

EM Symposium in Honor of Raj Mittra.

by

Jose Schutt-Aine

Professor Raj Mittra was a member of the ECE Illinois faculty from 1957 to 1996. In his nearly forty years on campus, he taught and mentored countless students in the Electromagnetics Lab on the fourth floor of Everitt. To show their gratitude for Professor Mittra and the impact he had on their careers and lives, a number of his former students are sought to name a space in the new ECE building in his honor. The response from students and friends of Raj was tremendous.

The Raj Mittra Symposium was held on Saturday, September 27, 2014 and was attended by a large group. The all-day event included a conference, a classroom dedication event and a banquet. ECE ILLINOIS alumni, students and friends of Raj Mittra met to recognize his contributions to Electromagnetics and to ECE-Illinois. A total of 9 speakers gave presentations outlining the Raj Mittra's contributions. In the afternoon, the "Raj Mittra Classroom" was officially dedicated. Finally, at the evening banquet, testimonials from former students and from Raj Mittra were heard. Overall, participants and attendees enjoyed a day full of good memories.

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The **Raj Mittra** Symposium on Saturday, September 27, 2014 was attended by about 70 people. The all-day event which included a conference, and the dedication of a classroom named in his honor began at 8:00 am with continental breakfast in the atrium of the new ECE Building where ECE ILLINOIS alumni, students and friends of Raj Mittra met for a working breakfast to finalize work for the symposium.

The group next proceeded to the conference room where symposium chair **Jose Schutt-Aine** gave a brief introduction, followed by ECE Department Head **Bill Sanders** who offered a warm welcome to visitors and guests, which included Raj Mittra and his wife Jeannette.

The first session of the symposium began with introduction of the first speaker, College of Engineering Dean **Andreas Cangellaris**, by session chairman **Jianming Jin** Illinois EM Lab Director. His presentation titled "*Computational Electromagnetics: Simplicity is Power*" gave an insight that making things as simple as possible is not easy and insisted that it is essential for us to anticipate and influence the future. Next, **YahyaRahmat-Samii** presented his talk "*How Should We Excite Non-Engineers about our Professions as Antenna Engineers and Scientists.*" Yahya discussed the latest trends in antenna design and showed some exciting projects under development at UCLA.

The second session, chaired by **Kevin Webb**, featured a talk by **Weng Chew** titled: "*150 Years of Maxwell's Equations and Raj Mittra.*" In it, Weng gave a brief history of electromagnetics, elaborated on three physics of electromagnetics and outlined Raj Mittra's contributions to electromagnetics. Weng was followed by **Vikram Jandhyala** and his talk "*Taking Lessons Learned from Computational EM into Other Domains.*" Vikram touched upon web search, social networks, homomorphic encryption, machine learning and Gaussian processes. The morning session ended with a talk delivered by **Tapan Sarkar** titled "*The Physics of Signal Propagation*

in a Cellular Environment.” Tapan argued that electromagnetic macro modeling can properly predict the path loss exponent in a mobile cellular wireless communication system.

The group then recessed for lunch which was served in the Kavita and Lalit Bahl Meeting Room.

The afternoon session, chaired by **Keith Whites**, commenced with a talk by **Madhavan Swaminathan**, “*Electromagnetics and its Relationship to the History of Packaging.*” In this talk, he presented a history of packaging and its relevance to system integration and miniaturization. The next talk, given by **Eric Michielssen**, covered “*Seven Open Problems in CEM*”.

After a break the final session, chaired by **Steven Castillo**, began with a presentation by **Tom Cwik** on “*Computational Electromagnetics: Raj and the Golden Age.*” The final talk of the symposium was given by **Chi Hou Chan**, “*Gauss, Euler, von Karman, Wiener, Mittra and You.*” Chi discussed Raj’s academic genealogical tree and retraced his academic ancestry to several prominent figures in mathematics and physics.

At the end of the symposium, **Phil Krein**, chair of the New ECE Building Committee, invited the audience for a tour of the facilities. He led the group on a multi-floor visit of labs and offices of the new ECE Building. The tour ended in front of the Raj Mittra classroom for the dedication ceremony.

