

RESUME: Louis Goodman

ADDRESS: 161 Narragansett Blvd
Portsmouth, RI 02871

Telephone: (H) 401 293 0766
(W) 508 910 6375
(C) 401 8352585
E-Mail (W) lgoodman@umassd.edu

EDUCATION: Ph.D. Physics, 1971, Drexel University, Philadelphia, Pa.
1 Year Graduate Research Cornell University, Ithaca, N.Y.
MS Physics, 1969, Drexel University, Philadelphia, Pa.
BS. Physics, 1967, Drexel University, Philadelphia, Pa.

RESEARCH INTERESTS: Ocean Turbulence; Small Scale Biological/Physical Interactions;
Dynamical Response of an AUV to Realistic Ocean Processes; Use of high frequency acoustics
for ocean observations; Development of Unique Autonomous Platforms and supporting
Instrumentation and Processing Techniques.

RECENT GRANTS:

1. Phase II STTR-036: Development of a Compact Long-Range Underwater Velocity Sensor System, Vehicle Control Technology/ONR , \$ 150k 1 Sept 2009 –Mar 2011, **PI L. Goodman**
2. Phase II STTR N08-T016: Expendable Glider, Vehicle Control Technology/ONR , \$ 150k ,1 Nov 2009 –Apr 2011, **PI L. Goodman**
3. Use of an AUV to Quantify Submesoscale Mixing Processes, ONR, 690,368 , October 15 2008 , 30 Sep 2011
4. Development of the Hybrid Programmable Underwater Profiler (HPUP), **PI L. Goodman**, 1 March 2008 28 Feb 2009, Massachusetts Technology Transfer Center, \$40K
5. Use of an AUV to Quantify Turbulent Mixing, ONR, **PI L. Goodman**, 1 April 2008 -31 March 2009,\$50K
6. Development of Turbulent Biological Closure Parameterizations , ONR , **PI. L. Goodman**, 1 April 2008 -31 March 2010, \$196K
7. Automated Launch and Recovery of Small Untethered Unmanned Underwater Vehicles from
8. Unmanned Surface Vehicles, **PI L. Goodman**, ONR STTR N038, Phase 1, 1 Oct 2007 - 28 May 2008 , \$23K
9. Compact Long-Range Underwater Velocity Sensor, **PI L. Goodman**, ONR STTR N037, Phase 1, 1 Oct 2007 -0 28 May 2008 , \$23
10. AUV Turbulence Measurements in the LOCO Field Experiments, **PI L. Goodman**, ONR, 1 March 2004 – 31 Dec 2009,\$613K

11. Predicting water mass modification within supercritical outflow from narrow estuaries”, PIs PI MacDonald and COPI Hetland, R., NSF, 1 Jan 2006 – 30 Sep 2009 (\$30K, **Participating Investigator** in this project)
12. An Investigation of Transient Tidal Eddies in the Western Gulf of Maine, PI Brown, W and **CO PI Goodman, L.** MIT SeaGrant, NOAA, 1 Oct 2007 -30 Sep 2009 , \$180k
13. Modeling Improved Parameterizations of Shallow Water Ocean Physics into Simulation Models for AUVs , **PI L. Goodman**, ONR, 1 Oct 2004 - 30Sep 2007 , \$ 128k
14. Use of the Turbulent Kinetic Energy and Scalar Variance Budgets to Obtain Directly Eddy Viscosity and Diffusivity from AUV Turbulence Measurements, **PI L. Goodman**, ONR, 1 Oct 2003- 30 Sep 2005
15. Acquisition of an AUV for Turbulence Parameterization Modeling and Verification, **PI L. Goodman** , ONR DURIP , \$428,600 Program, ONR 1 Dec 2003 30 Sep 2004
16. **Acoustic Scattering From Scalar Ocean Microstructure, ONR, PI: L. Goodman, \$ 250,000** 5/10/2002 – 30/Sep 2007, L. Goodman (PI)

