

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

- Associate professor, Department of Electrical and Computer Engineering
University of Massachusetts Amherst, Amherst, MA (Aug. 2008–Present)
Lab association: Antennas and Propagation Laboratory
- Post-doctoral researcher, Department of Electrical Engineering and Material Research Science and Engineering Center (MRSEC)
The Pennsylvania State University, University Park, PA (Apr. 2006–July 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 (July 2000–Mar. 2006)

Projects

- [Grant] Wearable antijam GPS antennas for dismounted soldier navigation systems, PI: Ramakrishna Janaswamy and Do-Hoon Kwon, Source: Army CERDEC via ARO, Period: 1/2016–1/2019 (36 months), Fund: \$242,602
- [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 (total \$141,261)
- [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 (total \$94,888)
- [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 333 Fields and Waves
- ECE 585 Microwave Engineering II
- ECE 687 Antenna Theory and Design
- ECE 697TE Transformation Electromagnetics and Metamaterials
- ECE 597AP Introduction to Antennas and Propagation

Service

- Graduate admissions committee (FA08–SP09, FA09–SP10): Evaluated applications for admission to ECE graduate program in Microwave Engineering field
- Graduate seminar committee (FA10–SP11): Arranged and hosted invited seminars for the graduate seminar course in the Microwave Engineering area
- ECE Picnic (SP12, SP13, SP14): Organize and plan for ECE Picnics in the spring semester
- Faculty advisor to ECE Student Advisory Committee (ESAC) (FA12–SP13, FA13–SP14, FA14–Present): Oversee and advise ESAC activities
- ECE Ph.D. Poster Session Committee (FA13): Planned and ran the 2nd annual ECE Ph.D. poster session.

Advising**Current students**

- Hsieh-Chi Chang (Ph.D. candidate)
- Jeffrey Maloney (Ph.D. student; co-advised with Prof. Ramakrishna Janaswamy)

Past students

Adebayo Adeyemi (M.S. 2014; currently with Tata Consultancy Services)
Yutong Yang (M.S. 2014; currently with Advanced Energy Industries, Inc.)
Hua Bai (M.S. 2014; co-advised with Prof. Ramakrishna Janaswamy; currently in Ph.D. program)
Narayana Balu (M.S. 2014; co-advised with Prof. Ramakrishna Janaswamy; currently with CST America)
Hsieh-Chi Chang (M.S. 2012; currently in Ph.D. program)
Christopher Merola (M.S. 2011; currently in Ph.D. program)
Caglar D. Emiroglu (Ph.D. 2015; M.S. 2011; currently with NIST)
Amin Nikravan (Ph.D. 2016; currently with AeroAntenna Technology, Inc.)

Committees

Huajie Ke (Ph.D. in Physics, 2013)
John Logan (Ph.D. 2016, M.S. 2013)
Salma Mirza (M.S. 2010)

Publications**Degree Theses**

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.
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

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

Book Chapters

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.
D.-H. Kwon, E. V. Balzovsky, Y. I. Buyanov, Y. Kim, and V. I. Koshchev, "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, ch. 49, 2010.

Papers in Refereed Journals

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.*, submitted for publication.
D.-H. Kwon and S. A. Tretyakov, "Arbitrary beam control using passive lossless metasurfaces enabled by orthogonally-polarized custom surface waves," *Phys. Rev. B*, submitted for publication.
Y. H. Cho and D.-H. Kwon, "Complex dispersion relations of a multiple-row periodic array of magnetodielectric circular cylinders," *IEEE Trans. Antennas Propag.*, under revision.

