A Tribute to Professor Steve Malkin

Reflections from Colleagues and Friends

— June 2014 —
The Stephen Malkin Fund

The Stephen Malkin Fund has been established to honor the late Professor Malkin (1941-2013), a visionary, leader, and extraordinary mentor. With a lead gift from the Saint-Gobain Corporation and generous contributions from alumni and friends, we have secured the foundation to permanently endow the Malkin Lecture Series. These lectures will attract a wide variety of expert speakers who will inspire our learning community on issues of innovation and progress in engineering fields involved with manufacturing. The first Malkin lecture will be held in the 2014-2015 academic year.

Under Professor Malkin’s tutelage, students thrived and through his leadership as MIE department head, younger faculty members made great educational and professional strides — each enriched by his unique style of teaching and leadership. Malkin was an internationally renowned guiding force in manufacturing science who established the scientific basis of modern grinding systems. He leaves behind a legacy of intellectual and professional rigor that the newly established lecture series will embody.

To give to the fund, please go to https://www.umass.edu/development/give/ and choose the following selections from the drop-down boxes:
1) College of Engineering;
2) Mechanical and Industrial Engineering — Dr. Malkin Tribute.

For questions about the fund or if you prefer to send a check manually, please contact Ericka Prew, Interim Development Director for the College of Engineering, at 413-545-6395 or eprew@ecs.umass.edu.

The Department of Mechanical Engineering at the University of Massachusetts Amherst together with colleagues and friends of Professor Steve Malkin have helped assemble this booklet.
Stephen Malkin, a Distinguished Professor Emeritus in the Mechanical and Industrial Engineering (MIE) Department at UMass Amherst, passed away on August 19. An announcement on August 20 from MIE Department Head Donald Fisher noted that “On a sad note, Steve Malkin passed away yesterday, Tuesday, at his home in Boston. Steve was a very important figure in the recent development of this department and was a well-respected engineer and teacher. We will miss his friendship, leadership, and companionship.” Among Professor Malkin’s many honors was his election to the National Academy of Engineering, one of the highest professional distinctions afforded to any engineer. In announcing the election, the academy cited Professor Malkin “for pioneering research in and the implementation of grinding-system simulation and optimization.” Services were held on August 21.

A two-paragraph obituary from Levine Chapels in Brookline reads as follows:

“Distinguished Professor Stephen Malkin of Jamaica Plain, formerly of Amherst, Massachusetts, and Tivon, Israel, on Monday, August 19, 2013. For 41 years the beloved husband of Maccabit (Gross). Devoted father of Ruth Lerner & her husband Avinoam and Gonen Nissim & his wife Inbal. Loving Saba of Judith, Millie, Noa, and Shai. Cherished son of Jeannette (Klickstein) Malkin and the late Simon Malkin. Dear brother of Celia Brown.

“Services at the Levine Chapels, 470 Harvard Street, Brookline on Wednesday, August 21, at 10 a.m. Burial will follow in Tivon, Israel. Please omit flowers. Remembrances would be appreciated to American Red Cross of Massachusetts Bay, 139 Main St., Cambridge 02142, or Jewish National Fund, 77 Franklin Street, Boston, MA 02110. He was a Distinguished Professor of Mechanical Engineering at UMass Amherst 1986-2009, a Society of Manufacturing Engineering (SME) Fellow, received the Manufacturing and Technology award from the American Society of Mechanical Engineers, and a member of the National Academy of Engineers, the highest possible recognition in his field.”

Professor Malkin was elected Fellow of the American Society of Mechanical Engineers (ASME), Fellow of the Society of Manufacturing Engineers (SME), Fellow of the International Academy for Production Engineering (CIRP), Honorary Member of the Romanian Society of Mechanical Engineers, and Honorary Professor at National Huaqiao University in China.

Professor Malkin’s research activities were mainly related to grinding and abrasive processes. An author of more than 200 technical articles and a book — *Grinding Technology: Theory and Applications of Machining with Abrasives* — he was internationally recognized as one of the leading researchers in his field. He has been an invited lecturer and keynote speaker at more than 65 industrial companies, professional associations, and universities in North America, Europe, Asia, and South America. His professional experience also encompassed consulting with more than 35 industrial companies.

Professor Malkin received numerous honors, including the ASME Blackall Award of 1993 for best papers related to machine tools, the SME Gold Medal of 1996 and the ASME William T. Ennor Manufacturing Technology Award of 2004 in recognition of his outstanding research accomplishments, and the Outstanding Senior Faculty Award in the College of Engineering at UMass in 1997.
Professor Malkin grew up in the Boston area and graduated in mechanical engineering from the Massachusetts Institute of Technology with B.S. (1963), M.S. (1965), and Sc.D. (1968) degrees. He began his academic career at the University of Texas, and thereafter taught at the State University of New York at Buffalo until he joined the faculty at Technion-Israel Institute of Technology in 1976. He came to the University of Massachusetts as Professor of Mechanical Engineering in 1986, where he was Director of the Manufacturing Engineering Program from 1987 until 1995 and co-founder of the Center for Manufacturing Productivity, which paired faculty with small to medium sized manufacturers to enhance productivity and competitiveness. He was named Distinguished Professor at the University of Massachusetts in 1998, and he served as Head of the Department of Mechanical and Industrial Engineering from 2000 to 2006.

Steve and Maccabit, 2004, Kraków.

Steve and Zhongde Shi.

Professor Malkin receiving ASME Taylor Medal at ASME Winter Meeting, 1990.

Steve’s last visit to Ann Arbor, September 2011. Lihui Zhang, Yancheng Wang, Yongjun Tan, Steve Malkin, Albert Shih, Mac van Loon, Bruce Tai, Chris Spangler, and Roland Chen.
For Pioneering Research in and the Implementation of Grinding-System Simulation and Optimization.

by Yoram Koren

Stephen Malkin, an internationally renowned guiding force in manufacturing science and a University Distinguished Professor Emeritus at the University of Massachusetts Amherst, passed away on August 19, 2013 at the age of 72.