Current Courses Teaching:

MAR 670 Ocean Turbulence (Spring)

Mar 560 Acoustical Oceanography (Fall)

Current Graduate Students: Marcos Sastre 4th year,
PhD, Dana Brown, 2nd Yr MS,
Joshua Carlson, 1st yr MS

EXPERIENCE:

- June 2009- Present **Chair, Department of Ocean and Estuarine Science**, School for Marine Science and Technology (SMAST), University of Massachusetts Dartmouth
- July 2001- Present **Professor**, School for Marine Science and Technology (SMAST), University of Massachusetts Dartmouth, Research, advising, and teaching.
- July 2001
31 Aug 2005 **Research Director:** School for Marine Science and Technology (SMAST) University of Massachusetts and University of Massachusetts Intercampus Graduate School of Marine Science and Technology (IGSMST). Responsible for coordinating all of the

research at SMAST and IGSMST.

July 2002-
2006

Associate Editor, Journal of Ocean Engineering, Physical Oceanography Section
Responsible for supervising the review process of this section of the journal

June 93 -
June 2001

Program Director, Physical Oceanography Program
Office of Naval Research, Arlington, Va.

Responsible for the management and execution of the Physical Oceanography Program, which is the single largest basic research program in the navy at the time having a budget of \$ 22 M and 130 contractors. Also responsible for management and execution of the applied research program "ocean sensors".

June 88 -
June 93

Chief Scientist, Head, Ocean Acoustics Turbulence Study (OATS)
Naval Undersea Warfare Center , Newport, R.I. 02841.

Principle Investigator of research projects: (1) Scattering from Ocean Microstructure; (2) Remote Acoustics Techniques to observe Turbulence. Funding level \$ 620 K per year, largest basic research (6.1) program at NUWC; staff of 7 scientists and engineers.

Sept. 89 -
May 94

Adjunct Professor of Physics University of Rhode Island,

Taught Graduate and undergraduate courses in ocean physics, Ph.D. and Master's candidate thesis advisor.

Sept. 84 -
Sept. 91

Adjunct Professor, University of Massachusetts, Dartmouth, North Dartmouth,

Mass. Taught Undergraduate Electrical Engineering, Graduate courses in ocean acoustics and physical oceanography. Advised MS students.

Sept. 72 -
Sept 89

Adjunct Professor, Roger Williams College, Bristol Rhode Island

Taught Undergraduate Physics and Oceanography Courses.

Sept. 83 -
June 88

Senior Staff Scientist, Naval Underwater Systems Center, Newport, R.I. 02841.

Coordinate, review, and initiate new 6.1 laboratory research. Develop and had successfully funded 11 new basic research program jointly supported with ONR NUWC in physical oceanography and ocean acoustics.

Nov. 78 -
Sept. 83

Program Director, Physical Oceanography Program, Office of Naval Research,

Arlington, Va. Responsible for the Management of the Physical Oceanography Program. Duties included supervision of two scientific officers and 101 contractors. Successfully developed 5 new Accelerated Research Options. Won the Naval Civilian Meritorious award for performance.

- Sept. 71 - **Research Physicist , Oceanography Group, Naval Underwater Systems Center.**
 Nov. 78 Principle Investigator of basic and applied research projects in physical oceanography, underwater acoustics, and fluid dynamics. Participated in 8 major oceanographic cruises, Ran NUSC fluid turbulence wind tunnel program. Work resulted in refereed publications in fluid dynamics, physical oceanography, and underwater acoustics.
- Sept. 66 - **Instructor, Physics Department, Drexel University,**
 Sept. 71 Philadelphia, Pa. All levels of undergraduate physics.
- Sept. 69 - **Research Assistant, Physics Department, Drexel University,**
 Sept. 71 Philadelphia. Research in high energy physics and fluid turbulence.
- June 68 - **Teaching Assistant, Physics Department, Drexel University,**
 Sept. 69 Philadelphia, Pa. Undergraduate physics courses.
- Sept. 67 - **Teaching Assistant, Physics Department, Cornell University,**
 June 68 Ithaca, N.Y. Undergraduate physics courses.
- Jan 64 - **Engineering Trainee, Naval Air Development Center,**
 June 65 Warminster, Pa. ('Cooperative' job while undergraduate)
- June 62 - **Engineering Trainee, Philadelphia Naval Shipyard,**
 Jan 64 Philadelphia, Pa. ('Cooperative' job while undergraduate)

