

Ergun Simsek

Professor of the Practice and Graduate Program Director for Data Science
Department of Computer Science and Electrical Engineering (CSEE)
University of Maryland Baltimore County (UMBC)
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EMPLOYMENT HISTORY

11/18 – present Professor of the Practice, Computer Science and Electrical Engineering, UMBC
Director, Graduate Data Science Programs
Senior Researcher, Computational Photonics Laboratory

05/17 – 11/18 Manager, Exponent Inc.

06/14 – 08/14 Visiting Summer Fellow, Naval Research Laboratory

09/11 – 08/18 Assistant Professor of Electrical and Computer Engineering, The George Washington University

02/11 – 08/11 Associate Professor of Electrical and Electronics Engineering, Bahcesehir University

09/08 – 01/11 Assistant Professor of Electrical and Electronics Engineering, Bahcesehir University

01/07 – 08/08 Post-Doctoral Research Associate, Schlumberger-Doll Research, Cambridge, MA
Advisers: Dr. Bikash Sinha and Prof. Kenneth Crozier (Harvard University)

EDUCATION

07/03 – 12/06 PhD in Electrical and Computer Engineering, Duke University
Adviser: Prof. Qing H. Liu
Dissertation: Electromagnetic Scattering from Inhomogeneous Objects of Arbitrary Shaped
Embedded in a Layered Medium

09/01 – 06/03 MS in Electrical and Computer Engineering, University of Massachusetts Dartmouth
Adviser: Prof. Branislav M. Notaros
Thesis: Evaluation of Closed-form Green's Functions for Multilayer Microstrip Antennas
and Circuits

09/97 – 06/01 BS in Electrical and Electronics Engineering, Bilkent University, Ankara, Turkey

AWARDS, HONORS, and HIGHLIGHTS

- Senior Member of the IEEE, since 2012.
- Invited participant in National Academy of Engineering-sponsored Frontiers of Engineering Education Symposium, 2013.
- Professor of the Year Award given by GW Electrical and Computer Engineering students, 2013.
- Marie Curie Fellow, 2008–2011.
- TUBITAK 7th Framework Participation Award, 2009.
- Duke University Conference Travel Fellowship, 2006.
- Research Assistantship awarded by Duke University, 2003-2006.
- Teaching Assistantship awarded by University of Massachusetts Dartmouth, 2001-2003.
- Full scholarship awarded by Bilkent University, 1996-2001.
- Ranked 5th in Nation-wide Student Selection Examination among 1.5 million students; full scholarship awarded by the Turkish Government for undergraduate study abroad, 1996.

RESEARCH INTERESTS

- Scientific Computing: Multiphysics & multiscale numerical solvers, inverse problems, computational quantum electromagnetics, and Maxwell-Schrödinger Systems.
- Photonics: 2D materials, surface plasmons, sensors, modulators, photodetectors, laser ablation, high energy lasers.
- Data Science: Deep-learning enhanced sensing, imaging, electromagnetic/optical inversion, imaging; designing photonic devices with machine learning and optimization, AI for micro-machining and discovery.

RESEARCH GRANTS

- Grant “Catastrophic impacts of geomagnetic disturbances on power system operation: Analysis and Mitigation,” from National Science Foundation, Co-PI, Total: \$327,246. Start Date: Sept. 1 2016. End Date: Aug. 31, 2019. Award No. NSF ECCS 16-10390.
- Grant “Numerical Solution of Electromagnetic Scattering from Three-Dimensional Arbitrarily Shaped Objects Embedded in a Multilayered Medium,” from The Scientific and Technological Research Council of Turkey, TUBITAK, PI Ergun Simsek (single-investigator grant), Start Date: Sept. 1, 2010, End Date: Oct. 30, 2012, \$110,000, Award No. 110E269.
- Grant “Novel Numerical Algorithms for Plasmonic Structures Embedded in a Layered Medium,” from European Commission Seventh Framework Programme, Marie Curie Grants, PI Ergun Simsek (single-investigator grant), Start Date: Nov. 1, 2009, End Date: Oct. 30, 2012, €100,000, Award No. PIRG-GA-2009-247876.
- Grant “Plasmonic resonance modes of cylindrical metal nanoparticles,” from TUBITAK, PI Ergun Simsek (single-investigator grant), Start Date: May 1, 2010, End Date: April 30, 2011, \$23,300, Award No. 110E002.
- Seed Fund “Plasmonic sensors,” from Bahcesehir University Research Foundation, PI Ergun Simsek, Start Date: January 1, 2009, End Date: April 30, 2009, \$19,200.

