JAMES M. GELB, PH.D.

(UPDATED JANUARY 26, 2015)

Research Scientist, Applied Research Laboratories, The University of Texas at Austin (ARL:UT)
Signal and Information Sciences Laboratory, Signal Physics Division (Active Sonar Subgroup)
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EDUCATION

Ph.D. 1992, Theoretical Physics, Massachusetts Institute of Technology (MIT);
Dissertation: Large Simulations of Gravitational Clustering in the Universe; Advisor: E. Bertschinger

B.A. 1985, Mathematics, University of California at Los Angeles (UCLA), *Summa cum Laude*

HONORS AND AWARDS

- **Honor Societies:** Phi Beta Kappa, Phi Eta Sigma, Sigma Xi, Golden Key, Sigma Pi Sigma Physics Honor Society (chapter president)
- **Awards:** Marilyn F. Lohr Memorial Physics Award, UCLA Distinguished Scholar Award
- **Other Significant Recognition:**

  Promoted to research scientist at ARL:UT with standards comparable to tenure, March 2007

  Offered an IPA sponsor position for the Office of Naval Research

  Ph.D. simulations featured on CNN, the Encyclopedia Britannica Yearbook of Science and the Future, the cover of Computers in Physics, the New York Times, and numerous astronomy textbooks

  Solar neutrino 1986 paper is a standard reference with over 250 citations (SPIRES topcite 250+); also, Gelb & Bertschinger 1994 cosmology simulations (SPIRES topcite 250+)

PROFESSIONAL MEMBERSHIPS

IEEE and Acoustical Society of America (ASA)

COMPUTATION

C (extensive) / C++ (basic), Perl, Bash, Matlab, UNIX/Windows/Office, Fortran. Expertise in general analytic and numerical modeling across many disciplines (e.g., physics, engineering, and finance)

INTERESTS

Aquariums, diving, marathons/triathlons, violin making, piano, history, woodworking

PROFESSIONAL EMPLOYMENT

Applied Research Laboratories (ARL:UT), University of Texas at Austin, August 2000 – Present

Research Scientist in the Signal Physics Division of the Signal and Information Sciences Laboratory

Mid-frequency active sonar: signal processing, tracking, and classification (details in the next section)

University of Texas at Arlington, August 1995 – August 2000

Director of Astronomy Program in the Department of Physics

Director of the astronomy program; research astrophysics / particle physics; left in good standing

Gelb Financial Systems, March 1995 – December 1997

Developed and marketed simulation software for transaction costs in derivatives trading

Morgan Stanley and Company, March 1993 – March 1995

Senior Research Associate

Modeled derivative securities and developed computerized trading systems

Fermi National Accelerator Laboratory, January 1992 – March 1993

Postdoctoral Fellow

Research on galaxy formation and solar neutrinos

Massachusetts Institute of Technology (MIT), September 1986 – January 1992

Graduate Research Assistant

Performed large cosmological simulations (largest in the world at the time), including strategic user status at the Cornell National Supercomputing Facility (CNSF); generated high profile scientific and media attention

Los Alamos National Laboratory, Summers/Winters 1985 – 1990

Research Assistant

Published highly referenced papers (1986 paper alone has over 300 citations) on the MSW effect (a term coined by Dr. Rosen and myself) for solar neutrino oscillations; supplementary research to MIT Ph.D. program

Princeton Plasma Physics Laboratory, June 1984 – September 1985

Graduate Research Assistant

Experiments of Thomson scattering of laser light off of hot electrons in fusion reactors; transferred to MIT

COURSES TAUGHT

Astronomy for Nonscientists – Part 1 – U.T. Arlington (UTA)

