

SANDIP MAZUMDER

Contact Information

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Biographical Narrative

Dr. Mazumder joined the Ohio State University (OSU) in March of 2004. Prior to joining OSU, he was employed at CFD Research Corporation in Huntsville, AL for 7 years. He is one of the architects and early developers of the commercial code CFD-ACE+™. His research is computational in nature, and spans three main areas: (1) computational fluid dynamics and heat transfer emphasizing on chemical reactions with applications in combustion, catalytic conversion, fuel cells, batteries and chemical vapor deposition, (2) thermal radiation and its applications, and (3) non-equilibrium transport phenomena as occurring in nanoscale systems. Dr. Mazumder is the author of two graduate-level textbooks, 60+ journal papers, and more than 50 peer-reviewed conference publications. He is the recipient of the McCarthy award for teaching and the Lumley award for research from the OSU College of Engineering among other awards, and is also a Fellow of the American Society of Mechanical Engineers (ASME) since 2011.

Professional Experience

August 2021 – present: Interim Associate Chair (Administration), Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, OH 43210

June 2018 – present: Professor, Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, OH 43210

October 2010 – May 2018: Associate Professor (with tenure), Department of Mechanical and Aerospace Engineering, The Ohio State University, Columbus, OH 43210

April 2004 – September 2010: Assistant Professor (tenure track), Department of Mechanical Engineering, The Ohio State University, Columbus, OH 43210

January 2003 – March 2004: Manager, CFD Research Corporation, Huntsville, AL 35805

January 2001 – December 2002: Group Leader, CFD Research Corporation, Huntsville, AL 35805

January 1999 – December 2000: Senior Engineer, CFD Research Corporation, Huntsville, AL 35805

March 1997 – December 1998: Project Engineer, CFD Research Corporation, Huntsville, AL 35805

Education

Ph.D., 1997, Mechanical Engineering, Penn State University

M.S., 1993, Mechanical Engineering, Penn State University

B.Tech. (Honors), 1991, IIT-Kharagpur

Courses taught at the Ohio State University

Undergraduate:

Heat Transfer (ME 4510): Average rating 4.5/5

Thermodynamics (ME 3501): Average rating 4.42/5

Applied Computational Fluid Dynamics and Heat Transfer (ME 5539): 4.72/5

Graduate:

Intermediate Heat Transfer (ME 6510): Average rating 4.85/5

Intermediate Numerical Methods (ME/NE 6507), Average rating 4.88/5

Computational Fluid Dynamics (ME 7511), Average rating 4.96/5

Graduate Student Advising

- Thesis/dissertation advisor for 20 completed graduate students.
- Thesis/dissertation committee member for 38 completed graduate students.

Technical Publications

Summary: 2 books; 60+ journal publications, 50+ conference publications, 2000+ citations in Web of Science, *h-index* = 22; 3100+ citations in Google Scholar, *h-index* = 28

Books

Numerical Methods for Partial Differential Equations: Finite-Difference and Finite-Volume Methods, 1st Edition, S. Mazumder (sole author), 2016, Academic Press, ISBN: 978-0-12-803484-2.

Radiative Heat Transfer, 4th Edition, M. F. Modest and S. Mazumder, 2021, Academic Press, ISBN: 978-0323984065

Journal Articles

Notes: [underlined] = Student advisee]

- 1) "Viscous and Joulean Power Losses in Liquid-Metal Sliding Electrical Contacts with Finite Electrically Conducting Electrodes," G. Talmage, S. Mazumder, S.H. Brown and D.A. Sondergaard, (1995), *IEEE Transactions on Energy Conversion*; v10, n.4, pp. 634-644.
- 2) "Boundary Treatment and an Efficient Pressure Algorithm for Internal Turbulent Flows using the PDF Method," S. Mazumder and M.F. Modest, (1997), *International Journal for Numerical Methods in Fluids*; vol.24, pp. 215-232.
- 3) "A Stochastic Lagrangian Model for Near-Wall Turbulent Heat Transfer," S. Mazumder and M.F. Modest, (1997), *Journal of Heat Transfer*; vol.119; n.1; pp. 46-52.
- 4) "A Probability Density Function Approach to Modeling Turbulence-Radiation Interactions in Nonluminous Flames," S. Mazumder and M.F. Modest, (1999), *International Journal of Heat and Mass Transfer*; vol.42; n.6; pp. 971-991.
- 5) "Turbulence-Radiation Interactions in Nonreactive Flow of Combustion Gases," S. Mazumder and M.F. Modest; (1999); *Journal of Heat Transfer*; vol.121; n.3; pp 726-729.
- 6) "A Fast Monte-Carlo Scheme for Thermal Radiation in Semiconductor Processing Applications," S. Mazumder and A. Kersch, (2000), *Numerical Heat Transfer*, Part B, vol. 37, no. 2, pp. 185.
- 7) "Monte Carlo Study of Phonon Transport in Solid Thin Films Including Dispersion and Polarization," S. Mazumder and A. Majumdar, (2001), *Journal of Heat Transfer*, Vol. 123, pp. 749-759.
- 8) 'The Importance of Predicting Rate-Limited Growth for Accurate Modeling of Commercial MOCVD Reactors,' S. Mazumder and S.A. Lowry, (2001), *Journal of Crystal Growth*, Vol. 224, Issue 1-2, pp. 165-174.
- 9) "The Treatment of Reacting Surfaces for Finite-Volume Schemes on Unstructured Meshes," S. Mazumder and S.A. Lowry, (2001), *Journal of Computational Physics*, Vol. 173(2), pp. 512-526.
- 10) "Poiseuille Flow of Liquid Crystals: Highly Oscillatory Regimes," B. Mukherjee, S. Mazumder, and M. Carme Calderer, (2001), *Journal of Non-Newtonian Fluid Mechanics*, Vol. 99(1), pp. 37-55.
- 11) "Time-Accurate, 3-D Computation of Wire Sweep during Plastic Encapsulation of Electronic Components," H.-Q. Yang, S. Bayyuk, S. Mazumder, S. Lowry, A. Krishnan, A. Przekwas, and L. Nyugen, (2001), *Journal of Pressure Vessel Technology*, Vol. 123, pp. 501-509.
- 12) "Application of the Full Spectrum Correlated *k*-Distribution Approach to Modeling Nongray Radiation in Combustion Gases," (2002), S. Mazumder and M.F. Modest, *Combustion and Flame*, Vol. 129(4), pp. 416-438.
- 13) "Subgrid Scale Modeling of Heterogeneous Chemical Reactions and Transport in Full-Scale Catalytic Converters," (2002), S. Mazumder and D. Sengupta, *Combustion and Flame*, Vol 131(1-2), pp. 85-97.
- 14) "Rigorous Three-Dimensional Mathematical Modeling of Proton Exchange Membrane Fuel Cells: Part 1: Predictions without Liquid Water Transport," S. Mazumder and J.V. Cole, *Journal of the Electrochemical Society*, Vol. 150(11), pp. A1503, 2003.