- S. N. Tsvetkova, D.-H. Kwon, A. Díaz-Rubio, and S. A. Tretyakov, "Near-perfect conversion of a propagating wave into a surface wave using metasurfaces," *Phys. Rev. B*, under revision.
- V. S. Asadchy, A. Díaz-Rubio, S. N. Tsvetkova, D.-H. Kwon, A. Elsakka, M. Albooyeh, and S. A. Tretyakov, "Flat engineered multichannel reflectors," *Phys. Rev. X*, vol. 7, 031046, 2017.
- 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.
- 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.
- M. Albooyeh, D.-H. Kwon, F. Capolino, and S. A. Tretyakov, "Equivalent realizations of reciprocal metasurfaces: the role of tangential and normal polarizations," *Phys. Rev. B*, vol. 95, 115453, 2017.
- C. D. Emiroglu and D.-H. Kwon, "Design and realization of virtual line source using metamaterials," *IEEE Trans. Antennas Propag.*, vol. 64, no. 12, pp. 5220–5229, Dec. 2016.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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>
- 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.
- 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.
- D.-H. Kwon, "Quasi-Conformal Transformation Optics Lenses for Conformal Arrays," *IEEE Antennas Wireless Propag. Lett.*, vol. 11, pp. 1125–1128, 2012.
- D.-H. Kwon and C. D. Emiroglu, "Non-orthogonal grids in two-dimensional transmission-line metamaterials," *IEEE Trans. Antennas Propag.*, vol. 60, no. 9, pp. 4210–4218, Sep. 2012.
- 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.
- 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.
- 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.
- 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.
- D.-H. Kwon and D. M. Pozar, "Optimal characteristics of an arbitrary receive antenna," *IEEE Trans. Antennas Propag.*, vol. 57, no. 12, pp. 3720–3727, Dec. 2009.

- D.-H. Kwon and D. H. Werner, "Beam scanning using flat transformation electromagnetic focusing lenses," *IEEE Antennas Wireless Propag. Lett.*, vol. 8, pp. 1115–1118, 2009.
- D.-H. Kwon, "Virtual circular array using material-embedded linear source distributions," *Appl. Phys. Lett.*, vol. 95, no. 17, 173503, Oct. 2009.
- 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.
- D.-H. Kwon and D. H. Werner, "Transformation optical designs for wave collimators, flat lenses, and right-angle bends," *New J. Phys.*, vol. 10, 115023, Nov. 2008.
- D.-H. Kwon and D. H. Werner, "Polarization splitter and polarization rotator designs based on transformation optics," *Opt. Express*, vol. 16, no. 23, pp. 18731–18738, Nov. 2008.
- D.-H. Kwon, "Radiation Q and gain of TM and TE sources in phase-delayed rotated configurations," *IEEE Trans. Antennas Propag.*, vol. 56, no. 8, pp. 2783–2786, Aug. 2008.
- I. C. Khoo, D. H. Werner, D. H. Kwon, and A. Diaz, "Designing liquid crystalline nonlinear optical metamaterials with large birefringence and sub-unity refractive index," *Mol. Cryst. Liq. Cryst.*, vol. 488, pp. 88–99, 2008.
- D.-H. Kwon, D. H. Werner, A. V. Kildishev, and V. M. Shalaev, "Material parameter retrieval procedure for general bi-isotropic metamaterials and its application to optical chiral negative-index metamaterial design," *Opt. Express*, vol. 16, no. 16, pp. 11822–11829, July 2008.
- D.-H. Kwon, P. L. Werner, and D. H. Werner, "Optical planar chiral metamaterial designs for strong circular dichroism and polarization rotation," *Opt. Express*, vol. 16, no. 16, pp. 11802–11807, July 2008.
- D.-H. Kwon and D. H. Werner, "Restoration of antenna parameters in scattering environments using electromagnetic cloaking," *Appl. Phys. Lett.*, vol. 92, no. 11, 113507, Mar. 2008.
- D.-H. Kwon and D. H. Werner, "Two-dimensional electromagnetic cloak having a uniform thickness for elliptic cylindrical regions," *Appl. Phys. Lett.*, vol. 92, no. 11, 113502, Mar. 2008.
- D.-H. Kwon, X. Wang, Z. Bayraktar, B. Weiner, and D. H. Werner, "Near-infrared metamaterial films with reconfigurable transmissive/reflective properties," *Opt. Lett.*, vol. 33, no. 6, pp. 545–547, Mar. 2008.
- D.-H. Kwon, E. V. Balzovsky, Y. I. Buyanov, Y. Kim, and V. I. Koshelev, "Small printed combined electric-magnetic type ultrawideband antenna with directive radiation characteristics," *IEEE Trans. Antennas Propag.*, vol. 56, no. 1, pp. 237–241, Jan. 2008.
- D.-H. Kwon and D. H. Werner, "Two-dimensional eccentric elliptic electromagnetic cloaks," *Appl. Phys. Lett.*, vol. 92, no. 1, 013505, Jan. 2008.
- 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.
- A. V. Kildishev, U. K. Chettiar, Z. Liu, V. M. Shalaev, D.-H. Kwon, Z. Bayraktar, and D. H. Werner, "Stochastic optimization of low-loss optical negative index metamaterial," *J. Opt. Soc. Am. B*, vol. 24, no. 10, pp. A34–A39, Oct. 2007.
- I. C. Khoo, A. Diaz, D. Kwon, D. H. Werner, J. Liou, M. Stinger, J. H. Park, S. Kubo, and T. Mallouk, "Nonlinear and electro-optics of nano-dispersed nematic liquid crystals with tunable negative-, zero-, and positive indices," *J. Nonlinear Opt. Phys. Mater.*, vol. 16, no. 3, pp. 381–399, Sep. 2007.
- D.-H. Kwon and D. H. Werner, "Low-index metamaterial designs in the visible spectrum," *Opt. Express*, vol. 15, no. 15, pp. 9267–9272, July 2007.
- D.-H. Kwon, "Wideband balun and vertical transition between microstrip and parallel-strip transmission line," *Microw. Opt. Tech. Lett.*, vol. 49, no. 7, pp. 1530–1532, July 2007.

