

Shannon Limit of Collegiality

In the eyes of rest of the world Gabor Temes is a brilliant researcher, educator, prolific author, and inventor of many things spanning diverse areas such as network theory, circuit analysis, analog filters, switched capacitor circuits, and more famously delta-sigma data converters. But to us, above all, he is the most wonderful friend, colleague and collaborator – the Shannon limit of collegiality. Gabor personifies the rare combination of being the smartest and the nicest person to work with. These characteristics have endeared him to his colleagues and students alike. When we joined Oregon State University some fifteen years ago, he embraced us immediately, as a colleague (Un-Ku) and as a student (Pavan), and got us involved in many of his research activities. This was instrumental in each of us getting an excellent start to our careers in academia. Gabor has offered similar opportunities over the past two decades to numerous other junior faculty members in the department and has been a big part of their success. He is a truly a great role model for mentoring.

Gabor has the uncanny knack of telling jokes with immaculate timing that would make a professional comedian proud. He always has the best jokes to share and his story-telling reputation among students and colleagues is legendary. To give a taste of this, during one of his customary hiking trips through the woods with graduate students (Pavan included), after reading the instructions on what to do if one sees a bear, Jose (his Ph.D. student) mockingly said that he would run as fast as he can if he encounters a bear. When another student argued that it's not easy to outrun a bear, Gabor nonchalantly said one needs to only outrun Jose! His jokes are mostly self-deprecating but never at the expense of others. Such is his reputation that there is always a great expectation of hearing an extremely funny joke whenever Gabor spoke, be it in faculty meetings or during Ph.D. defenses. He is yet to disappoint!

Humor and excitement always engaged in full, Gabor's ageless creativity continues to amaze us today. An effortless reaction to a critique of a research project led to a brilliant solution in noise-coupled delta-sigma

converter [1]. A casual joke telling afternoon over a double espresso yielded a perfect cup of enlightenment that paved a path to switched-R-MOSFET-C filter [2]. These are just a small representation of the wealth of delightful experiences in the workplace where he illuminates others by example. To know Gabor is to love him and what he loves – classical music, movies, world history, tennis, Tarn Tip Musmun Gai, and Tyee Gewurztraminer.

While Gabor made numerous technical contributions, his long lasting legacy will be the impact he had on innumerable students and faculty members he touched with his unmatched generosity, kindness and good humor. We feel fortunate to have him as a colleague and look forward to many more years of collaboration and friendship.

—Pavan Kumar Hanumolu and Un-Ku Moon

References

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- [2] P. Kurahashi, P. Hanumolu, G. Temes, and U. Moon, "Design of low-voltage highly linear switched-R-MOSFET-C filters," *IEEE J. Solid-State Circuits*, pp. 1699–1709, Aug. 2007.

About the Authors

Pavan Kumar Hanumolu received the Ph.D. degree from the Oregon State University where he is currently an Associate Professor. He worked with Gabor Temes for more than 10 years, initially as a graduate student and subsequently as his colleague in the School of Electrical Engineering and Computer Science. His research interests are in the area of analog and mixed-signal circuits.

Un-Ku Moon has been with the Oregon State University since 1998, where he first met Gabor Temes in person and have been friends/colleagues ever since. Prior to that, he was with Bell Laboratories (Reading and Allentown) 1988–1989 and 1994–1998. He received a bachelor's degree from the University of Washington, a master's degree from Cornell University, and a Ph.D. from the University of Illinois, Urbana-Champaign. His current research activities are found at <http://eecs.oregonstate.edu/~moon/research>.

Between 1975 and 1979, I was chair of the EE Department at UCLA. I was lucky to be able to hire a number of outstanding new faculty members. The department was highly ranked (sixth in the U.S.) by the end of my chairmanship, thanks to our rejuvenated faculty!

In 1978, I must have set an elapsed time record for (unintentional) plagiarism. I published a paper [13] which showed the equivalence between a periodically inverted capacitor and a resistor,

and suggested its use in SC filter design. Much later, Prof. Yannis Tsividis showed me the same idea (used in a different context) in J. C. Maxwell's book "A Treatise on Electricity and Magnetism," in 1873, a mere 105 years before my letter!

In 1981, with some talented UCLA students, we managed to come up with a technique which combined Orchard's ladder filter theory and the bilinear s - z mapping to obtain SC filters with very low passband sensitivity and low noise [14]. This

paper was rewarded with the Darlington Award.

Another important problem was the design of very narrow-band SC bandpass filters. Using the concept of pseudo- N -path filters, earlier suggested by Alfred Fettweis and his students, we proposed multi-phase SC circuits, which later turned out to have applications in communication systems [15]. This work, and several other papers on SC design, was the result of collaboration with Josef Nosssek, then an

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