- 15) "Rigorous Three-Dimensional Mathematical Modeling of Proton Exchange Membrane Fuel Cells: Part 2: Predictions with Liquid Water Transport," S. Mazumder and J.V. Cole, *Journal of the Electrochemical Society*, Vol. 150(11), pp. A1510, 2003.
- 16) "A New Approach to Performing Equilibrium Surface Reaction Calculations and its Application to Gallium Nitride Growth," S. Mazumder and D. Sengupta, *Journal of Crystal Growth*, Vol. 261, Issue 2-3, pp. 165-174, 2004.
- 17) "Combined *Ab Initio* Quantum Chemistry and Computational Fluid Dynamics Calculations for Prediction of Gallium Nitride Growth," D. Sengupta, S. Mazumder, W. Kuykendall, and S. Lowry, *Journal of Crystal Growth*, Vol. 279, pp. 369-382, 2005.
- 18) "A Generalized Phenomenological Model and Database for the Transport of Water and Current in Polymer Electrolyte Membranes," S. Mazumder, *Journal of the Electrochemical Society*, Vol. 152(8), pp. A1633-A1644, 2005.
- 19) "A New Numerical Procedure for Coupling Radiation in Participating Media with Other Modes of Heat Transfer," S. Mazumder, *Journal of Heat Transfer*, Vol. 127(9), pp. 1037-1045, 2005.
- 20) "Adaptation of the *In Situ* Adaptive Tabulation (ISAT) Procedure for Efficient Computation of Surface Reactions," S. Mazumder, *Computers and Chemical Engineering*, Vol. 30(1), pp. 115-124, 2005.
- 21) "Critical Assessment of the Stability and Convergence of the Equations of Multi-Component Diffusion," S. Mazumder, *Journal of Computational Physics*, Vol. 212(2), pp. 383-392, 2006.
- 22) "On the Convergence of Higher Order Upwind Differencing Schemes for Tridiagonal Iterative Solution of the Advection-Diffusion Equation," S. Mazumder, *Journal of Fluids Engineering*, Vol. 128(2), pp. 406-409, 2006.
- 23) "Methods to Accelerate Ray Tracing in the Monte Carlo Method for Surface-to-Surface Radiation Transport," S. Mazumder, *Journal of Heat Transfer*, Vol. 128(9), pp. 945-952, 2006.
- 24) "On the Use of the Fully Compressible Navier-Stokes Equations for the Steady State Solution of Natural Convection Problems in Closed Cavities," S. Mazumder, *Journal of Heat Transfer*, Vol. 129(3), pp. 387-340, 2007.
- 25) "Assessment of the Dilute Approximation for the Prediction of Combined Heat and Mass Transfer Rates in Multi-Component Systems," (2007), A. Kumar and S. Mazumder, *Heat and Mass Transfer*, Vol. 43, pp. 1329-1337.
- 26) "Modeling Full-Scale Monolithic Catalytic Converters: Challenges and Possible Solutions," (2007), S. Mazumder, *Journal of Heat Transfer* (in special issue in honor of Prof. S.V. Patankar), Vol. 129(4), pp. 526-535.
- 27) "Numerical Investigation of Wall Heat Conduction Effects on Catalytic Combustion in Split and Continuous Monolith Tubes," (2008), M. Grimm and S. Mazumder, *Computers and Chemical Engineering*, Vol. 32 (3), pp. 552-560.
- 28) "Assessment of Various Diffusion Models for the Prediction of Heterogeneous Combustion in Monolith Tubes," (2008), A. Kumar and S. Mazumder, *Computers and Chemical Engineering*, Vol. 32(7), pp. 1482-1493.
- 29) "On the implementation of membrane models in computational fluid dynamics calculations of polymer electrolyte membrane fuel cells," (2008), S. Kamarajugadda and S. Mazumder, *Computers and Chemical Engineering*, Vol. 32(7), pp. 1650-1660.
- 30) "Numerical Investigation of the Effect of Cathode Catalyst Layer Structure and Composition on Polymer Electrolyte Membrane Fuel Cell Performance," (2008), S. Kamarajugadda and S. Mazumder, *Journal of Power Sources*, Vol. 183, pp. 629-642.
- 31) "Coupled Solution of the Species Conservation Equations Using Unstructured Finite-Volume Method," (2010), A. Kumar and S. Mazumder, *International Journal for Numerical Methods in Fluids*, Vol. 64(4), pp. 409-442.
- 32) "Finite-Volume Formulation and Solution of the P_3 Equations of Radiative Transfer on Unstructured Meshes," (2010), M. Ravishankar, S. Mazumder, and A. Kumar, *Journal of Heat Transfer*, Vol. 132(2), Article number 023402.
- 33) "Toward Simulation of Full-Scale Monolithic Catalytic Converters with Complex Heterogeneous Chemistry," (2010), A. Kumar, and S. Mazumder, *Computers and Chemical Engineering*, Vol. 34, pp. 135-145.

