

Do-Hoon Kwon

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Education

- Ph.D. (2000) in Electrical Engineering, The Ohio State University, Columbus, OH
Area of specialization: High-frequency asymptotic methods (GTD/UTD), efficient numerical electromagnetic analysis, phased array antennas
Minor areas: Finite difference methods in mathematics, communications and signal processing in electrical engineering
- M.S. (1995) in Electrical Engineering, The Ohio State University, Columbus, OH
Area of specialization: Numerical electromagnetics
- B.S. (1994) in Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), Korea

Employment

- Professor (Sep. 2022–Present), Associate professor (Aug. 2008–Aug. 2022)
Department of Electrical and Computer Engineering
University of Massachusetts Amherst, Amherst, MA
Lab association: Antennas and Propagation Laboratory
- Visiting professor (during a full-year sabbatical), Department of Electronics and Nanoengineering
Aalto University, Finland (Aug. 2016–Jul. 2017)
Host: Prof. Sergei A. Tretyakov
- Post-doctoral researcher, Department of Electrical Engineering and Material Research Science and Engineering Center (MRSEC)
The Pennsylvania State University, University Park, PA (Apr. 2006–Jul. 2008)
Mentor: Prof. Douglas H. Werner
Area of specialization: Electromagnetic and optical metamaterials, electromagnetic cloaking, frequency selective surfaces, small/miniaturized antennas
- Senior engineer, Corporate Research & Development Center and Samsung Advanced Institute of Technology
Samsung Electronics Co., Suwon, Korea (Jul. 2000–Mar. 2006)

Projects

- [Cooperative Agreement] Radio source location using dynamic, cooperative antenna arrays, PI: Do-Hoon Kwon, Co-PIs: Robert Jackson and Ramakrishna Janaswamy, Source: Army Research Lab via ARO, Period: 9/2021–9/2024 (36 months), Fund: \$778,832 (my share: 1/3 of the total fund = \$259,611)

- [Contract] Small time-varying antennas for ultra-wideband radio signals, PI: Ramakrishna Janaswamy, Co-PI: Do-Hoon Kwon, Source: Air Force STTR Phase I via AntennaSys, Inc., Period: 12/2019–6/2020 (6 months), Fund: \$55,801 (my share: 40% of the total fund = \$22,320)
- [Grant] Functional electromagnetic surfaces on irregular grids, PI: Do-Hoon Kwon, Source: National Science Foundation, Period: 9/2019–8/2022 (36 months), Fund: \$362,389
- [Grant] Single and dual polarized metasurface cloaks for microwave invisibility and low observability, PI: Do-Hoon Kwon, Source: Army Research Office, Period: 8/2019–8/2022 (36 months), Fund: \$367,004