Steve, as he was generally called, was born in Malden, Massachusetts, on June 20, 1941. In high school Steve was an ambitious student who pushed himself to excel, so it is no surprise that he was admitted to the Massachusetts Institute of Technology, where he completed his bachelor’s degree in 1963.

Steve got a taste of research during his undergraduate studies and decided to attend graduate school at MIT, and to specialize in manufacturing engineering. He earned his M.Sc. in 1965, and in 1968 he graduated from MIT with a Sc.D. in Mechanical Engineering.

In 1968 Steve became an Assistant Professor at the University of Texas, Austin, and in 1974 he moved to the University of New York in Buffalo, where he was promoted to Associate Professor. In 1976 he immigrated to Israel, where he was a professor at the Technion-Israel Institute of Technology until 1986, when he returned to the U.S. and became a professor of Mechanical Engineering at the University of Massachusetts in Amherst. From 1987 until 1995 he was Director of the Manufacturing Engineering Program at UMass and co-founder of the Center for...
Manufacturing Productivity, which paired faculty members with small-to-medium-sized manufacturers to enhance productivity and competitiveness. In 1998 Steve was named Distinguished Professor at the University of Massachusetts, and he served as the Head of the Department of Mechanical and Industrial Engineering from 2000 to 2006.

Steve did a superb job during his two terms as department head. He was a visionary, a leader, and above all, an excellent mentor for younger faculty members, as evidenced by the number of new faculty members who were hired or promoted and nationally and internationally recognized during his tenure.

Steve’s unique style of inclusiveness and impartiality in running the department along with his intellectual and professional rigor can be seen in several new initiatives he introduced, among them the department seminar series and the department cluster groups emphasizing the department’s diversity and richness. During his tenure, the department’s wind energy and human performance programs became internationally prominent and have since been recognized as the two signature programs of the department and of the college. Under his leadership, the department’s human and fiscal resources grew significantly. Many new faculty members were hired, enrollment increased by over 50% and research expenditures increased by 44%. Steve retired from the University of Massachusetts Amherst in 2009.

Steve Malkin is the author of a scholarly body of papers on grinding system technology that constitutes the spearhead of innovative research in this field and is the leading light for new research directions in modern grinding optimization technology. He was instrumental in transforming grinding technology from an empirical craft to an applied science by laying the foundation for grinding system theory and developing enabling technologies to improve system efficiency. Steve’s book on Grinding Technology presents a comprehensive and consistent treatment of grinding theory and its practical aspects. Amazingly, this book has been cited over 1000 times by other researchers.

A primary objective of Steve’s early research was to develop a fundamental understanding of and quantitative models to describe the diverse aspects of grinding, including the mechanics of the process, temperatures, thermal damage to the workpiece, precision, and surface topography. He then realized that this fundamental processing knowledge could be more practically applied by taking a comprehensive systems approach in which the grinding model parameters are updated and intelligent control is utilized to optimize the process.

Steve developed a virtual manufacturing system that provides quantitative and visual computerized simulation of the process to predict what will occur and to identify the optimal conditions. Malkin’s simulations are currently used in industry. Another approach that Steve pioneered was the coupling of the knowledge base and simulation with intelligent control methodologies to achieve adaptive optimal control of grinding machines.

Among the industries that utilize Steve’s modeling and optimization methodologies are General Motors, Ford Motor Company, SKF, General Electric, Alcoa, Norton, Eaton Corp., United Technologies Pratt and Whitney, Caterpillar, Allied Signal, The Timken Company, TRW, Warner and Swasey, Iscar Blades, and many others. According to experts, Steve’s original grinding simulation and optimization methodology has saved millions of dollars.

Steve authored 200 scientific papers and supervised 50 graduate students, most of whom now work in high level engineering positions and management. Steve loved his students and maintained close relationships with them.
Steve was a Life Fellow of the American Society of Mechanical Engineers (ASME) and a Fellow of the Society of Manufacturing Engineers (SME). He was a Fellow of the International Academy for Production Engineering (CIRP) since 1980. Steve received the ASME William T. Ennor Manufacturing Technology Award (ASME), the Gold Medal of SME, and the Blackall Machine Tool and Gage Award of ASME.

Steve Malkin was honored by the title Doctor Honoris Causa by the Jan Evangelists Purkyne of the Czech Republic. He was an honorary member of the Romanian Society of Mechanical Engineering and an honorary professor at the National Huaqiao University in China. Steve was the R.S. Springer Visiting Professor at the University of California, Berkeley, and the Lady Davis Visiting Professor and later the Safra Visiting Professor at the Technion — Israel Institute of Technology, Haifa, Israel. Steve continually sought opportunities to serve the community and to advise, lead and help others. He will be greatly missed.

Steve is survived by his mother Jeannette, his beloved wife of 41 years Maccabit, his son Gonen and his daughter Ruth, his four granddaughters — Noa, Shai, Judith and Millie — his sister Celia, a nephew and a niece.

Yoram Koren
J.J. Duderstadt Distinguished University Professor
The University of Michigan, Ann Arbor, MI
Member, National Academy of Engineering, USA

Steve Malkin, my friend
by Joe Goldstein

Steve was a gentleman, a scholar, a mentor, a storyteller, a person with strong opinions; but he was also straight forward — tell it as it is, a big person with a caring temperament, a family man with a strong love for Maccabit and his family, a mentor, and a first class scholar.