- 34) "Monte Carlo Study of Phonon Heat Conduction in Silicon Thin Films Including Contributions of Optical Phonons," (2010), A. Mittal, and S. Mazumder, *Journal of Heat Transfer*, Vol. 132(5), Article number 052402.
- 35) "Application of the Modified Differential Approximation for Radiative Transfer to Arbitrary Geometry," (2010), M. Ravishankar, S. Mazumder, and M. Sankar, *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 111, pp. 2052-2069.
- 36) "Computational heat transfer analysis of the effect of skirts on the performance of third-world cookstoves," (2009), A. Wohlgemuth, S. Mazumder, and D. Andreatta, *Journal of Thermal Science and Engineering Applications*, Vol. 1, Article number 041001.
- 37) "Adaptation and Application of the In Situ Adaptive Tabulation (ISAT) Procedure to Reacting Flow Calculations with Complex Surface Chemistry," (2011), A. Kumar and S. Mazumder, *Computers and Chemical Engineering*, Vol. 35, pp. 1317-1327.
- 38) "Generalized Ballistic-Diffusive Formulation and Hybrid S_N - P_N Solution of the Boltzmann Transport Equation for Phonons for Non-Equilibrium Heat Conduction," (2011), A. Mittal and S. Mazumder, *Journal of Heat Transfer*, Vol. 133(9), Article No. 092402.
- 39) "Numerical Investigation of Radiation Effects in Monolithic Catalytic Combustion Reactors," (2011), M. Grimm and S. Mazumder, *International Journal of Chemical Reactor Engineering*, Vol. 9, Article no. A44.
- 40) "Numerical Investigation of Pulsed Chemical Vapor Deposition of Aluminum Nitride to Reduce Particle Formation," (2011), D. Endres and S. Mazumder, *Journal of Crystal Growth*, Vol. 335(1), pp. 42-50.
- 41) "Hybrid Discrete Ordinates—Spherical Harmonics Solution to the Boltzmann Transport Equation for Phonons for Non-Equilibrium Heat Conduction," (2011), A. Mittal and S. Mazumder, *Journal of Computational Physics*, Vol. 230(18), pp. 6977-7001.
- 42) "Solution of the Radiative Transfer Equation in Three-Dimensional Participating Media Using a Hybrid Discrete Ordinates—Spherical Harmonics Method," (2012), M. Sankar and S. Mazumder, *Journal of Heat Transfer*, Vol. 134(11), Article no. 112702.
- 43) "Brownian Dynamics Study of Particles in Chemical Vapor Deposition of Aluminum Nitride," (2012), D. Endres and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 2714-2718.
- 44) "Generalized Flooded Agglomerate Model for the Cathode Catalyst Layer of a Polymer Electrolyte Membrane Fuel Cell," (2012), S. Kamarajugadda and S. Mazumder, *Journal of Power Sources*, Vol. 208, pp. 328-339.
- 45) "General Procedure for Calculation of Diffuse View Factors between Arbitrary Planar Polygons," (2012), S. Mazumder and M. Ravishankar, *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 7330-7335.
- 46) "Computational Study of Transverse Peltier Coolers for Low Temperature Applications," (2013), S. A. Ali and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 62, pp. 373-381.
- 47) "Faster-than-Real-Time Simulation of Lithium Ion Batteries with Full Spatial and Temporal Resolution," (2013), J. Lu and S. Mazumder, *International Journal of Electrochemistry*, Vol. 2013, Article ID 268747.
- 48) "Direct Numerical Simulation of Catalytic Combustion in a Multi-Channel Monolith Reactor Using Personal Computers with Emerging Architectures," (2014), C. Choudary and S. Mazumder, *Computers and Chemical Engineering*, Vol. 61, pp. 175-184.
- 49) "Monte Carlo Simulation of Sunlight Transport in Solar Trees for Effective Sunlight Capture," (2015), N. Verma and S. Mazumder, *Journal of Solar Energy Engineering*, Vol. 137, Article No. 021015.
- 50) "Large-Scale Parallel Computation of the Phonon Boltzmann Transport Equation," (2014), S.A. Ali, G. Kollu, S. Mazumder, P. Sadayappan, A. Mittal, *International Journal of Thermal Sciences*, Vol. 86, pp. 341-351.
- 51) "Computational Modeling of a Solar Thermoelectric Generator," (2015), C. Ofoegbu, and S. Mazumder, *Journal of Thermal Science and Engineering Applications—Transactions of the ASME*, Vol. 7(4), Article No. 041004.
- 52) "Phonon Heat Conduction in Multi-Dimensional Heterostructures: Predictions using the Boltzmann Transport Equation," (2015), S.A. Ali, and S. Mazumder, *Journal of Heat Transfer*, Vol. 137(10), Article No. 102401.