- [Cooperative Agreement] Wearable antijam GPS antennas for dismounted soldier navigation systems, PI: Ramakrishna Janaswamy, Co-PI: Do-Hoon Kwon, Source: Army CERDEC via ARO, Period: 1/2016–1/2019 (36 months), Fund: \$242,602 (my share: 50% of the total fund = \$121,301)
- [Contract] Antennas at a Virtual Location using Metamaterials, PI: Do-Hoon Kwon, Source: Air Force Research Laboratory (via S4, Inc.), Period: 11/2013–10/2014 (12 months), Fund: \$138,870
- [Contract] Array Elements for Dual-Polarized C and Ku Band Aperture, PI: Do-Hoon Kwon, Source: NOAA SBIR Phase II (via Remote Sensing Solutions, Inc.), Period: 10/2012–9/2014 (24 months), Fund: \$120,000
- [Grant] Fundamental Limitations of Phased Array Antenna Elements, PI: Do-Hoon Kwon, Source: Army Research Office, Period: 10/2012–9/2015 (36 months), Fund: \$303,506
- [Grant] Robust Emergency Data (RED) Link, PI: Do-Hoon Kwon, Source: NSF STTR Phase I (via Q-Track Corporation), Period: 7/2012–6/2013 (12 months), Fund: \$51,733
- [Contract] 70/90-GHz Cassegrain Reflectarray for High Data Rate Communication, PI: Do-Hoon Kwon, Source: Electronics and Telecommunications Research Institute, Korea, Period: 7/2012–12/2012 (6 months), Fund: \$50,000
- [Contract] Bandwidth Limitations of Small Antennas Above a Ground Plane, PI: Do-Hoon Kwon, Source: The SI Organization, Period: 7/2012–11/2012 (5 months), Fund: \$50,000
- [Contract] Array Elements for Dual-Polarized C and Ku Band Aperture, PI: Do-Hoon Kwon, Source: NOAA SBIR Phase I (via Remote Sensing Solutions, Inc.), Period: 12/2011–3/2012 (4 months), Fund: \$30,960
- [Contract] 90-GHz Dual-Polarized Single-Aperture Reflectarray with High Isolation, PI: Do-Hoon Kwon, Source: Electronics and Telecommunications Research Institute, Korea, Period: 9/2011–1/2012 (5 months), Fund: \$50,000
- [Contract] Dual-Frequency, Dual-Polarized Antenna, PI: Dan Schaubert, Co-I: Do-Hoon Kwon, Source: Remote Sensing Solutions, Inc., Period: 2/2009–1/2011 (24 months), Fund: \$152k
- [Contract] Antenna Design for Future Apertures, PI: Dan Schaubert, Co-PI: Do-Hoon Kwon, Source: US Air Force Research Laboratory, Period: 10/2009–9/2010 (12 months), Fund: \$175k
- [Contract] EHF Phased Arrays, PI: Dan Schaubert, Co-PIs: Do-Hoon Kwon, Robert Jackson, Marinos Vouvakis, Anatoliy Borrysenko, Source: Lockheed Martin Corporation, Period: 5/2009–4/2010 (12 months), Fund: \$100,000

