Akhlesh Lakhtakia was born in Lucknow, India on July 1, 1957. He obtained a Bachelor of Technology degree in Electronics Engineering from the Banaras Hindu University, Varanasi, India in 1979; Master of Science and Doctor of Philosophy degrees in Electrical Engineering from the University of Utah, Salt Lake City in 1981 and 1983, respectively; and a Doctor of Science degree in Electronics Engineering from the Banaras Hindu University in 2006. In 1983, he joined the faculty of the Pennsylvania State University, where he was elevated to the rank of Distinguished Professor of Engineering Science and Mechanics in January 2004. In 2006, he became the Charles Godfrey Binder (Endowed) Professor of Engineering Science and Mechanics. In 2018, he received the highest rank at Penn State: Evan Pugh University Professor.

Dr. Lakhtakia has published more than 850 journal articles; has contributed 33 chapters to research books and encyclopedias; has edited, co-edited, authored or co-authored 21 books and 26 conference proceedings; has authored or co-authored 369 conference papers; has reviewed for 173 journals; serves on the editorial boards of five electromagnetics journals; and was the first Editor-in-Chief (2006–2013) of the SPIE Journal of Nanophotonics. He serves as an international lecturer for the International Commission for Optics, SPIE, and the Optical Society of America; was twice a Visiting Professor of Physics at Universidad de Buenos Aires, a Visiting Professor of Physics at the University of Otago, a Visiting Professor of Physics at Imperial College London, a Visiting Fellow in Mathematics at the University of Glasgow, and Honorary International Professor National Taipei University of Technology; and headed the IEEE EMC Technical Committee on Nonsinusoidal Fields from 1992 to 1994.

Dr. Lakhtakia was elected a Fellow of the Optical Society of America (1992), SPIE (1996), the UK Institute of Physics (1996), the American Association for the Advancement of Sciences (2009), the American Physical Society (2012), the Institute of Electrical and Electronics Engineers (2016), the Royal Society of Chemistry (2016), and the Royal Society of Arts (2017). He was named to the inaugural class of Outstanding Reviewers by the Optical Society of America in 2012. He also served as the 1995 Scottish Amicable Visiting Lecturer at the University of Glasgow. He received the PSES Outstanding Research Award in 1996, the PSES Premier Research Award in 2008, and the PSES Outstanding Advising Award in 2005. For his research on sculptured thin films and complex-medium electromagnetics, he received the Faculty Scholar Medal in Engineering in 2005 from the Pennsylvania State University, and was the sole recipient of the 2010 SPIE Technical Achievement Award. Nanotech Briefs recognized him in 2006 with a Nano 50 Award for Innovation. Sigma Xi bestowed on him the Walston Chubb Award for Innovation in 2016. The University of Utah made him a Distinguished Alumnus in 2007 and the Indian Institute of Technology (BHU) in 2014.

His current research interests lie in the electromagnetics of complex materials including chiral and bianisotropic materials, sculptured thin films, chiral nanotubes, nanoengineered metamaterials, surface multiplasmonics, engineered biomimicry, bone nano-refacing, and forensic science. He has more than 15500 citations on the Web of Knowledge and his Hirsch index is 51. According to Google Scholar, the number of citations exceeds 25100 and his Hirsch index is 67. His research accomplishments have been discussed on CNN and in a NOVA movie. His recent research has been covered on several scientific media outlets.