- 53) "Extraction of Thermal Contact Conductance of Metal-Metal Contacts from Scale-Resolved Direct Numerical Simulation," (2016), N. Verma and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 94, pp. 164-173.
- 54) "Hybrid Ballistic-Diffusive Solution to the Frequency-Dependent Phonon Boltzmann Transport Equation," (2016), P. Allu and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 100, pp. 165-177.
- 55) "Phonon Boltzmann Transport Equation Based Modeling of Time Domain Thermo-Reflectance Experiments," (2017), S.A. Ali and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 107, pp. 607-621.
- 56) "Comparative Assessment of the Finite-Difference, Finite-Element and Finite-Volume Method for a Benchmark One-Dimensional Steady State Heat Conduction Problem," (2017), S. Mazumder, *Journal of Heat Transfer*, Vol. 139(7), Article No. 071301.
- 57) "Quantifying the Effect of Asperity Size and Shape on Thermal Contact Conductance of Metal-Metal Contacts through Direct Numerical Simulations" (2017), N. Verma, and S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 115, pp. 336-346.
- 58) "Comparative assessment of deterministic approaches to modeling quasiballistic phonon heat conduction in multi-dimensional geometry," (2018), P. Allu and S. Mazumder, *International Journal of Thermal Sciences*, Vol. 127, pp. 181-193.
- 59) "Application of a variance reduction technique to Surface-to-Surface Monte Carlo radiation exchange calculations," (2019), S. Mazumder, *International Journal of Heat and Mass Transfer*, Vol. 131, pp. 424-431.
- 60) "Modeling Hydrogen Chloride and Aluminum Surface Interactions for Spacecraft Fire Safety Applications," (2020), J. Niehaus, S.A. Gokoglu, G. Berger, J. Easton, and S. Mazumder, *AIAA Journal of Spacecraft and Rockets*, Vol. 57(2), pp. 217-224.
- 61) "Development and Validation of a Model for Efficient Simulation of Freezing of Water in Large Tanks," (2021), V. Ramesh, S. Terala, S. Mazumder, G. Matharu, D. Vaishnav, and S. Ali, *ASME Journal of Thermal Science and Engineering Applications*, Vol. 13, Paper no. 011008.
- 62) "On the Determination of Thermal Conductivity from Frequency Domain Thermoreflectance Experiments," (2022), S. Saurav and S. Mazumder, *Journal of Heat Transfer*, Vol. 144, p. 013501.

Conference Papers

Notes: [underlined = Student advisee]
[* = Peer-reviewed]

- 1) 'Boundary Treatment and an Efficient Pressure Algorithm for Internal Turbulent Flows using the PDF Method,' S. Mazumder and M.F. Modest, (1996), *Twenty-Seventh AIAA Fluid Dynamics Conference*, New Orleans, LA, Paper No. AIAA 96-1971.
- 2) * 'Heat Transfer in Internal Turbulent Flows using the PDF Method,' S. Mazumder and M.F. Modest; *International Mechanical Engineering Congress and Exposition*, 1996, Atlanta, Georgia; ASME HTD, Vol.333, no.2; pp.85-90; 1996.
- 3) * 'PDF Modeling of Turbulence-Radiation Interactions,' S. Mazumder and M.F. Modest; *Proceedings of the National Heat Transfer Conference*, Baltimore; August, 1997
- 4) * 'Time-accurate, 3-D Computation of Wire Sweep During Plastic Encapsulation of Electronic Components, with Non-Newtonian Viscosity and Curing Chemistry,' H. Yang, S. Bayyuk, S. Mazumder, S. Lowry, A. Krishnan, A. Przekwas, and L. Nguyen, *Joint ASME/JSME Pressure Vessels and Piping Conference*, San Diego, ASME PVP; vol. 377; no.1; pp.175-185; 1998.
- 5) 'An Advanced Radiation Model for Thermal Processing of Wafers,' S. Mazumder and A. Kersch, *195th Electrochemical Society Meeting*, Proceedings Volume 99-10, pp. 435-442, 1999.
- 6) 'Toward Greater Realism in Chemical Reaction Modeling for Multi-Dimensional Reactor Simulation'; S.F. Owens, S. Mazumder and E. Meeks, *195th Electrochemical Society Meeting; Seattle, WA*, 1999.
- 7) * 'Effect of Thin Films on Radiative Transport in Chemical Vapor Deposition Systems,' S. Mazumder and A. Kersch, ASME-HTD, vol. 364-3, pp. 9-13, *International Mechanical Engineering Congress and Exposition*, Nashville, 1999.
- 8) * 'Modeling Commercial MOCVD Reactors: Role of Complex Chemistry Models,' S. Mazumder and S. Lowry, *Proceedings of the SPIE*, Vol. 3944-46, pp. 423-434, 2000.

