

Edwin Thomas is a leading materials scientist/engineer as well as educator and serves in a variety of senior leadership roles in the materials field. His education includes a bachelors degree in mechanical engineering (University of Massachusetts) and a PhD in materials science and engineering (Cornell University). Over his career, Thomas has worked at 3 leading universities, mentored over hundred graduate students and post docs, continually made fundamental and practical discoveries leading to over 370 journal publications (with a current H-factor of 65). Thomas holds 13 patents, 3 of which are commercially licensed to OmniGuide Inc. a successful company that he co-founded, that is saving lives through revolutionary minimally invasive surgery enabled by the discovery of the “perfect mirror.” Thomas has also founded several research centers at University of Massachusetts-Amherst and MIT, and serves in a variety of advisory roles to the government and industry. Overall, the theme throughout his career has been to do cutting edge research at the intersection of polymeric materials and technology. Whether it is using block copolymer self assembly to create novel patterns or to employ multibeam laser interference lithography to rationally fabricate structures, the aim is to exploit precisely designed structures to provide valuable, targeted properties that impact society and to contribute to the fundamental understanding of structure-property relationships.

His research interests include photonics, phononics, interference lithography and mechanical behavior of microtrusses, and engineering of the mechanical, thermal and optical properties of block copolymers, liquid crystalline polymers, and hybrid organic-inorganic nanocomposites. Dr. Thomas’ fundamental research in polymeric materials has established his group as a recognized world leader in materials, especially regarding structure-property relations in polymeric materials. His work on photonic and phononic crystals has placed him as a leading contributor to these emerging fields. Thomas’ most recent work combines key aspects of photonics and phononics for unprecedented acousto-optical interactions and new opportunities for exploiting phonon-photon interactions in materials with simultaneous complete band gaps for light and sound (so called “*blind and deaf*” structures). To date, a total of 52 PhDs have been completed under his supervision, spanning his career of 36 years from 1973 to the present and including students from the Chemical Engineering Department at the University of Minnesota, 1973-1977, the Department of Polymer Science and Engineering at the University of Massachusetts, 1977-1988 and 20+ years in the Materials Science and Engineering Department at MIT. These departments are all at the very top ranking in engineering in the USA and indeed in the world.

His previous senior leadership roles include Chairman of the Polymer Science and Engineering Department at the University of Massachusetts, founder and co-director of the Institute for Interface Science at UMassachusetts, Director of the Program for Polymer Science and Technology at MIT and Founding Director for the Institute for Soldier Nanotechnologies at MIT. This large center includes a set of industrial partners and has over \$11M/year in funding and involves some 60 faculty from over 12 departments. He also conceived and initiated the highly successful Soldier Design Competition, which involves undergraduate and graduate students as well as West Point cadets in solving nonweapons related technology challenges of today’s soldiers. Over the past 6 years of the SDC competition, an astounding 9 companies have been launched, including RallyPoint, Xitome and ATLAS Rope Ascenders, which have brought their SDC prototype designs into actual production with commercial sales to the Army. As department head in Materials Science and Engineering he introduced the MADMEC (Making and Design Materials Engineering Competition) student competition which has been sponsored by DOW, Saint Gobain and General Motors. He has worked to create a DMSE Alumni Club (first ever departmental alumni club at MIT) as well as the DMSE Community Committee was conceived to promote internal sense of shared community including the Registration Day Feast,

Pre-Frosh Orientation, Departmental Open Houses and programs to successfully recruit and retain underrepresented minorities at both the UG and G level.

As head of the MIT materials department, Thomas continues to play a leadership role in undergraduate and graduate materials education. He coauthored the undergraduate textbook, *The Structure of Materials*, which is used in the undergraduate core in materials departments in the USA. Thomas coauthored with one of his post docs the monograph, *Periodic Materials (With Applications to Photonics, Phononics and Mechanics)* just published by Wiley-VCH in 2008. This book addresses the exciting areas of wave-matter interaction using structured materials with designed periodicities (or quasiperiodicities) and nanoscale features such that interference effects of waves (elastic waves and electromagnetic waves in particular) result in novel and technologically important effects as well as on the field of the mechanical properties, especially toughness, of bicontinuous periodic solid/air microtruss structures.

Perhaps the greatest impact on society from the Thomas group has been the discovery of omnidirectional mirrors and their use in flexible, hollow photonic fibers. Thomas and a former student plus two colleagues from MIT co-founded OmniGuide Inc., in Cambridge, a successful (81 employee) startup utilizing the revolutionary concept of polymer-based hollow omnidirectional photonic fibers invented and developed at MIT for minimally invasive CO₂ laser surgical applications using endoscopic procedures. This new technology has been used in over a thousand microsurgical procedures during the last year and has even resulted in several life-saving surgeries.

Thomas has been recognized with election to the National Academy of Engineering in 2009, election to the American Academy of Arts and Sciences (2009), by the 1991 High Polymer Physics Prize of the American Physical Society and the 1985 American Chemical Society Creative Polymer Chemist Award. He was elected a Fellow of the American Physical Society in 1986 and a Fellow of the American Association for the Advancement of Science in 2003 and an inaugural fellow of the Materials Research Society in 2008. Professor Thomas received the Special Creativity Award from the National Science Foundation in 1988, 1996 and 2005. He also received a Civilian Patriotic Award from the US Army in 2003. Thomas serves on the National Research Council Board on Army Science and Technology and on the editorial boards of NanoLetters, and Polymer. Previously he was a Divisional Associate Editor for Physical Review Letters, and was on the editorial boards of Macromolecules, Philosophical Magazine, Chemistry of Materials, Journal of Polymer Science Physics and NanoStructured Materials. He has served on numerous National Research Council and international committees for prize selection and evaluation of university centers and programs. Thomas has organized a significant number of conferences and symposia including chairing several Gordon Research Conferences. He has been invited to give hundreds of invited lectures and dozens of plenary and keynote lectures and has testified twice before Congressional committees on the uses of nanotechnology for defense. He has been a visiting professor at the University of Freiburg in Germany, Cambridge University in England, Institute Charles Sadron of the CNRS in Strasbourg France, Bristol University in England, University of Minnesota and the California Institute of Technology. Over a dozen of Thomas' former PhD students have gone on to be highly successful academics in universities across the USA and around the world, including, for example, MIT, University of Pennsylvania, University of Michigan, Yale University, Carnegie Mellon University, University of Massachusetts, University of Maryland and Yonsei University in Korea and the Technion in Israel. His research group is among the top research groups in the world for novel engineering of structure-property relationships in polymeric materials. He is married and has 3 daughters and 3 grandsons.