PRINCIPAL RESEARCH CONTRIBUTIONS

- **Frequency-Domain Scattering**: Investigated scattering of acoustic, electromagnetic, and elastodynamic waves by single objects, half spaces, slabs, and surface gratings. Devised the Iterative Extended Boundary Condition Method (IEBCM) for scattering by long slender objects, and devised a semi-analytic technique to overcome the Rayleigh hypothesis for scattering by surface gratings.
- **Time-Domain Scattering**: Discovered temporal evolution of the anatomy of the circular Bragg phenomenon. Formulated and investigated pulse scattering by relativistically moving targets.
- **Bianisotropic Materials**: Obtained analytic expressions for (i) electromagnetic Green functions for many types of bianisotropic materials, and (ii) singularities of the dyadic Green function of any bianisotropic material. Examined wave propagation in many types of bianisotropic materials. Co-authored one of only two books on the topic.
- **Isotropic Chiral Materials**: Developed the principles of frequency-domain electromagnetics in isotropic chiral materials: 2D and 1D dyadic Green functions, Huygens principle, Ewald-Oseen extinction theorem, surface equivalence principles, image principle, Bruggeman homogenization formalism, strong property fluctuation theory, T-matrix method, method of moments, coupled dipole method, etc. Wrote two fundamental books and compiled a published anthology of milestone papers. Extended the concept to acoustic chiral (hemitropic micropolar) solids.
- **Sculptured Thin Films**: Enunciated the concept of STFs. Initiated and established the principles of optics in chiral STFs: analytic solutions for wave propagation, matrix Green functions, canonical sources of radiation, nanoscopic-to-macroscopic structure-properties model, surface-wave propagation, and pulse shaping in the time domain. Initiated and is developing optical applications: polarization filters, other filters and integrated optical devices, optical biosensors, LEDs and lasers. Initiated and is developing biomedical applications: tissue culture substrates, free-standing films for conformal coatings for prostheses and for in-vivo tissue transplants, gradient panels for protein-binding assays, and coatings for bones. Co-authored the only book on STFs. Extended the concept of structural chirality to elastostatics, elastodynamics, and piezoelectric materials.
- **Composite Materials**: Theoretically extended homogenization theories to account for inclusion size, inclusion shape, and material complexity (isotropic chirality, linear bianisotropy, nonlinear bianisotropy). Determined analytical expressions for polarizability dyadics. Compiled a published anthology of milestone papers and co-authored a monograph in 2015.
- **Negative Refraction**: Created several key concepts: (i) nihility; (ii) simple equations to predict negative-phase-velocity propagation is isotropic dielectric-magnetic materials; (iii) counterposition; (iv) distinction between negative refraction, negative phase velocity, and counterposition; (v) negative reflection; (vi) negative phase velocity in relativistic scenarios, and (vii) particulate metamaterials to simulate gravitational metrics.
- **Surface-Wave Propagation**: Extended the concept of Dyakonov waves. Predicted and experimentally discovered Dyakonov-Tamm waves. First unambiguous observation of Uller-Zenneck waves (111 years after prediction). Co-authored a recent book.
- **Surface Multiplasmonics**: Initiated and established the principles for propagating multiple surface plasmon-polariton waves along just one metal/dielectric surface. Initiated and is developing applications for (i) rapid multi-analyte biosensing and (ii) photovoltaics.
- **Solar Cells**: Applied surface multiplasmonics and biotexturing theory to solar cells. Devised a comprehensive optoelectronic model that predicts a 25% increase in the efficiency of CIGS solar cells by adopting two design strategies.
- **Machine Control**: Initiated the use of Mandelbrot sets to control machining processes, especially turning, which has been widely adopted by the industrial-engineering community. Co-authored perhaps the first eight papers in this area.

- **Bioreplication**: Enunciated the concept of bioreplication. Initiated and developed an industrially scalable technique for replication of biological surfaces, such as compound eyes of insects for solar-cell surfaces. Initiated and is optimizing a technique for rapid visualization of fingerprints and other impression evidence of forensic significance. Co-edited a recent book on engineered biomimicry.
- **Mimumes and Multicontrollable materials**: Developing the bioinspired concepts of (i) microfibrous multifunctional metamaterials (mimumes) using Parylene C and (ii) multicontrollable structures using terahertz metasurfaces.
- **Forensic Science**: Devised and is developing columnar-thin-film assisted visualization of latent fingerprints on forensically relevant nonporous substrates. Combining with DNA analysis of CTF-entombed cells for doubly secure identification. Combining columnar-thin-film assisted visualization with two-color holography for 3D electronic storage.
- **Bone Nanoresurfacing**: Devised a technique for osteogenic nanoresurfacing of bones, with eventual use in transplants. US patent filed with co-inventor from Penn State Hershey.

DATA ON PUBLICATIONS AND PRESENTATIONS

No. of sole-authored books	1	No. of co-authored books	7
No. of sole-edited research books	5	No. of co-edited research books	8
No. of sole-edited special issues of journals	3	No. of co-edited special issues of journals	6
No. of forewords and introductions to books	2	No. of co-edited conference proceedings	27
No. of journal editorials	19	No. of book reviews	27

No. of sole-authored book chapters	9	No. of co-authored book chapters	24
No. of sole-authored journal publications (including regular papers, review papers, short papers, letters, and comments)	151	No. of co-authored journal publications (including regular papers, review papers, short papers, letters, and comments)	718
No. of citations to journal articles (Web of Science; December 4, 2018)	15507	Hirsch index (Web of Science; December 4, 2018)	51
No. of citations to journal articles (Google Scholar; December 4, 2018)	25355	Hirsch index (Google Scholar; December 4, 2018)	67

No. of sole-authored conference papers (Abstracts and Summaries)	45	No. of co-authored conference papers (Abstracts and Summaries)	135
No. of sole-authored conference papers (Full papers)	18	No. of co-authored conference papers (Full papers)	178
No. of seminars (ex Penn State)	107	No. of seminars/presentations (Penn State)	72