Teaching

- ECE 213: Continuous-Time Signals and Systems
- ECE 333: Fields and Waves I
- ECE 585: Microwave Engineering II
- ECE 587: Introduction to Antennas and Propagation
- ECE 687: Antenna Theory and Design
- ECE 689: Phased Arrays

Service

Director, transfer student advising (Present): Advise incoming, ECE undergraduate transfer students

Chair, the ECE Equipment Committee (AY2019–Present): Solicit and prioritize equipment purchases for instructional purposes within the department; allocate available funds

Director, the ECE 5-year BS/MS program (AY2015–2016, 2017–2019): Administer and manage the ECE Department's 5-year BS/MS program

Chair, the ECE Ph.D. Poster Session Committee (FA2013): Planned and ran the 2nd annual ECE Ph.D. poster session

Faculty advisor, the ECE Student Advisory Committee (ESAC) (AY2012–2015): Oversee and advise ESAC activities

Chair, ECE Picnic (SP12, SP13, SP14): Organize and plan for ECE Picnics in the spring semester

Member, Graduate seminar committee (AY2010–2011): Arranged and hosted invited seminars for the graduate seminar course in the Microwave Engineering area

Member, Graduate admissions committee (AY2008–2010): Evaluated applications for admission to ECE graduate program in Microwave Engineering field

Advising**Current students**

Henry Powell (3rd year Ph.D. student; co-advised with Prof. Robert Jackson)

Past students

Hakjune Lee (Ph.D. 2024; currently a post-doc at UMass Amherst)

Tina Maurer (M.S. 2023; currently with Verkada, Inc.)

Jeffrey Maloney (Ph.D. 2020; co-advised with Prof. Ramakrishna Janaswamy; currently with MITRE Corporation)

Hsieh-Chi Chang (Ph.D. 2020; M.S. 2012; currently with Dassault Systèmes)

M. Amin Nikravan (Ph.D. 2016; currently with Agilent Technologies, Inc.)

Caglar D. Emiroglu (Ph.D. 2015; M.S. 2011; currently with Apple, Inc.)

Narayana Balu (M.S. 2014; co-advised with Prof. Ramakrishna Janaswamy; currently with Dassault Systèmes)

Hua Bai (M.S. 2014; co-advised with Prof. Ramakrishna Janaswamy; currently with MathWorks, Inc)

Yutong Yang (M.S. 2014; currently with Advanced Energy Industries, Inc.)