- A. V. Kildishev, V. P. Drachev, U. K. Chettiar, V. M. Shalaev, D. H. Werner, and D.-H. Kwon, "Comment on "Negative refractive index in artificial metamaterials"," *Opt. Lett.*, vol. 32, no. 11, pp. 1510–1511, June 2007.
- D. H. Werner, D.-H. Kwon, I.-C. Khoo, A. V. Kildishev, and V. M. Shalaev, "Liquid crystal clad near-infrared metamaterials with tunable negative-zero-positive refractive indices," *Opt. Express*, vol. 15, no. 6, pp. 3342–3347, Mar. 2007.
- D.-H. Kwon, L. Li, J. A. Bossard, M. G. Bray, and D. H. Werner, "Zero index metamaterials with checkerboard structure," *Electron. Lett.*, vol. 43, no. 6, pp. 319–320, Mar. 2007.
- D.-H. Kwon, D. H. Werner, A. V. Kildishev, and V. M. Shalaev, "Near-infrared metamaterials with dual-band negative-index characteristics," *Opt. Express*, vol. 15, no. 4, pp. 1647–1652, Feb. 2007.
- D.-H. Kwon and Y. Kim, "Small low-profile loop wideband antennas with unidirectional radiation characteristics," *IEEE Trans. Antennas Propag.*, vol. 55, no. 1, pp. 72–77, Jan. 2007.
- D.-H. Kwon, "Effect of antenna gain and group delay variations on pulse-preserving capabilities of ultra-wideband antennas," *IEEE Trans. Antennas Propag.*, vol. 54, no. 8, pp. 2208–2215, Aug. 2006.
- D.-H. Kwon and Y. Kim, "Suppression of cable leakage current for edge-fed printed dipole UWB antennas using leakage-blocking slots," *IEEE Antennas Wireless Propag. Lett.*, vol. 5, pp. 183–186, 2006.
- D.-H. Kwon, "A wideband balun and vertical transition between conductor-backed CPW and parallel-strip transmission line," *IEEE Microwave Wireless Compon. Lett.*, vol. 16, no. 4, pp. 152–154, Apr. 2006.
- D.-H. Kwon and Y. Kim, "A wideband vertical transition between co-planar waveguide and parallel-strip transmission line," *IEEE Microwave Wireless Compon. Lett.*, vol. 15, no. 9, pp. 591–593, Sep. 2005.
- Y. Kim and D.-H. Kwon, "CPW-fed right-angled dual tapered notch antenna for ultra-wideband communication," *Electron. Lett.*, vol. 41, no. 12, pp. 5–6, June 2005.
- D.-H. Kwon, "On the radiation Q and the gain of crossed electric and magnetic dipole moments," *IEEE Trans. Antennas Propag.*, vol. 53, no. 5, pp. 1681–1687, May 2005.
- Y. Kim and D.-H. Kwon, "CPW-fed planar ultra wideband antenna having a frequency band notch function," *Electron. Lett.*, vol. 40, no. 7, pp. 403–405, Apr. 2004.
- D.-H. Kwon, R. J. Burkholder, and P. H. Pathak, "Efficient method of moments formulation for large PEC scattering problems using asymptotic phasefront extraction (APE)," *IEEE Trans. Antennas Propag.*, vol. 49, no. 4, pp. 583–591, Apr. 2001.
- D.-H. Kwon, R. J. Burkholder, and P. H. Pathak, "Ray analysis of electromagnetic field build-up and quality factor of electrically large shielded enclosures," *IEEE Trans. Electromagn. Compat.*, vol. 40, no. 1, pp. 19–26, Feb. 1998.
- R. J. Burkholder and D.-H. Kwon, "High-frequency asymptotic acceleration of the fast multipole method," *Rad. Sci.*, vol. 31, pp. 1199–1206, Sep.–Oct. 1996.

