

# CURRICULUM VITA

Robert Grant Hohlfeld

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Citizenship: U.S.A.

Date and Place of Birth: 18 July 1952, Swindon, England

## Academic Degrees:

S.B. Physics	June, 1974	Massachusetts Institute of Technology
M.S. Astronomy	June, 1976	Cornell University
Ph.D. Astronomy	January, 1980	Cornell University

Honors and Awards: Associate of the Harvard College Observatory, 1984-90

Honorary Society Membership: Sigma Xi

## Professional Society Memberships:

Senior Member, Institute of Electrical & Electronic Engineers (IEEE)  
American Association for the Advancement of Science (AAAS)

## Employment:

1996-Present	Chief Scientist, Wavelet Technologies, Inc., and Research Associate Professor, Center for Computational Science, Boston University
2007-2010	Partner/Senior Scientist, PhaseCapital LP
1985-1995	Assistant Professor, Electrical, Computer, and Systems Engineering, Boston University
1984-1985	Assistant Professor of Astronomy, Boston University
1983-1984	Assistant Professor of Physics, Northeastern University
1983	Consulting Theoretical Physicist
1980-1982	Staff Scientist, Department of Earth and Planetary Sciences, Massachusetts Institute of Technology
1979-1980	Consulting Theoretical Physicist
1979	Visiting Scientist at M.I.T. Plasma Confinement Group and Consultant to the Cornell University Laboratory for Plasma Studies

## Bibliography:

### I. Theses

“A Study of the Conduction of the Thermal Energy Across the Earth's Bow Shock”, S.B. thesis, Massachusetts Institute of Technology (1974).

“On the Stability and Dynamics of Disk Galaxies: Considerations on the Axisymmetric Background”, Ph.D. thesis, Cornell University (1980).

### II. Professional Articles

Hohlfeld, R. G., “Conduction of Thermal Energy in the Neighborhood of the Earth's Bow Shock”, *J. Geophys. Res.*, **81**, 2257 (1976).

Hohlfeld, R. G., and Terzian, Y., “Multiple Stars and the Number of Habitable Planets in the Galaxy”, *Icarus*, **30**, 598 (1977).

Lovelace, R. V. E., and Hohlfeld, R. G., “Negative Mass Instability of Flat Galaxies”, *Ap. J.*, **221**, 51 (1978).

Cohen, N. L., Hohlfeld, R. G., Gorenstein, M. V., Potash, R. I., and Willson, R. F., “Langmuir Scattering and High Velocity Features in Stellar Water Masers”, *Astron. Astrophys.*, **95**, 386 (1981).

Hohlfeld, R. G., and Krumm, N., “An Infrared Search for Massive Galactic Envelopes”, *Ap. J.*, **244**, 476, (1981).

Hohlfeld, R. G., Manning, W., and MacLennan, D., “Self-Inductance Effects in Linear Flashtubes: An Extension to the Markiewicz and Emmett Theory”, *Appl. Opt.*, **22**, 1986 (1983).

Hohlfeld, R. G., “The Electrodynamics of Tethered Satellites in Low Earth Orbit: I. Vacuum Solutions”, preprint (1984).

Hohlfeld, R. G., and Dunham, E. W., “Aeroacoustic Noise and the Resolution Limits of Airborne Observatories”, preprint (1984).

Elliot, J. L., Dunham, E. W., Baron, R. L., and Hohlfeld, R. G., “Investigation of the Images Formed by the Telescope in the Kuiper Airborne Observatory”, Interim Report for NASA Grant NAG2-257, submitted to Ames Research Center, October 1984.

Ebersole, J. F., Cheng, W. K., Hallett, J., Hohlfeld, R. G., “Effects of Hydrometeors on Electromagnetic Wave Propagation”, Air Force Geophysical Laboratory Technical Report, AFGL-TR-84-0318, (1985).

Gullahorn, G. E., and Hohlfeld, R. G., “Analytical Investigation and Simulation of Partially Tensioned Systems”, Final Report, Contract RH5-394202 (Martin Marietta Corp.) March 1986.

Gullahorn, G. E., and Hohlfeld, R. G., “Tether as a Dynamic Transmission Line”, AIAA Proceedings of *Second International Conference on Tethers in Space*, Venice, Italy (1987).