Ph.D.

THESIS: Self-Similarity for the Global Dynamics of Clear Air Turbulence.

AWARDS: Navy Civilian Meritorious Award (for period of ONR service from Nov. 78 to Sept. 83)

NUWC Sustained Superior Accomplishment Award (Dec. 74 to Dec. 77)

14 MPS Outstanding Awards (FY 78 to FY 01)

14 NUWC Special Achievements Awards

NUWC Newport "Excellence in Science" Award, FY 91

PATENTS and Invention Disclosures

1. Turbulence Technique, Navy Case Number 72009, June 5 1991

2. Development of the Hybrid Programmable Underwater Profiler (HPUP) Invention Disclosure: #UMD 08-07).

PUBLICATIONS:

1. Comments on Hadron Mass Dependence in Quark Models, *Nuovo Cimento*, 68, 605, (1970)
2. Rigorous Bounds on the Vacuum Energy for a Fourth Power Scalar Field Cut-Off Theory, *Nuovo Cimento*, 72, July 1971
3. Self-Similar Statistical Theory for the Global Dynamics of Clear Air Turbulence. Drexel University Press, June 1972.
4. Experiments Concerning Pressure Distribution and Deformation Theory in the NUSC Wind Tunnel, TM 4002-72
5. The Relationship of Dynamic Pressure Fluctuations to Velocity Fluctuations, NUSC TR 4198, 1973.
6. The Deformation of a Turbulent Field by an Inviscid Mean Fluid Motion with Application to Flow around a Body, NUSC TR 4211, 1974
7. On the Pressure Induced by a Stagnating Turbulent Field, *Physics of Fluids*, Vol. 19, No 17 1976
8. Diffusion Loss in a Stratified Sound Channel, *J. Acoust. Soc. Amer.*, Vol. 60, No. 5, 1976.
9. COBLAMED '76 Tethered Buoy Experiment, NUSC TM 77-2984, 1977.
10. On the Generation of Internal Waves by Advecting Atmospheric Fields, *J. Geophys. Res.*, Vol. 82, No. 12, 1977.
11. Scattering from the Volume Variability of an Inhomogeneous Medium, NUSC TM77-2158, 1977.
12. On the Time Dependence of a Scalar Undergoing Advection, *J. PHYS. Oceanogr.*, Vol. 8, No.5, Sept. 1978.
13. Massachusetts Bay Internal Wave Experiment, NUSC TD 5684 1979
14. An Assessment of Upper Ocean Variability, *Naval Research Review*, 1979
15. Assessment of Microstructure Research, Office of Naval Research/ University of British Columbia joint Report, August 1980