Papers at Refereed Conferences

- S. N. Tsvetkova, D.-H. Kwon, A. Díaz-Rubio, and S. A. Tretyakov, "Nearly perfect conversion of a propagating wave into a surface wave," in *Proc. the 19th Int. Conf. Electromagn. Adv. Appl. (ICEAA 2017)*, Verona, Italy, Sep. 2017, pp. 1426–1428.
- S. A. Tretyakov, D.-H. Kwon, M. Albooyeh, and F. Capolino, "Functional metasurfaces: do we need normal polarizations?," in *Proc. the 32nd Int. Union Rad. Sci. Gen. Assy. Sci. Symp. (URSI GASS 2017)*, Montreal, Canada, Aug. 2017, paper B7-1 (invited).
- J. A. Maloney, D.-H. Kwon, R. Janaswamy, and S. D. Keller, "Comparison of radiation pattern modeling methods for GPS controlled reception pattern array," in *Proc. 2017 IEEE Antennas Propag. Soc. Int. Symp.*, San Diego, CA, Jul. 2017, pp. 1897–1898.

- M. Albooyah, H. Kazemi, F. Capolino, D.-H. Kwon, and S. A. Tretyakov, "Normal vs tangential polarizations in metasurfaces," in *Proc. 2017 IEEE Antennas Propag. Soc. Int. Symp.*, San Diego, CA, Jul. 2017, pp. 1707–1708.
- A. Días-Rubio, V. Asadchy, D.-H. Kwon, and S. Tretyakov, "Perfect reflectarrays elements based on non-local metasurfaces," in *Proc. 2017 IEEE Antennas Propag. Soc. Int. Symp.*, San Diego, CA, Jul. 2017, pp. 89–90.
- Y. H. Cho and D.-H. Kwon, "Electromagnetic dispersion relations for the TE- and TM-mode propagation in a periodic array of circular cylinders," in *Proc. the 16th Int. Symp. Microw. Opt. Technol.*, Seoul, Korea, Jun. 2017.
- D.-H. Kwon, "Fano matching bandwidth bounds for small loop antennas based on spherical wave scattering," in *Proc. the 11th Eur. Conf. Antennas Propag. (EuCAP 2017)*, Paris, France, Mar. 2017, pp. 1581–1585.
- Y. Yang and D.-H. Kwon, "Indirect impedance measurement of a small dipole antenna over a ground plane," in *Proc. the 2017 Int. Workshop Antenna Technol. (iWAT 2017)*, Athens, Greece, Mar. 2017, pp. 218–221.
- D.-H. Kwon, "On the bandwidth of small dipoles and the electric polarizability," in *Proc. 2016 IEEE Antennas Propag. Soc. Int. Symp.*, Fajardo, PR, Jun. 2016, pp. 1723–1724.
- D.-H. Kwon, "Bandwidth bounds for small dipole antennas based on spherical wave scattering," in *Proc. 2016 IEEE Antennas Propag. Soc. Int. Symp.*, Fajardo, PR, Jun. 2016, pp. 1721–1722.
- H.-C. Chang and D.-H. Kwon, "Higher-order bandwidth bounds for conductor-backed planar arrays," in *Proc. 2016 IEEE Antennas Propag. Soc. Int. Symp.*, Fajardo, PR, Jun. 2016, pp. 921–922.