SELECTED JOURNAL PAPERS (h-index = 18, i10-index = 25, Total Citations: 1305, [Google Scholar](#))

- E. Simsek, “Machine Learning Exercises on One-Dimensional Electromagnetic Inversion”, *IEEE Trans on Antennas and Propagation*, April 2021. DOI: 10.1109/TAP.2021.3069519
Significance: This work shows that neural networks trained with broadband data can beat the single-frequency systems designed with the Nyquist Sampling Theorem in terms of accuracy. This idea can lead to smaller and cheaper imaging, sensing, and electromagnetic inversion systems with longer lifetimes.
- E. Simsek, “Determining Optical Constants of 2D Materials with Neural Networks from Multi-Angle Reflectometry Data,” *IOP Machine Learning: Science and Technology*, vol. 1, no. 1, Feb. 2020.
- B. Mukherjee, N. Kaushik, R. P. N. Tripathi, A. M. Joseph, P. K. Mohapatra, S. Dhar, G. V. Pavan Kumar, S. Lodha, and E. Simsek, “Exciton Emission Intensity Modulation of Monolayer MoS₂ via Au Plasmon Coupling,” *Scientific Reports*, vol. 7, 41175, Jan. 2017.
- B. Mukherjee, B. Varghese, M. Zheng, E. S. Tok, E. Simsek, C. H. Sow, “Photoconductivity in VO₂-ZnO Inter-nanowire Junction and Nanonetwork Device,” *Nanosci. Nanotechnol. Lett.*, vol. 8, pp. 492–497, 2016.
- E. Simsek and B. Mukherjee, “Utilization of monolayer MoS₂ in Bragg Stacks and Metamaterial Structures as Broadband Absorbers,” *Opt. Commun.*, vol. 369, pp. 89-93, 2016.
- B. Mukherjee and E. Simsek, “Plasmonics Enhanced Average Broadband Absorption of Monolayer MoS₂,” *Plasmonics*, vol. 11, no. 1, pp 285–289, 2016.
- F. Tseng, E. Simsek, and D. Gunlycke, “Using Dark States for Exciton Storage in Transition-Metal Dichalcogenides,” *J. Phys.: Condens. Matter*, vol. 27, no. 3, 2016.
Significance: First theoretical work on the possibility of storing excitons in excitonic dark states in monolayer semiconducting transition-metal dichalcogenides for applications in energy management and quantum information processing.
- B. Mukherjee and E. Simsek, “Absorptance of PbS Quantum Dots Thin Film Deposited On Trilayer MoS₂,” *Adv. Mat. Lett.*, vol. 6, no. 11, pp. 779–782, 2015.
- B. Mukherjee and E. Simsek, “Visibility of Atomically Thin Layered Materials Buried in Silicon Dioxide,” *IOP Nanotechnology*, vol. 26, no. 45, 455701, October 2015.
- B. Mukherjee, W. S. Leong, Y. Li, H. Gong, L. Sun, Z. Shen, E. Simsek, and J. Thong, “Raman analysis of gold on WSe₂ single crystal film,” *Mater. Res. Express*, vol. 2, 065009, June 2015.
- B. Mukherjee, F. Tseng, D. Gunlycke, K. Kumar Amara, G. Eda, E. Simsek, “Complex Electrical Permittivity of the Monolayer Molybdenum Disulfide (MoS₂) in Near UV and Visible,” *Opt. Mater. Express*, vol. 5, no. 2,

pp. 447-455, Jan. 2015.

Significance: A truly interdisciplinary and multi-national research led by Dr. Simsek created a model enabling scientists and engineers with accurate and realistic representation of electrical and optical properties of MoS₂ as functions of wavelength, temperature, and Fermi energy.