Adebayo Adeyemi (M.S. 2014; currently with ESG Automotive, Inc.)

Christopher Merola (M.S. 2011; currently with Amazon.com, Inc.)

Committees

Eric Sutherland (M.S. 2024), Babak Mirzapourbeinekalaye (Ph.D. 2023), James Lacroix (M.S. 2022), Mahsa Torfeh (M.S. 2021), Mahdad Mansouree (Ph.D. 2021), Carl Wolsieffer (M.S. 2020), Christopher Merola (Ph.D. 2020), John Logan (Ph.D. 2016, M.S. 2013), Michael Lee (M.S. 2016), Huajie Ke (Ph.D. in Physics, 2013), Salma Mirza (M.S. 2010)

Publications

Degree Theses

- [2] Do-Hoon Kwon, "Efficient method of moments formulation for large conducting scattering problems using asymptotic phasefront extraction," Ph.D. Dissertation, Department of Electrical Engineering, The Ohio State University, Columbus, OH, June 2000.
- [1] Do-Hoon Kwon, "Asymptotic acceleration of the fast multipole method and its application to two-dimensional electromagnetic scattering by perfect conductors," M.S. Thesis, Department of Electrical Engineering, The Ohio State University, Columbus, OH, Oct. 1995.

Books

- [1] D. H. Werner and D.-H. Kwon, Eds., *Transformation Electromagnetics and Metamaterials: Fundamental Principles and Applications*. London: Springer, 2014.

Book Chapters

- [4] F. Liu, X. Wang, M. S. Mirmoosa, S. Tretyakov, O. Tsilipakos, A. C. Tasolamprou, M. Kafesaki, A. Ptilakis, N. V. Kantartzis, and D.-H. Kwon, "Electromagnetic specifications and prototype designs of software-defined surfaces," in *The Internet of Materials*, C. Liaskos, Ed. Boca Raton, FL: CRC Press, 2020, ch. 3, pp. 7–75.
- [3] V. Asadchy, A. Díaz-Rubio, D.-H. Kwon, and S. Tretyakov, "Analytical modeling of electromagnetic surfaces," in *Surface Electromagnetics: With Applications in Antenna, Microwave, and Optical Engineering*, F. Yang and Y. Rahmat-Samii, Eds. Cambridge: Cambridge University Press, 2019, ch. 2, pp. 30–65.
- [2] D.-H. Kwon, Q. Wu, and D. H. Werner, "Transformation electromagnetics for cloaking, lensing, and radiation applications," in *Transformation Electromagnetics and Metamaterials: Fundamental Principles and Applications*, D. H. Werner and D.-H. Kwon, Eds. London: Springer, 2014, ch. 2, pp. 33–81.
- [1] D.-H. Kwon, E. V. Balzovsky, Y. I. Buyanov, Y. Kim, and V. I. Koshelev, "Small printed ultrawideband antennas combining electric and magnetic type radiators," in *Ultra-Wideband Short-Pulse Electromagnetics 9*, F. Sabath *et al.*, Eds. New York: Springer, 2010, ch. 49, pp. 425–432.

Journal Papers (advisee name in capitals)

- [79] H. Lee, D. T. Nguyen, C. W. Jung, and D.-H. Kwon, "A transparent X-band leaky-wave antenna with a sector pattern for on-glass applications," *IEEE Antennas Wireless Propag. Lett.*, accepted for publication.
- [78] S. K. R. Vuyyuru, R. Valkonen, S. A. Tretyakov, and D.-H. Kwon, "Efficient synthesis of large finite patch arrays for scanning wide-angle anomalous reflectors," *IEEE Open J. Antennas Propag.*, accepted for publication.
- [77] J.-H. Kim and D.-H. Kwon, "Effective heights for radiation, reception, and scattering characterization of antennas and arrays," *IEEE Antennas Propag. Mag.*, submitted for publication.
- [76] H. LEE and D.-H. Kwon, "TEM-wave excited single-layer printed metasurface leaky-wave antennas," *IEEE Antennas Wireless Propag. Lett.*, vol. 23, no. 7, pp. 1991–1995, Jul. 2024.
- [75] H. LEE and D.-H. Kwon, "Dual-polarized printed cylindrical metasurface cloak at microwave frequencies," *Phys. Rev. Appl.*, vol. 21, no. 5, May 2024, Art. no. 054031.
- [74] H. LEE and D.-H. Kwon, "Circularly-polarized printed metasurface leaky-wave antennas on a conformal aperture," *IEEE Antennas Wireless Propag. Lett.*, vol. 22, no. 11, pp. 2614–2618, Nov. 2023.
- [73] S. K. R. Vuyyuru, R. Valkonen, D.-H. Kwon, and S. A. Tretyakov, "Efficient anomalous reflector design using array antenna scattering synthesis," *IEEE Antennas Wireless Propag. Lett.*, vol. 22, no. 7, pp. 1711–1715, Jul. 2023.
- [72] F. Liu, D.-H. Kwon, and S. Tretyakov, "Reflectarrays and metasurface reflectors as diffraction gratings," *IEEE Antennas Propag. Mag.*, vol. 65, no. 3, pp. 21–32, Jun. 2023.

