UNIVERSITY of MICHIGAN

COLLEGE OF ENGINEERING ■ MECHANICAL ENGINEERING

Dedication Ceremony of the

Yoram and Alina Koren Conference Room

1100D Herbert H. Dow Building

Monday, October 22, 2012

This booklet contains the dedication remarks by six professors, the Dean of Engineering, and Alina and Yoram Koren

Remarks by Kon-Well Wang

Stephen P. Timoshenko Collegiate Professor and Mechanical Engineering Department Chair

Good afternoon and thank you all for coming. I want to welcome you to this wonderful event.

Today, we are here to dedicate the Yoram and Alina Koren Conference Room - in honor of Professor Yoram Koren and his wife Alina and to celebrate their wonderful contributions to the university, to the technical community, and to our society.

Yoram has a distinguished career in engineering – He is Mr. FIRST and Mr. HIGHEST in his profession. Later in the program, you will hear about Yoram's accomplishments from some of his friends and colleagues. Covering from Reconfigurable Manufacturing, to Manufacturing Automation, to Robotics, and to Education and Mentoring. You will hear that he is the FIRST of many things.

Here let me just start by naming a few of Yoram's credentials:

Yoram is the recipient of the most prestigious honors in the field of manufacturing:

- Eugene Merchant Manufacturing Medal given jointly by SME and ASME
- Gold Medal of the Society of Manufacturing Engineers (SME)
- William T. Ennor Manufacturing Technology Award from the American Society of Mechanical Engineers (ASME)

At the University of Michigan, Yoram is the recipient of the

- Stephen S. Attwood Award — highest honor presented by the College of Engineering to a faculty member
- He is a Distinguished University Professor -- highest honor presented by the University to a faculty member

And of course, he is an elected member of the National Academy of Engineering – which is the highest NATIONAL honor for an engineer.

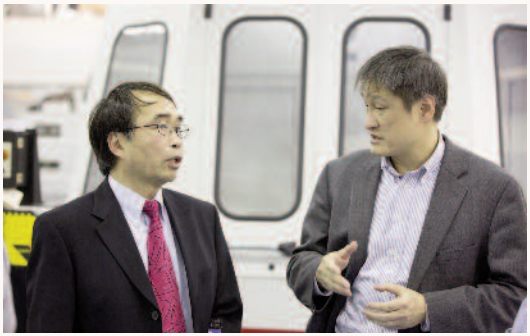
So, he is indeed Mr. HIGHEST!

In addition to his exceptional professional achievements, most of all, Yoram is a great citizen and a wonderful colleague of the department and to many people that he worked with. He is a senior statesman who is full of passion and compassion. He not only worked hard for his own success, but has worked hard and fought for many other people's success – he is a team builder and a wonderful mentor to many individuals; some of them are in this room today!

I believe Yoram will later share with us his secret of success. But I know one important factor is that he has a wonderful boss and companion – that is Alina. In fact, Yoram told me many times that Alina is his Strategic Advisor – who always keeps him on the right path.

Today it is truly our honor to dedicate the conference room to this excellent Michigan team – Yoram and Alina Koren! Congratulations!

w. Kon-Well and Jyoti Mazumder



Kon-Well Wang and Albert Shih

Welcome to our conference room

Remarks by Galip Ulsoy

C.D. Mote, Jr. Distinguished University Professor

I first met Yoram Koren on September 2, 1980. It was my first day on the job, as an Assistant Professor, at the University of Michigan. It was also Yoram's first day at Michigan as the Paul Goebel Visiting Professor of Engineering. Although it was the first time we had met, we had corresponded over the summer and written a proposal to the National Science Foundation (NSF) on adaptive control of machine tools. Of course, the proposal was primarily written by Yoram, and fortunately for me he was just trying to help this young assistant professor. Yoram had already developed and experimentally demonstrated the **first** adaptive control system for a lathe and had just published a landmark paper on the topic (Masory & Koren, *CIRP*, 1980, 65 citations). The proposal was eventually funded by NSF and enabled us to buy the first real-time laboratory control system (PDP-11) in the Mechanical Engineering Department, and to develop and experimentally demonstrate the world's first model reference adaptive control system for milling.

