

Name James Robert Mahan

Position Emeritus Professor,
Department of Mechanical Engineering
Director, NASA-funded Thermal Radiation Group
Virginia Polytechnic Institute and State University
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Education B.S., Electrical Engineering, University of Kentucky, 1966
M.S., Mechanical Engineering, University of Kentucky, 1968
Ph.D., Mechanical Engineering, University of Kentucky, 1970
B.A., French, Virginia Tech, 1991



Full-time professional experience

2014-Present	Emeritus Professor of Mechanical Engineering, Virginia Tech (Active)
2003-2005	Professor of Mechanical Engineering, Georgia Tech, and Director for Academic Affairs, Georgia Tech Lorraine, Metz, France
1984-2002	Professor of Mechanical Engineering, Virginia Tech
1983-84	Professor of Mechanical Engineering, West Virginia University
1974-83	Associate Professor of Mechanical Engineering, Virginia Tech
1970-74	Assistant Professor of Mechanical Engineering, Virginia Tech

Other professional experience

Fall 2000	Visiting Professor, United States Naval Academy, Annapolis, MD
Fall 1993	Visiting Research Professor, <i>Ecole Centrale</i> , Paris, France
1982-83	Visiting Scientist, <i>Office National d'Etudes et de Recherches Aérospatiales</i> , Paris, France
	Visiting Research Professor, <i>Ecole Centrale</i> , Paris, France
1976-77	Combustion Development Engineer, General Electric Power Systems, Schenectady, NY

Contributions to the technical literature

Books

1. Mahan, J. Robert, **The Monte Carlo Ray-Trace Method in Radiation Heat Transfer and Applied Optics**, Wiley-ASME Press, 2019.
2. Mahan, J. Robert, **Radiation Heat Transfer: A Statistical Approach**, John Wiley & Sons, 2002.

Recent peer-reviewed journal articles

1. Munir, Nazia, J. Robert Mahan, Luan Doan, N. Q. Vinh, and Kory J. Priestley, Gold-black directional absorptivity in the visible and near infrared, **Applied Optics**, Vol. 60, No. 23, August 2021, pp. 6857-6868.
2. Yarahmadi, Mehran J. Robert Mahan, Kevin McFall, and Anum Barki Ashraf, "Numerical Focusing of a Wide-Field-Angle Earth Radiation Budget Imager Using an Artificial Neural Network," **Remote Sensing**, Vol. 12, No. 1, January 2020, pp. 176-191.
3. Yarahmadi, Mehran, J. Robert Mahan, and Kevin McFall, "Artificial Neural Networks in Radiation Heat Transfer Analysis," **ASME Transactions, Journal of Heat Transfer**, Vol. 142, No. 9, September 2020, pp. 092801-1-9.

4. Munir, Nazia B., J. R. Mahan, and Kory J. Priestley, "First-Principle Model for the Directional Spectral Absorptivity of Gold-Black in the Near Infrared," **Journal of the Optical Society of America**, Vol. 36, No. 10, October 2019.
5. Yarahmadi, Mehran, J. R. Mahan, and Kory J. Priestley, "Uncertainty Analysis and Experimental Design in the Monte Carlo Ray-Trace Environment," **ASME Transactions, Journal of Heat Transfer**, Vol. 141, No. 3, March 2019.
6. Yarahmadi, Mehran, J. Robert Mahan, and Kory J. Priestley, "Estimation and Use of the Radiation Distribution Factor Median for Predicting Uncertainty in the Monte Carlo Ray-Trace Method," **ASME Transactions, Journal of Heat Transfer**, Vol. 141, No. 6, June 2019.
7. Jonathan F. Pfab, Brian Vick, J. Robert Mahan, and Kory J. Priestley, "Estimation of Model Parameters for Earth Radiation Budget Instruments," **International Journal of Thermophysics**, Vol. 40, No. 77, 21 pp., 22 July 2019.
8. Mahan, J. R., N. Q. Vinh, V. X. Ho, and N. B. Munir, "Monte Carlo Ray-Trace Diffraction Based on the Huygens-Fresnel Principle," **Applied Optics**, Vol. 57, No. 18, June 2018.
9. Mahan, J. R., A. R. Barki, K. J. Priestley, "Diffraction and Polarization Effects in Earth Radiation Budget Measurements," **Applied Optics**, Vol. 55, No. 34, 2016.
10. Mahan, J. R., Walker, J. A., and Stancil, M. M., "Bidirectional Reflection Effects in Practical Integrating Spheres," **Applied Optics**, Vol. 54, No. 30, 2015.