Steve was a best friend. I looked forward to my weekly lunches with him at which I would hear his favorite airplane stories and his usual complaints about the inadequate upper administration at the University. But we would talk about the issues that only best friends can — personal issues, problems that were coming up, problems with our courses and sometimes our students, etc. We would debate the issues and no matter whether I agreed with him or not, he never held a grudge or allowed a disagreement to have an influence over our friendship.

I met Steve 20 years ago when I arrived at UMass as the newly minted dean of engineering. None of my new colleagues would engage with me for their concern of what might happen to them in the future. But Steve was forthcoming, inviting me to join him and his group of friends. It was pure justice that a few years later I talked him into becoming the department head of ME reporting directly to me. Again Steve had his strong opinions but bless him, he pushed the limits and in the few times he lost an argument or a fight for resources, he never held anything against me in terms of our personal friendship. About 6 years later we exchanged roles: I went back into the faculty in Steve’s department and Steve was my boss — as department head. In fact I took his faculty office and he took over my old personal office in the administration building.

I think it is hard for most people to understand how important Steve’s scholarship was to the engineering community world-wide. He took us to the modern state of manufacturing that we have today using his work and the work of his students. He was a towering figure at technical meetings but with all that a gentleman and a mentor to many.

Steve will be missed. By his family of course. But also by his friends and students. Part of him will remain
with us, because he taught us so much. In my case he helped shape part of my life. I know his family will appreciate knowing that Steve had such an important influence and that his activities were so important to us, his friends.

Joe Goldstein
Distinguished Professor
Mechanical and Industrial Engineering
University of Massachusetts Amherst

In Memory of Stephen Malkin
by Serope Kalpakjian

In a distant corner of the Earth, an esteemed colleague, a beloved friend, now in the company of purple flowers blooming among the rocks, in a small town in a distant corner of the Earth.

In a world imperfect, he knew well what it meant to listen, to be informed, to understand and, above all, to be a fellow human being, on a planet tiny and a Universe infinite. Though with a commanding presence, humble was he; kind was his face, a face sculpted by all that it had been a witness to in seven decades.

Wherever he went, he brought a smile on our faces; wherever he was, he made it a nice place to be. We often felt the urge to say to him: “You know, Steve, in your presence I always become myself.” He taught us what it meant to love a colleague.

Comforting was his presence; enviable was his composure; firm, demanding, and suffering no fools, unflappable was he, like an intrepid mariner in high seas. Abrasive was a word that appeared often in his renowned tome, and in scores of his writings, but it could never, ever, be found in any of the glossaries describing his life.

Formidable was his intellect. In him, we saw a visionary, a man with a disciplined mind ready to cultivate the art of the possible. In him, we saw a decent man with an admirable sense of responsibility; our concerns were his concerns. In him, we saw a consummate peacemaker, seeking no glory. In him, high standards mattered, details mattered, and focus mattered, as in the photographs he took as a short-lived hobby in his youth.

Open was his door, open to a room abound with honors and awards, a room where knowledge reigned, where wisdom prevailed. With a straightforward manner, a credo of his own, and a mission sublime, welcome he would say, welcome, but please leave any gloom, pretense, or mendacity at my doorstep. Though his name meant crown, in Greek, his was a realm without a crown.

A modern-day muse, generous was he with his time to the young and to the old; an inspiration to students, with dreams to dream and mountains to climb, but never was he a gatekeeper to their dreams or to the landscapes to come. They followed the Master, as the sunflower follows the sun; and for us the old, he was always there, for he knew well that we now had mountains to descend and dreams to revise.

Memories of his trips from the University of Texas, where he once taught, to ASME meetings in the Windy City, where I once taught. Having read that Harvard was 200 years old while they were still shooting Indians in Texas, I once asked him how things were out in The Wild West. Ever the teacher with a critical mind, and with a smile that I remember to this very day, he wanted me to know that Texas was south, not west, of Illinois.

Memories of our days in Jerusalem and in Haifa: CIRP, twenty-eight years ago. Genial was the welcome by the Malkins and by the proud sons of a land ancient. Warm was the welcome by their spouses, if not the Daughters of Elysium, to bring us Joy, but of a more enduring Shalom, to bring us Peace.
Through that week, the speeches, the papers, the applause, the fleeting glories. The Hotel Laromme; the bottles of Sabra; the Shabbat elevators; the stories and the stories. We raised our glasses, cheers we said; l’chaim echoed the hills nearby, indifferent though the deer, the blackbird, and the tilapia.

We raised our glasses often, but in spite of our heroic efforts, we never reached bacchanalia. Who cared, we said, that we were at the dawn of fuzzy-logic devices and of expert systems. Who cared, we said, about virtual environments when our glasses were being repeatedly filled with the real stuff from the Hills of Galilee and of Judea. “Those were the days my friend/We thought they’d never end”.

One evening, in Jerusalem, our friend took a few of us out, not in search of more remains of empires and kingdoms past but, as he put it, in search of a good Arab restaurant. Enticing was the aroma of grilled lamb; good was the food; grand was our conversation, for we were in the presence of an Aristotle of our own. We listened to his keen insights as we watched the crowds outside our windows, restive youth with faiths other and hopes other.

The years went by; inevitably, time began to take its toll. We continued wondering why so many words in a dictionary; so many books, so many novels, on miles and miles of shelves; why so many poems, why so many songs. Our expectations began to dwindle; expectations, that dreadful word, though we had been warned by a wise man of the Orient, twenty-six centuries ago. We grieved as we began to remove, from our mailing lists, name after name after name; and the regrets and the regrets, that perhaps we should have paid more attention to Rod Stewart, when he sang: “Have I told you lately that I love you…”

Then a day in August, a Monday, in the year 5773. In our minds and our hearts, a beloved friend. The look in our eyes, different; the silence, ominous; the clouds, dark — prologue to the farewell to come. In mirrors of our own, we saw tears of our own. Prayers unanswered, we kept listening to the Mozart, the Verdi, the Faure; we listened to the Brahms: “Yes, said the Spirit, they rest from their labors and their works follow them.”