- D.-H. Kwon, "Received voltage and power for an arbitrary element of infinite planar arrays," in *Proc. 2015 IEEE Antennas Propag. Soc. Int. Symp.*, Vancouver, Canada, Jul. 2015, pp. 2505–2506.
- D.-H. Kwon and D. M. Pozar, "Spectral-domain radiation Q analysis of a planar dipole over a conducting ground plane," in *Proc. 2015 IEEE Antennas Propag. Soc. Int. Symp.*, Vancouver, Canada, Jul. 2015, pp. 1404–1405.
- C. D. Emiroglu and D.-H. Kwon, "Design and experimental validation of virtual line source radiation using metamaterials," in *Proc. 2015 IEEE Antennas Propag. Soc. Int. Symp.*, Vancouver, Canada, Jul. 2015, pp. 57–58.
- M. A. Nikravan and D.-H. Kwon, "A vertical waveguide-to-suspended stripline transition," in *Proc. 2014 IEEE Antennas Propag. Soc. Int. Symp.*, Memphis, TN, Jul. 2014, pp. 1696–1697.
- M. A. Nikravan, D.-H. Kwon, H. G. Schantz, and A. H. Uden, "Near-field MIMO communication utilizing both electric and magnetic field components," in *Proc. 2014 IEEE Antennas Propag. Soc. Int. Symp.*, Memphis, TN, Jul. 2014, pp. 474–475.
- D.-H. Kwon and D. M. Pozar, "Radiation Q of planar dipole phased arrays on a grounded substrate," in *Proc. 2014 IEEE Antennas Propag. Soc. Int. Symp.*, Memphis, TN, Jul. 2014, pp. 928–929.
- D. M. Pozar and D.-H. Kwon, "Radiation quality factor analysis of planar phased arrays," in *Proc. 2013 IEEE Int. Symp. Phased Array Syst. Technol.*, Waltham, MA, Oct. 2013, pp. 738–745.
- H. G. Schantz, A. H. Uden, M. A. Nikravan, and D.-H. Kwon, "Simple formulas for near-field transmission, gain, and fields," in *Proc. 37th Antenna Appl. Symp.*, Monticello, IL, Sep. 2013, pp. 360–384.
- W. J. Byun, Y. H. Cho, and D.-H. Kwon, "Analytic dispersion relation of periodic array of magnetodielectric circular cylinders," presented at *Prog. Electromagn. Res. Symp. 2013*, Stockholm, Sweden, Aug. 2013.
- H.-C. Chang, D.-H. Kwon, and Y. H. Cho, "Radiation Q of small vertically polarized dipole antennas over a ground plane," in *Proc. 2013 IEEE Antennas Propag. Soc. Int. Symp.*, Orlando, FL, Jul. 2013, pp. 1518–1519.
- Y. Yang and D.-H. Kwon, "Impedance measurement approach for small antennas without direct cable attachment," in *Proc. 2013 IEEE Antennas Propag. Soc. Int. Symp.*, Orlando, FL, Jul. 2013, pp. 782–783.