Astronomy for Nonscientists – Part 2 – UTA

Physics of Musical Instruments (for music majors) – UTA

Computational Physics (upper division course) – UTA

Astrophysics (upper division course) – UTA

Cosmology (survey course) – UTA

General Relativity (survey course) – UTA

Astrophysics (teaching assistant) – MIT

STUDENTS/STAFF SUPERVISED

Scott Johnston, Engineering Scientist Associate, 2014-present

Joshua Tomazin, summer High School Honors Apprentice, Summer 2014, psychoacoustics and pitch perception

Scott J. Schoen, Graduate Student Assistant, 2013

Andrew W. Oldag, Engineering Scientist Associate, 2009–2013

Lauryn McFarland, summer High School Honor Apprentice, Summer 2007, track simulation and temporal feature development for clutter classification studies

Dr. Ross E. Heath, December 2005–March 2007 (graduate research assistant) and March 2007-June 2008 (postdoc), clutter classification research

George L. Tipple, summer High School Honor Apprentice, Summer 2005, analysis and code development for PDF estimation; Fall 2005–Summer 2009, clutter classification research

Roy Cook and Gene Stevens, summer High School Honor Apprentices, Summer 2003, designed a horizontal buoy and won 2nd prize at the 2003 ARL:UT presentation competition

T. Zachary Laine, ARL:UT. Supervised Laine's conversion of the AII/DD(X) classification algorithm into a C++ component (2003/2004 student, Contract: 6600-4-35-1) and the MWT multi-waveform tracker into a C++/ETC component (2004-2006, staff), Contract: 6600-4-40-1

Sudheer Maremande (graduate student), University of Texas at Arlington, research assistant on the topic of relativistic electrons

Christopher Thebeau (graduate student), acted as thesis supervisor for his Masters of Science in Physics, The University of Texas at Arlington, 1998–2000, on solar neutrinos

PRINCIPAL INVESTIGATOR AT ARL:UT

ONR 321US, *Multi-scale Signal and Information Processing*, 2012-2015, Contract N00014-11-G-0041

ONR 321US, *Mutual Interference Mitigation Signal Processing*, 2011–2014, Contract: N00014-06-G-0218-46

ONR 321US, *Adaptive Clutter Characterization Methods for Active Sonar Tracking*, 2009–2012, Contract: N00014-06-G-0218-34 (includes ACB13 adaptive grid transition)

ONR 321US, *Classification of Clutter Types Using Spatiotemporal Features*, 2006–2009; Contract: N00014-06-G-0218-02 (includes ACB11 spatial feature transition)

ONR 321US, *Hybrid Joint PDFs for Active Sonar [target classification]*, 2003–2005, Contract: N00014-00-G-0450-20

SONAR RELATED RESEARCH AND DEVELOPMENT AT ARL:UT

Signal Processing: 1) Multipath recombination development including integration into the ETC active sonar string to study its efficacy on sonar data. 2) Post-processing waveform selection: developed signal processing methods to filter broadband active sonar data to replicate lower bandwidth waveforms. 3) Mutual interference mitigation and crossbeam normalization for a false alarm reduction initiative and for an ONR Discovery and Invention mutual interference mitigation project. 4) Beamforming methods for cross-sensor training. 5) Extensive clutter studies and feature development for theoretical and applied echo statistics modeling including hybrid models, stable distribution models, and generalized Pareto distribution models. 6) Novel hybrid model normalization and multi-thread signal processing algorithms.

Tracking: 1) Developed a research Kalman tracker to study new motion models and demonstrate the details and efficacy of new and old assumptions made in mature at-sea trackers. 2) Principle theoretical support and verification for the complete redevelopment of the an at-sea tracker including architecture changes allowing for easier additions of, for example, new waveforms, new motion models, and general dimensionality. 3) Development of erratic track features and an advanced adaptive grid technology based on improved echo statistics models to reduce false alarms. 4) Multi-mode tracking algorithms (combining various modes of operation and transmitted waveforms). 5) Multi-hypothesis methods for tracking. 6) Torpedo tracking and classification.