And now the honor of the presence of a lady with us today, Maccabit Malkin, with memories of yester-

year and of a life on two continents: Greater Boston, where he was born, on to Austin, Buffalo, Haifa, and Amherst. Wayfarers us all, with songs of our own and a Winterreise of our own. A lady, now walking in rooms where clocks know not of time, while friends, doing what friends do, reminding her of the words of a namesake, Stefan Zweig: “After all, shadows themselves are born of light.”

If in life we do our act, then leave the stage, our friend would supremely be worthy of a standing ovation as the curtain fell, a tribute thunderous and singular. If Copland had his Fanfare for the Common Man, we had our own fanfare, and it was for a man uncommon.

With faith that dusk will always be followed by dawn, and a covenant that we shall always be comrades-in-peace, our friend, with his gentle smile, would now be joining us in remembering the final words of Mahler’s Das Lied von der Erde (The Song of the Earth):

“Everywhere in the spring the earth blossoms and grows green! / Everywhere, forever, the skies are bright and blue! / Forever and ever.” (Ewig... Ewig...)
Professor Stephen Malkin was a man who left his mark on all who knew him. I was fortunate to work directly with him while he was Department Head for MIE at UMass Amherst. Conscientious, dedicated, disciplined and ingenious describe his persona in the academic arena. Compassionate, thoughtful, considerate and devoted best describe him as a person. I am deeply saddened by his passing but I am forever gratified that he was part of my life.

Jacqui Urban Bodin  
University of Massachusetts Amherst

I met Steve at an ASME winter annual meeting. I believe it took place in Anaheim, CA, in 1986. I was near completion of my Ph.D. degree and naturally used this meeting to network for an academic position. I cannot quite recall the exact circumstances, but it is possible that Steve overheard me speaking Hebrew with another colleague; Steve loved to speak Hebrew. In fact, I suspect that my hiring at UMass in 1988 has much to do with Steve’s desire for a Hebrew speaking colleague…

Steve and I worked in different research areas so while we had a healthy level of interactions it was mostly in social settings. I fondly recall how a core group of the younger faculty in the department would regularly go with Steve to lunch at the campus center. I always appreciated listening to Steve’s analysis of issues ranging from UMass politics to world affairs, of course, with strong emphasis on middle-east matters. And Steve was direct — you always knew what he meant. Invariably, the discussion would reach a point where Steve could exercise his phenom-

enal memory — for example, any time we discussed future travel plans for an upcoming professional conference, Steve was able to offer the best choice of flights from each airline to specific days and times. We soon learned that it was simply futile to question his memory about any topic. Steve and Maccabit have hosted my family several times at their Amherst home, and I also shared some time with Steve when we overlapped sabbaticals at the Technion, including many lunches at the faculty cafeteria where he told me endless stories about his time there.

Steve was a gentle soul, an intellectual giant, a fair person to people at all levels, generous, accessible, and always projecting a calm demeanor. Steve was a rare combination of scientist and humanist, representing the best in academia.

Neva and I would like to express our deepest condolences to Maccabit, Ruth, Gonen, and their families in this tragic loss. We will miss Steve.

Professor Yossi Chait  
Mechanical & Industrial Engineering  
University of Massachusetts Amherst

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Professor Yossi Chait  
Mechanical & Industrial Engineering  
University of Massachusetts Amherst

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“Anything you write, you should be able to use at least three times.”

—S. Malkin

Professor David Schmidt
Mechanical & Industrial Engineering
University of Massachusetts Amherst

I first encountered Stephen Malkin in 1998, at a CIRP Conference in San Sebastian, Spain. I was a second-year Ph.D. student at Trinity College in Dublin, Ireland and was presenting my first test results on the application of a two-dimensional model of grinding. During the question/answer period, a large, serious-looking man with a mustache seated in the front row leaned back in his chair, folded his arms, and told me in no uncertain terms that my model was absolute nonsense. I tried to mumble some defense, but really didn’t have any and was too new to the subject to even try. Afterwards, I asked an older colleague, “Who was that guy?” He answered, “That’s Stephen Malkin. Don’t take it personally. He does that everybody. Consider it a compliment that you’ve been publically ripped to shreds by the world expert in grinding.”

I did take it personally and quickly changed to a three-dimensional model of abrasion that formed the central part of my Ph.D. thesis. In the years since, as I’ve continued my work in grinding, I’ve grown to appreciate the brilliance and thoroughness of Professor Malkin’s work, and have grown to respect the incredibly high standard he held himself and others to. In recent years I’ve presented grinding papers at the CIRP General Assembly and nervously scanned the audience to see if Professor Malkin was there. He always was, leaning back in his chair, arms folded, looking imposing. By that time my paper had already been accepted by the CIRP reviewers. But when I survived the question/answer period without a drubbing by Malkin, for me that’s when I knew my work had truly passed muster.

I later developed a friendship with Professor Malkin. He asked me to call him Steve and assisted me with much of my research work. I was honored during a CIRP assembly in Boston when Steve said to a fellow CIRP member at dinner “Have you met my friend, Jeff?”

I never broached the subject to Steve about that fateful day in San Sebastian — in part because I’m grateful for the experience and in part because I’m still embarrassed of that 2-D model. Fortunately, I don’t think he remembers me there. Or if he does, he was polite enough never to bring it up.

Professor Malkin recently sponsored a CIRP Annals paper that I co-authored with Peter Krajnik and Rado Dražumerič. During preparation, every time we sent Steve a new draft of the paper, Peter, Rado and I spent hours nervously obsessing over every equation, every assumption and every word choice. We knew the high standards Malkin held himself and others to — and we wanted to live up to them. When Peter presented the paper in Copenhagen — two days after Professor Malkin’s death — we were honored and not a little proud to have Malkin’s name — his last contribution to CIRP — on our paper.