- R. Sahin, S. Akturk, and E. Simsek, “Quantifying the Quality of Femtosecond Laser Ablation of Graphene,” *Appl. Phys. A*, vol. 116, no 2, pp. 555-560, Aug. 2014.
- R. Sahin, E. Simsek, and S. Akturk, “Nanoscale Patterning of Graphene through Femtosecond Laser Ablation,” *Appl. Phys. Lett.*, vol. 104, 053118, 2014.
- C. Ye, K. Sikandar, Z. Li, E. Simsek, and V. J. Sorger, “ λ -Size ITO and Graphene-based Electro-optic Modulators on SOI,” *IEEE J. Sel. Topics Quantum Electron.*, vol. 20, no. 4, 2014.
- E. Simsek, “Graphene in Layered Medium Applications” *Microw. Opt. Technol. Lett.*, vol. 55, no. 10, pp. 2293–2296, Oct. 2013.
- R. Sahin, Y. Morova, E. Simsek, S. Akturk, “Bessel-Beam-Written Nanoslit Arrays and Characterization of their Optical Response,” *Appl. Phys. Lett.*, vol. 102, no. 19, 193106 (4 pages), May 2013.
- E. Simsek, “A Closed-Form Approximate Expression for the Optical Conductivity of Graphene,” *Opt. Lett.*, vol. 38, no. 9, pp. 1437–1439, May 2013.
- E. Simsek, “Improving the Tuning Range and Sensitivity of Localized Surface Plasmon Resonance Sensors with Graphene,” *IEEE Photon. Technol. Lett.*, vol. 25, no. 9, pp. 867–870, May 2013.
- Significance:* First demonstration of the concept of electrically tunable surface plasmon resonance sensors deploying graphene.
- E. Simsek and S. Akturk, “Plasmonic Enhancement during Femtosecond Laser Drilling of sub-Wavelength Holes in Metals,” *Plasmonics*, vol. 6, no. 4, pp. 767–772, 2011.
- E. Simsek, “Full Analytical Model for Obtaining Surface Plasmon Resonance Modes of Metal Nanoparticle Structures Embedded in Layered Media,” *Opt. Express*, vol. 18, no. 2, pp. 1722–1733, Jan. 2010.
- E. Simsek, “On the Surface Plasmon Resonance Modes of Nanoparticle Chains and Arrays,” *Plasmonics*, vol. 4, no. 3, pp. 223–230, Sept. 2009.
- Q. H. Liu, Y. Lin, J. Liu, J.H. Lee, and E. Simsek, “A 3-D Spectral Integral Method for Surface Integral Equations”, *IEEE Microw. Compon. Lett.*, vol. 19, no. 2, pp. 62–64, Feb. 2009.
- B. K. Sinha, E. Simsek, and S. Asvadurov, “Influence of a Pipe Tool on Borehole Modes in a Fast Formation,” *Geophysics*, vol. 74, no. 3, pp. E111–E123, May-June 2009.
- E. Simsek and B. K. Sinha, “Analysis of Noncircular Fluid Filled Boreholes in Elastic Formations Using a Perturbation Mode,” *J. Acoust. Soc. Am.*, vol. 124, no. 1, pp. 213–217, July 2008.
- K. B. Crozier, E. Togan, E. Simsek, and T. Yang, “Experimental Measurement of the Dispersion Relations of the Surface Plasmon Modes of Metal Nanoparticle Chains,” *Opt. Express*, 15, 17482–17493, 2007.
- B. Wei, E. Simsek, C. Yu, and Q. H. Liu, “Three-Dimensional Electromagnetic Nonlinear Inversion in Layered Media by a Hybrid Diagonal Tensor Approximation - Stabilized Biconjugate Gradient Fast Fourier Transform Method,” *Wave. Random. Complex.*, vol. 17, no. 2, pp. 129–147, May 2007.
- B. Wei, E. Simsek, and Q. H. Liu, “Improved diagonal tensor approximation (DTA) and hybrid DTA/BCGS-FFT method for accurate simulation of 3-D inhomogeneous objects in layered media,” *Wave. Random. Complex.*, vol. 17, no. 1, pp. 55–66, Feb. 2007.
- B. K. Sinha, E. Simsek, and Q. H. Liu, “Elastic wave propagation in deviated wells in anisotropic formations,” *Geophysics*, vol. 71, no. 6, pp. 191–202, Nov. 2006.
- E. Simsek, J. Liu, and Q. H. Liu, “A Spectral Integral Method and Hybrid SIM/FEM for Layered Media,” *IEEE Trans. Microw. Theory Techn.*, vol. 54, no. 11, pp. 3878–3884, Nov. 2006.
- E. Simsek, J. Liu, and Q. H. Liu, “A Spectral Integral Method (SIM) for Layered Media,” *IEEE Trans. Antennas Propag.*, vol. 54, no. 6, pp. 1742–1749, June 2006.

Significance: Most accurate and efficient algorithm ever developed to solve 2D layered-medium electromagnetic scattering problems.

- E. Simsek, Q. H. Liu, and B. Wei, “Singularity subtraction for evaluation of Green’s functions for multilayer media,” *IEEE Trans. Microw. Theory Techn.*, vol. 54, no. 1, pp. 216–225, Jan. 2006.
- L. P. Song, E. Simsek, and Q. H. Liu, “A Fast 2-D Volume Integral Equation Solver for Scattering from Inhomogeneous Objects in Layered Media,” *Microw. Opt. Technol. Lett.*, vol. 47, no. 2, pp. 128–134, Oct. 2005.