Adaptive control of machine tools was not the only research area that Yoram had already established when he came to the UM in 1980. His work on cross-coupled control which synchronizes two or more machine axes in the presence of disturbances, and has been widely adopted by the machine-tool industry was published that year (Koren, *ASME JDSMC*, 1980, 530 citations), as was his pioneering work with Steve Malkin on optimization of the grinding process (Malkin & Koren, *CIRP*, 1980).

In the mid 1970's, before coming to UM, Yoram had already published high-impact papers on flank wear estimation (Koren, *ASME JEI*, 1978, 77 citations), on the design of sampled-data drives for CNC machine tools (Koren & Bollinger, *IEEE Trans. IA*, 1978), and the **first** scientific paper on interpolators for CNC machines (Koren, *IEEE Trans. Computers*, 1976, 61 citations). Based on his research results he had started writing his book *Computer Control of Manufacturing Systems*, which was then published in 1983 and subsequently received SME's Merchant Manufacturing Textbook Award. It is now a classic text, still widely used, and has garnered over 400 citations.

These would be amazing accomplishments for anyone over an entire career. What is even more amazing is that **this was only the beginning**. You will hear from other speakers how he went on to do equally amazing things in reconfigurable manufacturing, and in robotics.

I am truly delighted to have had Yoram here as a friend and colleague for my entire career. I am also delighted that, through this conference room that is being dedicated today, others will continue to learn of his contributions to manufacturing engineering and to the University of Michigan.

Yoram, my heartfelt thanks for all your contributions, both personal and professional. Thank you!

Yoram and Galip, 1996

Koren conference room; capacity 20 people

Remarks by Jack Hu

Anderson Professor of Manufacturing Technology and Associate Dean of Engineering

Thank you for this opportunity to tell you about Yoram's contributions. A true leader in research is someone who defines a new research field so that others can follow. Prof. Koren is such a leader, and Reconfigurable Manufacturing Systems is a perfect example of such a research field. A reconfigurable manufacturing system is designed at the outset to accommodate rapid changes in its structure so that it can quickly adjust its production capacity and system functionality in response to sudden market changes and customer demands.

At an early stage, Yoram recognized the emergence of globalization and the need for responsiveness in manufacturing systems. He therefore proposed establishing a National Science Foundation (NSF) Engineering Research Center (ERC) for Reconfigurable Manufacturing Systems (RMS). This center, approved for NSF funding in 1996, was the first NSF-sponsored ERC at the University of Michigan.

Prof. Koren has made an impact in three areas: science, technology, and people.

The ERC developed the scientific foundations for reconfigurable manufacturing. Yoram's keynote paper on Reconfigurable Manufacturing Systems was presented at the CIRP General Assembly in 1999 and to date has received almost 1000 citations. In the field of manufacturing, a paper that receives 20 citations is usually considered a good paper, so 1000 citations are truly extraordinary. Prior to 1996, reconfigurable manufacturing as a research area did not even exist. Since Yoram introduced it, RMS has become a hot research topic in academia that is pursued intensively at universities in North America, Europe, Asia and South Africa.

The ERC developed a number of enabling technologies and led them to industry implementation. Several technologies, such as reconfigurable inspection machines and PAMS software, have been implemented and are being used in industry today.

The final and perhaps most important impact of Prof. Koren and the ERC has been the impact on people. Since the ERC's inception, 70 Ph.D. students, 270 masters and many undergraduate students have completed research projects in the ERC. These students have been trained and become knowledgeable in manufacturing systems, and they have a global view of manufacturing. This impact is long lasting!

Yoram's impact on faculty members has been also significant. I was a junior faculty member when the ERC began. I also worked closely with him at the ERC on designing manufacturing system configurations. I have always relied on Yoram for technical and professional advice. He has been a great supporter, mentor and promoter of me and my work. He has done the same for my other manufacturing colleagues. I want to thank Yoram and Alina for their support and friendship. I would say that there is no better person to go to for honest and trustworthy advice.