- 9) * 'Modeling Phonon Transport in Solid Thin Films,' S. Mazumder and A. Majumdar, *United Engineering Foundation Conference on Heat Transfer and Transport Phenomena in Microsystems*, Banff, Canada, October 2000.
- 10) 'Modeling Growth of Gallium Nitride From Trimethylgallium and Ammonia: Reaction Pathways and Rates,' D. Sengupta and S. Mazumder, *Materials Research Society Spring Annual Meeting*, San Francisco, CA, April, 2001.
- 11) * "Efficient Modeling of Full-Scale Catalytic Converters Using a Novel Sub-Grid Scale Approach," S. Mazumder and D. Sengupta, *Proceedings of the 2002 Technical Meeting of the Central States Section of the Combustion Institute*, Knoxville, TN.
- 12) "Integrated CFD Simulation Tool for Fuel Cell Performance Analysis," J.V. Cole and S. Mazumder, *Proceedings of the Centennial Meeting of the Electrochemical Society*, Philadelphia, PA, May 2002.
- 13) * "Tools and Techniques for Fuel Cell Performance Simulation," Alton J. Reich, Rupak Das, S. Mazumder, J. Vernon Cole, *Proceedings of the 5th International Bi-Annual ASME/JSME Symposium on Computational Technology for Fluid/Thermal/Chemical/Stressed Systems with Industrial Applications*, Vancouver, British Columbia, 2002.
- 14) "Numerical Study of the Effect of Operating Conditions on the Performance of PEM Fuel Cells," A. Gidwani, S. Mazumder, E. Blosch, S.A. Lowry and N. Solanki, *Proceedings of the Fuel Cell Seminar*, Miami Beach FL, 2003.
- 15) "An Accurate and Efficient Membrane Model for Use in Large-Scale CFD Calculations of PEM Fuel Cells," S. Mazumder, *Proceedings of the 207th Electrochemical Society Meeting*, Quebec City, Canada, May 15-20, 2005.
- 16) * "Coupling Radiation in Participating Media with Other Modes of Heat Transfer: Segregated Versus Coupled Solution," S. Mazumder, *Proceedings of the ASME Heat Transfer Conference*, Paper No. HT2005-72306, San Francisco, CA, July 2005.
- 17) * "A Reduced 1&1D Model for Optimization Analysis of a PEM Fuel Cell," D. Ambuhl, N. Anguiano, M. Sorrentino, Y. Guezennec, S. Mazumder, and G. Rizzoni, *Proceedings of the IMECE2005*, Paper No. IMECE2005-80121, Orlando, FL, November 2005.
- 18) * "Implications of the Dilute Approximation for the Prediction of Heat and Mass Transfer Rates in Multi-Component Systems," A. Kumar, and S. Mazumder, *Proceedings of the IMECE2006*, Paper No. IMECE2006-13113, Chicago, IL, November 2006.
- 19) * "The Binary Spatial Partitioning Algorithm for Efficient Tracing of Rays in the Monte Carlo Method for Surface-to-Surface Radiation Transport," S. Mazumder, *Proceedings of the IMECE2006*, Paper No. IMECE2006-13431, Chicago, IL, November 2006.
- 20) * "CFD Study of the Effect of Wall Heat Conduction on Catalytic Combustion in Split and Continuous Monolith Tubes," M. Grimm and S. Mazumder, *Proceedings of the ASME-JSME Thermal Engineering Summer Heat Transfer Conference (HT2007)*, July 8-12, 2007, Vancouver, BC, Canada, Paper number HT2007-32072.
- 21) * "Investigation of Approximate Diffusion Models for the Prediction of Heterogeneous Combustion in Monolith Tubes," A. Kumar and S. Mazumder, *Proceedings of the ASME-JSME Thermal Engineering Summer Heat Transfer Conference (HT2007)*, July 8-12, 2007, Vancouver, BC, Canada, Paper number HT2007-32073
- 22) * "Numerical Investigation of Radiation Effects in Catalytic Combustion," M. Grimm and S. Mazumder, *Proceedings of the ASME-JSME Thermal Engineering Summer Heat Transfer Conference (HT2007)*, July 8-12, 2007, Vancouver, BC, Canada, Paper number HT2007-32460
- 23) * "Strategies for Implementing Membrane Models in CFD Codes for PEM Fuel Cell Calculations," S.K. Kamarajugadda and S. Mazumder, *Proceedings of the IMECE2007*, November 10-16, 2007, Seattle, WA, Paper Number IMECE2007-42483.
- 24) * "A Low-Memory Block-Implicit Solver for the Coupled Solution of the Species Conservation Equations on an Unstructured Mesh," A. Kumar and S. Mazumder, *Proceedings of the IMECE2007*, November 10-16, 2007, Seattle, WA, Paper Number IMECE2007-42517.
- 25) * "Computational Modeling of the Cathode Catalyst Layer of a PEMFC," S.K. Kamarajugadda and S. Mazumder, *Proceedings of the ASME Summer Heat Transfer Conference*, August 10-14, 2008, Jacksonville, FL, Paper Number HT2008-56020.
- 26) * "An Unstructured Reacting Flow Solver with Coupled Implicit Solution of the Species Conservation Equations," A. Kumar and S. Mazumder, *Proceedings of the ASME Summer Heat Transfer Conference*, August 10-14, 2008, Jacksonville, FL, Paper Number HT2008-56145

