

# Society for Computers In Psychology

19th Annual Meeting

Atlanta: Hyatt Regency Hotel

Thursday, November 16, 1989

## Program at a Glance

### MORNING SESSIONS

Research Tools for Macintosh Computers  
Research Tools for PCs  
Adaptive Testing  
Using Computers in Writing and Publishing  
Coding and Analysis of Data  
Teaching Using Computers: General Issues and Reviews  
Knowledge-Based Expert Systems

### AFTERNOON SESSIONS

New Software for Instructors  
Modeling and Simulation  
Speech Processing

### ADDRESSES

Joseph B. Sidowski  
Cyndi McDaniel

### EVENING ACTIVITIES

MEL Workshop  
Macintosh User Group Meeting  
PC and Compatibles User Group Meeting

**Program Chair: Darrell L. Butler, Ball State University**

I want to thank everyone who contributed papers to this year's meeting. Special thanks to the members of the program committee : Drake Bradley, Bob Burke, N. John Castellan Jr., Doug Eamon, David Eckerman, Paula Goolkasian, Richard Lehman, C. Michael Levy, Cyndi McDaniels, and John Mueller. This group made the difficult decisions about which papers should be presented at the conference (70% acceptance rate) and several of them had to decide who should win the student paper award. The award was given to:

R. A. Rensink, University of British Columbia, for the paper Toolbox-Based Routines for Macintosh Timing and Display (to be presented at 9:20 in Essex A).

The grouping of papers into sessions and the deciding of session times was my responsibility. Every effort was made to try to avoid conflicts for attendees and participants. I hope I was successful. Enjoy the conference.

**Preconference Activities**

Steering Committee Meeting  
Wednesday, November 15th  
8:00-10:00 pm in the Spanish Room

**Registration**

The registration table on the Exhibit Level will be open from 8:00am to about 3:00pm Thursday, November 16th. Please Register.

**Software Demonstrations**

In the registration area, several award winning software packages will be demonstrated during the conference. The society is pleased to acknowledge the members of our society who created these packages. These demonstrations were by invitation. The program chair apologizes if other deserving software was not included.

**EDUCOM/NCRIPTAL 1989 Best Psychology Software**

**Laboratory in Cognition and Perception (2nd Edition)**

C. Michael Levy and Sarah Ransdell

**EDUCOM/NCRIPTAL 1989 Distinguished Software Award**

**Color Perception**

Douglas L. Chute

**EDUCOM/NCRIPTAL 1988 Best Social and Behavioral Science Award**

**MEL: Microexperimental Laboratory**

Walter Schneider

**EDUCOM/NCRIPTAL 1988 Best Curriculum Innovation in Laboratory Science**

**MacLaboratory**

Douglas L. Chute

## EARLY MORNING SESSIONS

### Research Tools for Macintosh Computers

9:00-10:00 In Essex A

Chair: Jon Vaughan, Hamilton College

- 9:00 Using the Macintosh Computer in Psychophysical Research: Programs for Stimulus Presentation, Data Collection, and Response Quantification  
Terry D. Blumenthal & Joseph A. Cooper, Wake Forest University  
Programs which allow the Macintosh computer to control stimulus presentation and data collection and quantification in a psychophysiological research laboratory are described. Up to three stimuli can be presented on each trial, with up to 15 stimulus conditions per session. Data can be scored using from 1 to 14 different response criteria.
- 9:20 Toolbox-Based Routines for Macintosh Timing and Display  
R. A. Rensink, University of British Columbia  
Pascal routines are described for real-time operations on Macintosh computers. Methods are presented for millisecond timing and for placing arbitrary bit-image displays upon the screen within one screen refresh. All routines are based on Toolbox procedures applicable to virtually the entire range of Macintosh computers.
- 9:40 VSEARCH:Macintosh Software for Experiments in Visual Search  
James T. Enns, Eric Ochs, & Ron Rensink, University of British Columbia  
We will demonstrate software that turns the Macintosh into a stand-alone research station for experiments in visual search. The software is portable (across machines), flexible (replication and extension of many search paradigms), easy to use (mouse clicks), and adaptable (stimuli and design changes are simple).