Thank you, Yoram, for all you have done for Michigan, and for all of us!

Over 100 guests attended the dedication ceremony that was conducted in the ERC-RMS Laboratory

Remarks by Johann Borenstein

Research Professor of Mechanical Engineering

The Robotics Years

Yoram Koren

Founder of the Mobile Robotics Lab
at the University of Michigan

1983 - 1987: The Nursing Robot

Yoram conceived the Nursing Robot

A mobile robot with a robotic arm for assisting bedridden patients. It obeys commands such as

- "Bring me a glass of water!"
- "Bring me my magazine!"

Today: There are tens of different service robots from different companies (mostly Japanese).

1987-1989: CARMEL

In 1987 Yoram founded the UM Mobile Robotics Lab

- In 1988 he demonstrated his obstacle avoidance system, called "Vector Field Histogram" (VFH), on a robot called CARMEL that was featured on CNN
- Yoram's seminal paper on VFH (*IEEE Trans. Robotics and Automation*) has the highest citation score (1460) among his hundreds of papers
- Today, 25 years later, VFH is used on mobile robots worldwide!

1989-1991: Obstacle Avoidance Technology for the Handicapped

In 1990 Yoram conceived of an application for his obstacle avoidance technology for the handicapped: The NavChair

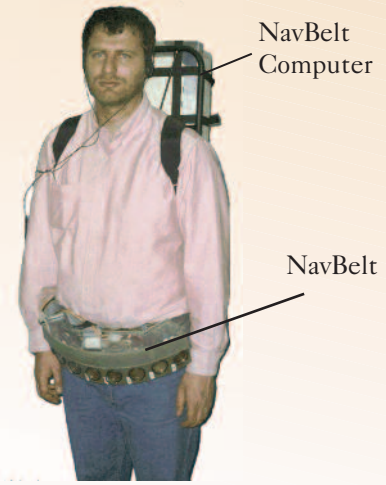
- NavChair was to help quadriplegics with limited manual control capabilities to avoid obstacles safely
- NavChair used 12 ultrasonic sensors to detect obstacles
- An onboard computer that can override user's joystick commands if the system detectes collision course with obstacles

1992-1995: The NavBelt for the Blind

- Another application of Yoram's obstacle avoidance technology was the NavBelt
- NavBelt guides blind users with audio signals

"Robotics for Engineering"

by Yoram Koren, published in 1985 by McGraw Hill, with translation into Japanese and French



Shraga Shoval, Ph.D candidate, today an Associate Professor

Yoram: It was my honor and pleasure to talk about your accomplishments. Your guidance, mentorship, and direct help with my career were worth far more than my technical contributions.

The ceremony yesterday was wonderful and you deserve this recognition. I am hopeful that you will receive even greater honors in the years ahead. Best regards, Johann
Oct. 23rd, 2012

Remarks by Elijah Kannatey-Asibu Jr.

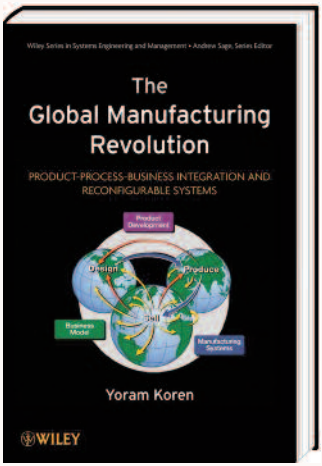
Professor of Mechanical Engineering

When most people hear the name Yoram Koren, the first thing that comes to their mind is his research accomplishments. What they do not realize is that he has also made outstanding contributions in education.

> Yoram has thus far written four books that have made significant impact on both undergraduate and graduate education.

His first book, *Numerical Control of Machine Tools* (1978), was one of the earliest books written on the subject to introduce practicing engineers to the basics of numerical control (NC) systems. This was followed in 1983 by *Computer Control of Manufacturing Systems*, which not only outlined the fundamental concepts of NC systems, but it was the first book to also address the control aspects of machine tools. This book became the standard textbook for courses on the subject all over the world, and is still in print, almost 30 years after it was first published.