Now, when I’ve finished an article on grinding and think it’s good enough for submission, I stop and ask myself, “What would Malkin say? Would I feel comfortable presenting this if I knew Malkin was in the audience?” It always causes me to go back and analyze my assumptions and spend more time making my paper better.

With his passing, the grinding world has lost a tremendous asset. In his honor, perhaps we could all hold ourselves to a higher standard and ask ourselves, “What would Malkin say? Would I want to present this in front of Malkin?” If we all did that, the result would undoubtedly be better research and better science.
R.I.P. Stephen Malkin: a mentor, a tough critic, and a friend. You will be sorely missed.

Jeffrey A. Badger, Ph.D.
The Grinding Doc
Expert in Grinding
Independent Consultant, New York, NY

I worked with Steve Malkin for many years as the department administrator while he was Department Head at UMass Amherst. I was very moved when I heard the news of Steve’s passing. Steve’s memory will always be with me because of who he was and how he approached life.

We covered a lot of administrative territory over the years but what stands out to me was Steve’s decency towards people when making a multitude of decisions. He would always take the higher ground and instinctively knew good will went a lot further than hard lines. A standard line was — ‘get out of their way and let people flourish’. He believed in people’s best intentions.

Steve always made sure that I thought of him as a colleague not my supervisor and I appreciated that gesture. Steve Malkin was a good and decent man, generous of spirit to everyone and taught us all ‘not to sweat the small stuff’ (and most everything is the small stuff). He is remembered with great fondness and respect by his UMass family.

Jennifer Kramer
Mechanical & Industrial Engineering
University of Massachusetts Amherst

Guoxian Xiao, Albert Shih, Steve Malkin, Yoram Koren and Elijah Kannatey-Asibu.

At the Malkin residence in Amherst, MA, 1992.
I was recruited by Stephen Malkin soon after he joined UMass in 1986. He was looking for a partner to collaborate with on control applications and I was recommended to him by Yoram Koren, with whom I was working as a postdoctoral fellow at the time. Yoram advised me to join UMass in place of a more highly-ranked university, from which I had a competing offer. He felt that the presence of a sincere and competent mentor, such as Stephen Malkin, would make all the difference in a young researcher’s success. I listened to this advice and I have never regretted my decision. Stephen Malkin was not only a superb researcher but a real human being. He not only taught me how to analyze potential projects, refine my presentation of the results, and evaluate findings, but also how to always regard the students’ wellbeing and education as a priority. Steve was a dear friend and colleague, whom I will sorely miss.

In Memory — Steve Malkin

I first met Steve Malkin at UMass in Oct 1991 as a young grinding process development engineer. I was just hired at Cummins and started to learn a new manufacturing process — grinding — for a new diesel fuel system program with tough technical challenges in precision internal grinding. I read his book and all his papers, from his Ph.D. dissertation work in the 60s with Nathan Cook to the late 80s sol-gel and CBN grinding, which were considered to be frontier grinding technologies at that time. I had a great visit and very in-depth technical discussion. I was thoroughly impressed by Steve’s technical depth and left with a new aspiration to excel in grinding and manufacturing research. Right before I left his lab, Steve sat down and provided detailed hand drawings and instructions on how to reach the highway from the campus parking lot. As a young manufacturing engineer in industry, it was a humbling experience and a unique demonstration of a great person/educator. At the end of my last visit to Steve at his Boston apartment on August 8, 2013, only 11 days before he passed away on August 19, Maccabit and I had left his room but heard him talking inside the room to get our attention. We returned to his room. Steve instructed Maccabit to provide me the detailed instructions on how to leave the apartment parking lot and reach the highway. This brought back the memory from 22 years ago. Steve was the same caring person with boundless love and caring mind.

As a grinding engineer, we owe a great deal to Steve and his contributions to our society. My most significant and proudest achievement — the invention of the silicon carbide grinding of zirconia — was inspired by studying his book in the reduction of the friability of an abrasive as the grit size becomes smaller and smaller after crushing. Small grit size silicon carbide abrasive is very tough and can be used for efficient grinding of zirconia. This invention opened a new chapter in industry for cost-effective grinding of zirconia fuel injector plungers and transformed the Cummins’ fuel systems in the late 1990s. Steve deserves credits for this and many other discoveries in grinding.


I was shocked when I heard the sad news during the CIRP Annual Meeting at Copenhagen on August 19. Steve was frail when I visited him 11 days ago. But the news was shocking. At the STC-G Part-I presentation, with the timing essentially synchronized with the funeral at Boston, STC-G members provided our
reflections and appreciations for Steve, the past Chair of STC-G.

Steve will be greatly missed by the grinding community. We have dedicated a symposium in the 2014 ASME Manufacturing Science and Engineering Conference (MSEC) for him. As one of the co-hosts of this conference, I hope we all have the opportunity to get together and remember him as one of the greatest grinding researchers.

Professor Albert Shih
Mechanical Engineering Department
University of Michigan

Professor Malkin was strong supporter of innovation in industry. We normally sat close together during the annual meetings of our International Academy for Production Engineering (CIRP). During these meetings he usually told me many fun stories about his experiences in industry. One of the most interesting was the software he developed to simulate the grinding processes. He could tell you how to improve your process and predict any kind of trouble such as grinding burn of roundness. This was a sensation for industry and he could solve many problems by simply simulating them.

One year he came to Brazil to visit our research labs and make presentations to the experts. During the talks he used his software to show how things happen in grinding. It was very exciting, so everyone wanted him to give a suggestion. We used to call him the Grinding Rabbi!