Classification: 1) Automated Information Integration (AII): a) Developed the pseudogauss multidimensional feature algorithm and wrote extensive software to automate classifier training and real-time classification of active sonar data for IUSW-21 and DD(X). 2) Developed automated hybrid PDF estimation and classification algorithms for arbitrary dimensions and datasets, including novel methodologies. 3) Developed tracking and classification algorithms tailored to marine mammal mitigation studies. 4) Developed general clutter classification algorithms using image processing techniques in the spatial domain and using tracking techniques in the temporal domain. 5) Developed methods to integrate classification information back into the tracking algorithms. 6) Developed numerous modules for evaluating information processing performance for a wide variety of data sets.

PUBLICATIONS

Refereed Journal Publications (conference proceedings listed separately)

[41] Gelb, J.M. 2015, *Mixed-Rayleigh Normalization*, J. Underwater Acoustics, in preparation

[40] La Cour, B.R., Thrasher, M.E., Pirkl, R., & Gelb, J.M. 2015, *Wave Detection and Classification*, J. Underwater Acoustics, in preparation

[39] Aughenbaugh, J.M., & Gelb, J.M. 2015, *Mutual Interference Signal Processing*, J. Underwater Acoustics, submitted

[38] Aughenbaugh, J.M., La Cour, B.R., & Gelb, J.M. 2014, *Interference Mitigation for Multistatic Active Sonar*, J. Oceanic Engr., in press

[37] Gelb, J.M. & Oldag, A.W. 2014, *Adaptive Clutter Modeling for Active Sonar Tracking,* J. Underwater Acoustics, 62(2), 232-247

[36] Stanton, T.K., Chu, D., Gelb, J.M., & Tipple, G.L. 2014, *Physics-based Interpretations of Echo Statistics of Three Distinct Clutter Classes Measured with a Midfrequency Sonar,* J. Oceanic Engineering, 99, 1-9

[35] Abraham, D.A., Gelb, J.M., & Oldag, A.W. 2011, *Background and Clutter Mixture Distributions for Active Sonar Statistics,* J. Oceanic Engineering, 36(2), 231-247

[34] Gelb, J.M., Heath, R.E., & Tipple, G.L. 2010, *Clutter Statistics and Normalization by Class in Midfrequency Active Sonar*, J. of Underwater Acoustics, 60(4), 787-810

[33] Gelb, J.M., Heath, R.E., & Tipple, G.L. 2010, *Statistics of Distinct Clutter Classes in Midfrequency Active Sonar*, J. Oceanic Engineering, 35(2), 220-229

[32] Heath, R.E., Gelb, J.M., & Tipple, G.L. 2008, *Classifying Clutter in Midfrequency Active Sonar Data Using Image Processing Techniques,* J. of Underwater Acoustics, 58(4), 1043-1062

[31] Gelb, J.M. & La Cour, B.R. 2005, *Post-processing Waveform Selection in Broadband Active Sonar*, J. of Underwater Acoustics, 55(1), 109-121

[30] Gelb, J.M. & Rosen, S.P. 2000, *Just-So Solar Neutrino Oscillations*, Foundations of Physics, 30(4), 599-606

[29] Gelb, J.M. & Rosen, S.P. 2000, *A Mass Matrix for Atmospheric, Solar, and LSND Neutrino Oscillations*, Physical Review D 62(013003), 1-4

[28] Gelb, J.M., Kaundrina, G.S., & Kennedy, D.C. 1999, *Relativistic Electrons in a Rotating Spherical Magnetic Dipole: Localized 3-D States*, Int. J. Mod. Phys. D 8(2), 251-270

[27] Gelb, J.M., Kaundrina, G.S., & Kennedy, D.C. 1999, *Relativistic Electrons on a Rotating Spherical Magnetic Dipole: Surface Orbitals*, Int. J. Mod. Phys. D 8(2), 229-250

[26] Gelb, J.M. & Rosen, S.P. 1999, *Another Look at "Just-So" Solar Neutrino Oscillations*, Physical Review D 60(011301), 1-4