Ebersole, J. F., Kilian, J. C., Friesen, D. D., Cassidy, T. W., and Hohlfeld, R. G., “Countermeasure Work Station Using an IBM-Compatible Personal Computer”, Tech. Rept. COI-LR-16, prepared for U. S. Ballistics Research Laboratory (1987).

Hohlfeld, R. G., Wachtman, R., and Kilian, J., “Application and Evaluation of a Differential Inversion Technique for Remote Sensing”, Creative Optics Report COI-SR-25, prepared for Air Force Geophysics Laboratory, Hanscom AFB, Tech. Rept. AFGL-TR-88-0138, (1988).

Hohlfeld, R. G., Thompson, A. R., Giles, R. M., and Fang, T. M., “Parallel Computation Techniques for Phased Array Applications”, report to Air Force Electronic Systems Division, Hanscom Air Force Base, (1988).

- Hohlfeld, R. G., Drueding, T. W., Ebersole, J. F., and Kilian, J. C., "Nonlinear Hyperbolic Algorithm and Optical Measure Theory: Numerical Stability, Data Availability, and Applicability", Creative Optics Report, COI-LR-37, prepared for Air Force Geophysics Laboratory, Hanscom AFB, (1988).
- Hohlfeld, R. G., Drueding, T. W., Ebersole, J. F., and Kilian, J. C., "Novel Methodology for Application of Adaptive Systems Techniques to DMSP Remote Temperature Sensing", Creative Optics Report, COI-SR-26, prepared for Air Force Geophysics Laboratory, Hanscom AFB, Tech. Rept. AFGL-TR-88-0323, (1988).
- King, J. I. F., Hohlfeld, R. G., and Kilian, J. C., "Application and Evaluation of a Differential Inversion Technique for Remote Temperature Sensing", *Meteorol. Atmos. Phys.*, **41**, 115-126 (1989).
- Hohlfeld, R. G., Drueding, T. W., and Ebersole, J. F., "Algorithm Selection and Development for a Nonlinear Least Squares Nonlinear Hyperbolic Algorithm for Fitting Upwelling Atmospheric Radiances", Creative Optics Report COI-LR-59, prepared for Air Force Geophysics Laboratory, Hanscom AFB, (1989).
- Hohlfeld, R. G., Drueding, T. W., and Ebersole, J. F., "Characterization of the Chi-Squared Surface for Nonlinear Least-Squares Minimization in Optical Measure Theory", Creative Optics Report, COI-LR-56, prepared for Air Force Geophysics Laboratory, Hanscom AFB, (1989).
- Varley, R., Hohlfeld, R., Sandri, G., Lovelace, R., and Cercignani, C., "Proposal for a Particle Accelerator in High Earth Orbit", *Il Nuovo Cimento*, **105**, 23-29, (1990).
- Hohlfeld, R. G., Sparagna, S. M., and Sandri, G. v. H., "Direct Solution of the Wave Equation Using Parallel Computational Techniques", 7th Annual Review of Progress in Applied Computational Electromagnetics, pp. 203-221, (1991).
- Hohlfeld, R. G., and Aggarwal, A., "High Performance Imaging Algorithms for High Resolution Inspection", Proceedings of Sensors Expo, Helmers Publishing, Inc., Petersborough, NH, pp. 301A-1,301A-8, (1991).
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- Collins, J. J., Fanciulli, M., Hohlfeld, R. G., Finch, D. C., Sandri, G. v. H., and Shtatland, E. S., "A Random Number Generator Based on the Logit Transform of the Logistic Variable", *Computers in Physics*, **6**, no. 6, Nov./Dec., p. 630-632, (1992).
- Hohlfeld, R. G., King, J. I. F., Drueding, T. W., and Sandri, G. v. H., "Solution of Convolution Integral Equations by the Method of Differential Inversion", *SIAM J. Appl. Math.*, **53**, pp. 154-167, (1993).
- Hohlfeld, R. G., Comins, N. F., Shalit, D., Shorey, P., and Giles, R. C., "Implementation of Particle-in-Cell Stellar Dynamics Codes on the Connection Machine-2", *J. Supercomp.*, **7**, 417-436, (1993).
- Brower, R. C., Hohlfeld, R. G., Nagem, R. J., and Sandri, G. v. H., "Nearly Isotropic Propagation of Spatially Discretized Waves", *Wave Motion*, **18**, 383-400, (1993).
- Konstantopoulos, C., Hohlfeld, R. G., and Sandri, G. v. H., "Deconvolution of Noisy Gaussian Filters and Wavelet-Stabilized Antidiffusion", *CVGIP: Graphical Models and Image Processing*, **56**, no. 6, pp. 433-441, (1994).
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- Cohen, N. L., and Hohlfeld, R. G., "Fractal Loops and the Small Loop Approximation", *Communications Quarterly*, **6**, 77-81, (1996).
- Hohlfeld, R. G., Munro, S. D., and Eckhardt, R. A., "Thrust Production in Projectiles Operating as External Combustion Ramjets", report to Air Force Research Laboratory, AFRL-MN-EG-TR-1998-7050, (1988).

