

Remembering Prof. Allen Taflove: A Finite-Difference Time-Domain Pioneer and Educator

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Prof. Allen Taflove, a pioneer of the finite-difference time-domain (FDTD) method, award-winning educator, and devoted mentor and advisor, died on 25 April 2021 at the age of 71. Prof. Taflove received B.S., M.S., and Ph.D. degrees in electrical engineering from Northwestern University, Evanston, Illinois, in 1971, 1972, and 1975, respectively. He began his career as a research engineer at IIT Research Institute, Chicago, where he spent nine years before returning to Northwestern to join the faculty of the Department of Electrical and Computer Engineering. His 37-year career as a professor at Northwestern was distinguished by groundbreaking research in fundamental FDTD algorithm development and scientific and engineering applications of FDTD across the electromagnetic spectrum.

From his earliest days as a graduate student laying the foundation for FDTD as he sought to understand microwave radar interactions with the human eye, through his late career collaborations in petaflops-scale supercomputing microscopy applications of FDTD for biomedical research on early stage cancer screening, Prof. Taflove was driven to advance the frontiers of electromagnet-



Prof. Taflove.

ics engineering to improve people's lives. His legacy includes three editions of the book *Computational Electromagnetics: The Finite-Difference Time-Domain Method*, which, by September 2012, became the seventh most-cited physics text in the world, according to a Google Scholar search conducted by the University of Rochester's Institute of Optics. He held 14 U.S. patents and published 152 journal papers. He was the first IEEE Fellow in the FDTD technical area, and he was elected as a fellow of the Optical Society of America "for creating the finite-difference time-domain method for the numerical solution of Maxwell's equations, with crucial application to the growth and current state of the field of photonics." He was named to the elite

Highly Cited Researchers list by the Institute of Scientific Information, and in 2014, he received the prestigious IEEE Electromagnetics Award.

He was also a dedicated educator who always went the extra mile for his students. Anyone passing by his office at Northwestern University would find an open door and one or more students meeting with him inside, when he wasn't in the classroom teaching. He was also a passionate advocate for involving undergraduate students in research, and he led by example in encouraging women to pursue research careers in applied electromagnetics. Prof. Taflove was the first Northwestern University McCormick School of Engineering and Applied Science faculty member to be named



Prof. Taflove, recipient of the 2010 IEEE AP-S Chen-To Tai Distinguished Educator Award, with his beloved wife, Sylvia, at the IEEE International Symposium on Antennas and Propagation awards banquet.

both Teacher of the Year and Adviser of the Year in the same academic year (2005–2006). In other recognitions, he was appointed a Northwestern University Charles Deering McCormick Professor of Teaching Excellence (2000–2003) and the Bette and Neison Harris Chair in Teaching Excellence (2009–2012). In addition, he received the Northwestern Alumni Association Excellence in Teaching Award (2008) and was selected by Northwestern’s Associated Student Government for its honor roll of best teachers in multiple years (2002, 2003, 2004, 2005, 2007, 2008, 2009, and 2016). He also received the 2010 IEEE Antennas and Propagation Society (AP-S) Chen-To Tai Distinguished Educator Award.

Prof. Taflove advised or coadvised 24 Ph.D. recipients, five postdoctoral fellows, and numerous undergraduate students during his career. Six of his advisees (four women and two men) currently hold tenured positions at universities around the world (University of Colorado Boulder, University of Wisconsin–Madison, McGill University, National Cheng Kung University, National Taiwan University, and University of Utah). Many of his other advisees have held professional positions at major research institutions and companies, including the Massachusetts Institute of Technology Lincoln Laboratory, the

Jet Propulsion Laboratory, the Argonne National Laboratory, the U.S. Air Force Research Laboratory, Northrop Grumman, Raytheon, Motorola, Applied Materials, Ball Aerospace, and the Georgia Tech Research Institute.

Prof. Taflove’s career in electromagnetics was cultivated by his interest in ham radio, which was ignited when he was 14 years old. At one point, he had the pleasure of connecting through ham radio with King Hussein of Jordan. He served for many years as the trustee of the Northwestern University Amateur Radio Society. In 2011, he was inducted into *CQ Magazine’s* Amateur Radio Hall of Fame. Late in his life, he enjoyed relaxing with his wife in the evenings and spending time with the family cats.

Comments that were shared on the Shalom Memorial Funeral Home website, upon his passing, beautifully convey the profound positive impact he had on the lives of countless students and colleagues during his career as a professor: “He was one of the most dedicated and passionate instructors I have ever known, treating every student with kindness, respect, and infinite patience.” “Allen made the world a better place.” “Taking a line from my thesis: ‘Allen is a veritable mensch in every sense of the word.’” “One grand part of his influence that is not reflected in his awards,

books, or tens of thousands of citations came from his generous investment of heart and mind to raising young scientists like myself.” “He had such an intelligent and active mind while being one of the most empathetic people I’ve ever met. He truly cared about each of his colleagues, and exhibited this both personally and professionally.” “Anyone who knew Allen could not help to be positively influenced by his great passion for knowledge and new ideas, and his compassion for people.” “Yes, he had written a book that became one of the most read works in physics. And yes, he was an exceptional researcher. But perhaps even more importantly, his work, friendship, and mentorship have touched so many lives. He was the best mentor to students and the best collaborator to faculty. Allen certainly changed my life.” And so on. May we all be so fortunate, at the end of the day, to be remembered for so many lives we touched in our professional careers.

Prof. Taflove is survived by his wife, Sylvia, of 44 years, his two sons, a grandchild, and many nieces and nephews. Memorial donations may be sent to Fight Lynch at www.fightlynch.org. A memorial session is being planned in his honor at the 2022 IEEE International Symposium on Antennas and Propagation and U.S. National Committee for the International Union of Radio Science–Committee for the International Union of Radio Science Meeting, to be held in Denver, Colorado, in July.

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