- [71] H. LEE and D.-H. Kwon, “Printed metasurface leaky-wave antennas based on penetrable aperture field synthesis,” *IEEE Trans. Antennas Propag.*, vol. 71, no. 6, pp. 4724–4736, Jun. 2023.
- [70] D.-H. Kwon, “Design of single-layer dense metasurfaces on irregular grids using discrete dipole approximation,” *IEEE Trans. Antennas Propag.*, vol. 70, no. 11, pp. 10592–10603, Nov. 2022.
- [69] H. LEE and D.-H. Kwon, “Microwave metasurface cloaking for freestanding objects,” *Phys. Rev. Appl.*, vol. 17, no. 5, May 2022, Art. no. 054012.
- [68] D.-H. Kwon, “Modulated scalar reactance surfaces for endfire radiation pattern synthesis,” *IEEE Trans. Antennas Propag.*, vol. 70, no. 1, pp. 440–450, Jan. 2022.
- [67] H. LEE and D.-H. Kwon, “Large and efficient unidirectional plane-wave–surface-wave metasurface couplers based on modulated reactance surfaces,” *Phys. Rev. B*, vol. 103, Apr. 2021, Art. no. 165142.
- [66] D.-H. Kwon, “Planar metasurface design for wide-angle refraction using interface field optimization,” *IEEE Antennas Wireless Propag. Lett.*, vol. 20, no. 4, pp. 428–432, Apr. 2021.
- [65] A. Pitilakis, O. Tsilipakos, F. Liu, K. M. Kossifos, A. C. Tasolamprou, D.-H. Kwon, M. S. Mirmoosa, D. Manassis, N. V. Kantartzis, C. Liaskos, M. A. Antoniadis, J. Georgiou, C. M. Soukoulis, M. Kafesaki, and S. A. Tretyakov, “A multi-functional intelligent metasurface: electromagnetic design accounting for fabrication aspects,” *IEEE Trans. Antennas Propag.*, vol. 69, no. 3, pp. 1440–1454, Mar. 2021.
- [64] D.-H. Kwon, “Modulated reactance surfaces for leaky-wave radiation based on complete aperture field synthesis,” *IEEE Trans. Antennas Propag.*, vol. 68, no. 7, pp. 5463–5477, Jul. 2020.
- [63] D.-H. Kwon, “Illusion electromagnetics for free-standing objects using passive lossless metasurfaces,” *Phys. Rev. B*, vol. 101, 235135, 2020.
- [62] K. M. Kossifos, L. Petrou, G. Varnava, A. Pitilakis, O. Tsilipakos, F. Liu, P. Karousios, A. Tasolamprou, M. Seckel, D. Manassis, N. V. Kantartzis, D.-H. Kwon, M. A. Antoniadis, and J. Georgiou, “Toward the realization of a programmable metasurface absorber enabled by custom integrated circuit technology,” *IEEE Access*, vol. 8, pp. 92986–92998, 2020.
- [61] F. Liu, O. Tsilipakos, A. Pitilakis, A. C. Tasolamprou, M. S. Mirmoosa, N. V. Kantartzis, D.-H. Kwon, J. Georgiou, K. Kossifos, M. A. Antoniadis, M. Kafesaki, C. M. Soukoulis, and S. A. Tretyakov, “Intelligent metasurfaces with continuously tunable local surface impedance for multiple reconfigurable functions,” *Phys. Rev. Appl.*, vol. 11, 044024, 2019.
- [60] D.-H. Kwon, “Lossless tensor surface electromagnetic cloaking for large objects in free space,” *Phys. Rev. B*, vol. 98, 125137, 2018.
- [59] D.-H. Kwon, “Lossless scalar metasurfaces for anomalous reflection based on efficient surface field optimization,” *IEEE Antennas Wireless Propag. Lett.*, vol. 17, no. 7, pp. 1149–1152, Jul. 2018.
- [58] Y. H. Cho and D.-H. Kwon, “Efficient analytical evaluation of complex dispersion relations of a multiple-row periodic array of magnetodielectric circular cylinders,” *IEEE Trans. Antennas Propag.*, vol. 66, no. 5, pp. 2449–2457, May 2018.
- [57] S. N. Tcvetkova, D.-H. Kwon, A. Díaz-Rubio, and S. A. Tretyakov, “Near-perfect conversion of a propagating plane wave into a surface wave using metasurfaces,” *Phys. Rev. B*, vol. 97, 115447, 2018.
- [56] D.-H. Kwon, G. Ptitsyn, A. Díaz-Rubio, and S. A. Tretyakov, “Transmission magnitude and phase control for polarization-preserving reflectionless metasurfaces,” *Phys. Rev. Appl.*, vol. 9, 034005, 2018.
- [55] D.-H. Kwon and S. A. Tretyakov, “Arbitrary beam control using passive lossless metasurfaces enabled by orthogonally-polarized custom surface waves,” *Phys. Rev. B*, vol. 97, 035439, 2018.
- [54] V. S. Asadchy, A. Díaz-Rubio, S. N. Tcvetkova, D.-H. Kwon, A. Elsakka, M. Albooyeh, and S. A. Tretyakov, “Flat engineered multichannel reflectors,” *Phys. Rev. X*, vol. 7, 031046, 2017.
- [53] D.-H. Kwon and S. A. Tretyakov, “Perfect reflection control for impenetrable surfaces using surface waves of orthogonal polarization,” *Phys. Rev. B*, vol. 96, 085438, 2017.