### Research Tools for PCs

9:00-10:00 In Essex B

Chair: David Washburn, Georgia State University

- 9:00 The Touch Screen System in the Pigeon Laboratory: An Initial Evaluation of its Utility  
Spencer K. Morrison & Michael F. Brown, Villanova University  
The touch screen system has been employed as a device for the measurement of responses and presentation of stimuli in pigeon laboratories for four years. A discussion of its contributions to the study of the pigeon's behavior and the complexities of its usage will be presented.
- 9:20 The NASA/LRC Computerized Test System  
W. Kirk Richardson, David A. Washburn, William D. Hopkins, E. Sue Savage-Rumbaugh & Duane M. Rumbaugh, Georgia State University

A new testing package, apparatus and tasks, is described for the study of behavior from a variety of species in a variety of experiments. The package is described with respect to the kinds of comparative psychological investigations for which it is well suited. The preliminary data generated within this new testing paradigm demonstrate that the NASA/LRC Computerized Test System provides a flexible yet powerful environment for the investigation of behavior and psychological processes.

- 9:40 PC-compatible Computer-Generated Stimuli for Video-Task Testing  
David A. Washburn, William D. Hopkins & Duane M. Rumbaugh, Georgia State University  
A program for automatic computer-generation of novel nonverbal stimuli is described in this paper. The program, STIMGEN, allows menu-driven control over the type and appearance of stimuli. Data are presented in which two monkeys matched-to-sample using stimuli generated with STIMGEN--one of many potential program applications.

### Adaptive Testing

8:45-9:15 In Lancaster A

Chair: C. Michael Levy, University of Florida

- 8:45 A New Strategy for Studying Spatial Aptitude  
Diane J. Schiano, Stanford University & Don R. Barch, NASA/Ames Research Center  
A new approach to testing and training spatial "aptitude" is described. Photodigitized CAT figural analogy problem terms, arrayed in zones on the computer screen, can only be seen when selected via the mouse (i.e., one at a time). Viewing patterns and durations can then be analyzed to assess problem encoding and solution strategies. Implications are discussed.
- 9:00 Flexible Testing Without Programming  
Douglas M. Klieger, Villanova University  
The possibility of computerized test administration with branching logic has been obvious to researchers upon their first encounter with programming. Despite the obvious need no general purpose system capable of branching logic exists. The Flexible Tester meets these requirements. Details of program logic, operation, availability, and future developments are discussed.

### Using Computers in Writing and Publishing

9:30-10:00 In Lancaster A

Chair: C. Michael Levy, University of Florida

- 9:30 Using Real-time Replay of Students' Word Processing to Understand and Promote Better Writing  
Sarah Ransdell, University of Maine  
The writing process is inherently difficult to study because it is not as accessible as the written product. This software provides access by capturing all writer

keystrokes and replaying them in real-time. Point of utterance revisions can then be immediately viewed by the writer who can then provide a retrospective protocol of the process.

- 9:45 Using Computers to Disseminate Scientific Research: The Potential of Electronic Journals in Psychology  
Michael E. Mills, Loyola Marymount University  
Several potential advantages of computerized optical disk based scientific journals are explored, including the availability of (a) hypertext functions, (b) databases of evaluative peer ratings and comments, (c) keyword, rating, and text searching, (d) author responses to peer comments and possible author revisions, (e) availability of original research data to other researchers and (f) the possibility of incremental construction of journal-based expert systems.

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**Coffee Break**

10:00-10:45 at Registration area, Exhibit Level  
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**LATE MORNING SESSIONS**

**Coding and Analysis of Data**

10:45-12:00 in Essex A

Chair: Ron D. Hays, RAND Corporation

- 10:45 The Interact Framework: Automatic Coding and Analysis of Parent-Child Conversational Interaction  
Jeffrey L. Sokolov, Carnegie Mellon University  
INTERACT is a computer program for the automatic coding and analysis of parent-child conversational interaction. Both parent's responses to their children's utterances and children's responses to their parent's utterances are coded. This allows for an analysis of the reciprocal relationship between parental and child language. Three longitudinal studies incorporating data from CHILDES (totalling 151,900 utterances) were coded and analyzed by INTERACT. The results indicated a high degree of contingency between parental and child language for different word-classes across a large slice of development.
- 11:00 TimeCode: Coding and Analysis of Multiple Overlapping Events  
Gary Perlman, The Ohio State University  
TimeCode is a PC-based system that supports the management of both coding and analysis of multiple overlapping events without a need for special hardware. The core of the system is a declarative language for coding multiple overlapping events. Codes

from multiple sources can be integrated and analyzed for transition probabilities and displayed graphically.

