

Enabling Computers for Factory Planning and More: In Memory of Dr. Moshe M. Barash, A Giant in Manufacturing Research

Dr. Moshe M. Barash passed away on June 16, 2006, after a very distinguished career in teaching and research in manufacturing.

Moshe was a Fellow of ASME since 1984, Ransburg Professor of Manufacturing from 1982–1992, and retired from Purdue University as Ransburg Professor Emeritus of Manufacturing Engineering and Industrial Engineering since 1992. He pioneered computerized planning for manufacturing processes and systems that formed a technical foundation for CAD/CAM integration and computer integrated manufacturing systems. He was recognized as a pioneer and a world leader in the area of manufacturing systems engineering.

Moshe obtained his degrees of B.Sc. and Dipl.Ing. in both EE and ME from the Technion, Israel in 1947 and 1950, respectively, and a Ph.D. from the University of Manchester, England in 1958.

Moshe had extensive experience in industry and non-university research in a number of fields; in particular, design of complex machines, instruments, control systems, and production processes and tools. His university experience, extending 39 years, included teaching and research of very diverse topics in manufacturing. He conducted research in theory of machines, material transformation processes, reliability, wear, surface integrity, metrology, and modeling and optimization of manufacturing systems. Moshe's research was developed uniquely in and across the areas of processes, machines, systems, and metrology in manufacturing. It was common in discussion with Moshe on a new research idea, regardless if it was in manufacturing processes or systems, for him to say, "I did some work in this topic 20 years ago," and he would show you a paper of his pioneering work. Moshe was an explorer and a trail blazer of manufacturing research.

His research activities in the years before his retirement included design of automatic flexible fixtures, automated design of manufacturing systems, precision engineering, robot applications, computer aided manufacturing, and others.

A major contribution that Moshe had made was his pioneering effort for research enabling computers for factory planning and scheduling, including the automatic planning for processes first and then for computerized manufacturing systems.

With P. B. Berra, his Ph.D. student, they published, in the *International Journal of Production Research*, the earliest paper known in automated process planning in 1968, leading to the emergence of a second phase of computer-aided manufacturing, after the invention of numerical controlled machine tools. The subsequent activities in enabling the computers for planning manufacturing systems had led to an NSF Grant in 1974 for research into the "Optimal Planning of Computerized Manufacturing Systems." This project pioneered the research for planning and scheduling of a manufacturing system later known as flexible manufacturing systems (FMS). The basic structure of a flexible manufacturing system was described in his paper entitled "Integrating Machining Systems With Workpiece Handling," published in *The Industrial Robot* in 1976. This pioneering research had built a technical base and contributed to the subsequent research in CAD/CAM integration, computer integrated manufacturing systems (CIMS), intelligent manufacturing systems (IMS), and



Professor Moshe M. Barash
April 5, 1922–June 16, 2006

later the reconfigurable manufacturing systems (RMS).

Dr. Barash also contributed extensively to technical literature. He produced over 120 papers in research proceedings and journals and had written over 380 review articles on various technical subjects, appearing in *American Machinist* (1950–1955, over 20 original manufacturing techniques described), *Digest Of Soviet Technology* (1959–1962, 96 technical reviews and analysis articles), *Manchester Guardian* (1958–1965, 142 technical review articles), *Tool And Manufacturing Engineer* (1964–1965, 12 articles), *Machinery* (1965–1971, 68 articles), and *Manufacturing Engineering* (1976–1980, 54 articles).

People who worked with or were taught by Moshe can all remember his radiant personality, dedicated spirit, and enthusiastic manner. We remember his office that might be viewed by others as totally unorganized, but was actually a perfectly organized place for him. We remember and enjoyed his uncomplicated, candid, and sometimes naïve personality. Altogether, the manufacturing community mourns the loss of a giant, a scholar, and a gentleman, who introduced computers for factory planning and built a conceptual and technical foundation for modern computerized manufacturing systems.

Note: Purdue University is setting up a fund for "Moshe M. Barash Distinguished Lectureship in Manufacturing." Contributions should be addressed to: Moshe Barash Memorial Fund, School of Industrial Engineering, 315 N. Grant St., Purdue University, West Lafayette, IN 47907-1287, USA.

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