- [52] J. A. MALONEY, D.-H. Kwon, S. D. Keller, and R. Janaswamy, "Realistic GPS coverage prediction for dual polarized controlled reception pattern antennas," *IEEE Antennas Wireless Propag. Lett.*, vol. 16, pp. 1907–1910, 2017.
- [51] M. Albooyeh, D.-H. Kwon, F. Capolino, and S. A. Tretyakov, "Equivalent realizations of reciprocal meta-surfaces: the role of tangential and normal polarizations," *Phys. Rev. B*, vol. 95, 115453, 2017.
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- [49] M. A. NIKRAVAN and D.-H. Kwon, "A broadband perpendicular E-plane waveguide-to-suspended stripline transition," *Microw. Opt. Technol. Lett.*, vol. 58, no. 8, pp. 1831–1834, Aug. 2016.
- [48] D.-H. Kwon and H.-C. CHANG, "Bandwidth limitations of linearly-polarized infinite planar phased arrays in free space," *IEEE Trans. Antennas Propag.*, vol. 63, no. 8, pp. 3423–3431, Aug. 2015.
- [47] D.-H. Kwon, "Effective height, receiving area, and receiving efficiency of infinite planar phased array elements," *IEEE Trans. Antennas Propag.*, vol. 63, no. 5, pp. 2022–2031, May 2015.
- [46] H.-C. CHANG, Y. H. Cho, and D.-H. Kwon, "Radiation Q bounds for small electric dipoles over a conducting ground plane," *IEEE Trans. Antennas Propag.*, vol. 62, no. 4, pp. 2031–2040, Apr. 2014.
- [45] M. A. NIKRAVAN, H. G. Schantz, A. H. Unden, and D.-H. Kwon, "Channel multiplexing technique utilizing electric and magnetic components of a radio wave," *IEEE Commun. Lett.*, vol. 18, no. 2, pp. 317–320, Feb. 2014.
- [44] D.-H. Kwon, "Transformation electromagnetics and optics," *Forum for Electromagnetic Research Methods and Application Technologies*, pp. 1–11, Feb. 2014. [Online]. Available: <http://www.e-fermat.org>
- [43] D.-H. Kwon and D. M. Pozar, "Energy storage and radiation Q of infinite planar dipole phased arrays," *IEEE Trans. Antennas Propag.*, vol. 62, no. 1, pp. 153–162, Jan. 2014.
- [42] Y. H. Cho and D.-H. Kwon, "Efficient mode-matching analysis of two-dimensional scattering by periodic array of circular cylinders," *IEEE Trans. Antennas Propag.*, vol. 61, no. 3, pp. 1327–1333, Mar. 2013.
- [41] D.-H. Kwon, "Quasi-Conformal Transformation Optics Lenses for Conformal Arrays," *IEEE Antennas Wireless Propag. Lett.*, vol. 11, pp. 1125–1128, 2012.
- [40] D.-H. Kwon and C. D. EMIROGLU, "Non-orthogonal grids in two-dimensional transmission-line meta-materials," *IEEE Trans. Antennas Propag.*, vol. 60, no. 9, pp. 4210–4218, Sep. 2012.
- [39] D.-H. Kwon, "Transformation electromagnetic design of an embedded monopole in a ground recess for conformal applications," *IEEE Antennas Wireless Propag. Lett.*, vol. 9, pp. 432–435, 2010.
- [38] C. D. EMIROGLU and D.-H. Kwon, "Impedance-matched three-dimensional beam expander and compressor designs via transformation optics," *J. Appl. Phys.*, vol. 107, no. 8, 084502, Apr. 2010.
- [37] D.-H. Kwon and D. H. Werner, "Transformation electromagnetics: an overview of the theory and applications," *IEEE Antennas Propag. Mag.*, vol. 52, no. 1, pp. 24–46, Feb. 2010.
- [36] D.-H. Kwon and C. D. EMIROGLU, "Low-profile embedded design of endfire scanning arrays with coordinate transformations," *J. Appl. Phys.*, vol. 107, no. 3, 034508, Feb. 2010.
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- [32] D.-H. Kwon and D. H. Werner, "Flat focusing lens designs having minimized reflection based on coordinate transformation techniques," *Opt. Express*, vol. 17, no. 10, pp. 7807–7817, May 2009.