16. Biennial Physical Oceanography Program Overview, ONR Report, Sept. 1981
17. Scattering from Volume variability, *J. of Geophys. Res.* Vol. 86, No. 25, 1981
18. On the Use of High frequency Acoustics for the Study of Internal Waves and Ocean Microstructure, NUSC Tech Report, Feb. 1982
19. Biennial Physical Oceanography Overview, ONR Report, Sept. 1983
20. Use of High Frequency Random Doppler Techniques to Infer Ocean Microstructure, NUSC TD, July 1985
21. Interaction of Surface and Internal waves NUSC TM 86 -1135,
22. Doppler Statistics of Ocean Velocity Variability, NUSC TR 6734, 1 Nov. 1988
22. Doppler Statistics of Ocean Microstructure, 2nd Annual Independent Navy Symposium, Silver Spring Md., July 1989
23. Vertical Motion of Neutrally Buoyant Floats, *J. Ocean and Atmos. Techn.*, Vol. 7, No. 1, Feb. 1990
24. Acoustic Scattering From Ocean Microstructure, *Journ. Geophysical Research*, Vol. 95, No. C7, July 1990
25. Ocean Acoustics Turbulence Study: Acoustic Scattering from a Buoyant Axisymmetric Plume, *J. Acoust. Soc. Amer.* **91** (6) June 1992 Goodman, L. and Oeschger, J.
26. Acoustic Characterization and Discrimination of Marine Zooplankton and Turbulence , *Journal of Marine Res.*, May 1994, Stanton, T. Weibe, P. , Goodman, L.
27. Acoustic Scattering from a Thermally driven buoyant Plume, Goodman, L. and Oeschger, J. *J. Acoust. Soc.*, 100, Sept. 1996
28. Microstructure Sensors in the Ocean, ONR Report, Coedited with Agrawal and Williams, October 1996
29. Acoustic Scattering from a Thermally Driven buoyant Plume Revisited” , *JASA* 113 (3) March 2003, Oeschger, J and Goodman, L.
30. “Use of the Turbulent Kinetic Energy and Scalar Variance Budgets to Obtain Directly Eddy Viscosity and Diffusivity from AUV Turbulence Measurements” Published in Proceedings of the

13th 'Aha Huliko'a Hawaiian Winter Workshop Near-Boundary Processes and the Parameterization, January 21 - 24, 2003, Imin Conference Center, University of Hawaii, Manoa Honolulu, HI 96822, Goodman, L. and Levine E.R.

31. On Closing Turbulence Budgets from an AUV, *J. Atmos. Ocean. Tech.* 23, 977-990, July 2006 L. Goodman, E. Levine, and R. Lueck
32. Turbulent dissipation in a near-field river plume: A comparison of control volume and microstructure observations with a numerical model, MacDonald, D. G., L. Goodman, and R. D. Hetland, 2007. , *J. Geophys. Res.*, 112,
33. Measurements of the turbulent microstructure of a buoyant salinity plume using acoustics, Sastre-Córdoba, M. M., L. Goodman, and Z. Wang, 2007, Proceedings of the OCEANS 2007 MTS/IEEE VANCOUVER Conference & Exhibition ISBN CD-ROM: 0-933957-35-1 2007 MTS
34. Turbulence in Coastal Fronts near the Mouths of Block Island and Long Island Sounds, Levine E.R., Goodman, L., and O'Donnell, J. , *JMS*, in press, Feb 2008
35. On the Theory of Advective Effects on Biological Dynamics in the Sea, III: The Role of Turbulence in Biological Physical Interactions, Goodman, L. and Robinson, A.R., *Proc Roy. Soc.* March 2008
36. Turbulence observations in the northern bight of Monterey Bay from a small AUV, *Journal Marine Systems*, Goodman, L. and Z. Wang, 2008, *Journal Marine Systems*.
Doi:10.1016/j.jmarsys.2008.11.004
37. Evolution of the spatial structure of a thin phytoplankton layer into a turbulent field. *Marine Ecology Progress Series*. (2009), in press 374:57-74 Doi:10.3354/meps07738
38. Observations of acoustic backscattering from salinity microstructure, Sastre-Cordova , Marcos and Louis Goodman (in review) *Journal of Acoustic Society of America* April (2009)
39. The evolution of a thin phytoplankton layer in strong turbulence, Wang, Z. and L. Goodman, in press, August 2009, *Continental Shelf Research*.
40. Sub Surface Observations of Surface Waves from an Autonomous Underwater Vehicle Goodman, L., Edward R. Levine, Zhankun Wang, Submitted July 2009, *J. Ocean Eng.*

