5TH INTERNATIONAL CONFERENCE ON
SOFTWARE ENGINEERING

March 9-12, 1981
SAN DIEGO, CALIFORNIA, USA
Town and Country

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IEEE COMPUTER SOCIETY
INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
**TUESDAY, MARCH 10, 1981**

9:00-10:30  **OPENING REMARKS**  
S. Jeffery, General Chairman  
L. Stucki, Program Chairman  
**KEYNOTE SPEAKER**  
"What Next After PASCAL?"  
Niklaus Wirth  

**TUESDAY MORNING** (parallel sessions)  
11:00-12:30  **CASE STUDIES**  
Chairperson: J. Manley  
"Implementing a Software Management Discipline (171)"  
R. Loesch, B. Larman, P. Moiko, and D. Reifer  
"Experience with Application of Modern Software Management Controls (187)"  
Donald L. Paster  
"Early Experience with Euclid (138)"  
David B. Wortman and James R. Cordy  

11:00-12:30  **SOFTWARE ENVIRONMENTS I**  
Chairperson: Hans-Ludwig Haussen and Monika Mullenberg  
"An Incremental Programming Environment (156)"  
Paul Medina-More and Peter H. Feiler  
"A Relational Database Model for Effective Configuration Management (158)"  
Karen E. Huff  

11:00-12:30  **ABSTRACT MODELS**  
Chairperson: J. Bubenko  
"A Robust B-Tree Implementation (82)"  
J.P. Black, D.J. Taylor, and D.E. Morgan  
"An Index Organization for Applications with Highly Skewed Access Patterns (141)"  
Chister Hulten  
"The Evolution of Programs: Program Abstraction and Instantiation (12)"  
Nachum Dershowitz  

2:00-4:00  **LIFE CYCLE CONSIDERATIONS**  
Chairperson: B. Boehm  
"A Comparison of Lifecycle Models (185)"  
Peter Freeman and Peniti Kerola  
"Program Complexity Measure for Software Development Management (73)"  
Takeshi Sunohara, A. Takano, K. Uehara and T. Ohkawa  
"A Meta-Model for Software Development Resource Expenditures (180)"  
John W. Bailey and Victor R. Basili  
"Use of Cluster Analysis to Evaluate Software Methodologies (179)"  
Eric Chen and Marvin V. Zelkowitz  

2:00-4:00  **SOFTWARE ENVIRONMENTS II**  
Chairperson: TBD  
"An Algorithm to Support Code-Skeleton Generation for Concurrent Systems (166)"  
M. Penedo, D. Berry, and G. Estin  
"Experience with a Modular Typed Language: PROTEL (26)"  
P.M. Cashin, M.L. Joliat, R.F. Kamel, and D.M. Lasker  
"A System of Communicating Residential Environments (61)"  
Erik Sandewall, Henrik Sorensen, and Claes Stromberg  
"Interactive Software Development Tool: ISDT (54)"  
M. Azuma, M. Takahashi, S. Kamiya, and K. Minomura  

2:00-4:00  **ANALYSIS OF TESTING METHODS**  
Chairperson: J. King  
"On the Time Overhead of Counters and Traversal Markers (84)"  
Ira R. Forman  
"Using Attributed Grammars to Test Designs and Implementations (128)"  
A.G. Duncan and J.S. Hutchinson  
"A Report on Random Testing (60)"  
Joe W. Duran and Simeon Ntafos  
"Sufficient Test Sets for Path Analysis Testing Strategies (94)"  
Steven J. Zeil and Lee J. White  

**TUESDAY EVENING**  
4:30-5:30  **HOW PRACTICAL ARE TODAY'S SOFTWARE ENGINEERING METHODOLOGIES?**  
Chairperson: Fred Brooks  
Panelists: M. Jackson, D. Parnas, E. Yourdon (tent.)