[25] Gelb, J. M., Kwong, W., & Rosen, S.P. 1997, *Searching for the MSW Enhancement*, Physical Review Letters 78(12), 2296-2299

[24] Gelb, J.M. & Bertschinger, E. 1994, *Cold Dark Matter II: Spatial and Velocity Statistics*, Astrophysical Journal 436, 491-508 (topsite 80+)

[23] Gelb, J.M. & Bertschinger, E. 1994, *Cold Dark Matter I: The Formation of Dark Halos, Astrophysical Journal* 436, 467-490 (topsite 227+)

[22] Katz, N., Quinn, T., Bertschinger, E., & Gelb, J.M. 1994, *Formation of Quasars at High Redshift*, Monthly Notices of the Royal Astronomical Society 270, L71-L74

[21] Kofman, L., Bertschinger, E., Gelb, J.M., Nusser, A., & Dekel, A. 1994, *Evolution of One-Point Distributions from Gaussian Initial Fluctuations*, Astrophys. J. 420, 44-57 (topsite 50+)

[20] Katz, N., Quinn, T., & Gelb, J.M. 1993, *Galaxy Formation and Peaks Formalism*, Monthly Notices of the Royal Astronomical Society 265(3), 689-705

[19] Gelb, J.M., Gradwohl, B., & Frieman, J.A. 1993, *Large- and Small-Scale Constraints on Power Spectra in Omega=1 Universes*, Astrophys. J. Letters 403, L5-L8

[18] Gelb, J.M., Kwong, W., & Rosen, S.P. 1992, *Implications of New Gallex Results for the MSW Solution of the Solar Neutrino Problem*, Physical Review Letters 69, 1864-1866

[17] Bertschinger, E. & Gelb, J.M. 1991, *Large Cosmological N-body Simulations*, Computers in Physics, 5, 164-179 (featured on the cover)

[16] Rosen, S.P. & Gelb, J.M. 1989, *Neutrino-Electron Scattering and the Choice Between Different MSW Solutions of the Solar-Neutrino Problem*, Physical Review D 39, 3190-3193

[15] Bahcall, J.N., Gelb, J.M., & Rosen, S.P. 1987, *Mikheyev-Smirnov-Wolfenstein Effect in Electron-Neutrino Scattering Experiments*, Physical Review D 35, 2976-2982

[14] Rosen, S.P. & Gelb, J.M. 1986, *Mikheyev-Smirnov-Wolfenstein Enhancement of Oscillations as a Possible Solution to the Solar Neutrino Problem*, Physical Review D 34(4), 969-979 (topsite 250+)

Conference Proceedings

[13] Abraham, D.A., Gelb, J.M., & Oldag, A.W., *K-Rayleigh Mixture Model for Sparse Active Sonar Clutter*, Oceans 2010, Sydney, Australia, May 2010

[12] Gelb, J.M. & Oldag, A., *Active Sonar Clutter Classification Using High Order Moments*, Acoustical Society of America, Baltimore, Maryland, April 2010, Proceedings of Meetings on Acoustics (POMA)

[11] Gelb, J.M., *Midfrequency Active Sonar Clutter Statistics Segregated by Broad Clutter Types*, Acoustical Society of America, Portland, Oregon, May 2009

[10] Gelb, J.M., Heath, R.E., & Tipple, G.L., *Characterization of Clutter by Class in Midfrequency Active Sonar,* NATO International Symposium on Reverberation and Clutter, Lerici, Italy, September 2008

[9] Heath, R.E., Gelb, J.M., & Tipple, G.L., *Classification of Clutter Types in Active Sonar Using Spatial Image Processing Techniques*, IEEE Oceans '07 - Europe, Aberdeen, Scotland, June 2007

[8] Gelb, J.M., *Hybrid Joint PDF Estimation and Classification for Sparse Systems*, IEEE Oceans 05 - Europe, Brest, France, June 2005