- 11:15 ANDISP: A Turbo PASCAL Program for Analyzing and Displaying Sampled Data  
Laurence Guentert, Purdue University  
ANDISP is Turbo Pascal program that analyzes, displays and manipulates sampled data recorded with a PC data acquisition system. Designed to analyze EEG/EMG data, the data analysis routines include integrate/differentiate a channel, rectify, filter, smooth, add/sub/mult/div a channel by a constant, as well as a routine that gives some basic statistics. The data manipulation routines can copy a channel or the data buffer to a file. The versatile display routine can give either oscilloscope-type displays of a data channel or publishable quality plots. Hardware requirements are an IBM-compatible PC with an EGA color monitor.
- 11:30 Logitudinal Scalogram Analysis: A Methodology and Microcomputer Program for Guttman Scale Analysis of Longitudinal Data  
Ron D. Hays & Phyllis L. Ellickson, The RAND Corporation  
no abstract
- 11:45 Dynamic Graphics in the Exploratory Analysis of Multivariate Data  
Frank M. Marchak & David Whitney, The Analytic Sciences Corporation  
Recent advances in personal computers simplify the use of dynamic graphics in exploratory data analysis. The present paper compares dynamic techniques such as rotation and animation to static scatter plots in their effects on subjects' abilities to extract cluster information from multivariate data sets.
- Teaching Using Computers: General Issues and Reviews**  
10:45-12:00 in Essex B  
Chair: N. John Castellan, Jr., Indiana University
- 10:45 An Experimental Evaluation of Different Amounts of Receptive and Exploratory Learning in a Tutoring System  
Franz Schmalhofer, Otto Kuhn, Universitat Freiburg, Paula Messamer, University of Colorado, & Rhona Charron, McGill University  
A general model of knowledge acquisition is presented which distinguishes receptive and exploratory learning as two separate learning modes. A learner's prior knowledge is represented as heuristic rules and domain specific knowledge. The different learning methods, which may be arbitrarily combined, are implemented as PROLOG meta-interpreters so that the costs and benefits of the different learning methods could be assessed. For the first hour of learning the programming language LISP, a tutoring system was developed in which the amount of exploratory and receptive learning can be manipulated.
- 11:05 A Review of Software for Introductory Psychology Instruction

Peter A. Hornby & Margaret D. Anderson, SUNY College at Plattsburgh

This paper provides a description and evaluation of software available for simulations and demonstrations in introductory psychology instruction. Packages for all major brands of hardware are included. The review covers descriptions of content, hardware requirements, specific strengths and weaknesses, availability of reviews, and cost of acquisition.

11:25 Computer Use in Psychology Instruction

Margaret D. Anderson & Peter A. Hornby, SUNY College at Plattsburgh

This paper reviews the current status of microcomputer use in psychology instruction. This includes an analysis of psychological software by instructional categories, trends in hardware use, and activity level in specific subfields. The data are taken from the COMPSYCH system as well as a survey of current users.

### **Knowledge-Based Expert Systems**

**10:45-12:00 In Lancaster A**

**Chair: Chris E. Stout, Forest Hospital and Foundation**

10:45 Software Development for the Non-Programmer: An Instructional Clinical Example

Chris E. Stout, Forest Hospital and Foundation

The focus of this paper is on an innovative way to which to instruct logical decision making in a psychology assessment course without students needing to know any programming language. It also yielded a tool with which students would be aided in making differential diagnoses between psychological and medical conditions.

