryanski

E.A. Unger, P.S. Fisher

Abstract

This paper is an account of experiments on information system architectures. Specifically, it deals with a comparison, under controlled conditions established by Cardenas, between the sequential and concurrent approaches to data-base manipulation. Cardenas' model was used to compare the throughput of sequentially manipulated databases. We here present a new model which permits the comparison of sequential and concurrent processing, using Cardenas' parameters and test data. The present model is devised in order to establish a means of validating the principle of hierarchical decomposition in the design of new information system architectures and to provide answers to three specific questions:

Journal of:

Software: Practice and Experience

Article

Resource monitors: A design methodology for operating systems

Ariel Pashtan¹ and Elizabeth A. Unger²

Article first published online: 30 OCT 2006

DOI: 10.1002/spe.4380140808

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Issue



Software: Practice and Experience

Volume 14, Issue 8, pages 791–806, August 1984

Abstract

Resource manager objects are the operating system entities that manage computer system resources. In this paper we extend Hoare's and Brinch Hansen's monitor concept, and introduce a *resource monitor* language construct that represents a resource manager object. Resource monitors provide requesting processes with implicit synchronization, and do not require separate processes to perform the resource access operations. The resource monitor construct is compared to current language constructs used to structure operating system software. For this purpose we use an evaluation methodology that combines software complexity measurements with program performance measurements. The evaluation itself is carried out in a Concurrent Pascal-like programming environment. The current language constructs have a software complexity that is larger by 37 to 219 per cent over the resource monitor's complexity. The run-time synchronization overhead of programs that use current language constructs is 1.43 to 2.75 times higher than the overhead of programs that use a resource monitor.



Mathematics Genealogy Project

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A service of the [NDSU Department of Mathematics](#), in association with the [American Mathematical Society](#).

Elizabeth A. Unger nee Buschlen

Ph.D. University of Kansas 1978



Dissertation: *A Concurrent Model*

Mathematics Subject Classification: 68—Computer science

Advisor 1: [Earl Justin Schweppe](#)

Students:

Click [here](#) to see the students listed in chronological order.

Name	School	Year
Constanza Hagmann	Kansas State University	1988
Steve Hansen	Kansas State University	1991
Mary Lou Hines	Kansas State University	1992
Janice Honeyman	Kansas State University	1987
Chuan Hsieh	Kansas State University	1987
Fereydoun Kazamiam	Kansas State University	1988
Ramon Mata de Toledo	Kansas State University	1984
Richard McBride	Kansas State University	1980
Yui-Kai Ng	Kansas State University	1991
Ariel Pastan	Kansas State University	1983
Sheela Ramana	Kansas State University	1991
Hossein Saiedian	Kansas State University	1989
David Schmidt	Kansas State University	1981
James Slack	Kansas State University	1992
Rayford Vaughn	Kansas State University	1988
Kasinath Vemuapali	Kansas State University	1991
Ka-Wing Wong	Kansas State University	1990
Robert Zhang	Kansas State University	1995

You could find all Beth's supervisees in the CIS Archives in Nichols Hall



But it's mostly gone now...)-:

