

BIOGRAPHICAL SKETCH

Leo Charles Kempel

Department of Electrical and Computer Engineering
Michigan State University
2120 Engineering Building
East Lansing, MI 48824-1226
517-353-9944 (fax-1980)
kempel@egr.msu.edu

Education

Ph.D. in Electrical Engineering, University of Michigan, Ann Arbor, MI, 1994
M.S. in Electrical Engineering, University of Michigan, Ann Arbor, MI, 1990
B.S. in Electrical Engineering, University of Cincinnati., Cincinnati, OH, 1989

Professional Experience

1. Assistant Professor (8/98 to present), Dept. of ECE, Michigan State Univ.
2. Senior Research Engineer (8/94-7/98), Mission Research Corporation.
3. Post-doctoral Fellow (05/94-07/94), Dept. of EECS, University of Michigan.
4. Graduate Student Research Assistant (09/89-04/94), Dept. of EECS, University of Michigan.

Honors and Awards

1. Finalist, 1993 URSI/USNC National Radio Science Meeting Student Paper Competition, "Scattering by a Small Cavity-backed Hole," by Leo C. Kempel and Thomas B.A. Senior.
2. Recipient, 1997 Technical Report of the Year, Mission Research Corporation.
3. Elected Full Member, United States National Committee/International Union of Radio Science (USNC/URSI), Commission B, July 1999.
4. Elected Senior Member of the Institute of Electrical and Electronic Engineers (IEEE), Nov. 1999.

Co-Authored Books

- [1] J.L. Volakis, A. Chatterjee, and L.C. Kempel, Finite Element Method for Electromagnetics with Application to Antennas, Microwave Circuits, and Scattering, *IEEE Press*, June 1998.

Refereed Journal Publications

- [1] H. How, X. Zuo, C. Vittoria, L.C. Kempel, and K.D. Trott, "Green's Function Calculations of a Microstrip Line Fabricated on a Ferrite Substrate," submitted.
- [2] M. E. Kowalski, B. Singh, L.C. Kempel, K.D. Trott, and J-M Jin, "Application of the Integral Equation-Asymptotic Phase (IE-AP) Method to Three-Dimensional Scattering," submitted.
- [3] A. D. Brown, L.C. Kempel, and J.L. Volakis, "Design Method for Antenna Arrays Employing Ferrite Printed Transmission Line Phase Shifters," submitted.
- [4] H. How, C. Vittoria, L.C. Kempel, and K.D. Trott, "Green's Function Calculation on Circular Microstrip Patch Antennas," *IEEE Trans. Antennas Propagat*, to appear January 2001.