PEER-REVIEWED CONFERENCE PAPERS AND ABSTRACTS

- E. Simsek, I. Md Anjum, T. F. Carruthers, and C. R. Menyuk, “Designing Photodetectors with Machine Learning,” Advanced Photonics Conference, Novel Optical Materials and Applications, Maastricht, Netherlands, 24 – 28 July 2022.
- E. Simsek, I. Md Anjum, T. F. Carruthers, and C. R. Menyuk, “Non-Uniform Time-Stepping For Fast Simulation of Photodetectors Under High-Peak-Power, Ultra-Short Optical Pulses,” submitted to, 22nd International Conference on Numerical Simulation of Optoelectronic Devices, Online, 12–16 September 2022.
- E. Simsek, “ODEMI: One Dimensional Electromagnetic Inversion Dataset to Study Machine Learning and Lessons Learned,” accepted to be presented at the PhotonIcs and Electromagnetics Research Symposium 2021.
- E. Simsek, S. E. J. Mahabadi, T. F. Carruthers, and C. R. Menyuk, “Photodetector Performance Prediction with Machine Learning,” accepted to be presented at the Frontiers in Optics 2021, Washington D.C. December 2021.
- E. Simsek, S. E. J. Mahabadi, I. Md Anjum, and C. R. Menyuk, “Thinner and Faster Photodetectors Producing Lower Phase Noise,” accepted to be presented at the IEEE Photonics Conference 2021.
- E. Simsek, S. E. J. Mahabadi, I. Md Anjum, and C. R. Menyuk, “A Robust Drift-Diffusion Equations Solver Enabling Accurate Simulation of Photodetectors,” accepted to be presented at the to PhotonIcs and Electromagnetics Research Symposium 2021.
- E. Simsek, “Fast Evaluation of Refractive Index with Machine Learning”, PhotonIcs and Electromagnetics Research Symposium (PIERS 2019), Rome, Italy, June 17-20, 2019.
- E. Simsek, M. Yuan, and Qing H. Liu, “Field Effect Transistors Deploying Anisotropic Two-Dimensional Materials for Light Generation and Detection,” Frontiers in Optics/Laser Science Conference (FiO/LS 2018), Washington, DC, USA, Sept. 16-20, 2018.
- B. Mukherjee, S. Roy, S. Lodha, S. Ghosh, V. G. Achanta, and E. Simsek, “Plasmonic Enhancements in Anisotropic Thin Films of ReS₂,” IEEE Photonics Conference (IPC 2018), Reston, VA, USA Sept. 30 – Oct. 4, 2018.
- D. Oler and E. Simsek, “Controlling Luminescence of Monolayers of Transition Metal Dichalcogenides with Plasmonics,” ACES 2017 Conference, Firenze, Italy, March 26 – 30, 2017.
- F. Tseng, E. Simsek, and D. Gunlycke, “Modeling excitons in transition-metal dichalcogenides,” AVS 63rd International Symposium & Exhibition, Nashville, TN, Nov. 7-10, 2016.
- Ergun Simsek, “Solving Schrodinger Equation for Excitons in Multilayered Media,” 2016 IEEE International Symposium on Antennas and Propagation (APS-URSI), pp. 231-232, Fajardo, Puerto Rico, June 26 - July 1, 2016.
- B. Mukherjee and E. Simsek, “Light-Matter Interactions in Complex Media with 2D Materials, Metamaterials, and Quantum Dots,” 2016 IEEE International Symposium on Antennas and Propagation (APS-URSI), pp. 977-978, Fajardo, Puerto Rico, June 26 - July 1, 2016.
- E. Simsek, B. Mukherjee, A. Guchhait, Y. T. Chan, “Enhanced absorption with quantum dots, metal nanoparticles, and 2D materials,” SPIE Photonics West, San Francisco, CA, USA, 13-18 February 2016.
- E. Simsek and B. Mukherjee, “Keeping 2D materials visible even buried in soI wafers,” SPIE Photonics West, San Francisco, CA, USA, 13-18 February 2016.
- F. Tseng, E. Simsek, and D. Gunlycke, “The Tri-Angular Lattice Exciton (3ALE) model: Exciton physics at the

- atomic scale,” AVS 62st International Symposium & Exhibition, San Jose, CA, Oct 18–23, 2015.
- F. Tseng, E. Simsek, and D. Gunlycke, “Controlling exciton population in 2D transition metal dichalcogenides,” Graphene Canada 2015, Montreal, Canada, October 14–16, 2015.
 - Frank Tseng, D. Gunlycke, and E. Simsek, “Theory and Applications of Strongly Bound Excitons in Layered Transition-Metal Dichalcogenides,” 2015 IEEE Photonics Conference (IPC), pp. 188–189, Reston, Virginia, USA, 4 - 8 October 2015.
 - B. Mukherjee and E. Simsek, “Plasmonics Enhanced Average Absorption of Monolayer MoS₂ in vis-NIR,” 2015 IEEE Photonics Conference(IPC), pp. 184–185, Reston, Virginia, USA, 4 - 8 October 2015.
 - R. Sahin, T. Ersoy, E. Simsek, and S. Akturk, “Zeroth and First-order Bessel Beam Formation of Nanostructures on Thin-film Type Surfaces,” 36th Progress In Electromagnetics Research Symposium (PIERS 2015), Prague, Czech Republic, 06-09 July, 2015.
 - D. Gunlycke, F. Tseng, and E. Simsek, “Exciton Physics in Transition-Metal Dichalcogenides at the Atomic Scale,” Advanced Photonics 2015, Boston, MA, USA, 27 June - 01 July 2015.
 - R. Sahin, E. Simsek, S. Akturk, “Quantitative and Qualitative Studies of Femtosecond Laser Nanopatterning of Graphene,” CLEO/Europe-EQEC 2015, Munich, Germany, 21-25 June 2015.
 - B. Mukherjee and E. Simsek, “Enhancing Scattering and Absorption in Two-Dimensional Layered Material Systems with Surface Plasmons and Periodicity,” the 31st International Review of Progress in Applied Computational Electromagnetics (ACES 2015), Williamsburg, VA, USA, March 22-26, 2015.
 - F. Tseng, E. Simsek, D. Gunlycke, “Atomistic model for excitons: Capturing Strongly Bound Excitons in Monolayer Transition-Metal Dichalcogenides,” APS March Meeting 2015, San Antonio, TX, March 2–6, 2015.
 - B. K. Sinha and E. Simsek, “Estimation of Depletion- or Injection-induced Changes in Reservoir Stresses using Time-lapse Sonic Data,” 2014 IEEE International Ultrasonics Symposium, pp. 260–263, Chicago, IL USA, September 3-6, 2014.
 - E. Simsek, “On The Development of A New Multi-Physics Solver for Atomically Thin Layered Material Systems,” 2014 IEEE Antennas and Propagation Society International Symposium (APSURSI), pp. 1389-1390, Memphis, Tennessee, USA, July 6-12, 2014.
 - E. Simsek, “A Hybrid Spectral Integral - Finite Element Method for Layered Media Including Graphene-like Atomically Thin Layered Materials,” 2014 IEEE Antennas and Propagation Society International Symposium (APSURSI), pp. 2122-2123, Memphis, Tennessee, USA, July 6-12, 2014.
 - R. Sahin, Y. Morova, E. Simsek, S. Akturk, “Electromagnetic Wave Propagation Through and Reflection from Metal Nano Stripes Fabricated with Femtosecond Laser Ablation,” 2014 Radio Science Meeting (Joint with AP-S Symposium, USNC-URSI), pp. 129, Memphis, TN, USA, July 6-12, 2014.
 - C. Ye, K. Sikandar, Z. Li, E. Simsek, V. Sorger, “A Performance Comparison of ITO and Graphene-based Electro-optic Modulators,” 2014 Radio Science Meeting (Joint with AP-S Symposium, USNC-URSI), pp. 211, Memphis, TN, USA, July 6-12, 2014.
 - R. Sahin, E. Simsek, and S. Akturk, “Nanometer-Scale Structuring of Gold Thin-Films and Graphene by Femtosecond Laser Bessel Beams,” 2014 Conference on Lasers and Electro-Optics (CLEO), San Jose, CA, USA, June 8-13, 2014.
 - E. Simsek, “Graphene: A Two Dimensional Material in Three Dimensional Structures,” 2013 IEEE Antennas and Propagation Society International Symposium (APSURSI), pp. 1142–1143, Orlando, FL, USA, July 7-12, 2013.
 - R. Sahin, E. Simsek, S. Akturk, “Femtosecond Laser Ablation with Bessel Beams and Applications to Plasmonics,” 9th Nanoscience and Nanotechnology Conference of Turkey, Erzurum, Turkey, June 24- 28, 2013.
 - R. Sahin, E. Simsek, and S. Akturk, “Double Surface Plasmon Resonances Obtained with Bessel-Beam-Written Nanoslits Arrays,” The European Conference on Lasers and Electro-Optics and the International Quantum Electronics Conference (CLEO/Europe-IQEC 2013), Munich, Germany, May 12-16, 2013.
 - E. Simsek, “Tunable graphene-based SPR Sensors,” Smart Biomedical and Physiological Sensor Technology X

