

The Seventh International Workshop on Qualitative Reasoning about Physical Systems

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The Seventh International Workshop on Qualitative Reasoning about Physical Systems was held on 16–19 May 1993 at the Rosario Resort on Orcas Island, Washington. To promote deep and focused discussion, participation was limited to 50 researchers; the bulk of attendees work in the area of AI, but several engineers and cognitive psychologists enriched the atmosphere. The 29 papers presented covered a wide range of subjects. Phase space analysis of dynamic systems still attracted attention, but the mathematics of qualitative differential equations appeared to have exhausted most interest. The two topics that attracted special concentration were automated modeling and the design task.

Amplifying a trend from previous years, almost one-third of this year's papers were on modeling. A. Capelo, L. Ironi, and S. Tentoni (Istituto di Analisi Numerica) described a program that generates qualitative descriptions of visco-elastic materials and then refines their quantitative properties. Takashi Kiriya and Tetsuo Tomiyama (University of Tokyo) discussed recent progress on multi-ontological reasoning. Two

groups—Patrice Gautier and Tom Gruber (Stanford University) and Franz Amador, Adam Finkelstein, and Daniel Weld (University of Washington)—described programs that compile special-purpose simulators from a library of compositional fragments yet maintain dependency links to generate natural language answers to questions about the simulator output. Yumi Iwasaki and Alon Levy (Stanford University) presented a new algorithm for constructing the simplest model capable of answering a query given a library of model fragments organized into assumption classes. Peter Struss (Technical Uni-

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versity of Munich) advanced a theory of temporal abstraction. Ken Yip (Yale University) described an exciting program that automatically abstracts partial differential equation models of fluid mechanical systems. Ken Forbus (Northwestern University) rounded out the discussion by leading a panel session on building and sharing large-scale models.

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and provide a metric for evaluating success. This year, the favorite task appeared to be conceptual design. Devika Subramanian and Edward Wang (Cornell University) described an innovative program that performs kinematic synthesis; lego instantiations of their program's creations excited the crowd. Dorothy Neville (University of Washington) and I presented a complete and systematic algorithm that simplifies the information-based information system approach to interaction-based design. Nikitas Sgouros (Northwestern University) integrated qualitative, numeric, and heuristic techniques in a program that designs distillation columns using a large database of compositional model fragments. Prasanta Bose and Shankar Rajamoney (University of Southern California) described how their compositional design algorithm copes with multiple operating regions. Several papers addressed other engineering tasks, notably monitoring and control, and a paper by Rob Milne (Intelligent Applications) and Louise Travé Mas-suyès (LAAS-CNRS) surveyed over 50 applications of qualitative reasoning. Johan de Kleer (Xerox Palo Alto Research Center) sparked heated debate when he challenged his panel members to list research areas that deserved increased attention and list an equal number of areas whose investigation should be terminated! Although I am forced to admit that no consensus was reached, the discussion was stimulating. Projecting past trends through the lively energy of this year's gathering, I predict that the eighth workshop (to be held in June 1994 in Nara, Japan) will be an even greater success.

Daniel Weld, associate professor of computer science and engineering at the University of Washington, earned dual B.S. degrees (computer science and molecular biophysics) from Yale University in 1982. He received an M.S. (1984) and a Ph.D. (1988) in computer science from the Massachusetts Institute of Technology. He received a Presidential Young Investigator's Award (1989) and an Office of Naval Research Young Investigator's Award (1990). His current research interests include engineering problem solving, planning algorithms, and software agents.