BIOGRAPHICAL SKETCH

- [5] H. How, P. Shi, C. Vittoria, E. Hokanson, M.N. Champion, L.C. Kempel, and K.D. Trott, "Steerable phased array antennas using single-crystal YIG phase shifters -- Theory and experiment," *IEEE Trans. Microwave Theory Tech.*, 48, pp. 1544-1549, 2000.
- [6] H. How, P. Shi, C. Vittoria, L.C. Kempel, and K.D. Trott, "Single-crystal YIG phase shifter using composite stripline structure at X band," *J. Applied Phys.*, 87, pp. 4966-4968, 2000.
- [7] H. How, P. Shi, C. Vittoria, M.H. Champion, L.C. Kempel, and K.D. Trott, "X-band phased array antennas using crystal yttrium-iron-garnet phase shifters," *J. Applied Phys.*, 87, pp. 6908-6910, 2000.
- [8] H. How, W. Hu, C. Vittoria, L.C. Kempel, and K.D. Trott, "Single-crystal yttrium garnet phase shifter at X band," *J. Applied Phys.*, 85, pp. 4853-4855, 1999.
- [9] A. Brown, J. Volakis, L. Kempel, and Y. Botros, "Patch antennas on ferromagnetic substrates," *IEEE Trans. Antennas Propagat.*, 47, pp. 26-32, Jan. 1999.
- [10] A. Chatterjee, J.L. Volakis, and L.C. Kempel, "Optimization issues in finite element codes for solving open domain 3D electromagnetic scattering and conformal antenna problems," *Intl. J. Numerical Modeling: Elec. Networks, Devices and Fields*, 9, pp. 335-344, 1996.
- [11] L.C. Kempel, J.L. Volakis, and R.J. Sliva, "Radiation by cavity-backed antennas on circular cylinder," *IEE Proc.-Microw. Antennas Propag.*, 142, pp. 233-239, June 1995.
- [12] J.L. Volakis and L.C. Kempel, "Electromagnetics: Computational methods and considerations," *IEEE Comp. Sci. Engineering Mag.*, 2, pp. 42-57, 1995.
- [13] L.C. Kempel and J.L. Volakis, "Scattering by cavity-backed antennas on a circular cylinder," *IEEE Trans. Antennas Propagat.*, 42, pp. 1268-1279, Sept. 1994.
- [14] J.L. Volakis, A. Chatterjee, J. Gong, L.C. Kempel, and D. Ross, "Progress on the application of the finite element method to 3D electromagnetic scattering and radiation," *COMPEL*, 13, Suppl. A., pp. 359-364, May 1994.
- [15] J.L. Volakis, A. Chatterjee, and L.C. Kempel, "A review of the finite element method for three-dimensional electromagnetic scattering," *J. Optical Soc. of America-A*, pp. 1422-1433, Apr. 1994.
- [16] L.C. Kempel and T.B.A. Senior, "Scattering by a small cavity-backed hole," *IEEE Trans. Antennas Propagat.*, 41, pp. 1115-1121, Aug. 1993.
- [17] L.C. Kempel and J.L. Volakis, "TM scattering by a metallic half plane with a resistive sheet extension," *IEEE Trans. Antennas Propagat.*, 41, pp. 910-917, July 1993.
- [18] L.C. Kempel, J.L. Volakis, T.B.A. Senior, S.S. Locus, and K.M. Mitzner, "Scattering by S-shaped surfaces," *IEEE Trans. Antennas Propagat.*, 41, pp. 701-708, June 1993.
- [19] L.C. Kempel, J.L. Volakis, and T.B.A. Senior, "TM diffraction from tapered resistive junctions," *Radio Science*, 28, pp. 129-138, Mar-Apr 1993.

Reviewed Conference Proceedings Papers

- [1] J. Gulick and L.C. Kempel, "Analysis of Numerically Solving Integral Equations Using Rao-Wilton-Glisson and Asymptotic Phase Basis Functions Concurrently," *2001 URSI National Meeting*, Boulder, CO, January 2001.
- [2] A. Brown, L. Kempel, and J. Volakis, "Phase characterization of ferromagnetic materials using a coplanar waveguide," *2000 IEEE Antennas Propagat. Society Symp.*, Salt Lake City, UT, July 2000.