- (SPIE Defense, Security, and Sensing), 29 April - 3 May 2013, Baltimore, Maryland USA.
- E. Simsek, “Graphene Based Tunable SPR Sensors,” APS March Meeting, Baltimore, MD, USA, March 18-22, 2013.
 - E. Simsek and Q. H. Liu, “Hybrid Optical Waveguides,” 11th International Workshop on Finite Elements for Microwave Engineering (FEM2012), Estes Park, Colorado, USA, June 4-6, 2012.
 - E. Simsek, J. Liu, and Q. H. Liu, “A Spectral Integral Method for the Analysis of Nano Wires,” 30th URSI General Assembly and Scientific Symposium (XXXth URSI GA), Istanbul, Turkey, August 13-20, 2011.
 - E. Simsek, “Conventional Computational Electromagnetics toward Nanoscale, Optical, and Plasmonic Applications,” International Conference on High Performance Computing & Simulation, Istanbul, Turkey, July 4-8, 2011. (invited)
 - E. Simsek and S. Akturk, “Plasmonic Enhancement inside sub-Wavelength Holes in Metals,” 7th Nanoscience and Nanotechnology Conference of Turkey, Istanbul, Turkey, June 28- July 2, 2011.
 - C. B. Akdal and E. Simsek, “Nanowires for Sensing and Wave-guiding,” 7th Nanoscience and Nanotechnology Conference of Turkey, Istanbul, Turkey, June 28- July 2, 2011.
 - E. Simsek and B. Sonmez, “Layered Medium Discrete Dipole Approximation,” IET 8th International Conference on Computation in Electromagnetics (CEM 2011), Wroclaw, Poland, April 11-14, 2011.
 - E. Simsek, J. Liu, and Q. H. Liu, “An Efficient Algorithm for the Analysis of a Nano Wire in Homogeneous or Layered Media,” PIERS 2011 in Marrakesh, MOROCCO, on March 20-23, 2011.
 - E. Simsek and C. B. Akdal, “Nano Particles, Wires and Helical Wires for Sub-Wavelength Energy Transport,” PIERS 2011 in Marrakesh, MOROCCO, on March 20-23, 2011.
 - E. Simsek and B. K. Sinha, “An Efficient Formulation for Harmonic Waves in Multilayered Cylindrical Structures and its Geophysical Applications,” 19th International Geophysical Congress and Exhibition of Turkey, Ankara, November 23-26, 2010.
 - E. Simsek, “Frequency Domain Solvers to Design Functional Nano Structures,” 6th Nanoscience and Nanotechnology Conference of Turkey, Izmir, Turkey, June 15-18, 2010.
 - B. K. Sinha and E. Simsek, “Sonic logging in deviated wellbores in the presence of a drill collar,” 80th Annual International Meeting, Society of Exploration Geophysicists, Denver, CO, 17-22 Oct. 2010.
 - E. Simsek and Q. H. Liu, “Design of Optical Devices Using Frequency Domain Solvers,” International Symposium on Electromagnetic Theory, pp. 536–539, Berlin, Germany, August 16-19, 2010.
 - E. Simsek, T. Aydogan, and G. Barlak, “Surface Plasmon Resonance Modes of Metal Nanostructures Embedded in Layered Media: A Full Analytical Method,” PIERS 2010 in Cambridge, MA, USA 5-8 July, 2010.
 - E. Simsek, “A More Realistic Coupled Dipole Approximation Model for Plasmonic Waveguides,” ECIO 2010, Cambridge, UK, 7-9 April, 2010.
 - E. Simsek and B. K. Sinha, “An Efficient Formulation for Harmonic Waves in Multilayered Cylindrical Structures,” IEEE UFFC Symposium, pp. 1483–1486, Roma, Italy. 20-23 Sept. 2009.
 - E. Simsek and Q. H. Liu, “Integral Equation Solvers and Their Applications in the Optical Regime,” ICEAA 09, pp. 230–233, Torino, Italy, Sept. 14-18, 2009.
 - Q. H. Liu, B. K. Sinha, E. Simsek, “Time-Domain Numerical Models for Acoustoelasticity in Multidimensional Inhomogeneous Media,” IEEE International Symposium on Antennas & Propagation, Charleston, South Carolina, June 1-5, 2009 (invited).
 - E. Simsek, “Effective Refractive Index Approximation on the Surface Plasmon Resonance Modes of Metal Nanoparticle Chains and Arrays,” PIERS 2009 in Moscow, RUSSIA, 18-21 August, 2009.
 - E. Simsek, “Effects of Inhomogeneous Background to the Surface Plasmon Resonance Modes of Metal Nanoparticle Chains,” IEEE CLEO Europe 2009, June 2009.
 - E. Simsek and B. K. Sinha, “Estimation of borehole ellipticity using cross-dipole dispersions,” 78th Annual International Meeting, Society of Exploration Geophysicists, Las Vegas, Nevada, Nov. 2008.