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- D.-H. Kwon, "Bandwidth limitations of phased array elements," in *2013 IEEE Antennas Propag. Soc. Int. Symp.*, Orlando, FL, Jul. 2013, pp. 97–98.
- D.-H. Kwon, "Virtual conformal arrays using quasi-conformal transformation optics lenses," in *Proc. 7th Eur. Conf. Antennas Propag. (EuCAP 2013)*, Gothenburg, Sweden, Apr. 2013, pp. 2192–2196.
- C. D. Emiroglu and D.-H. Kwon, "Dichroic FSS design for angularly stable response using homogenization," in *Proc. 2012 IEEE Antennas Propag. Soc. Int. Symp.*, Chicago, IL, Jul. 2012.
- D.-H. Kwon, "Sum rule for conductor-backed thin-wire dipole antennas," in *Proc. 2012 IEEE Antennas Propag. Soc. Int. Symp.*, Chicago, IL, Jul. 2012.
- D.-H. Kwon and C. D. Emiroglu, "Two-dimensional metamaterial designs for line-source radiation from a virtual location," in *Proc. 6th Eur. Conf. Antennas Propag. (EuCAP 2012)*, Prague, Czech Republic, Mar. 2012, pp. 1706–1710.
- D.-H. Kwon and C. D. Emiroglu, "Non-orthogonal grid transmission-line metamaterials for tensor medium parameters," in *Proc. 2011 USNC/URSI National Radio Science Meeting*, Spokane, WA, Jul. 2011.
- C. D. Emiroglu and D.-H. Kwon, "Transmission-line metamaterial design of an embedded-recessed line source," in *Proc. 2011 IEEE Antennas Propag. Soc. Int. Symp.*, Spokane, WA, Jul. 2011.
- J. P. Turpin, Z. Jiang, P. L. Werner, D. H. Werner, and D.-H. Kwon, "Embedded transformation optics lenses for antenna performance enhancement," in *Proc. 27th Int. Rev. Prog. Appl. Comput. Electromagn.*, Williamsburg, VA, Mar. 2011.
- C. Merola and D.-H. Kwon, "Resonant antennas based on coupled transmission-line metamaterials," in *Proc. 34th Antenna Appl. Symp.*, Monticello, IL, Sep. 2010.
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Patents

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- D.-H. Kwon and Y.-E. Kim, "Apparatus for converting transmission structure," U.S. Patent Application Publication 2007/0139133, June 21, 2007.
- D.-H. Kwon and S.-S. Lee, "Ultra-wideband antenna having an isotropic radiation pattern," U.S. Patent Application Publication 2005/0146471, Jul. 7, 2005.

Patent applications (non-U.S. applications or U.S. applications unpublished)

Available upon request

Presentations

- Invited seminar at Korea Advanced Institute of Science and Technology, Daejeon, Korea (6/21/2013)
- Invited seminar at Electronics and Telecommunication Research Institute, Daejeon, Korea (6/21/2013)
- Invited seminar (via teleconferencing) at The SI Organization, Inc., Chantilly, VA (8/2/2012)
- Invited seminar at Air Force Research Lab/Sensors Directorate, Wright-Patterson Air Force Base, OH (8/30/2011)
- Invited seminar at the Material Research Science and Engineering Center (MRSEC) of the Pennsylvania State University (1/10/2011)
- Invited seminar at the Electrical and Computer Engineering Department of Worcester Polytechnic Institute (11/4/2010)
- Invited seminar at IEEE Antennas and Propagation Society Boston Section Meeting (1/27/2009)
- Invited seminar at Pohang University of Science and Technology, Pohang, Korea (1/23/2009)
- Invited seminar at Korea Electrotechnology Research Institute, Ansan, Korea (1/22/2009)
- Invited seminar at Korea Advanced Institute of Science and Technology, Daejeon, Korea (1/21/2009)
- Invited seminar at Electronics and Telecommunications Research Institute, Daejeon, Korea (1/21/2009)
- Invited seminar at Telecommunication and Network Research Center, Samsung Electronics, Suwon, Korea (1/20/2009)
- Invited seminar at Samsung Advanced Institute of Technology, Samsung Electronics, Giheung, Korea (1/19/2009)
- Invited seminar at Seoul National University, Seoul, Korea (1/16/2009)
- D.-H. Kwon, Y. Kim, S.-S. Lee, and S.-H. Myoung, "A small printed dipole UWB antenna for mobile handset applications," presented at the IEEE 802.15 working group meeting in Berlin, Germany, Sep. 16, 2004.
- D.-H. Kwon, "Samsung Electronics Co., Ltd. (SAIT)'s PHY proposal for IEEE 802.15.3a," presented at the IEEE 802.15 working group meeting in Dallas, TX, Mar. 12, 2003.

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 and Wireless Propagation Letters (Jul. 2013–present)

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*.

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

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

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

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.*

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.

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