

In Memoriam: Tatsuo Itoh

1940 - 2021

It is not easy to describe the shock and pain of our community after receiving the sad news of the passing of Prof. Tatsuo Itoh. It is so unfortunate that Prof. Itoh accepted giving an invited talk after the Covid-19 pandemic at GASS 2021. It is very hard to find anyone else who has contributed so much, so deeply, and inspired so many people in microwave engineering. Prof. Itoh continuously introduced revolutionary breakthroughs, one after another, until his passing. His gigantic work, remarkable for its quality and diversity, constitutes an extraordinary asset that will guide our explorations and investigations for decades to come. We express our endless recognition and respect for his legendary life and integrity. We express our deepest and sincere condolences to his family.



Life Member of MTT Society in 1994. He was the Chair of Commission D of International URSI for 1993-1996. He served on advisory boards and committees of a number of organizations. He served as Distinguished Microwave Lecturer on Microwave Applications of Metamaterial Structures of IEEE MTT-S for 2004-2006. He had 450 journal publications, 900 refereed conference presentations, and had written 48 books and book chapters in the area of microwaves, millimeter-waves, antennas, and numerical electromagnetics. He generated 80 PhD students.

Testimonies

Prof. Makoto Ando URSI President 2017-2021

I was informed of the sad news about the death of Prof. Tatsuo Itoh. His academic and industrial contributions had been really great and wide enough to cover all of radio science. He served as the Commission D Chair of URSI, and inspired many young radio scientists. He frequently visited Japan and stimulated the microwave community also in Japan. Many students with his guidance are leading the microwave community in Japan. The Microwave Workshop and Exhibition (MWE), being supported by him, has grown up to be among the most important events in the IEICE Japan, where academia and industry collaborate. I personally remember his visit on my invitation to and a lecture at Tokyo Institute of Technology in March 2006, for advising how to encourage graduate students, especially in the doctoral course. His experience in engineering education has thus been surviving in the future of Tokyo Tech, as well. We shall continually pray for Prof. Tatsuo Itoh and his family.

Dr. Gregory Lyons 2021 MTT-S President

Members of the IEEE Microwave Theory and Techniques Society (MTT-S) feel great sadness over the loss of Prof. Tatsuo Itoh. Tatsuo was one of our cherished leaders, and truly one of the pillars of our Society. He was an educator, mentor, colleague, and friend to so many of us. He was a Life Fellow of the IEEE, served as 1990 MTT-S President,

Tatsuo Itoh received the PhD in Electrical Engineering from the University of Illinois, Urbana, in 1969. After working for the University of Illinois, SRI, and the University of Kentucky, he joined the faculty at the University of Texas at Austin in 1978. There, he became a Professor of Electrical Engineering in 1981. In September 1983, he was selected to hold the Hayden Head Centennial Professorship of Engineering at the University of Texas. In January 1991, he joined the University of California, Los Angeles, as Professor of Electrical Engineering and holder of the TRW Endowed Chair in Microwave and Millimeter Wave Electronics (currently, the Northrop Grumman Endowed Chair). He received a number of awards, including the IEEE Third Millennium Medal in 2000 and the IEEE MTT-S Distinguished Educator Award in 2000. He received the Nikola Tesla Award in 2001. He was elected a member of the US National Academy of Engineering in 2003. He received an honorary doctorate from the Universitat Autònoma de Barcelona. He also received the 2018 Electromagnetics Award from the IEEE for “contributions to electromagnetic modeling, artificial materials, microwave electronics, and antennas.”

Dr. Itoh was a Fellow of URSI, a Life Fellow of the IEEE, a member of the Institute of Electronics and Communication Engineers of Japan, and Commissions B and D of USNC-URSI. He served as the Editor-in-Chief of the *IEEE Transactions on Microwave Theory and Techniques* for 1983-1985. He was President of the IEEE Microwave Theory and Techniques Society in 1990. He was the Editor-in-Chief of the *IEEE Microwave and Guided Wave Letters* from 1991 through 1994. He was elected as an Honorary

and received the 2001 Nikola Tesla Award, IEEE Third Millennium Medal, and the 2018 IEEE Electromagnetics Award. The MTT-S named a best journal paper award after him. Tatsuo was active as a voting Honorary Life Member of our MTT-S Administrative Committee until his passing. A biographical journal article captures Tatsuo's life from childhood through the evolution of his career ("Terahertz Pioneer: Tatsuo Itoh," *IEEE Trans. THz Sci. Technol.*, 4, May 2014, pp. 298-306). Tatsuo's inspiration will live long within MTT-S.

Dr. Apostolos Georgiadis Chair of URSI Commission D

I saw Prof. Itoh for the first time when I began attending the IEEE MTT-S International Microwave Symposium about twenty years ago. However, I was already aware of his work from my first steps in the research world as many other students and researchers around the world. I managed to speak briefly to him several years later on a few occasions during IMS and APMC conferences. I was very nervous to finally speak to one of the greats of the microwave community. I can remember that Prof. Itoh was concise and always to the point, transmitting a great sense of respect but without being distant. Several years later, I had the pleasure to collaborate more closely with him within URSI Commission D. He was always accessible, present in all Commission D meetings, and he always contributed towards development of the Commission, concisely and meaningfully, from highlighting emerging topics, to attracting new members and to successfully merging the electronics and photonics worlds of Commission D. He has left an unparalleled legacy to the microwaves and electromagnetics communities, and I feel privileged to have met Prof. Itoh. I would like to express my deepest condolences to his family.

