

**Ri-Chee Chou, Ph.D.**  
**Senior Manager**

**Professional Profile**

Dr. Ri-Chee Chou is a Senior Manager in Exponent's Technology Development practice. Dr. Chou has research, development, and teaching experience in electromagnetics, antennas, propagation, radar scattering, RF, and millimeter-wave systems, as well as in the areas of sensors and robotics. His technical expertise includes antenna and antenna array design, real-time passive millimeter wave imaging systems, and electromagnetic wave propagation and scattering. Additionally, Dr. Chou has experience in the management of military programs and rapid development of technology for use in military applications.

Dr. Chou is currently serving as the Program Manager for Exponent's Professional Engineering Support Services contract with the U.S. Army Rapid Equipping Force (REF). This program provides a variety of engineering and technical support to the REF, including Exponent engineers embedded in Iraq and Afghanistan, working closely with the REF in providing science and technology solutions to mission essential operational problems. Other prior technical and management responsibilities at Exponent include the development of custom antennas and bi-directional amplifiers for use on sonar buoys for the Network Enabled Anti-Submarine Warfare program, and the development of robotic and semi-autonomous ATV's for the Advanced Robotic Controller program. Dr. Chou has also served as the Sensors Lead for the first phase of the U.S. Army's Object Force Warrior program as well as the U.S. Navy's Maritime Munitions Interdiction program.

Prior to joining Exponent, Dr. Chou was a Senior Technical Staff Member of Deskin Research Group in Sunnyvale, California, with primary responsibility of Satellite Antenna Manager for the Leo One communications satellite system. Previous to that, he was a Senior Scientist in the Passive Remote Sensing Group at ThermoTrex Corporation in San Diego, California where he served as the Chief Engineer of the Passive Microwave Camera program. Dr. Chou was also formerly a professor in the Department of Electrical Engineering and a member of the ElectroScience Laboratory at The Ohio State University, where he taught courses in electromagnetics theory and performed NASA sponsored research in RCS computations of the electromagnetic scattering from jet engine inlets and other cavities.

**Academic Credentials and Professional Honors**

Ph.D., Electrical Engineering, University of Illinois at Urbana-Champaign, 1987  
M.S., Electrical Engineering, Stanford University, 1985  
B.S., Electrical Engineering, California Institute of Technology (with honors), 1983

HKN/Fred H. Phumphrey Electrical Engineer Award for Distinguished Teaching, 1988, 1989, 1990; Lilly Foundation Teaching Fellowship, 1990-1991

## Patents

Patent 5,365,237: Microwave Camera, November 15, 1994.

Patent 5,481,183: Electro-Optic Spectrum Analyzer, January 2, 1996.

Patent 6,037,908: Microwave Antenna, March 14, 2000.

## Publications

“The Modelling and the Electromagnetic Scattering from Bifurcated Open-Ended Cavities,” *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields*, Vol. 7, pp. 167–177, May 1994.

“Two Ray Shooting Methods for Computing the EM Scattering by Large Open-Ended Cavities,” *Computer Physics Communications*, Vol. 68, pp. 353–365, November 1991 (with R.J. Burkholder and P.H. Pathak).

“On Physical Optics for Calculating Scattering From Coated Bodies,” *Journal of Electromagnetic Waves and Applications*, Vol. 3, No. 8, pp. 725–749, December 1989 (with S.W. Lee, J. Baldauf, and H. Ling).

“High-Frequency RCS of Open Cavities with Rectangular and Circular Cross Sections,” *IEEE Trans. Antennas Propagat.*, Vol. AP-37, pp. 648–654, May 1989 (with H. Ling and S.W. Lee).

“Shooting and Bouncing Rays: Calculating the RCS of an Arbitrarily Shaped Cavity,” *IEEE Trans. Antennas Propagat.*, Vol. AP-37, pp. 194–205, February 1989 (with H. Ling and S.W. Lee).

“Radar Cross Section Reduction Studies of Partially Open Cavity Structures,” *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields*, Vol. 1, pp. 207–220, December 1988 (with S.W. Lee).

“Ray-Tube Integration in Shooting and Bouncing Ray Method,” *Microwave Optical Tech. Lett.*, Vol. MOTL-1, pp. 286–289, October 1988 (with S.W. Lee and H. Ling).

“Modal Attenuation in Multilayered Coated Waveguides,” *IEEE Trans. Microwave Theory Tech.*, Vol. MTT-36, pp. 1167–1176, July 1988 (with S.W. Lee).

“A Versatile Reflector Antenna Pattern Computation Method: Shooting and Bouncing Rays,” *Microwave Optical Tech. Lett.*, Vol. MOTL-1, pp. 81–87, March 1988 (with S.W. Lee).

“Rays Versus Modes: Pictorial Display of Energy Flow in an Open-Ended Waveguide,” *IEEE Trans. Antennas Propagat.*, Vol. AP-35, pp. 605–607, May 1987 (with H. Ling and S.W. Lee).

## Book Chapters

“RCS of Open Cavities with Rectangular and Circular Cross Sections,” Chapter in *Radar Cross Section of Complex Objects*, Ross Stone (ed.), IEEE Press, New York, 1990 (with H. Ling and S.W. Lee)

## Conference Presentations

“Passive Millimeter-Wave Imaging Using a Sparse Phased-Array Antenna,” SPIE Proceedings, *Passive Millimeter-Wave Imaging Technology*, Vol. 3164, pp. 63–70, Orlando FL, April 1997 (with R. Olsen, J. Lovberg, C. Martin, and J. Galliano).