- E. Simsek and B. K. Sinha, "Influence of a Logging Tool on Modes of Noncircular Fluid-filled Boreholes in Elastic Formations," PIERS 2008, Cambridge, MA.
- Q. H. Liu, L. Yun, C. Yu, J.H. Lee, J. Liu, and E. Simsek, "Fast CEM Solvers Based on Volume and Surface Integral Equations," PIERS 2008, Cambridge, MA, July 2008.
- B. K. Sinha and E. Simsek, "Formation Stress Effects on Wave Propagation in a Fluid-filled Borehole," IEEE International Ultrasonics Symposium, New York, NY, Oct. 2007.
- E. Simsek, B. K. Sinha, S. Zeroug, and N. Bounoua, "Influence of breakouts on borehole sonic dispersions," 77th Annual International Meeting, Society of Exploration Geophysicists, San Antonio, TX, Sept. 2007.
- J. Liu, Y. Lin, J.H. Lee, E. Simsek, and Q. H. Liu, "Application of the hybrid spectral integral method with spectral element method," IEEE Antennas and Propagation Society International Symposium and URSI, Honolulu, HI, June 2007.
- B. K. Sinha, E. Simsek, and Qing-Huo Liu, "Elastic wave propagation in deviated wells in anisotropic formations," 76th Annual International Meeting, Society of Exploration Geophysicists, New Orleans, LA, Oct. 2006.
- J. Liu, E. Simsek, and Q. H. Liu, "A 3-dimensional Spectral Integral Method for Acoustic and Electromagnetic Wave Scattering," IEEE Antennas and Propagation Society International Symposium and URSI, Albuquerque, NM, July, 2006.
- J. Liu, J. H. Lee, E. Simsek, and Q. H. Liu, "A Hybrid Spectral Integral Method/Spectral Element Method for Electromagnetic Wave Scattering," IEEE Antennas and Propagation Society International Symposium and URSI, Albuquerque, NM, July, 2006.
- E. Simsek, J. Liu, Q. H. Liu, "A 3D Spectral Integral Method for Layered Media," IEEE Antennas and Propagation Society International Symposium and URSI, Albuquerque, NM, July, 2006.
- C. Yu, E. Simsek, and Q. H. Liu, "Accurate Simulation of Electromagnetic Waves Scattered by 3D Objects in a Multilayered Medium by a Surface Integral Equation Method," IEEE Antennas and Propagation Society International Symposium and URSI, Albuquerque, NM, July, 2006.
- E. Simsek, J. Liu, and Q. H. Liu, "A Spectral Integral Method (SIM) for Layered Media," IEEE Antennas and Propagation Society International Symposium and URSI, Abstract, Washington, DC, July 2005.
- E. Simsek, J. Liu, Q. H. Liu, "A 2D Hybrid Spectral-Integral/Finite-Element Method for Layered," IEEE Antennas and Propagation Society International Symposium and URSI, Albuquerque, NM, July, 2006.
- E. Simsek, J. Liu, and Q. H. Liu, "Fast Simulation of Periodic Structures in a Layered Medium", IEEE Antennas and Propagation Society International Symposium and URSI, Abstract, Washington, DC, July 2005.
- E. Simsek, Q. H. Liu, and J. Liu, "Fast computation of dyadic Green's function for layered media and its application in interconnect simulations," IEEE Antennas and Propagation Society International Symposium and URSI, Abstract, Monterey, CA, June 2004.