11:05 Computer Work Stations for Manned Spacecraft: Explorations in Human and Machine Cognition

Roy Lachman, University of Houston and NASA

Multipurpose computer work stations are being developed at major corporations and NASA. These efforts may dramatically change the nature of professional work including scientific research. Efforts are described to conceptualize, research, and to prototype a knowledge-based, adaptive interface for consoles aboard U.S. Space Station Freedom.

11:25 Simple Rule and Judgment Structures for Automated Perceptual Classification Expert Systems

Richard Bloch & Sorel Bosan, College of William and Mary

The use of single rule and judgement structures in an automated method of knowledge base development suggests a simplified schema for the logic underlying structured classification and diagnostic activities. This is extended to suggest similarly simple structures could facilitate knowledge acquisition and expert system development in other domains.

**Lunch**

12:00-1:30

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### **AFTERNOON SESSIONS**

**New Software for Instructors**

**1:30-2:30 in Essex A**

**Chair: Nancy Duncan, Hampton University**

1:30 A Time-Shared Record-Keeping Program for an Introductory Psychology Laboratory System

David R. Basden & Barbara H. Basden, California State University, Fresno

An introductory psychology laboratory system is described which services 750 students each semester. The system employs a VAX 11/785 time-sharing system to administer, score, and record quizzes, and to keep complete subject pool records. The specially written software permits centralized record-keeping along with near simultaneous access by multiple users.

1:40 Increase in Mastery Levels Using a Computer-Based Tutorial/Simulation in Experimental Psychology

Linda C. Petty, Hampton University

A computer program was written in PCPilot to teach a unit in basic concepts in experimental design. The graphic-based program uses both tutorial and simulation techniques. Students who used the program had significantly higher test scores than those in an earlier class which did not. Students reported enjoying learning using the program.

1:50 Teaching about Speech Perception and Production Inexpensively on Microcomputers

Joseph P. Blount, Saint Mary's College & Mary Ann R. Blount, Saint Joseph's Medical Center

It is difficult to teach an introduction to speech perception and production without hands-on experiences for the students. We suggest inexpensive ways to use microcomputers to give such experiences with regard to letter-to-sound correspondences, formants, voice onset time, and other topics.

2:05 Contour: A Hypermedia Teaching Environment for Teaching about Subjective Contours and Other Visual Illusions

Thomas J. Dougherty, The Claremont Graduate School

Contour is a Hypercard courseware stack intended for use in introductory psychology and perception courses. Students can learn about subjective contours and other visual illusions in an interactive, highly graphic interface which includes many animated

examples. Literature searches of relevant research can be completed, and saved as text files.

**Modeling and Simulation**  
1:30-2:30 in Essex B  
Chair: Scott Gronlund, Northwestern University

- 1:30 Implementation of Global Memory Models with Software that does Symbolic Computation  
Scott D. Gronlund, Ching-fan Sheu, & Roger Ratcliff, Northwestern University  
Tools that facilitate the analysis of a mathematical model are now available with the advent of software packages that do symbolic computations. We use one of these (Mathematica) to implement the global familiarity memory models of Gillund and Shiffrin, and Murdock. We describe our implementation, and illustrate its flexibility and usefulness.
- 1:50 Statistical Simulation on Microcomputers  
Drake Bradley, Michael Senko, & Foster A. Stewart, Bates College  
A general purpose statistical simulation program, DATASIM, is evaluated to determine if it generates random variates with the desired theoretical properties. Uniform random number generation, standard normal deviate generation, and the generation of sampling distributions of  $x$ ,  $t$ ,  $F$ ,  $X^2$ , and  $r$  are investigated. Kolmogorov-Smirnov tests verify that the sample distributions generated by DATASIM have CDF's which closely match the corresponding theoretical distributions.
- 2:10 Item-presentation Controls for Computerized Adaptive Testing: Content-balancing vs. Mini-cat  
Thomas J. Thomas, The Johns Hopkins University  
Computerized Adaptive Testing (CAT) based on Item Response Theory offers an exciting alternative to conventional testing based on Classical Test Theory. These series of monte carlo studies investigates two procedures proposed to ameliorate the multidimensional nature of item pools, a current obstacle to full acceptance and implementation of CAT.