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- [20] X. Wang, D.-H. Kwon, D. H. Werner, I.-C. Khoo, A. V. Kildishev, and V. M. Shalaev, "Tunable optical negative-index metamaterials employing anisotropic liquid crystals," *Appl. Phys. Lett.*, vol. 91, no. 14, 143122, Oct. 2007.
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Patents**Patents granted (U.S. patents)**

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- [3] K.-H. Kim, Y.-E. Kim, and D.-H. Kwon, "Built-in antenna system for indoor wireless communications," U.S. Patent 6 947 009, Sep. 20, 2005.
- [2] D.-H. Kwon, "Small and omni-directional biconical antenna for wireless communications," U.S. Patent 6 943 747, Sep. 13, 2005.
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Invited talks

- Invited talk “Interface field optimization for wide-angle metasurface refractors in TM polarization” at *the 2021 IEEE Int. Symp. Antennas Propag.*, Singapore, Dec. 2021. (online)
- Invited talk “Functional electromagnetic surface design via complete interface field synthesis,” at *the 15th International Congress on Artificial Materials and Novel Wave Phenomena (Metamaterials 2021)*, New York, NY, Sep. 2021. (online)
- Invited talk “Planar modulated reactance surfaces for endfire antenna applications” at *the 6th International Conference on Metamaterials and Nanophotonics (Metanano 2021)*, Tbilisi, Georgia, Sep. 2021. (online)
- Invited seminar “Holistic lossless functional surface design via complete boundary field synthesis” at the Department of Electronics and Nanoengineering, Aalto University, Finland (11/4/2020, online)
- Invited talk “Modulated reactance surfaces for efficient plane wave to surface wave conversion” at *the 5th International Conference on Metamaterials and Nanophotonics (Metanano 2020)*, Tbilisi, Georgia, Sep. 2020. (online, without proceeding)
- Invited seminar “Holistic lossless boundary conditions and their application to metasurfaces” at Department of Electrical and Computer Engineering, Seoul National University, Korea (8/26/2019)
- Invited seminar “Transformation EM and metamaterials for antennas at a virtual location” at Air Force Research Lab/Sensors Directorate, Wright-Patterson Air Force Base, OH (8/30/2011)
- Invited seminar “Transformation optics/electromagnetics device designs” at the Material Research Science and Engineering Center (MRSEC) of the Pennsylvania State University (1/10/2011)
- Invited seminar “Transformation optics/electromagnetics device designs” at the Electrical and Computer Engineering Department of Worcester Polytechnic Institute (11/4/2010)
- Invited seminar “Small electric-magnetic type antennas for enhanced gain and bandwidth” at IEEE Antennas and Propagation Society Boston Section Meeting (1/27/2009)

Honors and Awards

- 2011 IEEE Antennas and Propagation Edward E. Altshuler Prize Paper Award (inaugural)
- Reconfigurable transmissive/reflective metamaterial paper (D.-H. Kwon *et al.*, *Opt. Lett.* **33**, 545 (2008)) highlighted in the April 2008 issue of Nature Photonics.
- Achievement award, RF Technology Group, Communication Laboratory, Samsung Advanced Institute of Technology (2006)
- Breakthrough award, Samsung Advanced Institute of Technology (2005)
- Outstanding graduate research award, ElectroScience Laboratory, Department of Electrical Engineering, The Ohio State University (1995)

Memberships

- IEEE Antennas and Propagation Society (Membership grade: Senior Member)

Professional activities

Associate editor for *IEEE Antennas Wireless Propag. Lett.* (Jul. 2013–Jul. 2019)

Guest editor for IEEE AWPL Special Cluster on Transformation Electromagnetics (2014)

Editor for Journal of Electromagnetic Engineering and Science (JEES) (Jan. 2014–Dec. 2014)

Reviewer for Army Research Office basic research grant proposals

Co-chair of Student Program and member of Technical Program Committee, 2013 IEEE International Symposium on Phased Array Systems & Technology, Waltham, MA, Oct. 2013.

Reviewer for IEEE journals: *IEEE Trans. Aerosp. Electron. Syst.*, *IEEE Trans. Robot. Autom.*, *IEEE Trans. Microw. Theory Tech.*, *IEEE J. Sel. Topics Quantum Electron.*, *IEEE Trans. Antennas Propag.*, *IEEE Antennas Propag. Mag.*, *IEEE Antennas Wireless Propag. Lett.*, *Proc. IEEE*, *IEEE Microw. Wireless Compon. Lett.*

Reviewer for IET journals: *IET Microw. Antennas Propag.*, *Electron. Lett.*

Reviewer for physics journals: *Appl. Phys. Lett.*, *J. Appl. Phys.*, *Phys. Rev. Appl.*

Reviewer for optics journals: *Nature Photon.*, *Opt. Express*, *Opt. Lett.*

Reviewer for Springer Nature journals: *Sci. Rep.*

Reviewer for other journals: *ETRI J.*, *Prog. Electromagn. Res.*, *J. Electromagn. Waves Appl.*, *Appl. Comput. Electromagn. Soc. J.*, *Int. J. Antennas Propag.*, *Wirel. Commun. Mob. Comput.*, *Engineering* (by Elsevier).

Co-chair of Student Program and member of Technical Program Committee, 2010 IEEE International Symposium on Phased Array Systems & Technology, Waltham, MA, Oct. 2010.

Panelist for the NSF-ENG-ECCS-IHCS program (Jun. 2010)

Session co-organizer and co-chair, “Special Session: Transformation Electromagnetics” (Session 517), 2009 IEEE Antennas Propag. Soc. Int. Symp., Charleston, SC, Jun. 2009.

Secretary-Treasurer, IEEE Central Pennsylvania Section (2008)