[7] Gelb, J.M., *Post-processing Waveform Selection in Broadband Active Sonar*, IEEE Oceans 05 - Europe, Brest, France, June 2005

[6] Gelb, J.M. 1995, *Groups of Galaxies in CDM Universes*, proc. of the Groups of Galaxies Workshop at the Space Telescope Science Institute, Baltimore, MD., ed. Richter, O.G. & Borne, K. (California: Astronomical Society of the Pacific)

[5] Gelb, J.M. 1993, *N-body Simulations of Cold Dark Matter*, proc. of the XXVI Int. High Energy Physics Conference, Dallas, Texas, ed. Sanford, J.R. (New York: AIP)

[4] Gelb, J.M. 1992, *Cold Dark Matter Simulations,* XXVI International Conference on High Energy Physics, Dallas, TX

[3] Gelb, J.M. 1991*, Galaxy Correlation Functions in Redshift Space from Large N-body Simulations*, proc. of After the First Three Minutes, ed. Holt, S., Bennett, C, & Trimble, V. (New York: American Institute of Physics)

[2] Bertschinger, E. & Gelb, J.M. 1989, *Path Integral Methods for Primordial Density Perturbations***,** proc. of the IAU Symposium 130, ed. Audouze, J., Pelletan, M.C., & Szalay, A. (Dordrecht: Reidel)

[1] Rosen, S.P. & Gelb, J.M. 1987, *Matter Oscillations and Solar Neutrinos: A Review of the MSW Effect*, proc. of the XXIII International Conference on High Energy Physics, Berkeley, CA, ed. Loken, S.C. (Singapore: World Scientific)

Articles and Technical Reports (not including abstracts and conference proceedings)

Donnell, M.A. & Gelb. J.M., *ACB15 Functional Description Document*, IWS-51, January 2015

Aughenbaugh, J.M. & Gelb, J.M., *Mutual Interference Mitigation Signal Processing Annual Re*port, September, 2014

Gelb, J.M., *Adaptive Clutter Modeling in Tracking*, ONR Year End Report, October 2012

Gelb, J.M., *Advanced Adaptive Grid Functional Description Document*, Active Clutter Reduction, IWS-5A, January 2012

Gelb, J.M., *Adaptive Clutter Modeling in Tracking*, ONR Year End Report, October 2011

Gelb, J.M., *Adaptive Clutter Modeling in Tracking*, ONR Year End Report, October 2010

Gelb, J.M., *Integrated Tracking / Classification,* IWS-5A FY2009 Year End Report, January 2010

Gelb, J.M., *Integrated Tracking / Classification Functional Description Document*, Active Clutter Reduction, IWS-5A, November 2009

Gelb, J.M., *Classification of Clutter Types Using Spatiotemporal Features*, ONR Year End Report, October 2007, N00014-06-G-0218-02

Clements, J.M., Gelb, J.M., & Unruh, S., *Marine Mammal Identification in Active Sonar Data*, FY06 progress report and future research, ARL:UT, July 2006

Gelb, J.M., *Classification of Clutter Types Using Spatiotemporal Features*, ONR Year End Report, October 2006

Gelb, J.M. & Miller, J.R., *Torpedo Detection Classification and Localization: Signal Processing and 3D Tracking*, September 2006

Gelb, J.M. & Unruh, S., *Marine Mammal Identification in Active Sonar Data*, July 2006

Gelb, J.M., Laine, T.Z., & Donnell, M.A., *Flexible Multi-waveform Tracker (FMT)*, February 2006

Gelb, J.M., *Hybrid Joint PDFs for Active Sonar*, Office of Naval Research, Ocean Atmosphere Space, 2005, Active Sonar Program Review

Gelb, J.M., *Hybrid Joint PDFs for Active Sonar*, Office of Naval Research, Ocean Atmosphere Space, 2004, Active Sonar Program Review