**WEDNESDAY, MARCH 11, 1981**

9:00-10:30  **KEYNOTE SPEAKER**  
"Design Lessons from Nature"  
D. Glaser (Nobel Laureate)  

**WEDNESDAY MORNING** (parallel sessions)  
11:00-12:30  **HUMAN ENGINEERING**  
Chairperson: R. Brooks  
"The Effect of Symbology and Spatial Arrangement on Comprehending Software Specifications (194)"  
Bill Curtis  
"The Effect of Modularization and Comments on Program Comprehension (78)"  
S.N. Woodfield and H.E. Dunsmore  
"Methods for Improving Controlled Experimentation in Software Engineering (9)"  
G. Michael Schneider
11:00-12:30  PROGRAM TESTING TOOLS AND TECHNIQUES
Chairperson: TBD
"Completeness Criteria for Testing Elementary Program Functions (194)"
William E. Howden
"A Partition Analysis Method to Increase Program Reliability (103)"
Debra J. Richardson and Lori A. Clarke
"An Automated Program Testing Methodology and Its Implementation (177)"
D.M. Andrews and J.P. Benson

THURSDAY MORNING (parallel sessions)
11:00-12:30  INTERACTIVE SYSTEMS
Chairperson: TBD
"User Software Engineering and the Design of Interactive Systems (158)"
Anthony I. Wasserman
"A Software Methodology for Building Interactive Tools (162)"
Robert W. Lingard
"A User Interface for Online Assistance (102)"
N. Reiles and L. Price

11:00-12:30  PROGRAMMING TOOLS
Chairperson: J. Rader
"FLAT: A FORTRAN Language Augmentation Tool (175)"
Eugene W. Myers and Leon J. Osterweil
"ALBE/P: A Language-Based Editor for PASCAL (28)"
J.W. Lewis and D.F. Forges
"Program Refinement by Transformation (193)"
Thomas E. Clemen, Glenn H. Holloway, and Judy A. Townley

11:00-12:30  PROGRAM DECOMPOSITION
Chairperson: TBD
"Program Slicing (81)"
Mark Weiser

2:00-3:30  DESIGN TECHNIQUES
Chairperson: L. Peters
"Development of Computer Programs by PAD (Problem Analysis Diagram) (33)"
Yoshikio Futamura
"Prototyping as a Tool in the Specification of User Requirements (64)"
Hassan Gomaa
"HFP: A Hierarchical and Functional Programming Methodology Based on Attribute Grammar (87)"
Takuya Katayama

WEDNESDAY AFTERNOON (parallel sessions)
2:00-3:30  REQUIREMENTS ENGINEERING
Chairperson: TBD
"Executable Requirements for Embedded Systems (165)"
Pamela J. Zave and Raymond T. Yeh
"An Innovative Approach to System Requirements Analysis by Using Structural Methodology (116)"
N. Komoda, K. Haruna, H. Kaj, and H. Shinozawa
"Evaluation of the A-7 Requirements Document by Analysis of Change Data (183)"
Max L. Wilson

THURSDAY, MARCH 12, 1981
9:00-11:00  Keynote Speaker
TBD

THURSDAY MORNING (parallel sessions)
11:00-12:30  INTERACTIVE SYSTEMS
Chairperson: TBD
"User Software Engineering and the Design of Interactive Systems (158)"
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"A Software Methodology for Building Interactive Tools (162)"
Robert W. Lingard
"A User Interface for Online Assistance (102)"
N. Reiles and L. Price

11:00-12:30  PROGRAMMING TOOLS
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Thomas E. Clemen, Glenn H. Holloway, and Judy A. Townley

11:00-12:30  PROGRAM DECOMPOSITION
Chairperson: TBD
"Program Slicing (81)"
Mark Weiser

THURSDAY AFTERNOON (parallel sessions)
2:00-3:30  SIGNIFICANT ASPECTS OF THE CONFERENCE FROM A MANAGEMENT AND HUMAN FACTORS POINT OF VIEW
Chairperson: J. Marley
Panelists: B. Boehm, B. Curtis, C. Vick, TBD

THURSDAY AFTERNOON (concluding session)
3:15-4:15  CHALLENGES OF THE DECADE
Chairperson: R. Yeh
Panelists: L. Stucki, N. Wirth, F. Brooks, TBD

See opposite side for conference and tutorials registration and publications information
A choice of three pre-conference TUTORIALS

TUTORIALS

MODELS AND METRICS FOR SOFTWARE MANAGEMENT AND ENGINEERING

Instructor: Victor R. Basili

Audience: Intended for software managers and software engineers who are looking for quantitative assistance in managing, controlling, estimating, evaluating, and contracting software development and maintenance.

Course Description: Presents a new quantitative approach to software management and software engineering. Focuses on attributes that can be managed quantitatively, covering both product-oriented and process-oriented attributes. Utilizes a large set of models with emphasis on those areas where quantitative management can give the greatest payoff.