“More Advances in Real-Time Millimeter-Wave Imaging Radiometers,” SPIE Proceedings, *Enhanced and Synthetic Vision 1997*, Vol. 3088, pp. 2–7, Orlando FL, April 1997 (with J. Lovberg and C. Martin).

“Advances in Real-Time Millimeter-Wave Imaging Radiometers for Avionic Synthetic Vision,” SPIE Proceedings, *Synthetic Vision for Vehicle Guidance and Control*, Vol. 2463, pp. 20–27, Orlando FL, April 1995 (with J. Lovberg, C. Martin, and J. Galliano).

“Real-Time Millimeter-Wave Imaging Radiometer for Avionic Synthetic Vision,” SPIE Proceedings, *Sensing, Imaging, and Vision for Control and Guidance of Aerospace Vehicles*, Vol. 2220, pp. 234–244, Orlando FL, April 1994 (with J. Lovberg and C. Martin).

“Ultra-High-Resolution Radar Development,” Proceeding, 2<sup>nd</sup> International Conference on UWB Short-Pulse Electromagnetics, Brooklyn NY, April 1994 (with C. Phillips, P. Johnson, K. Garner, G. Smith, A. Shek, and S. Leong).

“Passive Microwave Camera,” IEEE AP-S International Symposium Digest, pp. 1925–1928, Ann Arbor MI, June 1993 (with P. Johnson, J. Lovberg, C. Martin, and B. Spivey).

“A One-Dimensional Study of the Effect of Boundary Conditions on Discretization Error for FEM,” URSI Radio Science Meeting Digest, Chicago IL, July 1992 (with Y.S. Choi and R. Lee).

“The Energy Flow Inside a Waveguide Cavity Using the SBR and GRE Methods,” IEEE AP-S International Symposium Digest, pp. 2150–2513, Chicago IL, July 1992 (with T.T. Chia and R. Lee).

“High Frequency Scattering by Complex Open Cavity Structures,” URSI Radio Science Meeting Digest, p. 178, London, Ontario, June 1991 (with R.J. Burkholder and P.H. Pathak).

“Hybrid Analysis (UTD-MM) of EM Scattering from Complex Structures,” URSI Radio Science Meeting Digest, p. 243, London, Ontario, June 1991 (with M. Hsu and P.H. Pathak).

“EM Characterization of Complex Terminations Inside Electrically Large Open Cavities,” URSI Radio Science Meeting Digest, p. 326, London, Ontario, June 1991 (with R.J. Burkholder and P.H. Pathak).

“Application of the Generalized Ray Expansion for Analyzing the EM Scattering by Open-Ended Non-Uniform Waveguide Cavities with a Varying Super-Elliptic Cross Section,” Proceedings, 6<sup>th</sup> Annual Review of Progress in Computational Electromagnetics, Monterey CA, March 1990 (with C.W. Chuang, R.J. Burkholder, and P.H. Pathak).

“Ray Tracing Methods for Computing the Electromagnetic Scattering from Open-Ended Cavities,” Proceedings, Progress in Electromagnetics Research Symposium, p. 194, Boston MA, 1989.

“A Generalized Ray Expansion Method for Analyzing the EM Scattering by Open-Ended Waveguide Cavities,” IEEE AP-S International Symposium Digest, pp. 840–843, Santa Clara CA, June 1989 (with P.H. Pathak, R.J. Burkholder, and G. Crabtree).

“On Ray Methods in Computing the Electromagnetic Scattering from Open-Ended Cavities,” URSI Radio Science Meeting Digest, p. 375, Santa Clara CA, June 1989 (with P.H. Pathak, R.J. Burkholder, and G. Crabtree).

“A Microwave Imaging Technique for Determining the Scattering Center Of Cavity Structures,” URSI Radio Science Meeting Digest, p. 103, Syracuse NY, June 1988 (with W.D. Burnside).

“A Versatile Reflector Antenna Pattern Computation Method: Shooting and Bouncing Rays,” IEEE AP-S International Symposium Digest, pp. 120–123, Syracuse NY, June 1988 (with S.W. Lee, J. Baldauf, and H. Ling).

“Twelve Versions of Physical Optics: How do They Compare?” IEEE AP-S International Symposium Digest, pp. 408–411, Syracuse NY, June 1988 (with S.W. Lee, J. Baldauf, and H. Ling).

“Radar Cross Section Computation with BRL-CAD,” Proceedings, BRL-CAD Symposium '88, Aberdeen MD, June 1988 (with S.W. Lee).

“Toward Realistic Modeling in RCS Computations,” IEEE AP-S International Symposium Digest, pp. 546–549, Blacksburg VA, June 1987 (with S.W. Lee).

“RCS Reduction of a Cylindrical Cavity By Dielectric Coating,” IEEE AP-S International Symposium Digest, pp. 305–308, Philadelphia PA, June 1986 (with C.S. Lee and S.W. Lee).

“Shooting and Bouncing Rays: Calculating the RCS of an Arbitrarily Shaped Cavity,” IEEE AP-S International Symposium Digest, pp. 293–296, Philadelphia PA, June 1986 (with H. Ling and S.W. Lee).

“Modal Attenuation in an Overmoded Dielectric-Coated Circular Waveguide For RCS Reduction,” URSI Radio Science Meeting Digest, p. 193, Philadelphia PA, June 1986 (with S.W. Lee).

### **Prior Experience**

Senior Technical Staff Member; Leo One Satellite Antenna Manager, Deskin Research Group, 1998–2002

Senior Scientist, ThermoTrex Corp., 1992–1998

Assistant Professor, Department of Electrical Engineering, The Ohio State University, 1987–1992

### **Professional Affiliations:**

- Institute of Electrical and Electronics Engineers (member)