The dedication ceremony began with remarks of appreciation from Bill Sanders on Mittra’s contribution to ECE ILLINOIS and thanked him as a donor. Raj Mittra then shared his thoughts about his experience at Illinois with students and colleagues. This was followed by the ribbon-cutting ceremony in presence of Dean Cangellaris, Sanders and Jeannette Mittra. Next, Raj, friends and former students gathered in the room for several group photos.

The final event of the day, after the dedication, was a reception and dinner hosted for all the attendees in the Bahl Meeting Room. Dinner closed with a testimonial program emceed by Yahya Rahmat-Samii. Yahya started by giving a summary of Raj’s achievements, which include guiding the completion of 80 PhD theses and 85 MS theses. In addition, Raj has mentored more than 50 postdocs and visiting scholars and has published over 900 papers (he has published about ten papers and graduated about one PhD student every year since he was born!).

After reviewing some of Raj’s achievements, Yahya opened the floor to Raj’s former students present at the dinner. This spanned testimonials of students over four decades and first featured, Gary Brown who represented the ’60s during which Raj graduated 15 PhDs. Next Mike Van Blaricum represented the ’70s during which Raj advised 22 students. He was followed by Tom Cwik from the ’80s during which Raj advised 24 PhDs. Other alumni from the ’80s included Steve Castillo, Kevin Webb, Rafi Kastner and Scott Ray who also gave testimonials. Finally, the last group, the ’90s with 14 PhDs, was represented by Eric Michielssen and Keith Whites.

After the testimonials, it was Raj’s turn to address and entertain the audience with his presentation of, “*A Hi-Tech and Scientific Approach to Big Game Hunting,*” which the audience found quite captivating. Finally, Raj reflected on the events of the day and thanked all the participants for attending.

The event ignited many great memories for the attendees of their days spent at Illinois. The consensus from most attendees is that it was a fun day of gathering and reminiscing. It will undoubtedly be remembered by all as a special day.

Testimonials

Gary Brown, PhD, August 1967, Number 10 - In addition to an excellent grounding in electromagnetics, the most useful benefit I derived from working with Raj was the ability to survive and profit from failure; and I have made ample use of it during my career. When Raj announced that he was going on sabbatical to Oxford in my first year of graduate school, I was petrified but it provided me a large dose of self-reliance. I also claim to be his only student for whom he wrote the dissertation into a journal paper; the reason behind this was valid as I was in Vietnam at the time. Hip, Hip, Hurrah for Raj!

Don Wilton – PhD 1970 - I'd just like to add my support to the symposium celebrating Raj's extraordinary accomplishments and his nearly 40 years of service at Illinois. Though his technical accomplishments are all very well-known, perhaps even more important are his interactions with and influence on the many students, post-docs, and colleagues with whom he has collaborated over the years. Hence it is very heart-warming to see this group honoring him via this symposium and by the naming of a classroom in the new ECE Building in his honor. Our heartiest thanks and congratulations to Raj!

Yahya Rahmat-Samii – PhD 1975 - What is it all about! It has been said, "When you look back at your life it is not all the papers and books that you have written, it is not how many awards you have received and it is not how many proposals that did not get funded, it is rather your family, friends, colleagues and most importantly your students whom you have mentored, collaborated with and in the process you have touched their lives and they have touched your life." Raj – We thank you for your mentorship and friendship.

Michael L. VanBlaricum – PhD 1976 - I first met Raj Mittra while I was still in high school. My brother, Glenn, was Raj's 11th PhD student. Six years later I found myself studying under Raj as his 32nd PhD student. Besides the obvious skills he taught in EM, numerical methods, and signal processing, he also set the expected professional standards of his students very high. This is evident by the universal academic and business successes of all who studied with him. He also taught us that whether you are studying electromagnetics, playing tennis, shooting pool, or playing bridge, you should always strive to be the best and to do it with color and flare. Thanks, Raj, for all of the guidance you gave and the professional goals you set for us.