INVITED TALKS

- "All things multi-layered," imec [online], July 28, 2021.
- "Waves in Layered Media: Past, Present, and Future," Sabanci University [online], January 26, 2021.
- "Layered Medium Electromagnetics," Silicon Austria Labs [online], December 1, 2020.
- "Layered Medium Electromagnetics," Royal Holloway, University of London, March 11, 2019.
- "3D Electromagnetic Inversion and Machine Learning" Virginia Tech, October 15, 2018.
- "2D Material Based Nanophotonics," Tennessee Technological University, February 18, 2018.
- "Accurate Modeling of Atomically Thin Layered Materials in Electromagnetic Wave Propagation and Scattering Problems," Duke University, Department of Electrical and Computer Engineering, February 17, 2015, Durham, NC, USA.
- "Layered Medium Electromagnetics," Schlumberger Doll Research, October 13, 2014, Cambridge, MA, USA.
- "Design of Optical Devices Using Frequency Domain Solvers and Analytical Methods," Bilkent University, March

8, 2010.

- “Plasmonics,” Istanbul Technical University, February 19, 2010.
- “Extension of Discrete Dipole Approximation to Layered Media,” Koc University, October 22, 2009.
- “Design and Analysis of Plasmonic Structures with a Hybrid Integral Equation Solver,” 3rd INTELECT Workshop, Istanbul, Turkey, September 7, 2009.
- “Computational Electromagnetics for Real World Problems,” University of South Alabama, March 24, 2008.
- “Electromagnetic Scattering from Inhomogeneous Objects of Arbitrary Shaped Embedded in a Layered Medium,” University of California Davis, February 25, 2006.

PATENTS

- Bikash K. Sinha and E. Simsek, “Estimation of Depletion or Injection Induced Reservoir Stresses Using Time-Lapse Sonic Data in Cased Holes,” granted on November 3, 2015, U.S. Patent 9,176,250.

TEACHING EXPERIENCE

13 years of teaching experience as a faculty member (3 years at Bahcesehir University, 6 years at the George Washington University, and 4 years at UMBC). Participated at the Junior Faculty Learning Community (FLC, Jr) Program, a year long program aimed at strengthening junior faculty’s teaching techniques, in 2013. Participated several workshops and bootcamps on in-classroom and online teaching organized by UMBC, GW, and National Academy of Engineering.

Courses Taught and Developed at UMBC Graduate Courses:

- DATA 601 Introduction to Data Science (Spring 21, Fall 21, Spring 22)
- DATA 606 Capstone in Data Science (Every Fall and Spring semester since 2019): More than 120 graduate students were supervised to solve real-world data science problems with the modern machine learning algorithm, high performance computing facilities, and big data tools.
- New graduate course: DATA 690 Statistical Analysis and Visualization with Python (Fall 2020). Full curriculum designed and created in Spring 19, has been taught by other instructors every semester since Fall 19.
- Two-day long Python workshops designed and taught every summer since 2019

Undergraduate Courses:

- CMSC 411 Computer Architecture (Spring 22, 40 students)

Courses Taught at the George Washington University

Undergraduate Courses:

- ECE 3315 Fields and Waves I and ECE 4320 Fields and Waves II were taught every spring and fall semester, respectively, 2011–16. These two courses were required for all electrical engineering majors.
- ECE 3310 Introduction to Electromagnetics, an introductory course on electromagnetics specifically designed for non-electrical engineering majors, was taught in Spring 2016 to 15 students from Computer Science and Biomedical Engineering.
- ECE 2120 Engineering Seminar, a course created to discuss facets of electrical engineering, engineering education, life after graduation, and other department topics of interest. Redesigned and taught in Fall 14 and Fall 15.

Graduate Courses:

- ECE 6800 Computational Techniques in Electrical Engineering was redesigned to cover all the main numerical techniques used in modern engineering. Fall 15.
- ECE 6025 Signals and Transforms in Engineering. Spring 16.

Courses Taught at Bahcesehir University

Undergraduate Courses:

- EEE 3703 Electromagnetic Fields and EEE 3704 Electromagnetic Waves were taught every fall and spring semester, respectively, 2008–11. These two courses were required for all electrical engineering majors.
- EEE 2101 Circuit Theory I, Spring 2009.

Graduate Courses:

- EEE 5012 Numerical Methods in Engineering, Spring 2011.
- EEE 5722 Antennas and Propagation for Wireless Communications, covering main antenna types for wireless communications and propagation models, Fall 2010.