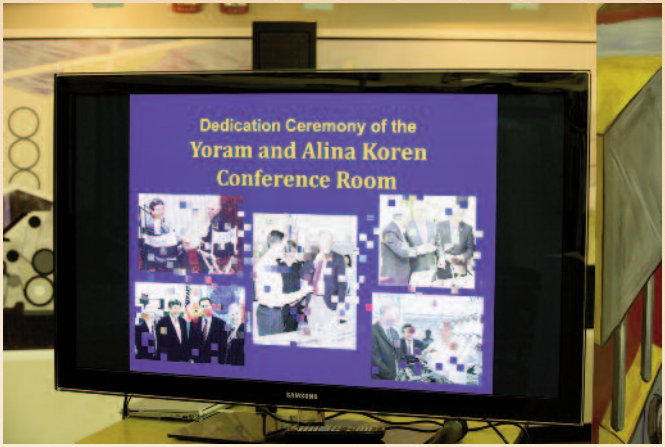
When robotics became a "hot" research area in the late seventies and early eighties, many people quickly came out with books on the subject. I had the feeling that the authors had rushed in publishing their books, apparently in an effort to be one of the first to publish a book on the subject of robotics, and thus had not done due diligence. Then a few years later, Yoram came out with his book *Robotics for Engineers* in 1985. The contrast was obvious. Yoram's book was what a textbook was supposed to be. It had all the basic elements of a classic textbook.



When I read it, I had the feeling that is best described with the analogy of going to a restaurant and eating a meal that makes you feel very content. His robotics book has since been translated into several languages, including French and Japanese. And Yoram's most recent work, *The Global Manufacturing Revolution*, sets another landmark, being a pioneer in this emerging field.

Quite apart from the books that he has written, Yoram has also introduced a number of courses since coming to The University of Michigan (UM). The first course that I taught as a faculty member at UM, Computer Control of Manufacturing Systems, was introduced by Yoram. His most recent course, Global Manufacturing, exposes students to the frontiers of modern manufacturing. Another course in which he was extensively involved in developing, Manufacturing System Design, is one of the most popular manufacturing courses in the College.

Even though there will be remarks specifically on mentoring, my remarks will not be complete without any reference to Yoram's impact as a mentor. And in a nutshell, all I shall say is that I have always seen him as the older brother that I never had.


Dedication Ceremony of the
Yoram and Alina Koren
Conference Room


Arch-t

Remarks by Kira Barton

Assistant Professor of Mechanical Engineering

Today, in light of all of the amazing accomplishments that Yoram Koren has achieved over the years, I would like to take this opportunity to talk about his role as a mentor. As you can see from the sheer numbers, Yoram has influenced many people over the years. Today, I would like to discuss Yoram's impact on me; ranging from his influence on my research to his role as an advocate and mentor to me as a new assistant professor in the ME department.

During the winter faculty party in 2011, I mentioned that Yoram was the person I had known the longest in the room; much to his surprise, it had been six years at this point. Seeing his surprise, I relayed the story of our first meeting.

I first met Yoram at a conference during my second year as a graduate student at the University of Illinois. I was presenting my initial work as a graduate student. The work built off one of Yoram's many technical areas of contribution, a manufacturing-based control approach known as Cross-Coupled Control. I had read many of Yoram's papers and was extending the framework in a new manner. Following my presentation there were a few questions from the audience, with one notable question and comment coming from a specific individual. While the question escapes me, the comment was a compliment for my work and expressed his interest in my research. As I was packing up my computer, the session chair asked me if I knew the individual from the audience. Being new to the area, I said I did not. He informed me it was Yoram Koren; the author of the material I was referencing in my work. I must admit at that time I felt as though I had had a **rock star** in the audience. It was an exciting discovery to learn that one could study and learn from the published work of an expert in the field, and then have an opportunity to meet and potentially work with that individual later. It was something that stayed with me during my years as a graduate student.

