



Professor Joseph K. Davidson

**Recipient of the 2005 ASME Mechanisms and Robotics Award
at the 29th Biennial Mechanisms and Robotics Conference,
2005 ASME International Design Engineering Technical Conferences,
September 26–28, 2005, Long Beach, CA**

At the Mechanisms and Robotics Award Luncheon, held on September 27, 2005, Dr. Joseph K. Davidson, Professor of Mechanical Engineering, Arizona State University, received the 2005 Design Engineering Division, Mechanisms and Robotics Award. Upon receiving the award from Krishna C. Gupta, Design Engineering Division Chair, Dr. Davidson made the following brief remarks.

“I am deeply honored and pleased to receive this award, especially since it gives me an opportunity to acknowledge all the family, friends, and colleagues in mechanism who have helped me to arrive at this stage of my career.

“When John Uicker received this award last year, I recall listening to him make comments about the first Mechanisms Conference he attended and his choosing good parents. Although I had different parents, my choice in these was excellent also, and it was made in the same year: 1938. My father was a professor of entomology at The Ohio State University, and my mother was a teacher of music until my sister and I were born. Very fortunately, my wife also is an academic, so we are both comfortable with an over commitment to career.

“My first Mechanisms Conference was in 1960 at Purdue University. I was a beginning graduate student, and Chuck McLarnan, who was my mentor and the enthusiast for mechanisms at Ohio State at that time, drove me, and another beginning student, to the conference. This opened our eyes considerably, and I became ever more fascinated with the subject. Then, in 1963 I attended the Second Yale Conference for Mechanism Teachers. This conference was intended for faculty, and I did not yet have my Ph.D. degree. But apparently the view around Ohio State was that I would make the grade because, when Chuck McLarnan heard that there had been a cancellation in the roster for the Yale Conference, I filled it. That was an educational and delightful experience for me. The instructors were Oene Bottema, Ferdinand Freudenstein, Allen Hall, Erskine Crossley, and George Sandor, all giving us their most up-to-date thinking on the synthesis, design, and properties of mechanisms.

“Next in importance in affecting my professional career has been the five sabbatical leaves I have had over the years. My first was a year at the Gleason Works in Rochester, NY. Gleason manufactures machine tools that produce gears, especially bevel and hypoid gears, and there I found a way to minimize manufacturing variations in an assembly by using the theory of spatial mechanisms. The next was in 1980 where I spent seven months at Monash University in Melbourne, Australia. My host there was Ken Hunt, and that visit began a long association that endured until his death three years ago. After that I spent four months in the fall of 1987 at the Swiss Federal Institute of Technology with Gerhard Schweitzer and his robotics lab in Zürich, Switzerland. Here I found that there was still a contribution to be made using screw theory to predict the likelihood of static instability for walking machines that are used in the mountains and hills of Europe by construction and forestry companies. It was here, also, that I was introduced to the Delta robot, and where I found that it was simply a constant-velocity plunging shaft coupling that constrains the two shafts to be parallel. But now it was arranged with one shaft nailed to the ground and with the other as a moving platform that can only translate. After that came 3-1/2 months at the University of Salford in the UK, and eight years later, in 2002, another 3-1/2 months at The Ohio State University. Some research work on robotics got done at Salford and on tolerances at Ohio State, but much of both of these times was spent writing portions of the book that I authored with Ken Hunt and that was published in 2004. It is entitled *Robots and Screw Theory: Applications of Kinematics & Statics to Robotics*.

“I remember that when I left Monash University in 1980 that I was presented with a plaque that had emblazoned on it the Italian words ‘Ancora Imparo,’ which translates into English as ‘I am still learning.’ This Mechanisms and Robotics Award has given me an opportunity to review my own career in relation to this guiding principle at Monash University. I started around 1960 working on mechanism problems, then robotics for over 15 years, and now geometric tolerances, learning more about geometry all along the way!

“In reflecting on what I would say today, I was reminded of comments by Bernie Roth which he made at the luncheon of another mechanisms conference many years ago: There should be some fun derived from the problems we work on. We have all noticed that research is strongly driven by outside pressures to obtain funding and produce publications. In academic institutions, the adverb ‘strongly’ is enforced by deans and promotions committees, and, in industry or government labs, by the admonition ‘No hobby research.’ We all know colleagues who have shifted from a favorite discipline to one that is more ‘productive.’ What I heard Bernie say was: be sure to spend some time on research that you, in your heart, want to pursue. Being a somewhat cantankerous individual, I have found this easy to do.

“In conclusion, I suppose that, after 45 years of attending these conferences, I have earned the right to make recommendations to younger members of this group. I suggest two: ‘keep learning,’ and, for at least some of the problems that you pursue, ‘follow your heart.’ Once again, I thank you all for this award.”

Pierre M. Larochelle
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