- 27) * “Monte Carlo Study of Phonon Heat Conduction in Silicon Thin Films: Role of Optical Phonons,” A. Mittal and S. Mazumder, *Proceedings of the ASME Summer Heat Transfer Conference*, July 19-23, 2009, San Francisco, CA, Paper Number HT2009-88008
- 28) * “Computational Heat Transfer Analysis and Design of Third-World Cookstoves,” A. Wohlgemuth, S. Mazumder, and D. Andreatta, *Proceedings of the ASME Summer Heat Transfer Conference*, July 19-23, 2009, San Francisco, CA, Paper Number HT2009-88013
- 29) * “Finite-Volume Solution of the P_3 Equations of Radiative Transfer and Coupling to Reactive Flow Calculations,” M. Ravishankar, S. Mazumder, and A. Kumar, *Proceedings of the ASME Summer Heat Transfer Conference*, July 19-23, 2009, San Francisco, CA, Paper Number HT2009-88014
- 30) * “Application of the Modified Differential Approximation (MDA) for Radiation Transport to Arbitrary Three-Dimensional Geometry,” M. Ravishankar, and S. Mazumder, *Proceedings of the IMECE2009*, November 13-19, 2009, Lake Buena Vista, FL, Paper Number IMECE2009-12844
- 31) * “A Hybrid S_N - P_N Formulation for Solution of the Boltzmann Transport Equation for Phonons,” A. Mittal, and S. Mazumder, *Proceedings of the ASME/JSME 8th Thermal Engineering Joint Conference*, March 13-17, 2011, Honolulu, HI, Paper number AJTEC2011-44129.
- 32) * “Hybrid S_N - P_N Solution of the Radiative Transfer Equation in Multi-Dimensional Media,” M. Sankar, and S. Mazumder, *Proceedings of the ASME/JSME 8th Thermal Engineering Joint Conference*, March 13-17, 2011, Honolulu, HI, Paper number AJTEC2011-44131.
- 33) * “Computational Study of Pulsed Metal-Organic Chemical Vapor Deposition of Aluminum Nitride,” D. Endres, and S. Mazumder, *Proceedings of the IMECE2011*, November 11-17, 2011, Denver, CO, Paper Number IMECE2011-65525
- 34) * “Computational Investigation of the Fate of Aluminum Nitride Particles During Chemical Vapor Deposition,” D. Endres, and S. Mazumder, *ASME Summer Heat Transfer Conference*, San Juan, Puerto Rico, July 8-12, 2012, Paper Number HT2012-58030
- 35) * “Cathode Catalyst Layer Model for Polymer Electrolyte Membrane Fuel Cell,” S. Kamarajugadda, and S. Mazumder, *Proceedings of the IMECE2012*, November 9-15, 2012, Houston, TX, Paper Number IMECE2012-85952
- 36) * “Computational Modeling of Transverse Peltier Coolers,” S.A. Ali, and S. Mazumder, *ASME Summer Heat Transfer Conference*, Minneapolis, MN, July 14-19, 2013, Paper Number HT2013-17003
- 37) * “The In Situ Adaptive Tabulation (ISAT) Algorithm for Reacting Flow Computations with Complex Surface Chemistry,” A. Kumar and S. Mazumder, *ASME Summer Heat Transfer Conference*, Minneapolis, MN, July 14-19, 2013, Paper Number HT2013-17694
- 38) * “Prediction of Non-Equilibrium Heat Conduction Using Parallel Computation of the Phonon Boltzmann Transport Equation,” S.A. Ali, G. Kollu, S. Mazumder, and P. Sadayappan, *Proceedings of the IMECE2014*, November 14-20, 2014, Montreal, Canada, Paper Number IMECE2014-36084
- 39) * “An Investigation of Solar Trees for Effective Sunlight Capture Using Monte Carlo Simulations of Solar Radiation Transport,” N. Verma, and S. Mazumder, *Proceedings of the IMECE2014*, November 14-20, 2014, Montreal, Canada, Paper Number IMECE2014-36085
- 40) * “Computational Modeling of a Solar Thermo-Electric Generator,” C. Ofoegbu, and S. Mazumder, *Proceedings of the IMECE2014*, November 14-20, 2014, Montreal, Canada, Paper Number IMECE2014-38095
- 41) * “Direct Numerical Simulation of Heat Conduction across Metal-Metal Contacts to Extract Thermal Contact Resistance (TCR),” (2015), N. Verma, and S. Mazumder, *Proceedings of the 6th International Symposium on Advances in Computational Heat Transfer*, May 25-29, Piscataway, NJ, Paper Number 74.
- 42) * “Are Solar Trees a Better Way to Capture Sunlight? A Feasibility Study using Monte Carlo Simulations of Solar Radiation Transport,” (2015), N. Verma, and S. Mazumder, *Proceedings of the 6th International Symposium on Advances in Computational Heat Transfer*, May 25-29, Piscataway, NJ, Paper Number 75.
- 43) * “Parallel Computation of the Phonon Boltzmann Transport Equation for the Prediction of Thermal Transport across Silicon-Germanium Interfaces,” (2015), S.A. Ali, and S. Mazumder, *Proceedings of the 6th International Symposium on Advances in Computational Heat Transfer*, May 25-29, Piscataway, NJ, Paper Number 77.