As I prepared to visit the University of Michigan during my interview process, I was excited with the prospect of meeting with Yoram once again. Since I accepted my position in the ME department, Yoram has been an outstanding advocate and mentor to me. He has helped me transition into teaching a course he developed titled 'Global Manufacturing'; working with me to introduce new topics that align with my research interests. Additionally, Yoram has helped facilitate the set-up of my lab and always been available to discuss research or provide insight and perspective.

I would like to take this opportunity to thank Yoram for everything he has done for me and to congratulate him and his wife on this wonderful honor.

Y. Koren " Cross-coupled biaxial computer control for manufacturing systems". *ASME Trans., J. Dynamic Systems, Measurement, and Control*, Vol. 102, No. 4, pp. 265-272, 1980. Cited 530 times.

Chava (L) and Raoul (R) Kopelman

Sungchul Jee

Zbigniew Pasek (L)
Kazu Saitou(M), Wei Lu (R)

Jack Rubinfeld

Noel Perkins (L)
Rod Hill (M), Steve Culp (R)

Karen Brown

Elias and Sana Shakour

Remarks by Alina Koren

I would like to point out three of the areas in which Yoram worked that I found most important:

1 His efforts to put theories into practice, especially when it comes to helping people with disabilities. He encouraged and supervised students who came with new ideas to improve existing devices and inventing new ones, in order to make life easier for those who are less fortunate.

2 The way he involved in reseach people from 30 different countries; some from nations that are at war and show hatred toward each other. Yet, when they worked together on the same project they fully cooperated with each other, and the prejudices and animosity were completely forgotten.

3 The good atmosphere in the Mechanical Engineering Department. From Day 1 the department was very welcoming and encouraging. The cooperation between faculty members has been always excellent, despite the sometimes stiff competition. Since Yoram is very sensitive regarding any unkind word, he encouraged this kind of cooperation and good atmosphere, which, no doubt, contributed to the fact that the Mechanical Eng. Department and the University of Michigan became one of the best in the nation.

In a more personal note, I want to thank Yoram for hiring me as his strategic advisor. I consider myself lucky.

Thank you all for coming.

w. Amy Cohn

w. Daisy Wu

w. Chava Kopelman, in Koren's Conference Room

(L to R) John Agapiou, Serge Li Hoi Foo-Gregory,
Elias Shakour, Don Chaffin, Melissa Eljamal, Leigh McGrath

Remarks by Yoram Koren

James J. Duderstadt Distinguished University Professor of Manufacturing

We are honored and thrilled to have this event. Many thanks to the presenters – Kon-Well, Galip, Jack, Johann, Elijah, Kira and my beloved wife Alina – for their personal remarks, and to Dean Dave Munson for his concluding comments.

Dedicating a room to Alina and me is indeed an incredible honor. We were married almost 50 years ago, and as Alina mentioned, she was hired a few years later as my Strategic Advisor – a title that she well deserves.

I would like to express my thanks to Kon-Well and Jack Hu for initiating the idea of dedicating this conference room, and to Dean Dave Munson for supporting and endorsing it at the university level.

And a special thank to Merlis for organizing this wonderful event.

We would also like to acknowledge some important guests who are attending this ceremony. First, I want to thank my former Ph.D. students, Sungchul Jee and Byung-Kwon Min, who are both professors in Korea and came all the way from Korea just for this event. We are also very happy that Daisy Wu is here. I first met Daisy and Sam Wu in 1970, and a few years later in 1974/75, Alina and I spent a year in Madison and became friends with the Wus.

We indeed appreciate it that Gary Cowger, Don Chaffin, Jyoti Mazumder and Glen Knoll, all NAE members, are here at the dedication ceremony. In 1995 Glen Knoll was acting Dean of the College, and joined me on a trip to a machine tool company in Rockford to get the required industry support for the ERC. Panos Papalambros was at that time the Department Chair and played an important role in winning the NSF-sponsored RMS Center.