Victor R. Basili is an associate professor at the University of Maryland at College Park. A consultant to several organizations and government agencies, he has been active in the design and development of several software projects and is currently involved in the management and control of software development at NASA's Goddard Space Flight Center. Basili received his Ph.D. in computer science from the University of Texas at Austin in 1970.

Course Outline

Introduction: Quantitative software management, modeling, metrics.

Resource Models: Classes of models, empirical models of programming estimation and measurement, model validation studies, an empirical meta-model, theoretical dynamic modeling using the Rayleigh curve, various uses of resource models.

Changes and Errors: The use of changes and errors in the characterization, estimation, and evaluation of software development, the use of error analysis in improving the software development process, error models for program evolution and reliability, distribution by various classification schemes, metrics based on error and change.

Product Measures: Size, control and data structure metrics, cyclomatic complexity, software science, data bindings, span, metrics across time, example uses and effects of software metrics on technology transfer, quality assurance and contracting.

Data Collection: Establishing the environment, collecting the data, data validation analysis and result reporting.

SOFTWARE DESIGN TECHNIQUES

Instructor: Peter Freeman

Audience: Programmers, analysts, designers and managers of software.

Course Description: Provides a balanced introduction to most modern software design techniques. Treats concepts, explicit methods, and current practice in the areas of design specification, architectural and detailed design, design quality, and management of the design activity. Provides a unique approach to understanding the continually expanding repertoire of design methods by stressing the intellectual basis of the design activity.

Peter Freeman is an associate professor of information and computer science at the University of California, Irvine. He has been involved in the analysis, design, and construction of advanced computer applications and the training of software engineers since 1961.

Freeman's research activities have been concentrated in software design techniques and their application to the software engineering process. He is active in professional organizations and is well-known for his seminars on software design and software engineering. He has served as a consultant to the United Nations, the U.S. government, and numerous industrial organizations.

Freeman has published numerous technical papers and is the author of Software Systems Principles (SRA, 1975). In addition, he has jointly edited (with Prof. Wasserman) two books: Software Engineering Education (Springer-Verlag, 1976) and Tutorial on Software Design Techniques (IEEE Computer Society, 1980). He received his Ph.D. in computer science from Carnegie-Mellon University in 1970.

Course Outline

Introduction: software engineering and the role of design • the interplay of system and data design • payoffs from improved design

Design Theory: fundamental operations of design • the role of representation, experience, and knowledge • desired characteristics of the design product and methods

Specifications: goals for specifications • formal specification techniques

Architectural Design: importance of structure • abstraction • modularity and structural models

Survey of Structuring Methods: SADT, Parnas, Petri nets, FSM, structured design

Detailed Design Program Design Languages Survey: LCP • step-wise refinement • Jackson

Design Quality: establishing quality expectations • testing design • complexity measures and their use

Design Management: allocating and controlling design resources • design organizations and reviews

PROGRAM PROOFS PRODUCED PRACTICALLY

Instructor: Daniel M. Berry

Audience: Intended for professional programmers and other technical persons interested in increasing the reliability of their programming.

Course Description: Through an example programmed with the students' help, introduces a tool applying an informal variant of proof-assisted structured programming. Shows how to develop assertions describing the current state of program variables, these assertions being written in a readable combination of pictures, spoken language, programming language, and predicate calculus. Shows how to manipulate these assertions by the formal rules of program verification. Demonstrates how these assertions can be used to assist in the standard top-down structured programming process. Discusses benefits, drawbacks, and caveats of the methodology.

Daniel M. Berry was born in Cleveland Heights, Ohio in 1948. He received his B.S. in Mathematics from Rensselaer Polytechnic Institute in 1968. He went on to graduate school at Brown University, during which time he worked at General Electric R & D Center in Schenectady and taught at the Hebrew University in Jerusalem, Israel. He joined the UCLA faculty as an Acting Assistant Professor in September 1972. After some delay, he completed his Ph.D. thesis in September 1973 for his degree in Computer Science from Brown. Shortly thereafter he was promoted to Assistant Professor. He was promoted to Associate Professor in 1977. During the 1978-1979 academic year, he spent a sabbatical at the Hebrew University, Jerusalem and at the Weizmann Institute, Rehovot, Israel. He has taught courses in Software Engineering at Tadiran and Israel Aircraft Industries in Israel. He has consulted at Aerospace Corporation and at Systems Development Corporation, there assisting in the use of formal verification in program specification and design.