He liked music very much. I remember one night we had a Brazilian Jazz session for Steve and Maccabit in my house. We were experts in American Jazz — this was another topic I liked to chat about and learn with Steve!

Professor Dr. João Fernando G. de Oliveira
CEO, EMBRAPII — Brazilian Enterprise for Innovation in Industry

At the Malkin residence in Amherst, MA, 1990.

At the Malkin residence in Amherst, MA, 1994.
Dr. Stephen Malkin was my advisor, colleague, and most importantly a very good friend. I began to know him through studying his publications when I was working on my master’s degree in the early 1980s. I studied his well-known Grinding Energy theory and I am still utilizing the theory today to solve real-world challenging grinding problems. I started working with Malkin from 1989 when I came to UMass working for my Ph.D. I had been working with him ever since. I studied in his classes. I worked in his grinding research lab for many years. We developed research proposals together. We wrote technical papers together. We traveled together. We were awarded together for our work. We wrote the 2nd edition of the Grinding Technology book together. He was my go-to person of my professional development. He provided the most help for my professional development. I really enjoyed working with him. I learnt a lot from him.

We all know that Dr. Malkin was most well-known scholar in abrasive machining. His research work has laid down the foundation for fundamental understanding of modern abrasive machining processes. If you read Malkin’s publication, you probably already know that Malkin wrote very good papers. You probably already realized that he was very serious about research and publications. I had personal experience, as most of his students did. He really spent time and effort to work on his papers. When I was writing papers with him together, he edited the papers word-by-word for many iterations. He often said to me that a good paper should last for many years after its publications. The readers should really learn something new from a well-written paper. He was absolutely correct. Recently, one of my projects called for better understanding of the mechanism of electrical chemical grinding processes. Among all the papers I read, Malkin’s three papers on the topic published in the 1970s are the best and provided the most insight into the subject. We were able to use his analyses to understand our data and it made sense.

Most of you know that Dr. Malkin was a scholar with deep theoretical knowledge of manufacturing processes especially material removal processes. You should also know that he had very good knowledge about real-world manufacturing processes. I was often amazed to see how quickly he could know if results from sophisticated simulation software made sense.

When working with students on research projects, he could quickly tell you if the results from either models or experimental work make sense or not.

Besides his well-known academic accomplishments and impact, Dr. Malkin was the nicest person I ever worked with. He cared about others and often offered help. When I need to travel, he would offer help on how to get there and where to stay with detailed driving directions. I used his detailed driving directions for my first trip to Boston with my family. When his international students and visiting scholars arrived at campus, he wanted to make sure that they had good living arrangements. You can understand why his students maintained close connection with him years after graduation. A group of us organized a celebration for his retirement and traveled from all over the country to join the celebration.

Changsheng Guo, Ph.D.  
Project leader  
United Technologies Research Center

Steve was a giant of a man in so many ways. A towering intellect and member of the National Academy of Engineering, he had the gift of making others feel they were his equal in every way. A man with a heart of gold, he continually reached out to me when my wife was so sick, making me feel like I was part of his larger family. As a Department Head, he was transparent and fair, always full of enthusiastic praise for his faculty, staff and students, wearing his pride in the Department on his sleeve. And on a personal level, he was warm and welcoming, ever ready to share and to listen no matter what
the occasion or how busy he was. Steve was there for me and so many of us when we needed his help, personally or professionally or for whatever reason. His legacy will long live on. I will miss him so much.

Don Fisher
Professor and Head
Mechanical & Industrial Engineering
University of Massachusetts Amherst

I had the great good fortune to know Steve Malkin as a colleague at UMass Amherst in the College of Engineering. First, this was when Steve was Head of the Mechanical and Industrial Engineering Department and I was Head of Chemical Engineering. Later I became Dean of Engineering and for some of that time, Steve remained Head of Mechanical and Industrial Engineering. After he stepped down, Steve remained a valued colleague and thought leader in the department and the college. What I recall most about Steve was his attention not only to the program elements of research and educational content, faculty, students and staff but also to the personal aspects of how people work productively together to build and maintain a high quality educational experience that meets the needs of all the stakeholders.

Steve was much more than an accomplished and highly respected scholar. He was also a terrific advocate for the department and, at the same time, an exemplary citizen of the college and the university. I never had a chance to ask Steve what it was in his background or circumstances that prepared him for this role and made him so effective. But I think it was his culture, his family, and his natural character of caring for others. It was a privilege to have Steve as a colleague and I am sure that many others would say the same.

Michael F. Malone
Vice Chancellor for Research & Engagement
Ronnie & Eugene Isenberg Distinguished Professor of Engineering
University of Massachusetts Amherst

Mike Malone, Ian Grosse, Steve Malkin, 2007
I will always be grateful to Steve for his mentoring and support during my early career. While I still remember being a bit intimidated by him during my interview at UMass, Steve turned out to be a nurturing department head and a great mentor. He went out of his way to make sure I succeeded and got the recognition I deserved. His selfless support is better described by his actions. Just two short examples: (1) he fully read and provided constructive feedback on my (later successful) NSF-CAREER proposal, despite being in a topic not even slightly related to his interests; (2) he secured a merit raised I had never asked for, so as not to let me fall behind my male peers. Steve is truly missed as a dear colleague and a friend.

Professor Ana Muriel
Mechanical & Industrial Engineering
University of Massachusetts Amherst

For nearly 15 years I have had the privilege to work with Professor Malkin, and enjoyed his mentorship, wisdom, and friendship deeply. An internationally renowned authority in grinding with many accolades, Steve has remained what a gentleman scholar stands for: kind, caring, and supporting. His help and advice over the decade have been crucial to my professional development. He was a wonderful colleague, a trustworthy mentor, and a dear friend, and he will be sorely missed and fondly remembered by many of us, for many years to come.