You all have a copy of the booklet "On Dreams and Timing" that was published last week. From the story on page 22 you can see that I have been working with President Duderstadt since 1981, and I wish to thank him for honoring me by extending the use of his name on my Distinguished University professorship. Tonight Jim is chairing a meeting in Washington and cannot be with us.

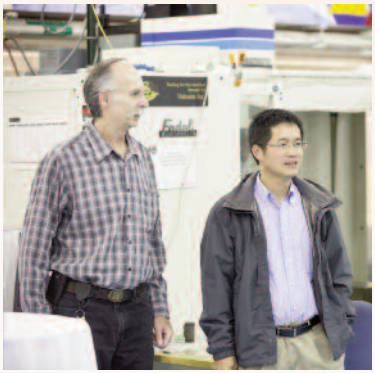
The close cooperation and teamwork of the faculty members from ME, IOE and EE has been a very important factor in the tremendous success of our Engineering Research Center for Reconfigurable Manufacturing Systems. Many thanks to the RMS Dream Team (Galip, Jun, Jack, Elijah, Dawn, Amy, Judy, Albert, James, Zbigniew, Wencai and Leigh) that is here tonight for their cooperation and the hard work over the years; you are wonderful partners.

Thank you all for coming and taking part in our celebration.

Dear Yoram: It was great to see your many accomplishments recognized at the naming ceremony yesterday. I enjoyed hearing from many of your colleagues and learned more about how much you have contributed to the College and University. Thanks for the nice mention of our trip to Rockford for the ERC planning. It was an interesting day, and I learned a bit more about what real engineering looks like. All the best, Glenn (Oct 23, 2012)

Left: w. Don Chaffin (L) and Glenn Knoll (R)

Right: w. Gary Cowger
Former Group VP,
Global Manufacturing
General Motors



Steve Erskine (L), John Wang (R, GM)

Judy Jin (L), Joe Pan (M),
Chava Kopelmans (R)

Margaret Wooldridge (L) Barb Behm (R)

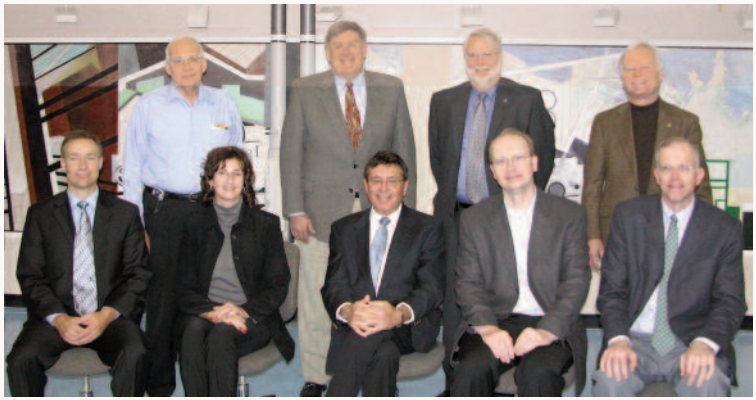
Dave Cole – the national expert
on the automotive industry

Sungchul Jee (L) and Byung-Kwon Min (M)

Dean Dave Munson: “Thank you, Alina, for sharing Yoram with us”

"I first met Yoram at an ERC-RMS Executive Committee meeting (in 2006) where I found that his management style was very different. Although the job of the executive committee was to offer advice, Yoram already had made most of the decisions! Of course, everyone was fine with this, because Yoram is a master planner and his decisions always proved right”

— Dean Dave Munson



ERC Executive Committee – high-level reps from Chrysler, Ford, General Motors, UM, and the state of Michigan

"Where is my plate?"
– Eytan

"We are so thin... Why we didn't get any food?" – Rony and Mayan

Ribbon Cutting Ceremony Opening the Koren Conference Room (L to R): Jack Hu, Galip Ulsoy, Dave Munson, Alina Koren, Yoram Koren, Panos Papalambros and Kon-Well Wang

Koren Conference Room Plaque

Students having a project meeting in Koren Conference Room