BIOGRAPHICAL SKETCH

- [3] C. Macon, L. Kempel, K. Trott, and S. Schneider, "Conformal wide bandwidth antennas on circular cylinders," *2000 URSI Radio Science Meeting*, Salt Lake City, UT, July 2000.
- [4] C-W Wu, L. Kempel, and E. Rothwell, "Mutual coupling between antennas on an elliptic cylinder," *2000 URSI Radio Science Meeting*, Salt Lake City, UT, July 2000.
- [5] M.E. Kowalski, B. Singh, K.D. Trott, L.C. Kempel, and J.M. Jin, "On the integral equation-asymptotic phase (IE-AP) method for three-dimensional scattering," *Progress in Electromagnetics Research Symposium*, Boston, MA, July 2000.
- [6] L.C. Kempel and G. Bao, "Least squares finite element method," *Progress in Electromagnetics Research Symposium*, Boston, MA, July 2000.
- [7] L.C. Kempel and S. Schneider, "Hybrid Finite Element Methods for Conformal Antenna Design," *5th Finite Elements Workshop for Microwave Engineering*, Boston, MA, June 2000.
- [8] C. Macon, L. Kempel, K. Trott, and S. Schneider, "Conformal multi-modal antennas on cylinders," *Millennium Conference on Antennas and Propagation*, Davos, Switzerland, April 2000.
- [9] C. Macon, L.C. Kempel, K. Trott, and S. Schneider, "Curvature effects on a conformal log-periodic antenna," *16th Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [10] L.C. Kempel, P. Rummel, T. Grotjohn, "Finite Element Method for Designing Plasma Reactors," *16th Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [11] K.D. Trott, R. D. Guidry, L.C. Kempel, "Modeling and analysis of wideband conformal antennas," *16th Review of Progress in Applied Computational Electromagnetics*, Monterey, CA, March 2000.
- [12] H.How, C. Vittoria, L.C. Kempel, and K.D. Trott, "Single-crystal YIG phase shifter at X-band," *44th Conference on Magnetism and Magnetic Materials*, San Jose, CA, Nov. 1999.
- [13] H.How, C. Vittoria, M.H. Champion, L.C. Kempel, and K.D. Trott, "X-band phased array antennas using crystal YIG phase shifters," *44th Conference on Magnetism and Magnetic Materials*, San Jose, CA, Nov. 1999.
- [14] A. Brown, L. Kempel, and K. Trott, "Compact integrated coplanar phase shifter/antenna array," *1999 IEEE Antennas Propagat. Society Symp.*, Orlando, FL, July 1999.
- [15] L.C. Kempel, "Advances in modeling conformal antennas on cylinders," *1999 URSI Radio Science Meeting*, Orlando, FL, July 1999.
- [16] L.C. Kempel, "Implementation of Various Hybrid Finite Element-Boundary Integral Methods: Bricks, Prisms, and Tets," *1999 ACES Meeting*, Monterey, CA, pp. 242-249, 1999.
- [17] K.D. Trott and R.D. Guidry (presented by L.C. Kempel), "Modeling wideband conformal antennas using finite element-boundary integral techniques," *1999 ACES Meeting*, Monterey, CA, pp. 226-231, 1999.
- [18] L.C. Kempel and K. Trott, "Progress in modeling complex conformal antennas using the finite element-boundary integral method," *1998 URSI Radio Science Meeting*, Atlanta, GA, June 1998.
- [19] L.C. Kempel, "On the use of decoupled meshes in the analysis of printed antennas," *1997 URSI Radio Science Meeting*, Montreal, QUE., CANADA, p. 182, Jul. 1997.
- [20] T. Ozdemir, J. Volakis, J. Berrie, and L. Kempel, "Finite element analysis of frequency independent antennas," *1996 URSI Radio Science Meeting*, Baltimore, MD, p. 152, 1996.

BIOGRAPHICAL SKETCH

- [21] E. Kipp, S.W. Lee, T. Ozdemir, J.L. Volakis, L. Kempel, and J. Berrie, "Antenna pattern evaluations using a hybridization for the finite element and high frequency methods," *1995 URSI Radio Science Meeting*, Newport Beach, CA, p. 183, June 1995.
 - [22] L.C. Kempel and J.T. Aberle, "Scattering and radiation by conformal microstrip antennas with dielectric overlay," *1995 URSI Radio Science Meeting*, Newport Beach, CA, p. 36, June 1995.
 - [23] L.C. Kempel, S. Bindiganavale, and J.L. Volakis, "Evaluation of new vector ABCs for conformal printed antennas," *1994 IEEE Antennas and Propagat. Society Symp.*, Seattle, WA, June 1994.
 - [24] L.C. Kempel and J.L. Volakis, "Radiation by patch antennas on a circular cylinder using the FE-BI method," *1994 IEEE Antennas and Propagat. Society Symp.*, Seattle, WA, June 1994.
 - [25] L.C. Kempel and J.L. Volakis, "Scattering by cavity-backed antennas on a circular cylinder using the FE-BI method," *1994 IEEE Antennas and Propagat. Society Symp.*, Seattle, WA, June 1994.
 - [26] J. Gong, L.C. Kempel, and J.L. Volakis, "Computer codes for the analysis of planar and cylindrically conformal printed antennas," *1994 ACES Conference*, Monterey, CA, pp. 203-209.
 - [27] J.L. Volakis, L.C. Kempel, and J. Gong, "Hybrid finite element-integral equation methods for conformal antenna characterizations," *1993 Progress in Electromagnetics Research Symp.*, Pasadena, CA, p. 41.
 - [28] L.C. Kempel and J.L. Volakis, "TM scattering by a metallic half plane with a resistive sheet extension," *1993 IEEE Antennas and Propagat. Society Symp.*, Ann Arbor, MI, June 1993.
 - [29] L.C. Kempel and J.L. Volakis, "A finite element-boundary integral method for cavities in a circular cylinder" *1993 IEEE Antennas and Propagat. Society Symp.*, Ann Arbor, MI, June 1993.
 - [30] L.C. Kempel and T.B.A. Senior, "Scattering by a small cavity-backed hole," *1993 URSI.USNC National Radio Science Meeting*, Boulder, CO, Jan. 1993.
 - [31] K.M. Mitzner, J.L. Volakis, J.M. Jin, L.C. Kempel, and D. Ross, "An integral equation in terms of charge for TE scattering by curved open surfaces," *1992 URSI Radio Science Meeting*, Chicago, IL, p. 85.
 - [32] L.C. Kempel, J.L. Volakis, and T.B.A. Senior, "TM diffraction from tapered resistive junctions," *1992 IEEE Antennas and Propagat. Society Symp.*, Chicago, IL, 1992.
- L.C. Kempel, J.L. Volakis, T.B.A. Senior, and S.S. Locus, "Scattering by S-shaped surfaces," *1991 IEEE Antennas and Propagat. Society Symp.*, London, ONT, CANADA, 1991.