Other recent contributions

1. Anum Barki, Brian Vick, and J. R. Mahan, "A Dynamic Electrothermal Model of a Thermopile Detector for Earth Radiation Budget Applications," Paper No. TFEC-2019-29182, 4th Thermal and Fluids Engineering Conference, April 7-10, 2019, Las Vegas, NV.
2. Nazia Munir, J. Robert Mahan, and Kory J. Priestley, A New Absorption Model for Gold-Black, Paper No. TFEC-2019-27403, 4th Thermal and Fluids Engineering Conference, April 7-10, 2019, Las Vegas, NV.
3. Mehran Yarahmadi, J. Robert Mahan, and Kory J. Priestley, "The Role of the Radiation Distribution Factor PDF in Assessing Uncertainty in the Monte Carlo Ray-Trace Method," Paper No. TFEC-2019-27524, 4th Thermal and Fluids Engineering Conference, April 7-10, 2019, Las Vegas, NV.
4. Deepali Shirsekar, Yifei Wang, Nguyen Q. Vinh, J. Robert Mahan, and Kory J. Priestley, "Design and Demonstration of an Automated Bidirectional Reflectometer for Low-Reflectivity Optical Coatings," Paper No. TFEC-2019-27537, 4th Thermal and Fluids Engineering Conference, April 7-10, 2019, Las Vegas, NV.
5. Nazia Munir, J. Robert Mahan, Kory J. Priestley, and Mehran Yarahmadi, A First-Principle Model for the Spectral Absorptivity of Gold Black in the Near Infrared, ASME Summer Heat Transfer Conference, July 14-18, 2019, Bellevue, WA.
6. Luan C. Doan, J. Robert Mahan, Kory J. Priestley, and Nguyen Q. Vinh, "Measuring Bidirectional Reflectance Distribution of Low-Reflectivity Surfaces in the Near Infrared," SPIE Optics + Photonics Conference, August 11-15, 2019, San Diego, CA (**Proceedings of SPIE 11103, Optical Modeling and System Alignment**, 111030I, 11 September 2019).
7. Mehran Yarahmadi, J. Robert Mahan, and Farshad Kowsary, "A New Approach to Inverse Boundary Design in Radiation Heat Transfer," 16th UK National Heat Transfer Conference, September 8-10, 2019, Nottingham, England.
8. Ashraf, Anum Barki, J. Robert Mahan, Kory J. Priestley, and Mohan Shankar, "Numerical Focusing of a Wide Field-of-View Instrument for Monitoring the Planetary Energy Budget," 15th International Workshop on Advanced Infrared Technology and Applications, September 16-19, 2019, Florence, Italy.

9. Pfab, J., Vick, B., Mahan, J.R., and Priestley, K., 2018, "Estimation of Model Parameters for Radiation Budget Instruments," Twentieth Symposium on Thermophysical Properties, June 24-29, 2018, University of Colorado, Boulder, Colorado.
10. Ashraf, Anum Rauf Barki, Kory James Priestley, and James Robert Mahan, "First-Principle Dynamic Electro-Thermal Numerical Model of a Scanning Radiometer for Earth Radiation Budget Applications," IGARSS 2018, July 23-27, 2018, Valencia, Spain.
11. Vinh, N. Q., J. Robert Mahan, and Kory J. Priestley, "An Advanced Bidirectional Reflectance Distribution Function Model for Studying the Performance of an Optical Instrument," Paper No. 10743-2, SPIE Optics + Photonics 2018, August 19-23, 2018, San Diego.
12. Ashraf, Anum B., Kory J. Priestley, and James R. Mahan, "Numerical Modeling for Earth Radiation Budget Instruments", Paper No. 10764-28, SPIE Optics + Photonics 2018, August 19-23, 2018, San Diego.
13. Mahan, J. R., N. Q. Vinh, and Kory J. Priestley, "An Application of the Monte Carlo Ray-Trace Method with Bidirectional Reflection," Paper No, 22038, 3rd Thermal and Fluids Engineering Conference (TFEC), March 4-7, 2018, Fort Lauderdale, Florida.
14. Mahan, J. R., N. Q. Vinh, N. B. Munir, and Vinh Ho, "Monte Carlo ray-trace diffraction based on the Huygens-Fresnel principle," 14th International Workshop on Advanced Infrared Technology and Applications, September 27-29, 2017, Québec, Canada.
15. Mahan, J. R., Anum R. Barki, and Kory J. Priestley, "Diffraction and Polarization Effects in Radiation Heat Transfer: A Case Study," HT2017-4804, ASME 2017 Summer Heat Transfer Conference, July 9-14, 2017, Bellevue, WA.
16. Vick, Brian, Jonathan Pfab, J. Robert Mahan, and Kory J. Priestley, "Thermal Analysis of the Sensor in a Radiation Budget Instrument," HT2017-4797, ASME 2017 Summer Heat Transfer Conference, July 9-14, 2017, Bellevue, WA.
17. Vick, B., J. R. Mahan, and K. Priestley, 2017, "Complex Model Building: Application to the Earth Radiation Budget Instrument," 4th International Workshop on Heat Transfer, IWHT2017, April 2-5, 2017, Las Vegas, NV, USA.
18. Barki, Anum R., Kory J. Priestley and James R. Mahan, A New Approach to Earth Radiation Budget Measurements: Inclusion of Coherence and Polarization Effects, SPIE Asia-Pacific Remote Sensing 2016, April 4-7, 2016, New Delhi, India.
19. Vick, Brian, J. R. Mahan, and Kory J. Priestley, Optimization of Thickness Allocation between Two Fused Silica Filters, Meeting on Characterization and Radiometric Calibration for Remote Sensing (CALCON), Space Dynamics Laboratory, August 22-25, 2016, Utah State University.
20. Barki, A. R., K. J. Priestley and J. R. Mahan, An Initiative to Include Coherence and Polarization in Earth Scene Classification, Proceedings of the 13th International Workshop on Advanced Infrared Technology and Applications, September 29-October 2, 2015, Pisa, Italy.

Membership in honor societies

Pi Tau Sigma
 Phi Beta Kappa
 Phi Kappa Phi
 Golden Key
 Sigma Xi

Director of 17 doctoral dissertations, 50 Master of Science theses, and 3 postdoctoral fellows