Robert Gao
Pratt and Whitney Chair Professor
Mechanical Engineering Department
University of Connecticut

Steve with graduating students at the University of Massachusetts Amherst, 1993 & 1994.
I was a colleague of Steve Malkin since he joined the Mechanical Engineering Department at the University of Massachusetts. In my opinion there is one thing that best characterizes Steve as a friend and colleague, it is:

Throughout the many years I have known Steve I have never heard him speak ill of anyone even of those who didn’t see eye-to-eye with him.

This is something that many of us in academia are unable to claim.

Karl Jakus, Emeritus Professor
Mechanical & Industrial Engineering
University of Massachusetts Amherst

I met Steve in 1976, while he was a professor in the ME department in the Technion, Haifa Israel. I was looking after a professional and experienced moderator (guide) for the research in the field of wear that I intended to do within my Ph.D. study. (I was 33 years old with theoretical and industrial practical experience of over 11 years). The understanding between us generated at once. I was impressed from the positive academic and professional attitude and the cooperation between us started.

Steve’s help and contribution was done along the research, especially in the theoretical side. The connection between us that started in 1976 never ended. It continued during my stay with my family in the US, Steve’s stay in Cornell and later after Maccabit and Steve moved to Amherst MA, and my family returned to Israel. Our connection was social and professional. We published few technical papers together and we liked to share a table in a restaurant along the Carmel beach and to have breakfast on Friday close to the sea that Steve liked so watch. We enjoyed doing things together. It was always useful to listen to this wise, positive and modest person. I always considered myself to be very lucky to have Steve as a friend and teacher.

An example for professionalism: during the 1980s I was consulting for a factory in Carmel, north east of Haifa. Some of the products that were made in very large quantities include 3 high precision grooves (3mm wide, 15mm deep, and 70mm long) with accurate locations, all above with precision of 0.03mm. As large volume production was needed the creep-grinding process was used in which the groove is formed with a single pass of the grinding wheel. The existing production problem was: Fast wear rate of the grinding wheel, grooves inaccuracies, need to frequent dressing of the wheel that caused low production rate. The problem was not solved even after various grinding parameters were modified (rpm, feed, cooling, wheel, etc.). The production people were out of answers and I asked Steve to visit the factory and to see into this problem. Steve came, and while the grinder was working asked about the work conditions. After a short while his conclusion was that the cooling is wrong. The flow amount is really very high — but does not reach the right points. (The machine was totally closed, nobody could see thru the heavy coolant flow). It took few days to modify the cooling jets according to Steve’s instructions. The production restarted and the process as with a new grinder. An investigation was conducted and it was found that few years ago the cooling jets needed a repair. It was done without the know-how needed for creep-grinding process combination of theory and experience.

Avner Ronen, Ph.D.
Just a few quotes from the many remarkable comments I heard or read about Professor Stephen Malkin:

“I have met Professor Malkin a couple of times and he is a ‘giant’ in the field of grinding….Our research group members all had copies of Professor Malkin’s book on grinding technology and we learned so much from his work” by Dr. Mark J. Jackson.

“In my opinion (and in many others’ opinion, I’m sure), Professor Malkin was the most knowledgeable person in the world on grinding. His book, Grinding Technology, is one of the best ever written…. Yesterday a colleague wrote to me saying ‘No one will surpass his work.’ I think he’s right” by Dr. Jeffrey A. Badger.

“Steve’s name comes up first and right away when people talk the persons in the grinding community. He is the most famous scientist in grinding” by Dr. Helmi Attia.

Professor Dr.-Ing. Jan C. Aurich
University of Kaiserslautern
FBK — Institute for Manufacturing Technology and Production Systems
Kaiserslautern, Germany

Zhongde Shi, Ph.D., Senior Research Officer
Structures, Materials, and Manufacturing Aerospace
National Research Council of Canada (NRC)
Campus of University of Montreal

From Steve Malkin I learned how to ask questions after conference presentations. In fact, Steve was known to many as someone who would ask difficult and sometimes critical questions. Knowing about his reputation, he once told me on a bus ride during a CIRP General Assembly: ‘People think that I intend to ask critical questions. But I just ask what I did not understand during the presentation. The problem is that it often turns out they did not understand the point in question themselves’. I have to say, I never received a better recommendation on how to ask questions to any talk.

I would like to extend my most sincere condolences to the Malkin family for their tremendous loss. Professor Malkin has been and continues to be an inspiration to me in my personal and professional life. I benefited from his direct instruction in multiple courses for each of the three degrees I received from the University of Massachusetts Amherst and through his role as my Ph.D. co-Advisor. Steve’s guidance and counsel, unflappable composure and keen insight have shaped and honed my career and my life. I very much treasure that our time together will always be present with me on my journey.

Steve shared two life principles with me are easy to say but often hard to do. The first principle is Keep It Simple Son (KISS). While this is overused in general, it is a critical and often overlooked guideline in technical writing that helped me sharpen and hone my writing. The second principle is Only Handle It Once (OHIO). This is also a relatively common prin-
ciple, but the details of his interpretation and execution are vital to understanding. It was in 1992, when email was a very novel tool used mostly by academics and research labs. Steve and I were in his office and I brought a draft paper to discuss with him again. He turned to his computer and said — this email business is really useful, but it is going to rapidly grow out of control. He said “I set aside 1-2 hours on Friday morning to handle my emails. I don’t look at emails outside of that time, and I go through them in order and finish my responses for each one in order. By using ‘only handle it once’, I minimize how much of my day is eaten up by back and forth emails.” He then turned to my paper, asked me 5 questions, wrote down my answers, and said “There is your abstract, now structure your paper to expand on each of your answers in the same order, and do not re-write the abstract — only handle it once, and keep it simple son.”