Hohlfeld, R. G., and Cohen, N. L., “Self Similarity and the Geometric Requirements for Frequency Independence in Antennas”, *Fractals*, **7**, 1999.

Cohen, N., and Hohlfeld, R. G., “Array Sidelobe Reduction by Small Position Offsets of Fractal Elements”, 16<sup>th</sup> Annual Review of Progress in Applied Computational Electromagnetics Symposium, Conference Proceedings, pp. 822-828, March 20-24, 2000.

Cohen, N., and Hohlfeld, R. G., “Mutual Figure of Merit for an ETI Link”, Proceedings of Frank Drake SETI Symposium, May 7, 2000.

Hohlfeld, R. G., and Cohen, N., “Optimized Search Strategies Based on the Properties of Flux-Limited Catalogs”, Proceedings of Frank Drake SETI Symposium, May 7, 2000.

Hohlfeld, R. G., and Cohen, N. “Fractal Element Antennas and the Electrically Small Limit”, Proceedings of July 2001 IEEE-URSI meeting

Alves, Nuno, Crespo-Miranda, William, Fernandes, Felipe, Santana, Fabio, Hohlfeld, Robert G., and Cohen, Nathan, “Fractal Antenna Element Optimization Using a PC Cluster”, 18<sup>th</sup> Annual Review of Progress in Applied Computational Electromagnetics, (2002).

Hohlfeld, Robert G., Moschella, David, and Cohen, Nathan, “Prospects for Fractal Coded Genetic Optimization in Electromagnetics”, 18<sup>th</sup> Annual Review of Progress in Applied Computational Electromagnetics, (2002).

Hohlfeld, R. G., Rajagopalan, Cadathur, and Neff, G. W., “Traitement de Signaux Electrophysiologiques par Ondelettes”, *Techniques de l'Ingenieur*, S 7 033, (2004).

Lovelace, R. V. E., and Hohlfeld, R. G., “Rossby Wave Instability with Self-Gravity”, *Mon. Not. R. Astron. Soc.*, **429**, issue 1, p. 529-533, (2013).

Hohlfeld, R. G. and Lovelace, R. V. E. (2014), “Instability of Counterrotating Flow in an Astrophysical Disk”, proceedings of the Conference on Computational Physics (sponsored by the International Union of Pure and Applied Physics), August 18, Boston, Massachusetts.

### III. Invited Lectures

“Parallel Computation Techniques for Phased Array Applications”, R. Hohlfeld, presented to Boston IEEE Section, Aerospace & Electronic Systems, Feb. 15, 1989.

“Application and Evaluation of the Differential Inversion Technique for Remote Temperature Sounding”, J. I. F. King, R. G. Hohlfeld, and J. C. Kilian, presented at 5th Scientific Assembly of the International Association of Meteorology and Atmospheric Physics, Reading, UK, August 2, 1989.

“At Last: The Thermal Inferencing Problem Correctly Formulated, Explicitly Solved, and Applied to TOVS Satellite Data”, J. I. F. King and R. G. Hohlfeld, Dept. of Meteorology Seminar, University of Maryland, College Park, MD, September 28, 1989.