- 44) * “Hybrid Ballistic-Diffusive Solution to the Frequency Dependent Phonon Boltzmann Transport Equation.” (2016), P. Allu and S. Mazumder, *Proceedings of the ASME Summer Heat Transfer Conference*, July 10-14, Washington DC, Paper number HT 2016-7079.
- 45) * “Effect of Asperity Shape and Height on Thermal Contact Conductance of Metal-Metal Contacts: A Computational Study,” N.N. Verma, and S. Mazumder, *Proceedings of the IMECE2017*, November 3-9, 2017, Tampa, Florida, Paper Number IMECE2017-70367
- 46) * “Experimental and Computational Study of Flow and Heat Transfer Around a Surrogate Engine Mount,” N.N. Verma, A. Iacob, S. Mazumder, and A. Selamet, *Proceedings of the IMECE2017*, November 3-9, 2017, Tampa, Florida, Paper Number IMECE2017-70580
- 47) * “Fundamental Study of Multiple Slopes Exhibited by Measured Thermal Contact Conductance (TCC) Versus Load Data for Metal-Metal Contacts,” N.N. Verma, and S. Mazumder, *Proceedings of the IMECE2018*, November 11-14, 2018, Pittsburgh, Pennsylvania, Paper Number IMECE2018-86722
- 48) * “Calibration of External Heat Transfer Coefficients During Cooling of a Partially-filled Water Tank Using Measured Temperature-Time Data,” V. Ramesh, S. Mazumder, G. Matharu, D. Vaishnav, S. Ali, D. Lawrence, and J. Desai, *Proceedings of the IMECE2018*, November 11-14, 2018, Pittsburgh, Pennsylvania, Paper Number IMECE2018-86716
- 49) * “Combined Computational and Experimental Analysis of Cooldown of a Surrogate Engine Mount Assembly,” N.N. Verma, A. Iacob, S. Mazumder, and A. Selamet, *Proceedings of the IMECE2018*, November 11-14, 2018, Pittsburgh, Pennsylvania, Paper Number IMECE2018-87139
- 50) * “Development and Validation of a Model to Account for Gaseous HCl and Aluminum Surface Interactions for Spacecraft Fire Safety Applications,” J.E. Niehaus, S.A. Gokoglu, G. Berger, J. Easton, and S. Mazumder, *49th International Conference on Environmental Systems*, July 7-11, 2019, Boston, Massachusetts, Paper Number ICES-2019-180.
- 51) * “A Reduced Model for Efficient Simulation of Freezing of Water in Large Tanks,” V. Ramesh, S. Terala, S. Mazumder, G. Matharu, D. Vaishnav, and S. Ali, *Proceedings of the ASME Summer Heat Transfer Conference, SHTC2020*, July 12-14, 2020, Orlando, Florida, Paper Number HT2020-10840.
- 52) * “Assessment of models for extracting thermal conductivity from frequency domain thermorefectance experiments,” S. Saurav and S. Mazumder, *Proceedings of the ASME Summer Heat Transfer Conference, SHTC2020*, July 12-14, 2020, Orlando, Florida, Paper Number HT2020-10838.
- 53) * “Effect of Humidity on Surface Interaction of Gaseous HCl and Aluminum for Spacecraft Fire Safety Applications,” J.E. Niehaus, S.A. Gokoglu, G. Berger, J. Easton, and S. Mazumder, *International Conference on Environmental Systems*, July 12-16, 2020, virtual conference, Paper Number ICES-2020-341.
- 54) * “Modeling the Uptake of Hydrogen Chloride by Interior Spacecraft Materials,” J.E. Niehaus, S.A. Gokoglu, G. Berger, J. Easton, and S. Mazumder, *International Conference on Environmental Systems*, July 12-14, 2021, virtual conference, Paper Number ICES-2021-271.
- 55) * “Assessment of a Hybrid Solution Approach for the Solution of the Radiative Transfer Equation in Combustion Gases,” N. Jajal and S. Mazumder, *ISHMT-ASTFE Joint Conference (virtual)*, December 2021, Paper number IHMTC2021-228.
- 56) * “An Efficient Computational Model for Solidification of Water in Large Tanks,” S. Terala, S. Mazumder, G. Matharu, D. Vaishnav, M. Ehteshami, and S. Ali, *ISHMT-ASTFE Joint Conference (virtual)*, December 2021, Paper number IHMTC2021-413.

Awards and Honors

- Exemplary Service Award as Associate Editor for *ASME Journal of Thermal Science and Engineering Applications*, November 2021.
- Distinguished Graduate Faculty Award, OSU Department of Mechanical and Aerospace Engineering, April 2019
- Certificates of Outstanding Contributions as Reviewer from *Journal of Quantitative Spectroscopy and Radiative Transfer* (February, 2017), *International Journal of Heat and Mass Transfer* (April, 2017), and *International Journal of Thermal Sciences* (May, 2018).
- First Place, Flash Talk Presentation Contest, Ohio Supercomputer Center’s Statewide User Group Meeting, April 2017.
- Lumley Research Award, OSU College of Engineering, March 2017
- David C. McCarthy Teaching Award, OSU College of Engineering, March 2014

- Michael J. Moran Teaching Excellence Award, OSU Department of Mechanical and Aerospace Engineering, April 2013
- Fellow of the American Society of Mechanical Engineers (ASME), April 2011 onwards.
- Second Place (co-author to student Derek Endres), Young Engineer Paper Award, ASME Fluids Engineering Division, 2011
- Access Award from Office of Disability Services, Ohio State University, April 2008.
- Inducted as an Honorary Member into TEXNIKOI, a society of engineering students at Ohio State.
- Listed in Marquis Who's Who in America, 56th Edition.
- Phi Kappa Phi Honor Society Fellow
- Graduate Fellow from Fall, 1995 to Fall, 1996, The Pennsylvania State University
- Research/Teaching Assistantship from Penn State University; Spring, 1992 to Spring, 1995
- All India top scorer in Mathematics in Indian School Certificate Examination in 1987