Funded Projects Since Joining MSU

1. Conformal Antenna Research, [Mission Research Corporation](#), 08/16/98-02/29/00, \$164,800.
2. Advanced Integral Equation Research, [Mission Research Corporation](#), 01/01/99-11/11/00, \$65,000

BIOGRAPHICAL SKETCH

3. Engineered Porous Materials for Microwave Applications, [MSU IRGP Program](#), 12/15/99-03/15/01, \$75,000(w/ D. Nyquist (PI), M. Crimp, and E. Rothwell).
4. Dissimilar Basis Function Research, [MSU IRGP Program](#), 12/15/99-03/15/01,\$50,000.
5. Advanced Foam Support Technology, [Mission Research Corporation](#), 08/15/00-3/31/01,\$40,000 (w/ D. Nyquist and E. Rothwell).
6. General Research, [Dow Corporation](#), Open,\$5,000 (w/ D. Nyquist and E. Rothwell)/
7. Aperture Research-I, [Veridian Engineering](#), Delivery Order Contract supporting AFRL PRDA-99-03-SNK,05/15/00-05/14/02, \$150,000.
8. Electromagnetic Materials Research, [Dow Corporation](#), 01/01/01-12/31/01, \$50,000 (w/ D. Nyquist and E. Rothwell).
9. Multi-Spectral Low Observable (LO) Nondestructive Evaluation Research, Boeing Defense and Space Group,8/31/00-9/1/01, \$50,000 (w/ E. Rothwell (PI) and D. Nyquist).

Courses Taught at MSU

1. ECE 835 (F98)
2. ECE 836 (SP99)
3. ECE 435 (F99, F00)
4. ECE 305 (SP00)
5. ECE 381 (SP01)
6. ECE 802 (SP01)

Committee Service

1. Member, ECE Graduate Studies Committee (AY98-99)
2. Chairperson, ECE Graduate Studies Committee (AY99-00, AY00-01).
3. Advisor, Electrical Engineering Honor's Students (AY99-00, AY00-01).
4. Member, ECE Advisory Committee (AY00-01, AY01-02).
5. Member, ECE Strategic Planning Committee (AY99-00, AY00-01).
6. Member, ECE Chairperson Search Committee (AY00-01).
7. Ex-officio Member, College of Engineering Research Council (AY00-01, AY01-02).
8. Member, Engineering Research Council Division of Engineering Research Review sub-committee (Fall 2000).
9. Member, University Graduate Council (AY00-01, AY01-02).
10. Member, Graduate Student Welfare Sub-committee for the University Graduate Council (AY00-01).
11. Reviewer, MSU Intramural Research Grants Program – twice – (Fall 2000).
12. Advisor, Tau Beta Pi (Spring 2000, AY00-01).
13. Member of ECE Department Displays Committee (AY98-99).
14. Member of College of Engineering Teaching Certificate Planning Committee (Fall 1998).