Rafi Kastner – PhD 1982 - "I had a great experience working for my PhD under Raj Mittra. For me, it was important that Raj gave me a free hand to think and implement my ideas freely. But then, you had to present your thoughts and work to him for scrutiny. Raj is very good at that, being able to grasp new ideas as fast as he does. So, working almost independently was a great pleasure, especially since you knew that an intelligent, constructive feedback is due at the end of the day."

Kevin Webb – PhD 1984 number 46 - While working towards my PhD under Raj Mittra's guidance at the University of Illinois during 1981-84, I learned how to go to the boundaries of our collective, fundamental understanding, and then go beyond. Critically, I learned how to break problems down to their basic physical and mathematical principles. At that level and with this view, one can solve almost any problem. This education has allowed me to move into many different research fields during my career. Each of my graduate students in turn benefits from this experience and this philosophy. Raj has an optimistic and agile approach to research that is

both respectful and encouraging, yet sets the bar high. I developed many lifelong friendships during my all too short stint at Illinois. One of those truly great friendships has been with Raj. For my experience as his student, I am eternally grateful.

Chi Hou Chan – PhD 1987 - I first met Professor Mitra in April 1982 when I sought admission to the PhD program at Illinois. Not only did I become his 52nd PhD graduate, but I also had the privilege to become a member of his extensive research family of former students and associates. Many of them have become leaders in their own right and life-long friends. I have been greatly inspired by Professor Mitra and have benefited a lot from his teachings. Three things I learned from him serve me well, namely, (i) don't give up a research problem easily, (ii) don't be afraid of going into new areas, and (iii) be resourceful to others. My first trip to Illinois 32 years ago has changed my life forever and I owe this to Professor Mitra.

Steve Castillo – PhD 1987- Professor Mitra has always demonstrated excellence in his research, teaching and in his student's work. In fact, he demonstrates excellence in all aspects of his life including on the dance floor. Professor Mitra seems to have captured enduring youth by staying excited about his work and play and by associating with and mentoring smart and enthusiastic young students. Professor Mitra was a major, positive factor in the success I have experienced in my career.

Jose Schutt-Aine – PhD 1988 - One of the things I appreciated in being in Raj's research group in the EM Lab was the excellent working conditions. For instance, as a microwave engineer from HP, I knew how difficult it was at the time to get access to sophisticated equipment such as a network analyzer. However, when I told Raj that we needed one for the research in signal integrity, he did not hesitate to get one. The end result was that I had the perfect setting for doing cutting-edge research in the subject. I will always be grateful to Raj for giving me an opportunity to join his group. Thanks Raj for allowing me to become your number 55 PhD.

Keith Whites – PhD 1991 - We had a weekly seminar series for the electromagnetics researchers, which often attracted a good sized crowd. I remember the faculty would sit near the front of the room with the graduate students filling the back. I noticed that Raj would often drift off to sleep, but on one occasion it was quite dramatic. His head was canted over and he appeared completely zonked out. I pointed this out to my buddies and we were having a good chuckle watching Raj doze. When the speaker was finished and the applause ended, I was really surprised to hear Raj asking the first question. I thought for sure he didn't hear much, if anything, the speaker had to say, but instead he had a very insightful question. I guess he was assimilating information while he slept!

Doug Werner - I was not one of Raj's many graduate students or postdoctoral scholars, but nevertheless Raj played a critical role, especially in my early career development. I am very grateful to Raj for his strong support; without it I would not be where I am today. I will just recount one of many stories about the kind of influence Raj has had in my life. I had planned to wear a very special tie to the EM Symposium event today. This particular tie once belonged to Raj and was given to me by him to wear when I interviewed for the faculty position which I now hold with the Department of Electrical Engineering at Penn State. It was part of a wardrobe make-over that Raj coordinated to help better prepare me for my interview. I can recall that Raj went along shopping with me to help pick out a new shirt etc. to go along with the tie. In the end,

I was offered the position, in large part due to the strong support I received from Raj (and maybe also because of that tie, which garnered several compliments during my interview). This has become my "good luck tie," which I still wear for very special occasions. Thank you Raj for your friendship and all that you have done to support my career! Best wishes in all your future endeavors!

Photos From EM Symposium in Honor of Raj Mittra.