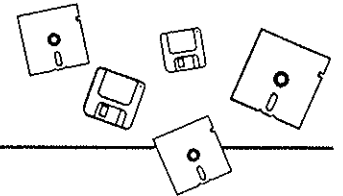
**Speech Processing**  
1:30-2:30 in Lancaster A  
Chair: Dominic Massaro, University of California, Santa Cruz

- 1:30 Voice Reaction Times with Recognition for the Commodore Family of Computers  
David A. Washburn & R. Thompson Putney, Georgia State University  
Hardware and software modifications which allow the collection and recognition of spoken responses by a Commodore computer are presented. Responses can be timed with millisecond accuracy and automatically analyzed and scored. Accuracy data for

this device from several experiments are presented, as are suggestions for improving recognition accuracy.

- 1:45 Taming the Heathkit-Votrax Speech Synthesizer  
Phillip L. Emerson, Doris C. Karniski, & Carol J. Kastanis, Cleveland State University  
Three inexpensive text-to-speech synthesizers are described, intelligibility data from a pilot experiment are reported, and software is offered that has been written to facilitate the phonemic programming of the Heathkit-Votrax synthesizer.
- 2:00 Synthesis of Visible Speech  
Michael M. Cohen & Dominic W. Massaro, University of California, Santa Cruz  
We have implemented a facial animation system to carry out visible speech synthesis. Using this system, it is possible to manipulate control parameters to synthesize a sequence of speech articulations. In addition, it is possible to synthesize novel articulations, such as one that is halfway between /ba/ and /da/. A demonstration illustrating the influence of this visible speech in face-to-face communication will be presented.

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**Recent titles for the IBM**

**EVENTLOG** by Robert Hendersen — A tool to help observers record real-time events. It can be customized for particular applications and observers. Winner of the EDUCOM/NCRIPTAL 1987 Award for Best Psychology software.

**Laboratory in Cognition and Perception (Second Edition)** by C. Michael Levy and Sarah E. Ransdell — These experiments offer three modes of use (demonstration, laboratory exercises, and advanced projects). In addition to improving the original programs, the authors have added topics such as spatial cognition, lateralization of memory, and reading.

**START (Stimulus and Response Tools for Experiments in Memory, Learning, Cognition, and Perception)** by R. J. Gregory and S. A. Poffel — Transforms the computer into a set of specialized research tools for hands-on experience in designing and conducting psychological research. Winner of the 1987 Classroom Computer Learning Software Award of Excellence.

**Computer Lab in Memory and Cognition** by J. M. Keenan and R. A. Keller — Students participate as subjects in experiments covering levels of processing, encoding specificity, semantic memory, sentence-picture verification, and constructive processes in prose comprehension.

**Recent titles for the Apple II**

**Accuracy and Precision** by H. Ono, M. Wagner, and K. Ono — Shows how these two concepts are distinct, through tutorials and experiments involving the Mueller-Lyer Illusion and Weber's Law.

**Classical Psychophysical Methods** by M. Wagner, H. Ono, and K. Ono — Tutorials and experiments which compare three methods of measuring difference thresholds: method of adjustment, method of constant stimuli, and method of limits.

*Psychology Series Editor: N. John Castellan*

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**Invited Address:**  
**Chair: Doris Aaronson, New York University**  
**3:00-3:45 In Lancaster A**

**Joseph B. Sidowski, University of South Florida**  
**Past, Present and Future**  
**of the Society for Computers in Psychology**

**Presidential Address:**  
**Chair: Darrell L. Butler, Ball State University**  
**4:00-5:00 In Lancaster A**

**Cyndi McDaniel, Northern Kentucky University**  
**Surviving Academic Computing**

**Members Business Meeting**  
**5:00 In Lancaster A**

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**EVENING ACTIVITIES**

**Workshop**

7:00 MEL Workshop  
Walter Schneider  
Group will meet in Lancaster A then will be transported to a computer lab at Georgia Tech.

**User Group Meetings**

8:00 Macintosh Users' Group Meeting in Essex A  
Facilitator: Richard Lehman, Franklin and Marshall College

8:00 PC and Compatibles Users' Group Meeting in Essex B  
Facilitator: Drake Bradley, Bates College