Gelb, J.M, Laine, Z., Faulkner L.L., and Donnell, M.A. 2004, *Integration Test Results, (with test procedures) for DD(X) Engineering Development Model Automated Information Integration*, NAVSEA

Gelb, J.M, Laine, Z., Faulkner L.L., & Donnell, M.A. 2004, *Final Report for the DD(X) Engineering Development Model (EDM) Automated Information Integration (AII*), NAVSEA

Donnell, M.A. & Gelb, J.M. 2004, *ADD for Automated Information Integration Statistical Classification and Track Association*, NAVSEA, 31 Aug

Faulkner, L.L., Gelb, J.M., & Donnell, M.A. 2004, *Integration Test Plan for the DD(X) EDM AII*, NAVSEA, 31 Aug

Faulkner, L.L., Donnell, M.A., & Gelb, J.M. 2004, Algorithm Test Plan (with test cases) Rev. 3 for the DD(X) EDM AII, NAVSEA, 28 May

Gelb, J.M., Laine, T.Z., Faulkner, L.L., & Donnell, M.A. 2004, *Algorithm Test Results for DD(X) EDM AII*, NAVSEA, 28 May

Gelb, J.M. 2003, *DD(X) IUSW EDM AII*, NAVSEA

Donnell, M.A., Gelb J.M., & Faulkner, L.L. 2003, *DD(X) IUSW EDM Program, Data Fusion, Software Design Description (AII portions)*, NAVSEA

Donnell, M.A., Gelb, J.M., & Faulkner, L.L. 2003, *DD(X) IUSW EDM Program, Data Fusion, Software Requirements Specification (AII portion)*, NAVSEA, 13 Oct

Rosen, S.P. & Gelb, J.M. 1999, *Solar Neutrinos*, Haller Festschrift.

Rosen, S.P. & Gelb, J.M. 1987, *Detailed MSW Calculations for Solar Boron-8 Neutrinos*, Los Alamos National Laboratory publication

PRESENTATIONS

Invited Talks (those without conference proceedings)

ONR ASA/EC Spring Review, *Error-based Clustering and Normalization Results*, March 2015

Austin Piano Society, *Physics of Music*, January 2015

ONR ARL:UT ASA/EC Technical Review, *Error-based Clustering and Normalization Results*, Nov 2014

UT Arlington Physics Seminar, *Acoustical Foundations of Scales*, *Tempered Tuning, & Pitch Perception*, Aug 2014

UT Austin Acoustics Seminar, *Acoustical Foundations of Scales, Tempered Tuning, &Pitch Perception*, Aug 2014

AWG, *Normalization and Contextual Features Step 1 Briefs*, Baltimore, MA, July 2014

ONR ASA/EC Program Review, *Normalization, Clustering, and Contextual Features*, March 2014

ONR ARL:UT ASA/EC Technical Review, *Normalization, Clustering, and Contextual Features*, November 2013

ONR ARL:UT Site Review, *Mutual Interference Mitigation*, May 2013

AWG/ACR, *Multi-mode Tracking and Limited Multi-hypothesis Tracking*, Baltimore, MA, April 2013

ONR, *Clutter modeling in Normalization*, Clutter modeling workshop, Baltimore, MA, April 2013

ONR FNC Spring Review, *Multi-scale Signal and Information Processing*, March 2013.

ONR FNC Fall Meeting, *Multi-scale Signal and Information Processing*, October 2012, ARL:UT.