Prof. Smail Tedjini University Grenoble Alpes

My first contact with Prof. Itoh was, as for many, through his publications in the 1980s. His work inspired and guided me to move forward for my PhD. I had the enormous privilege of having him as a member of my thesis jury, and of meeting him in Grenoble in November 1985. During his stay in Grenoble, we had very inspiring discussions on many subjects, not exclusively scientific! I will always remember the pleasant walk in the Vercors park around Grenoble. His intelligence and open-minded remarks had a decisive impact on my activities after my PhD. Later, it was with great pleasure that I had the opportunity to meet him during various events. My last contact was to invite him to participate in a special session for the 100th anniversary of URSI. He accepted the invitation with great reactivity and simplicity. Prof. Itoh will continue to be a reference and a shining and guiding beacon for our scientific community. May he rest in peace.

Prof. Alwyn. J. Seeds University College London

I knew him for over 30 years, during which time I enjoyed regular visits to his group at UCLA, and worked with him on conference organization for both the IEEE Microwave Theory and Techniques Society and URSI. What distinguished everything he did was his quest for perfection. Any modeling must be accurate. Any deadline must be perfectly met. He was one of the most hard-working people I have known and inspired all who worked with him to give of their best. He had an abiding curiosity for new technology and made remarkable contributions to our field throughout his career. His legacy will long remain, both from his own work and from the work of the many PhD students who benefited from his inspiring training.

Prof. Victor Fouad Hanna University Pierre et Marie Curie – Sorbonne University

I have known Professor Tatsuo Itoh since 1982, through meeting him nearly every year in International Microwave Symposia (IMS), European Microwave Conferences, URSI General Assemblies, joint USA URSI AP-S Symposia, and through participating with him in many of their subcommittees related to electromagnetism. In 1983, he accepted my invitation to visit my newly created research team on the application of electromagnetism to microwave and millimeter circuits at the French National Center of Telecommunication Studies (CNET) in the Paris area. I profited largely from his advices and remarks in defining proper orientations for the research of the team. He accepted many times my invitations to him to participate in the jury of many PhD and DSc theses submitted by my students. He also accepted my invitations several times in the period from 1988 to 1992 to give lectures to members of the newly created France MTT-S Chapter. I visited him when he invited me to his university at Austin in 1990. I summarize: I learned much from Tatsuo during nearly 40 years. My thoughts go to his wife and his daughter, to whom I express my deepest, heartfelt condolences and most heartfelt sympathy.

Prof. Jenshan Lin University of Florida

Prof. Itoh was my PhD advisor. I was fortunate to be the first UCLA student joining his group in December 1990, when he moved from UT Austin to UCLA. He took me in and trained me, even though I knew nothing about microwave circuits. His generosity and philosophy of education changed a young student's life and shaped his career. His research vision is something I always tried to learn. Whatever he did, whether theoretical or experimental, eventually would lead to significant impacts. I was watching

his online APMC2020 plenary talk, trying to get some ideas of applying metasurfaces to future microwave systems and applications. Sad to know that this was his last conference presentation. He told me 30 years ago that he would never retire. Indeed, he continued to work and contribute to this world until his last moment. He has left us, but his impacts will live forever.

Prof. Dr. Peter Russer

I am saddened to hear of Tatsuo Itoh's death. Tatsuo has been an outstanding member of our MTT family for decades. His achievements combined excellence in numerous fields. Among the international community of engineers, he was known as a leading thinker and a driver of research in the area of microwaves, millimeter-waves, microwave circuits, metamaterials, antennas, and numerical electromagnetics. In all these areas, he was a creative and skilled problem solver with a lot of innovative ideas, and he contributed significantly to the sum of knowledge in microwave theory and techniques. I remember many encounters at conferences and in the context of mutual visits, and the fruitful discussions that took place. With Tatsuo, we have lost a good friend and a significant member of our community. I will miss Tatsuo.

Dr. Nasimuddin Institute for Infocomm Research A*STAR

I am very saddened to hear of Prof. Tatsuo Itoh's death. He has been an outstanding member of our MTT-S/AP-S family for decades. His achievements combined excellence in the passive to active microwave/millimeter-wave components and systems. He will be a role model for MTT-S/AP-S related engineers and researchers as he was a leading researcher in the area of microwaves, millimeter-waves, microwave circuits, metamaterials, antennas, and numerical electromagnetics. I started my research with reading his research works and was highly motivated. I recall many encounters with him at conferences, most recently in APMC 2019 Singapore, Singapore visits as a visiting professor, and had wonderful discussions. We have lost a good friend, great professor, and a key member of our community. I will miss Prof. Tatsuo.

Prepared by

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