In my career with the Timken Company for over 26 years, Timken asked Steve three times to conduct research programs for the development of grinding process modeling. These were 1) Superfinishing process modeling, 2) Process modeling of double disk grinding and 3) ID and OD grinding modeling. Through these projects, I had many opportunities to discuss grinding with him, and sometimes had arguments on grinding. I also learned grinding fundamentals from him through discussions and his publications. These discussions happened not only during the project review, but also during dinner. Steve took me to an Italian restaurant near UMass (Pinocchio?) and discussed grinding model development. Later he asked if I liked the food in the restaurant. I did not remember what food I had, but clearly remembered what discussions I had with Steve. Timken received significant contributions from Steve through the above programs. Timken also received a very valuable asset from him: That was a future leader of Timken finishing technology, Rahul Chaudhari who was a former student of Steve, conducted Timken project in UMass and now currently leading Timken finishing technology as a grinding expert and a manager.

In CIRP, Steve led STC-G group as a chairman, and guided us the future direction of grinding research. He brought up a lot of young grinding researchers who are currently playing key roles in academy and industry.

Professor Malkin was a Master of Grinding. Researchers in grinding academy miss him, and I personally miss my good friend and mentor.

A Master of Grinding — Steve Malkin

I first met Steve Malkin at SME Grinding Conference in 1988 and had an opportunity to have a dinner with him. During the dinner, we deeply discussed on grinding fundamentals. I was totally convinced of his passion about the development of the systematic modeling of total grinding system. Since then, Steve was always my mentor and advisor in activities of grinding research, and treated me as a good friend.
It has been a great privilege to be a graduate student of Professor Steven Malkin. I have been working in the abrasive processing area for the past 20 years and always refer to many publications by Professor Malkin in everyday life.

I first met Professor Malkin in August 1990 to request him to accept me as his student. From that day till the last time I met him in person in 2010, I have always seen him cheerful and compassionate.

My time at UMass, working as a Research Assistant for Professor Malkin, was quite challenging but rewarding. Usually all his students would end up doing countless experiments to completely understand the process. Writing the thesis or project report was the most critical piece. This was the time when I spent a lot of time with Dr. Malkin and got to know his deep desire to understand and develop science.

Professor Malkin had a strong bond with his students and looked after their academic and career progress. He was a great advisor and he will be missed.

Professor Steven Malkin has done a great service to educate the academic and industrial societies. We are forever thankful to him to dedicate his life in the fundamental research of the grinding process. I will always cherish pleasant memories of my association with my beloved Professor Steven Malkin.

Two months ago I was asked to write a paragraph about Steve but could not bring myself to do it until now. I simply could not believe Steve is not with us anymore.

I first met Steve about forty years ago when I was a graduate student in a very interesting grinding course he taught when he was a visiting professor at Technion. After moving to Israel with Maccabit and after joining Technion we became close friends and since then have spent a lot of time together, celebrating birthdays, going out together and of course discussing professional topics.

Steve was the one who taught me how to write papers. We used to meet on a daily basis. Every morning I showed him what I had written. He used to ask: “What did you want to say?” when I tried to explain he smiled and said “So why didn’t you write it? Rewrite it then and come back tomorrow”. This ritual repeated itself again and again and again. This has made a real impact on my academic career.

Many years later, at my 60th birthday party, Steve surprised me and the guests when he showed everyone an original piece of homework I wrote during his course. It seems I finally got it.

“I value the friend who for me finds time on his calendar, but I cherish the friend who for me does not consult his calendar.” — Robert Brault

Professor Moshe (Shefi) Shpitalni
Georg Schlesinger Professor in Manufacturing Systems
Head, Laboratory for CAD & Life Cycle Engineering
Department of Mechanical Engineering
Technion, Israel

Rahul Chaudhari, MSME
The Timken Company
A Great Grinding Researcher; Professor Stephen Malkin

One of my research fields is grinding. Therefore, I read many papers that Professor Stephen Malkin published in the scientific journals and I learned a lot from them. His achievements with respect to the heat generation, partition, and temperature in the grinding process are, needless to say, the assets for grinding engineers and technology.

There are two different types of researchers; one who sticks to a single research item and another who is interested in several different items. From my point of view, Professor Malkin is the former type. I was deeply impressed by the sincerity of his attitude as a scientific researcher. I respect to him very much.

I am convinced that his achievements will remain as the assets in grinding technology and will need to be referred to by many researchers in the future over a long period.

Professor Ph.D. Dr.-Ing. E.H. Ichiro Inasaki
Honorary Fellow of CIRP
Fellow of SME
Chubu University

Steve Malkin’s retirement celebration, South Windsor, CT, July 19, 2008.
Before we met in 1998, Professor Stephen Malkin was a great master in my mind. I respect him more as a mentor after 1998 because I had learned so much from him during my one-year stay at his Grinding and Machining Lab at UMass from 1998 to 1999. During that period, he often told me, “As a scientific researcher, you should try your best to make contributions to your field”. I also remember the well-known saying of Albert Einstein, “Imagination is more important than knowledge” hanging on the wall of his Lab.

In 2001, I invited Professor Malkin and his wife to visit Huaqiao University in China, where an Honorary Doctorate was conferred on him.

The last time we met was in early 2010. Together with Dr. Changsheng Guo, Professor Robert Gao, and Professor Bi Zhang, we had a pleasant and memorable afternoon in Changsheng’s house at Hartford. He had given me a lot of valuable advice during the party.

Although he left us, his contributions to the field of grinding and machining will encourage his colleagues around the world. I will remember and miss him forever.

Xipeng Xu
Huaqiao University, China
2014 ASME Manufacturing Science and Engineering Conference

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Professor Brigid Mullany, UNC Charlotte, NC
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