AWG/ACR *Multi-mode Tracking and Limited Multi-hypothesis Tracking*, Baltimore, MA, August 2012

ONR Program Review – *Mutual Interference Mitigation (w/ Jason Aughenbaugh)*, Seattle, WA, August 2012

ONR Program Review – *Adaptive Clutter Modeling in Tracking*, Seattle, WA, August 2012

ONR FNC Kickoff, *Multi-scale Signal and Information Processing*, April 2012

ONR ARL:UT Site Review, *Adaptive Clutter Modeling*, April 2012

AWG/ACR *Step-2 Evaluation of BTI*, Baltimore, MD, November 2011

ONR Program Review – *Adaptive Clutter Modeling in Tracking*, Seattle, WA, August 2011

AWG/ACR Update and ABF Evaluations, Centreville, VA, August 2011

Research Opportunities at ARL:UT, UT Physics Department, March 2011

Advanced Adaptive Grid update for AWG/ACR, Baltimore, MD, January 2011

ARL:UT Technology Update on Clustering for AWG/ACR, Washington, D.C., September 2010

Clutter Analysis for Surface Ship ASW, for Barry Raff, N00X, Washington, D.C., November 2010

Active Sonar Operator Performance in VS-07 Clutter Fields, CNMOC visiting group with Ed Gough, ARL:UT, August 2010

Tracking and Clutter Classification, AEMBERS working group, ARL:UT, August 2010

ARL:UT Technology Update, Adaptive Methods, VA, August 2010

Adaptive Clutter Characterization Methods for Active Sonar Tracking, ONR D&I Program Review, APL/UW, August 2010

Adaptive Clutter Modeling: Echo Statistics, Spatial Structure, and Very Preliminary Tracking Results, ONR D&I Site Review, ARL:UT, May 2010

ITC and End-to-End Performance Evaluations, ACR meeting, Washington D.C., March 2010

FMT Code Verification and Performance Evaluations Demonstrations, ARL:UT, January 2010

MFA Clutter Statistics and Recognition Differential, ARL:UT, December 2009

Classification of Clutter Amplitudes by Class in Mid-frequency Active Sonar, ONR D&I Program Review, Seattle, WA, August 2009

Classification of Clutter Amplitudes by Class in Mid-frequency Active Sonar, ONR D&I Site Review, ARL:UT, May 2009

Echo Statistics and Classification of Broad Clutter Classes of Scatterers in Long Range Sonar, Seminar, Woods Hole Oceanographic Institution, April 2009

PCA Analysis, PEO IWS5, False Alarm Reduction Brief, ARL:UT, March 2009

Integrated Tracking and Classification, PEO IWS5, False Alarm Reduction Brief, ARL:UT, March 2009

Characterization of Clutter by Class in Mid-Frequency Active Sonar, Mini-symposium on Marine Biologics in Active Sonar, ARL:UT, January 2009

Classification of Clutter in Active Sonar, ONR D&I Program Review, Seattle, WA, August 2008

Classification of Clutter in Active Sonar, ONR D&I Site Review, ARL:UT, May 2008

Integrated Tracking and Classification, PEO IWS5, False Alarm Reduction Brief, ARL:UT, April 2008

Cross-Beam Normalization, PEO IWS5, False Alarm Reduction Brief, APL:JHU, VA, Oct 2007

Classification of Clutter in Active Sonar, ONR D&I Program Review, APL:UW, August 2007

Classification of Clutter in Active Sonar, ONR D&I Site Review, ONR, Arlington, VA, June 2007

Classification of Clutter in Active Sonar, ONR D&I Program Review, APL:UW, August 2006

Classification of Clutter in Active Sonar, ONR D&I Site Review, ARL:UT, June 2006

