



Guest Editorial

Special Issue Dedicated to Professor Avram Bar-Cohen

This Special Issue of the ASME *Journal of Electronic Packaging* (JEP) is dedicated to Prof. Avram (Avi) Bar-Cohen, who sadly passed away on October 10, 2020. Over the course of his career, Avi held faculty positions at the Naval Postgraduate School, the Massachusetts Institute of Technology, the University of Minnesota, the Ben Gurion University (Beer Sheva, Israel), and the University of Maryland, College Park as the Distinguished University Professor in the Department of Mechanical Engineering. Avi also served as a Program Manager in the Microsystem Technology Office at the Defense Advanced Research Projects Agency and held a variety of roles related to thermal packaging at Raytheon.

Much has already been written about Avi's life [1], and this is not the first Special Issue to have been dedicated to him within the wider scientific literature [2,3], which highlights just how seminal his contributions have been to *multiple electronics packaging communities* (including the ASME EPPD, the ASME HTD, and the IEEE EPS) as well as the impact he had on those who were fortunate enough to be around him. In fact, Avi is widely credited as a *founder* of this specific field, having served as the inaugural chair of the IEEE Intersociety Conference on Thermal Management in Electronic Equipment (ITherm) in 1988. For these accomplishments (and others), Prof. Bar-Cohen was awarded the ASME Heat Transfer Memorial Award (1999), the ASME Curriculum Innovation Award (1994), the Worcester Reed Warner Medal (2000), and the InterPACK Achievement Award (2007), among many others.

In this Editorial, we briefly highlight a handful of perspectives from several of Avi's former students and colleagues that detail the impact he had on their own lives. While this is by no means an exhaustive account of such impacts, these personal stories reflect the incredible person we all knew him to be.

One thing we all universally adore, and can only hope to one day replicate ourselves, is Dr. Bar-Cohen's unyielding, unapologetic, and playful enthusiasm for science and technology. As described by Dr. JR Saylor, "The thing that I remember most about him was the joy that he took in the work. Avi worked hard, always had a lot on his plate, and put in a lot of hours. But I never got the sense that any of this was a burden to him. Rather, he seemed to just relish whatever he was working on. Whether it was organizing a meeting, sussing out the meaning of some experimental data, or getting a journal article submitted, Avi always seemed to be doing exactly what he wanted to be doing, with the people he wanted to do it with. But I think he was also a person who taught us how to live well. Avi taught us that we should do the thing that we truly love doing and to then embrace it wholeheartedly."

He used this enthusiasm to inspire and bring joy to others. When he wasn't writing papers, presenting at conferences, or leading his research teams, he could often be found writing poetry about two-phase cooling and physics—encouraging a sense of excitement and pride in our mutual technical endeavors. And as many others can attest, he never shied away from penning witty, punny, and/or genuinely heartfelt messages to the team and collaborators emphasizing his love for his craft and his appreciation for 'us'. As an example, when D. J. Sharar successfully defended his Ph.D. (UMD 2016) project titled "Flow regime drive thermal

enhancement in internally grooved tubes"—he sent out the following message:

Throughout his groovy defense, Darin was unphased by the heated, though stratified, comments and coolly displayed his ability to intermittently slug it out with the best.

Please join me in congratulating him on this well-earned and auspicious milestone.

Signed – ABC

His profound love for mentoring and the community was also reflected by his genuine 1:1 interactions with others, particularly meeting others for the first time. Dr. R. Warzoha recalls, "I remember the first time that I met him was in an elevator at InterPACK (just him and I)—he asked me who I was and what I was doing, and I told him I was going to present my first conference paper as a graduate student - he immediately laughed and said not to worry, that everyone in the room was only there to be helpful, and just to be confident. He told me he was sure I'd do well, and that it was just another opportunity to be part of a wonderful community. He didn't have to say anything at all, but he made me infinitely less fearful in that moment." And a great message by Dr. Emil Rahim, a grad student of Avi's at the University of Maryland, "I remember the first time and the last time I met Avi in person. The first time was in his UMD office back in the summer of 2005. I was an independent graduate student looking for an advisor to hire me and offer me an opportunity to work on a research project. Avi greeted me at his office, and within seconds made me feel welcome and at ease. This was and will continue to be the friendliest job interview of my life. He knew how to make people comfortable and welcome to speak, even in the toughest situations. The last time I saw him was at ITherm 2019 organizing committee dinner in Las Vegas. Sometime after dinner, he pulled a chair and sat next to me, and we had an uninterrupted 1:1 conversation for a few minutes. Despite his busy schedule, he always made time for everyone, and made sure everyone was heard and felt safe and supported."

Moreover, he taught us that diversity, through unique cultural and academic perspectives, inspires creativity, drives innovation, and represents a vision of a more-perfect world. As stated by Dr. Karl Geisler, "For Avi, diversity was an action, a practice. This is one of the clearest lessons I took away from him. During my time in Avi's group, we had team members representing all of the world's major religions and more. We came from many places, including Europe, Africa, India, China, Japan, Korea, Texas, and Minnesota. We were male and female, young and midcareer. We were open and inviting to friends and guests and found value in collaborating internally and externally. Avi worked to make our graduate school experience reflect his vision of an ideal world." And it's in part due to this profound respect for diversity that he was such a successful mentor/leader and was capable of working so well with others. According to Gary Solbrekken, "he allowed me to develop my own approaches while guiding me through our conversations. I am certain that it was not the most efficient way to complete projects, but that style has influenced the way I advise my own graduate and undergraduate students, where I attempt to

allow them to find their own creative path for solving problems.” Additionally, Dr. Mehmet Arik said, “At Ozyegin University, I had over 25 graduate students and I shared stories of ABC team and his leadership in our [now fabled] biweekly [bagel-lunch] meetings. My students, coming from different countries, were always amazed by his enthusiastic style and leadership. I always emphasize his kind personality, engineering vision, and leadership for my young students.”

As our advisor, friend, and mentor, he made work fun and inspired us to be the absolute best versions of ourselves. He has motivated us, enabled us, and always supported our professional and personal development in ways that this Editorial will never do justice. We, as a collective group, hope to represent his leadership legacy not only through our technical and academic achievements but in living our lives and carrying on a community that was so central to who he is. Dr. Bar-Cohen - Thank you for teaching us to love what we do, to love and appreciate the people we do it with, to work hard and with integrity and remain unphased to adversity and challenges, and for always reminding us to have some fun along the way. You’ll be deeply missed but never forgotten.

We are honored to present this Special Issue to the wider electronics packaging community.

Acknowledgment

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References

- [1] Hodes, M., Mahajan, R., Ruder, Z., Simon, T., Geisler, K., Ohadi, M., Maurer, J., Altman, D., Wilson, J., Ziskind, G., and Spector, M., 2021, “In Memoriam: Professor Avram Bar-Cohen (1946–2020),” *ASME J. Heat Transfer-Trans. ASME*, **143**(3), p. 030101.
- [2] ASME, 2012, “Special Issue Dedicated to Professor Avi Bar-Cohen in Celebration of His 65th Birthday,” *ASME J. Electron. Packag.*, **134**(2), p. 020201.
- [3] IEEE, 2020, “Index IEEE Transactions on Components, Packaging and Manufacturing Technology,” *IEEE Trans. Compon., Packag. Manuf. Technol.*, **10**(12), pp. 2133–2186.