“Wave Propagation Simulations of Phased Arrays on the Connection Machine”, R. G. Hohlfeld, presented at the Naval Underwater Systems Center, Newport, RI, and New London CT, October 6, 1989.

“Wave Propagation Simulations of Phased Arrays on the Connection Machine”, R. G. Hohlfeld, presented at Physics Dept., University of Vermont, December 1, 1989.

“Wave Propagation Simulations of Phased Arrays on the Connection Machine, R. G. Hohlfeld and S. M. Sparagna, presented at Submarine Signals Division, Raytheon Corp., Portsmouth R. I., December 14, 1989.

“Wave Propagation Simulations on the Connection Machine”, R. G. Hohlfeld, Space Physics Colloquium, Hanscom AFB, MA, 1990.

“Convolution Algebras and Hyperdistribution Wavelets”, R. G. Hohlfeld, Thinking Machines Corporation, Wavelet Seminar Series, May 28, 1991.

“High Performance Imaging Algorithms for High Resolution Inspection”, R. G. Hohlfeld and A. Aggarwal, presented at Sensors Expo: Conference and Exposition of Systems and Sensors, October 3, 1991.

“Parallel Computing and the Connection Machine”, R. G. Hohlfeld, Compact Software, Paterson NJ, December 5, 1991.

“*N*-Body Simulations of Disk Galaxies on the Massively Parallel Connection Machine-2”, R. G. Hohlfeld, Boston University Astronomy Dept. Colloquium, October 26, 1992.

“Fluid Debubbling by Ultrasonic Radiation Pressure”, R. G. Hohlfeld, Du Pont Experimental Station, Wilmington, DE, December 9, 1992.

“An Operational View of NASA's Tethered Satellite Adventure”, R. G. Hohlfeld, Students for the Exploration and Development of Space, February 10, 1993.

“Convolution Algebras, Hyperdistributions, and Hermite-Rodrigues Wavelets, R. G. Hohlfeld, Technical Professional Lecture Series, Analogic Corporation, Peabody, MA, February 23, 1993.

“Convolution Algebras, Hyperdistributions, and Hermite-Rodrigues Wavelets, R. G. Hohlfeld, IEEE Lecture Series on Wavelets, December 2, 1993.

“*N*-Body Simulations of Disk Galaxies on the Massively Parallel Connection Machine”, R. G. Hohlfeld, joint meeting of Boston Computer Society and National Space Society, December 8, 1993.

“Convolution Algebras, Hyperdistributions, and Hermite-Rodrigues Wavelets”, R. G. Hohlfeld, Applied Mathematics Seminar, Boston University, April 21, 1994.

“Representation of Signals Using Orthogonal Functions (and an Introduction to Wavelets), R. G. Hohlfeld, Technical Professional Lecture Series, Analogic Corporation, Peabody MA, July 21, 1994.

“Hypervelocity Accelerating Projectiles”, R. G. Hohlfeld, Final Report on Phase I SBIR given to Wright Laboratory Armament Directorate, Eglin AFB, 19 May 1997.

“Supersonic Projectiles Producing Thrust by External Combustion”, R. G. Hohlfeld, Center for Computational Science Seminar, Boston University, November 7, 1997.

“Fractals Get Practical: An Introduction to Fractal Antennas”, N. Cohen and R. G. Hohlfeld, technical presentation to the National Security Agency, June 1999.

“Building a Quantitative Hedge Fund”, R. G. Hohlfeld, Center for Computational Science Seminar, Boston University, October 24, 2008.

Hohlfeld, R. G. and Lovelace, R. V. E. (2014), “Instability of Counterrotating Flow in an Astrophysical Disk”, Conference on Computational Physics 2014 (sponsored by the International Union of Pure and Applied Physics), August 18, Boston, Massachusetts.

#### **IV. Poster Papers and Abstracts of Papers Given at Meetings**

Hohlfeld, R. G., “A Useful Representation for MHD Shock”, *EOS*, **54**, 439 (1973).

Hohlfeld, R. G., and Lovelace, R. V. E., “Collisionless Expansion of a Bubble or Relativistic Particles”, *News Lett. Astron. Soc. N. Y.*, **1**, 21 (1976).