COMPUTER HARDWARE INSTALLATION MODEL

by

DANNY ROY MICHAEL

B.S., University of Texas at El Paso, 1966

A MASTER'S REPORT

submitted in partial fulfillment of the

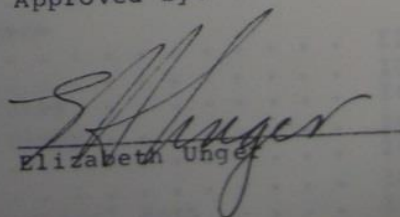
requirements for the degree

MASTER OF SCIENCE

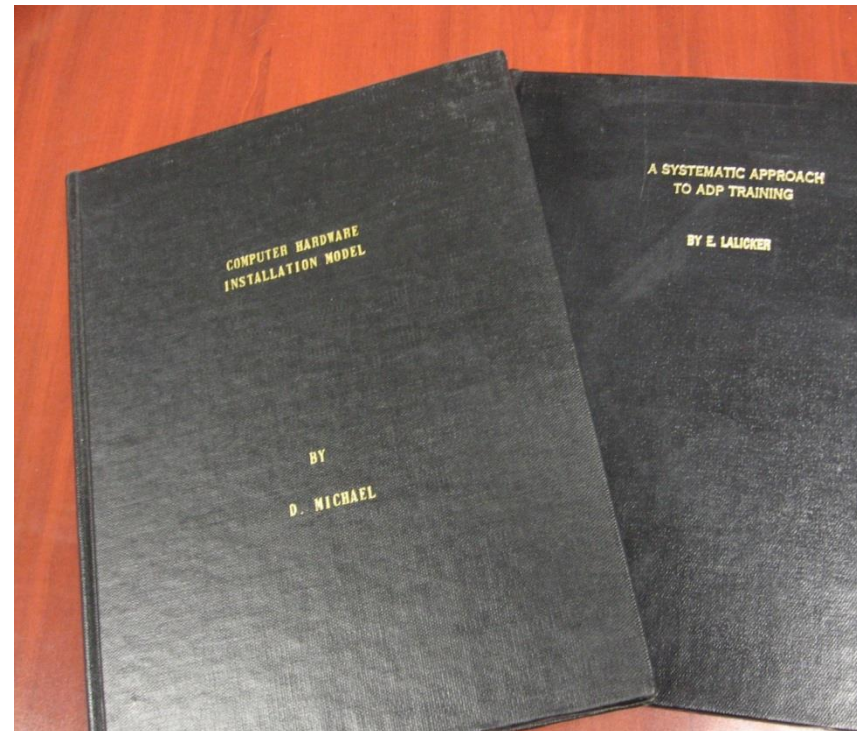
Department of Computer Science

KANSAS STATE UNIVERSITY
Manhattan, Kansas
1979

Approved by:

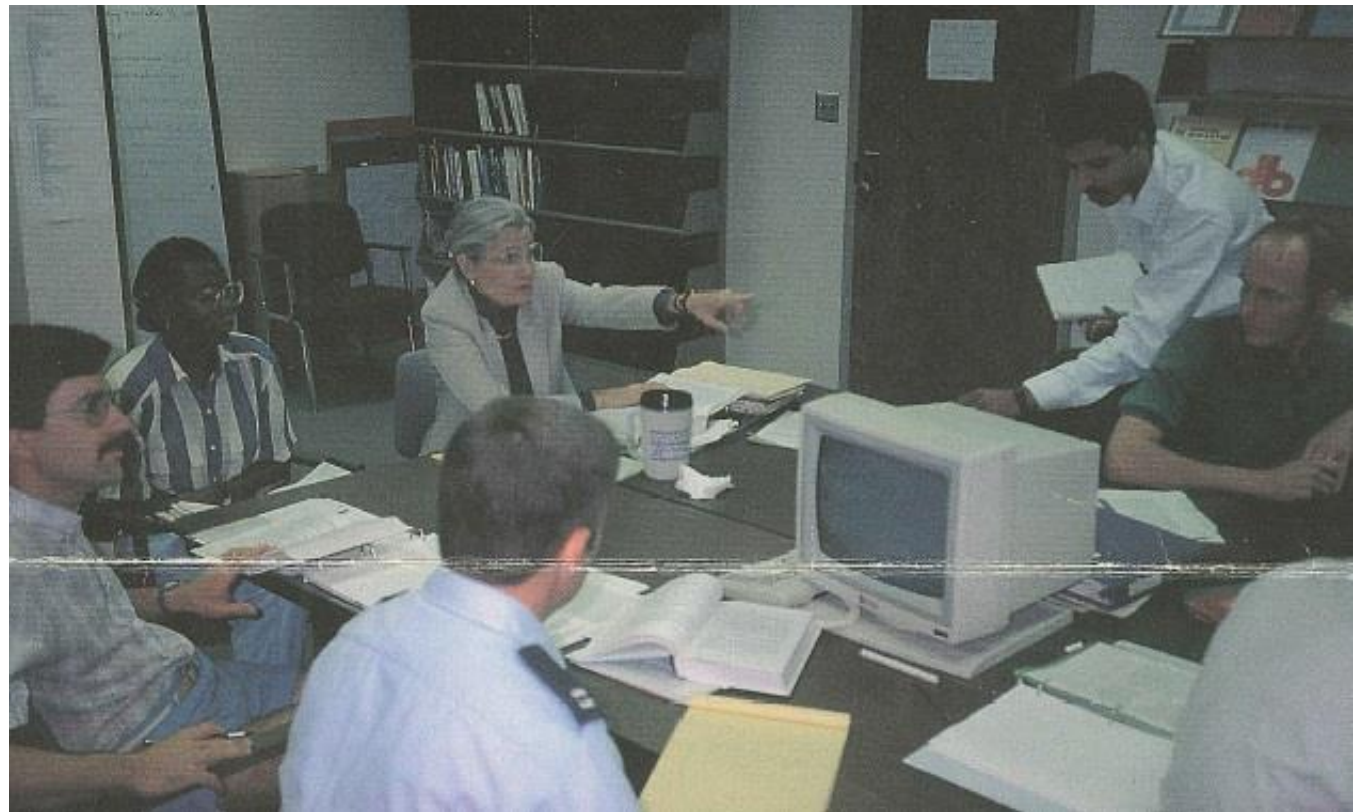

Elizabeth Unger

Beth's first graduate students, 1979



(Danny Michael and Elmer Lalicker)

In 1985, the CS Dept. moved to Nichols Hall (and became CIS in 1987), and Beth was the primary database person, teaching all course levels and supervising loads of grad students. The rest is history.



**Recruiting
poster,
1988**

***Again, Thank You, Beth, for your
contributions to CIS !***

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