BIOGRAPHICAL SKETCH

Public Service

1. NSF proposal reviewer (AY98-99).
2. Co-chair, "Finite Element Methods and Applications," 1998 Joint AP-S/URSI Conference, Atlanta, GA.
3. Reviewer, IEEE Transactions on Antennas and Propagation (1998,2000).
4. Consultant, Mission Research Corporation (1998-2000)
5. Organizer and Co-chair, "Finite Element Methods," 1999 Applied Computational Electromagnetics Society (ACES) Conference, Monterey, CA.
6. Organizer and Co-chair, "Special Session on Conformal Antennas," 1999 URSI Meeting, Orlando, FL.
7. Reviewer, Radio Science (1999)
8. Reviewer, Journal of Electromagnetic Waves and Applications (1999)
9. Reviewer, Oxford University Press (1999).
10. Reviewer, IEEE Trans. Aerospace and Electronic Systems (1999-2000).
11. IEEE, SE Michigan, Chapter 4 Vice-Chair, 07/01/99-06/30/00.
12. Organizer and Co-chair, "Conformal Antennas," 2000 Applied Computational Electromagnetics Society (ACES) Conference, Monterey, CA.
13. Vendor Chair, 2000 Applied Computational Electromagnetics Society (ACES) Conference, Monterey, CA.
14. Reviewer, IEEE Trans. Antennas and Propagation Magazine (2000).
15. Reviewer, IEEE Trans. Magnetics (2000).
16. Reviewer, IEEE Trans. on Components, Packaging, and Manufacturing Technology (2000).
17. Reviewer, IEEE Trans. Microwave Theory and Techniques (2000-2001).
18. Chair, "FEM Modeling of Antennas," 2000 Finite Element Workshop, Boston, MA.
19. Co-Chair, "Advances in Computational Electromagnetics," 2000 Progress in Electromagnetics Research Symposium (PIERS), Boston, MA.
20. Technical Chairperson, 2001 Applied Computational Electromagnetics Society (ACES) Conference, Monterey, CA.

Collaborators

Arindam Chatterjee (Simplex Corp.), Melissa Crimp (MSU), Hoton How (Electromagnetic Associates), Jian-Ming Jin (UIUC), Matt Mutka (MSU), Dennis Nyquist (MSU), Ed Rothwell (MSU), Diane Rover (MSU), Keith Trott (Mission Research Corp.), Carmine Vittoria (Northeastern University), John Volakis(UMich), Time Grotjohn (MSU)

Graduate Advisees

John Gulick (M.S.), Sandeep Rana (M.S.), Chi-Wei Wu (Ph.D.), Charles Macon (Ph.D.), Jeff Meese (Ph.D.), Ben Wilmhoff (M.S.), Derik Love (M.S.), Sebastian Richter, (Diplomingenieur thesis – 10/20/2000).

Undergraduate Research Assistants

Scott Rice (Sp98,F99,Sp00), Brock Napierkowski (SU99,SP00), Faiz Ikramulla(F99,SP00), John Amrhein (F99,SP00), Steve Ferrari (SP00), Rosalee Egan (FA00), Garrett Stenholm (SU00, FA00), Steven Smith (SP01), Andrew Bogle (SP01)

BIOGRAPHICAL SKETCH

Major Professor

John Volakis (University of Michigan), 1989-1994, M.S.E.E., Ph.D., Post-doctoral Researcher

Summary of Research & Educational Accomplishments

Dr. Kempel received the Ph.D. degree from the University of Michigan in 1994. His dissertation focused on developing and applying novel hybrid finite element analysis and design procedures to conformal antennas. After a brief Post-doctoral experience at UM, Dr. Kempel joined Mission Research Corporation as a Senior Research Engineer. He led research programs in the following areas: conformal antenna analysis and design, ultra-wide bandwidth antenna design, high power microwave analysis, low observable feature analysis and design, and synthetic scene generation using physics-based models.

Dr. Kempel left MRC after four years of employment to join Michigan State University in August 1998. Since joining MSU's faculty, he has taught undergraduate and graduate level courses in Electromagnetic Theory and supervised an undergraduate laboratory. He has transferred a portion of his research program, concerning computational electromagnetics, from MRC to MSU. He has also instigated new cooperative research thrust areas with faculty members from within the Electrical and Computer Engineering department as well as other departments within the MSU College of Engineering. Dr. Kempel is also collaborating with faculty at the University of Michigan as well as Northeastern University.

He updated ECE435 Laboratory content including the publication of laboratory instructions via the world-wide web, introduction of new microstrip circuit/antenna design software, and use of the ECE Department's desktop PC board milling machine for class projects. He is introducing a new course at MSU in the Spring 2001 term concerning Computational Electromagnetics Methods.

Dr. Kempel was the Chapter 4 Vice Chair for the Southeast Michigan Chapter of the IEEE for 1999-2000. He has organized and chaired sessions at the ACES'99 and IEEE-AP/URSI'99 conferences and is presently organizing technical sections for the ACES'00 and PIERS'00 conferences. In addition, Dr. Kempel is the Vendor Chair for the ACES 2000 Conference. He is the Technical Chair for the ACES 2001 Conference.