Course Outline


Example: Application of informal-assertion, proof-assisted structured pro-
SPECIAL TUTORIAL

9:00 A.M.—5:00 P.M.
WEDNESDAY, March 11, 1981

AN INTELLIGENT LAYMAN'S
GUIDE TO COMPUTERS

Instructor: Ware Myers

Audience: Planned for persons without no education or experience in the computer field. There are no prerequisites except an interest in finding out enough about computers to appreciate their role in today's society. Attendees may be the spouses of computer professionals who seek more understanding of their partner's work.

Course Description: A computer is fundamentally simple: it takes an instruction from its memory and performs the arithmetic or logical operation the instruction specifies. Creating a string of these instructions is called programming. Computers can be complicated only because these simple steps are carried out millions of times. Our purpose is to grasp the underlying simplicities and on this foundation come to appreciate what the computer can do and what effect it is having on us.

We will be assisted in this purpose by two or three 18-minute video tapes. Prepared by Evolution 1, a division of Electronic Data Systems Corp, these programs help us visualize and understand the world of computers.

Ware Myers is an engineer, a teacher, and a writer. He is a contributing editor for Computer magazine and has published widely in trade and professional publications. Although he has explored many facets of computers, he is not so much of a specialist that he can't be understood by the layman.

Course Outline

The Computer: how a computer functions • comparison with the brain • patterns of problem solving • how we build up from electrical signals to the languages programmers use

The Hardware: how the central processor reads an instruction from its memory, performs it, and advances to the next instruction • how it stores data in magnetic tape recorders and disks

Communications: how computers communicate with each other • keyboards, printers, video screens, etc. • how they transmit information over communication channels • how they can be used to control a process

Applications: how the computer reproduces speech, recognizes speech, synthesizes music, and creates graphics on a TV screen

Social Implications: what effect computers will have on life in the next decade

No charge for attendees or their spouses

Software Engineering

Software engineering is an emerging field for managing growth and change in data processing and realtime control of physical processes. This conference, sponsored by NBS, ACM, and the IEEE Computer Society, seeks to present actual experiences of real gains in productivity and quality. Topics include concepts, tools, project control, and methodology.

*332 Fifth International Conference on Software Engineering, March 1981, c 400 pp.
Order No. 300
NM, $30.00; M, $22.50

Order No. 302
NM, $22.00; M, $16.50

Order No. 300
NM, $20.00; M, $15.00

*available on conference date

If you cannot attend the conference, be sure to order your copy of the conference proceedings and tutorial texts!
FIFTH INTERNATIONAL CONFERENCE ON SOFTWARE ENGINEERING
March 9-12, 1981 – San Diego, California

ADVANCED REGISTRATION

Advance Hotel Registration for Town and Country Hotel

Complete and mail this reservation form to:

TOWN & COUNTRY HOTEL
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(714) 291-7131

PLEASE CHECK ACCOMMODATIONS DESIRED:

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Double & Twin $45-$60

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a.m. p.m.

Departure Date:

a.m. p.m.

Please reserve room(s) of the type and rate checked.

Advance Registration

Please check (Prior to 2/27/81) (After 2/27/81) appropriate box

Member Non-Member

Tutorial

$65 $85 $100

Conference Only

$65 $85 $100

Tutorial & Conference

$130 $150 $145 $165

Requests for refunds must be received in writing on or before Mar 2, 1981.

In order to confirm your room reservation, it must be received by the Town & Country Hotel prior to February 22, 1980. Mention 5ICSE. Reservations will be held until 6 P.M., unless accompanied by a deposit, or your company guarantees payment, or an accepted credit card number and signature are provided.

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ACM Number

Check enclosed

NO OTHER CREDIT CARD ACCEPTED

Requests for refunds must be received in writing no later than March 2, 1981.

* Registrations are not transferable.

* Tutorial registration fee includes lunch and notes.

* Conference registration fee includes one copy of the conference proceedings and two complimentary beverage tickets for the 5ICSE-hosted party and a ticket for an evening at Sea World.

* Registration fee includes free registration for spouses at special Wednesday tutorial.

Limited Attendance. Register Early - Avoid Disappointment.

LATE REGISTRATIONS WILL BE ACCEPTED AT THE TOWN & COUNTRY HOTEL BEGGINING SUNDAY EVENING, MARCH 8, 1981, 4-7 P.M.

GUESTS MUST BE REGISTERED AT THE TOWN & COUNTRY HOTEL TO RECEIVE A DISCOUNT.