Hybrid PDFs, ONR D&I Program Review, NRL, August 2005

Hybrid PDFs, ONR D&I Site Review, ARL:UT, July 2005

Automated Information Integration, Phase 1, ATAWG, NUWC, RI, September 2004

Hybrid PDFs, ONR D&I Program Review, Newport, RI, Aug/Sep 2004

Hybrid PDFs, ONR D&I Site Review, ARL:UT, July 2004

ETC Overview and Multipath Algorithm Integration, June 2001, ARL-PSU

Multipath Estimation via Projections onto Complex Sets, June 2001, ARL-PSU

Underwater Acoustics, Oct. 2001, U.T. Arlington, Physics Colloquium

The Thermal History of the Universe, Feb. 2000, Fort Worth Astronomical Society

The Physics of Star Trek, September 1999, U.T. Arlington

Latest Results on Solar Neutrinos, April 1999, Rice University

Physicists on Wall Street, April 1999, Rice University

Solar Neutrino Oscillations, October 1998, APS, Nuclear Physics, Santa Fe, NM

Seasonal Variation of Solar Neutrinos, Oct. 1998, U.T. Arlington

Neutrino Astronomy, February 1998, Texas Astronomical Society

Financing Neutrinos, January 1997, Case Western Reserve University

Searching for the MSW Enhancement, January 1997, Univ. of Florida at Gainesville

Black Holes to Black-Scholes to Black Holes, Jan.1997, Univ. of Florida Gainesville

Black Holes to Black-Scholes, July 1996, Fermi National Accelerator Laboratory

Computing Cosmological Models, March 1996, Southern Methodist University

Making Galaxies on Supercomputers, February 1996, Texas Astronomical Society

Supercomputing and Cosmology, October 1995, Texas Christian University

Computational Astrophysics, October 1995, U.T. Arlington

Pricing Options and Forecasting Volatility, July 1994, International Risk Conf., NY

Volatility Research, May 1994, Kellogg Conf. at Northwestern University, Chicago

Recent Events in Solar Neutrinos, Feb.1993, University of Washington at Seattle

Computational Cosmology, February 1993, University of Washington at Seattle

Gravitational Clustering in the Universe, Nov.1992, Univ. of Colorado Boulder

Supercomputing and Cosmology, Oct. 1992, NASA/Goddard Space Flight Center

Why Cold Dark Matter is Broken and Can it be Fixed?, October 1992, Harvard

Gravitational Clustering in the Universe, September 1992, Dartmouth College

Cold Dark Matter: Trouble on Small Scales, April 1992, Princeton University

Cold Dark Matter: Trouble with Omega=1, April 1992, Fermilab

Gravitational Clustering in the Universe, February 1992, U.T. Arlington

Cold Dark Matter: Trouble on Small Scales, February 1992, Univ. of Michigan

Cosmological N-body Simulations, January 1991, Fermilab

Cosmology on the IBM Supercomputer, April 1989, MIT.

Path Integral Formulation of Primordial Density Fluctuations, July 1987, Los Alamos

New Models for Solar Neutrino Oscillations, January 1986, Los Alamos

Contributed Talks (those without conference proceedings)

Classification of Clutter Types Using Spatiotemporal Features, IEEE Workshop Underwater Acoustic Signal Processing, University of Rhode Island, October 2007

Hybrid PDFs, IEEE Workshop Underwater Acoustic Signal Processing, University of Rhode Island, October 2005

Acoustical Society of America, San Diego, California, November 2004. *Hybrid Methods for Active Sonar Classification*

American Physical Society, Long Beach, California, April 2000. *Mass Matrices for Atmospheric, Solar, and LSND Neutrinos*

American Physical Society, Austin, Texas, Jan. 1999. *Just-so Neutrino Oscillations*

American Physical Society, Division of Nuclear Physics, October 1998, Santa Fe, NM. *Neutrino Oscillations*

American Astronomical Society, San Diego, June 1998. *Solar Neutrinos through the Earth*

APS/ASPT Meeting, October 1996, Arlington, TX. *Teaching Popular Astronomy*

Cosmic Microwave Background Workshop, December 1992, Berkeley, CA. *Velocity Bias in Pairwise Velocity Dispersions*

APS/ASPT Meeting, April 1992, Washington, D.C. *Large Cosmological Simulations*

178th Meeting of the American Astronomical Society, June 1991, Seattle, WA. *Scale-free Simulations*

Galaxy Formation Workshop, January 1990, Taos, NM. *Dynamic Range in Cosmological Simulations*