MENTORING

Undergraduate researchers

- At GW: Aaron and Mark Tentindo Williams (Summer 2013); Jack Ferrell, Daniel Oler, and Shea Metzhar (2015 – 2016); Jessica Emma Thomson (Fall 2015)
- At BAU: Can B. Akdal (Spring 2011), Gokhan Barlak (Fall 2010), and Baris Sonmez (Fall 2010)

International undergraduate researchers at GW

- Pedro Strepeckes, Pedro Canelada, and Francisco Nakao (Summer 2015)

MS Students

- At BAU: Mehmet Bay, Dilek Bolat, and Tolga Aydogan (2009–11)
- At GW: Zhizhen Ma, Isil Ogut, and Can Suer (20011-13)
- at UMBC: Supervised 127 Capstone Project in Data Science

PhD Students

- At GW: Reid McCargar, Can Suer, Isil Ogut, and Reza Karimian Bahnemiri (2013–16)
- A UMBC: Ishraq Md Anjum (Co-advisor)

Post-doctoral research associates

- At GW: Dr. Bablu Mukherjee (03/2014– 08/2015)

SERVICE TO COMMUNITY

- Associate Editor for the IEEE Journal on Multiscale and Multiphysics Computational Techniques, 2015 – 2020.
- Member of Subcommittee 2 (Metamaterials, Plasmonics and Complex Media) for the 42nd PIERS in Xiamen, China, 17 - 20 December 2019.
- Co-organizer and co-chair of the “Nano-Electromagnetics” session, the 31st International Review of Progress in Applied Computational Electromagnetics, March 22-26, 2015, Williamsburg, Virginia, USA.
- Organizer and Chair of the “FEM and CEM Applications in Optics and Nanophotonics” session at the 11th International Workshop on Finite Elements for Microwave Engineering, June 4-6, 2012, Estes Park, CO, USA.
- Panelist (proposal reviewer) for Leverhulme Trust UK (2019), NSF ECCS 2014, NSF SBIR/STTR 2015; U. S. Army Research Office 2015, The Israel Science Foundation, 2014, and TUBITAK 2010.
- Periodically serves as reviewer for IOP Nanotechnology, ACS Nano, Plasmonics, Journal of Optics, Journal of the Optical Society of America B, Optical Materials Express, New Journal of Physics, Radio Science, Electromagnetics; IEEE Journal of Selected Topics in Quantum Electronics, IEEE Transactions on Antennas and Propagation, Transactions on Microwave Theory and Techniques, and Geoscience & Remote Sensing.

UNIVERSITY SERVICE

UMBC, Baltimore, Maryland, USA

- Member of CS Executive Committee, 2018 – present
- Member of CS Graduate Curriculum Committee, 2018 – present
- Member of the UMBC Graduate Faculty, 2019 – present

George Washington University, Washington, D.C., USA

- Member of Graduate Admissions and Support Committee, 2011 – 2016
- Member of Undergraduate Curriculum Committee, 2011 – 2015

- Member of Research Committee, 2011 – 2015
- Member of Undergraduate Recruiting Committee, 2015 – 2016
- Member of Graduate Recruiting and Award Committee, 2015 – 2016
- Member of Distinguished Lecture Committee, 2016
- Member of New Faculty Search Committee, 2013 and 2015
- Member of ABET Committee, 2012-2013
- Contributed to curriculum improvement and program evaluation (ABET) through UCC meetings, town hall meetings, and working on the evaluation reports in person
- Member of PhD Preliminary Exam Preparation and Grading Committee, 2015-2017
- Participated as a Judge at the SEAS R&D Days and the SEAS Pelton Prize Competitions
- Served on dissertation (e.g. Gregory Mitchell in 2015 and Qianyi Zhao in 2013) and thesis (e.g. Wanxin Dong and Siyan Liu both in 2016) committees.

Bahcesehir University, Istanbul, Turkey

- Member of Graduate Curriculum Committee, 2008 – 2011
- Member of Undergraduate Curriculum Committee, 2008 – 2011
- Member of MUDEK (Turkish ABET) Committee, 2010 – 2011
- Director of Erasmus and other exchange programs
- CO-OP coordinator for Alcatel-Lucent related courses

OUTREACH

UMBC, Baltimore, Maryland, USA

- Organizing and chairing seminars, webinars, and “open house” events for prospective students, twice a semester, 2018 – present
- Building partnerships with government agencies, research institutes, and organizations. Success stories include NIH, SSA, WRI, NewWave, and Microsoft.

George Washington University, Washington, D.C., USA

- Co-organizer of Nano@GW Workshops, 2012–2014, and ECE Research Blitz, 2012–2014. Organized ECE Colloquium talks, social events for current and prospective students, and R&D Days where both students make poster presentations about their research
- Gave several webinars to prospecting graduate students, 2012–16 ; visited 7 private high schools in Istanbul, Turkey and gave talks about GW, Nov. 2013; gave talks at local high-schools about GW, SEAS, and STEM
- Attended Korea University-GW workshops to initiate long-term collaborations

Bahcesehir University, Istanbul, Turkey

- Gave seminars and webinars to prospecting undergraduate and graduate students, 2008 – 2011
- Host high-school students for their summer internships.

Miscellaneous

- Licensed Professional Engineer, License No: E 22513, since 2018.
- Citizenship: Citizen of Turkey and the US.
- Languages: Turkish (native), English (advanced), and Italian (intermediate).