Hohlfeld, R. G., and Terzian, Y., “Multiple Stars and the Number of Habitable Planets in the Galaxy”, *News Lett. Astron. Soc. N. Y.*, **1**, 21 (1976).

Hohlfeld, R. G., and Lovelace, R. V. E., "Negative Mass Instability of Flat Galaxies", *Bull. American Astron. Soc.*, **9**, 363 (1977).

Lovelace, R. V. E., and Hohlfeld, R. G., "Global Stability Conditions for Flat Galaxies by the Nyquist Method", *Bull. American Astron. Soc.*, **10**, 430 (1978).

Williams, G., Lovelace, R., Hohlfeld, R., and Kintner, P., "Electrostatic Diode and Cyclotron Acceleration of Energetic Electrons and Protons in the Jovian Magnetosphere: Possible Contributions to the Unexplained Particle Fluxes?", *EOS*, **59**, 351 (1978).

Cohen, N. L., and Hohlfeld, R. G., "Shock-Induced Variability of Water Masers in HII Regions", *News Lett. Astron. Soc. N. Y.*, **1**, 12 (1978).

Varley, R., Hohlfeld, R., Sandri, G., and Lovelace, R., "Proposal for a Particle Accelerator in High Earth Orbit", presented at APS Annual Meeting, Baltimore, MD, April 18-21, 1988.

Hohlfeld, R., Pealer, D., Sandri, G., and Varley, R., "Construction of a Particle Accelerator in High Earth Orbit", presented at APS Annual Meeting, Baltimore, MD, April 18-21, 1988.

Lovelace, R., Baillieul, J., Bifano, T., Hohlfeld, R., and Sandri, G., "The Dynamical Stability of a Particle Accelerator in High Earth Orbit", presented at APS Annual meeting, Baltimore, MD, April 18-21, 1988.

Sandri, G., Anderson, E., Hohlfeld, R., Komerska, R., Thomas, P., Weaver, M. K., Cercignani, C., and Varley, R., "Preliminary Design Study for a Particle Accelerator in High Earth Orbit", presented at APS Annual Meeting, Baltimore, MD, April 18-21, 1988.

Hohlfeld, R. G., and Sandri, G. v. H., "Construction of a Convolution Algebra with Applications to Image Restoration", presented at the New England Section of the American Physical Society, Yale University, (1990).

Drueding, T. W., Hohlfeld, R. G., Sandri, G. v. H., and King, J. I. F., "Determination of Temperature Profiles by Differential Inversion of Satellite Radiance Data", presented at the New England Section of the American Physical Society, Yale University, (1990).

Hohlfeld, R. G., and Sandri, G. v. H., "Reconstruction of Images Degraded by Turbulence Utilizing Convolution Algebra", *Bull. Am. Phys. Soc.*, **35**, 2250, (1990).

Drueding, T. W., Hohlfeld, R. G., Sandri, G. v. H., and King, J. I. F., "Atmospheric Temperature Profiles by Differential Inversion of Satellite Radiance Data", *Bull. Am. Phys. Soc.*, **35**, 2325, (1990).

Hohlfeld, R. G., "Ultrasonic/Acoustic Radiation Pressure for Physical Separation of Bubbles from Viscous Fluids", Sixth International Coating Process & Technology Symposium, Supplement to Chemical Engineering Progress, A. I. Ch. E., (1992).

Hohlfeld, R. G., and Cohen, E. D., "Application of Ultrasonic Radiation Pressure in Debubbling Thin-Film Materials", Sixth International Coating Process & Technology Symposium, Supplement to Chemical Engineering Progress, A. I. Ch. E., (1992).

Hinders, M. K., Fang, T. M., Hohlfeld, R. G., and Sandri, G. v. H., "Ultrasound Debubbling in a Viscous Fluid", Sixth International Coating Process & Technology Symposium, Supplement to Chemical Engineering Progress, A. I. Ch. E., (1992).

Hinders, M. K., Fang, T. M., Hohlfeld, R. G., and Sandri, G. v. H., "Plasma Radiation Force on a Plasma Sphere", Sixth International Coating Process & Technology Symposium, Supplement to Chemical Engineering Progress, A. I. Ch. E., (1992).