External Service

Symposium/Topic/Session Chair/Co-Chair at Professional Conferences:

- Two sessions on Advances in Computational Heat Transfer, Joint ASME/JSME Summer Heat Transfer Conference, Vancouver, BC, Canada, July 2007
- Session on Computational Fluid Flow and Heat Transfer, IMECE 2007, Seattle, WA, November 2007.
- Session on Transport Phenomena in Fuel Cells, ASME Summer Heat Transfer Conference, Jacksonville, FL, August 2008
- Symposium Chair and Organizer for Special Symposium on Radiative Heat Transfer, ASME Summer Heat Transfer Conference, San Francisco, CA, July 2009.
- Panel on “Multi-Scale Thermal Transport: Bridging the Gap,” IMECE 2009, Orlando, FL, November 2009.
- Two sessions on Computational Heat and Mass Transfer, and one session on Heat and Mass Transfer in Energy Devices, ASME/JSME Joint Thermal Engineering Conference, March 2011, Honolulu, Hawaii.
- Session on “Transport Phenomena in Energy Systems,” IMECE 2011, Denver, CO, November 2011
- Two sessions on Computational Heat Transfer, ASME Summer Heat Transfer Conference, Puerto Rico, July 2012
- Two sessions on “Applications of Computational Heat Transfer” and “High Performance Computing,” IMECE 2012, Houston, November 2012
- Topic Chair for “Computational Heat Transfer” for IMECE 2008, Boston, MA, November 2008
- Track Co-Chair of “Computational Heat Transfer” at ASME Summer Heat Transfer Conference, Puerto Rico, July 2012
- Topic Chair of “Heat Transfer in Energy Systems” at IMECE2012, Houston, TX, November 2012
- Session Chair of “Applications of Computational Heat Transfer,” ASME Summer Heat Transfer Conference, Minneapolis, MN, July 2013
- Session on “Radiative Heat Transfer II,” International Symposium on Advances in Computational Heat Transfer, Rutgers University, NJ, May 2015.
- Topic Chair of “Computation Heat Transfer” at IMECE2016, Phoenix, AZ, November 2016.
- Topic Co-Chair of “Computational Heat Transfer” at IMECE2017, Tampa, FL, November 2017.
- Session Chair of “Analysis of Cooling, Heating and Power Systems and Components—II,” Summer Heat Transfer Conference, Bellevue, WA, July 2017
- Topic Co-Chair of “Computational Heat Transfer” at IMECE2018, Pittsburgh, PA, November 2018.
- Track Chair of “Computational Heat Transfer” at Summer Heat Transfer Conference, Bellevue, WA, July 2019
- Track Co-Chair of “Computational Heat Transfer” at Summer Heat Transfer Conference, Orlando, FL, July 2020.

Invited Panelist

- THEREMES II, a Gordon Conference on electronic cooling, January 2009
- Panel on “Heat Transfer Education,” Summer Heat Transfer Conference, Bellevue, WA, July 2019.

Professional Activities

- Active member of K6 (Heat Transfer in Energy Systems) and K20 (Computational Heat Transfer) committees of the ASME Heat Transfer Division
- Vice Chair (by election), ASME Heat Transfer Division K20 (Computational Heat Transfer) Committee, 2015-2018
- Chair (by election), ASME Heat Transfer Division K20 (Computational Heat Transfer) Committee, 2018—2021
- Member of Scientific Committee, 7th International Symposium on Radiative Transfer (RAD-13), Cesme, Turkey, June 2013
- Scientific Advisory Committee, ASTFE-ISHMT Joint Conference, IIT-Chennai, December 2021.
- Proposal Reviewer/Panelist: National Science Foundation (average of 1 every year), Air Force Office of Scientific Research, Department of Energy, NSERC (Canada), Ohio Supercomputing Center, and California Energy Commission
- Promotion and Tenure Review: University of Michigan, Flint (8/2018), University of California, Merced (10/2020). University of North Dakota (8/2021), Purdue University Northwest (7/2021)
- Book Review: John Wiley and Sons, Cengage Publishing, and Elsevier Inc. (Academic Press)
- Editorship:
 - Special Editor (substituting for Editor-in-chief on an “as needed” basis) of the *Journal of Thermal Science and Engineering Applications* (ASME Transactions), January 2021—present.
 - Associate Editor of the *Journal of Thermal Science and Engineering Applications* (ASME Transactions), June 2017—present.
 - Editor and Media Editor, ASME Heat Transfer Division newsletter and website, 2016-2019.
 - Associate (Guest) Editor of the *Journal of Heat Transfer* (ASME Transactions), September 2008—December 2009, special issue on Radiative Heat Transfer
 - Editorial Board of *American Journal of Heat and Mass Transfer* (Columbia International Publishing), 2013—present
 - Editorial Board of *Energies* (Thermal Management section), 2019—present.
- Reviewer (average 1 paper/month) for 39 different journals to date.

Outreach Activities

- Serves on Upper Arlington School Board’s Engineering (STEM) Advisory Board
- Serves as panelist in FOCUS, a career development symposium for Upper Arlington High School students
- Conducted modules in summer camps through OSU K-12 Program on numerous occasions
- Offers course on “Numerical Methods for Partial Differential Equations,” on nanoHUB.org (an NSF-funded consortium); currently has 200+ students enrolled.
- YouTube channel with lectures on Numerical Methods and Computational Fluid Dynamics (launched January 2016); currently has 2700+ subscribers.