Hohlfeld, R. G., and Cohen, E. D., "Ultrasonic Fluid Debubbling Using Acoustic Radiation Pressure", *Imaging Science and Technology*, (1993).

Hohlfeld, R. G., Comins, N. F., and Shalit, D., "Effects of Large  $N$  on  $N$ -Body Simulations of Disk Galaxies", *Bull. Amer. Astron. Soc.*, **25**, p. 798 (1993).

Hohlfeld, R. G., Aggarwal, A., Friedl, S., Abela, G., and King, J. I. F., "Image Restoration for Intravascular Ultrasonography by the Method of Differential Inversion", Science Innovation 1993, American Association for the Advancement of Science (1993).

Hohlfeld, R. G., and Cohen, N., Development of "Development of Fractal Antennas", presented to the New England Section of the IEEE, 5 December 2001.

Hohlfeld, R. G., and Cohen, N. L., "Genetic Optimization of Sparse, Frequency Invariant Arrays Using the HCR Principle", IEEE International Symposium on Phased Array Systems and Technology, Waltham, MA Oct. 15, 2003

Hohlfeld, R. G., "Fractal-like Antenna Design", presentation to Hanscom AFB and MITRE, January 5, 2006.

Comins, N., Palestini, N., Borra, E., Hohlfeld, R., and Wholly, L., "Inertial Effects from Companion Galaxies Driving Warps in Disk Galaxies", Poster session presented at: Evolution of Galaxies I. 215<sup>th</sup> Meeting of the American Astronomical Society, 2010 January 3-7, Washington DC.

## V. Web Publications

Hohlfeld, R. G., Rajagopalan, C., and Neff, G. W., "Wavelet Processing of Physiologic Waveforms", (2003),  
[http://www.wavelettech.com/Wavelet\\_Signal\\_Processing\\_of\\_Physiologic\\_Waveforms.pdf](http://www.wavelettech.com/Wavelet_Signal_Processing_of_Physiologic_Waveforms.pdf)

Hohlfeld, R. G., and Sandri, G., "Closed Form, Exact Solutions of the Schrödinger Equation with an  $|x|$  Potential", Wavelet Technologies White Paper WTI.11.3.001, April 12, 2011,  
<http://www.wavelettech.com/schroedingerabsx.pdf>

Lovelace, R. V. E., and Hohlfeld, R. G., "Rossby Wave Instability with Self-Gravity", arXiv:1212.0443 [astro-ph.SR], submitted 3 December 2012.

## VI. Theses Supervised

Sparagna, S. M., "Wave Propagation Using Parallel Computational Techniques", Ph.D., May 1990.

Lyons, R. J., "An Application of Differential Inversion to Radiative Transfer: Forward and Inverse Problems for a Lorentz-Line Atmosphere", M.S., May 1991.

Venkatsubramanian, N., "Application of Differential Inversion to Microwave Atmospheric Temperature Sounding", M.S., January 1994.

DiMarzio, N., "Application of Differential Inversion to DMSP Microwave Sounder Data", M.S., May 1995.

Shalit, D., Massively Parallel Particle-Mesh Simulations of Disk Galaxies: A Kinetic Approach, Ph.D., May 1995.

## VII. Patents

Hohlfeld, R. G., and Thomas, E., "Sonic Debubbler for Liquids", U.S. Patent No. 5,022,899, 11 June 1991.

Hohlfeld, R. G., Ellis, J. B., Aggarwal, A. A., and Drueding, T. W., "System for and Method of Storing Image Data Processed in Multiple Stages", U.S. Patent No. 5,278,954, 11 January 1994.

Muller, J. L., and Hohlfeld, R. G., "Improved System for Measuring the Period of a Quasi-Periodic Signal", U.S. Patent No. 5,584,295, 17 December 1996.

Hohlfeld, R. G., and Jenkins, G., "A Device and Process for Measuring Acoustic Reflectance", U.S. Patent No. 5,902,252, 11 May 1999.

Zahniser, M., Wong, K. L., Zahniser, D., and Hohlfeld, R., "Imaging Blood Cells", U.S. Patent No. 9,690,976, 27 June 2017.