PROFESSIONAL SOCIETY PRESENTATIONS:

1. Generation of Internal Waves by Advecting Pressure Fields- Theory and Experiment, American Geophysical Union, Dec. 1974.
2. On the Generation of Internal Waves by Advecting Wind Velocity Fields, American Geophysical Union, Washington, D.C. June 1975
3. On the Generation of Internal Waves by Advecting Atmospheric Fields, International Union of Geodesy and Geophysics, Grenoble France, Aug. 1975
4. Numerical Evaluation of the generation of Internal Waves by Advecting Atmospheric Fields, American Geophysical Union, San Francisco, Dec. 1975
5. On the Generation of Internal Waves by Advecting Atmospheric Fields, American Meteorological Society Conference on Atmospheric and Oceanic Interactions, Seattle Wa., March 1976.
6. On the Role of Advection in Inducing Time Variability in Oceanographic Scalars, American Geophysical Union, Washington, D.C. June 1976
7. Diffusion Loss in a Stratified Sound Channel, American Acoustical Society, Washington, D.C. June 1976
8. NUSC Tethered Buoy Experiment- COBLAMED 76, American Geophysical Union, San Francisco, Ca. Dec. 1976.
9. On the Upper Ocean Internal Waves Observed during COBLAMED-69, American Geophysical Union, San Francisco, Ca. Dec. 1977
10. Use of Empirical Orthogonal Functions for Analyzing Upper Ocean Variability, American Geophysical Union, Miami Fl., April 1978
11. Acoustic Scattering from Internal Waves and Microstructure, American Geophysical Union, San Francisco, Ca. Dec. 1980
12. New Tools and Techniques for Very near Surface Open Ocean Measurements, ONR Conference on Air Sea Interaction, Boulder Co., Feb. 1983.
13. On the Measurement of Ocean Microstructure by Random Doppler Techniques, NUSC Conference on Ocean Microstructure, June 1985.
14. Response Characteristics of Isopycnal Floats, American Geophysical Union, San Francisco, Ca. Dec. 1986

15. On the Dynamic Response of Freely Drifting Floats, American Geophysical Union, New Orleans, La., Jan 1988
16. Use of High Frequency Acoustic Techniques to Observe Ocean Variability, ONR special session on biology/physical coupling, at Oceanography Society, Monterey, Ca., Aug. 1989
17. Acoustic Scattering from Ocean Microstructure, Acoustical Society of America, Penn State University, State College Pa., May 1990
18. Acoustic Scattering from Temperature Turbulence: Theory and Laboratory Results, Woods Hole Oceanographic Seminar Series, October 1990.
19. Ocean Acoustics Turbulence Study (OATS), Theory and Laboratory Results, College of Marine Studies Seminar Series, University of Delaware, April 1991.
20. Ocean Acoustics Turbulence Study (OATS), Acoustical Society of America, Baltimore Maryland, May 1991.
21. Joint IR/ONR Program: Ocean Acoustics Turbulence Study (OATS), 4th Annual Independent Navy IR/IED Symposium, Johns Hopkins University, Columbia, MD June 1991.
22. Acoustic Scattering from Temperature Microstructure, international Association for the Advancement of the Physical Sciences of the Ocean, Vienna Austria, August 1991.
23. Acoustic Scattering from a Buoyant Plume, Invited Presentation to a Special Session on Small Scale Physical Structure, Acoustical Society of America, Houston Texas, November 1991 (Note: served as session chairman).
24. Acoustic Scattering from Fluid Turbulence, Acoustical Society of America, Salt Lake City Utah, May 1992.
25. Application of the Vector Bragg Scattering Wave Number Condition to Obtaining Turbulent Field Variables, Acoustical Society of America, New Orleans, Louisiana, October 1992.
26. Chairman Workshop of Ocean Microstructure Sensors, Timberline Lodge, Oct 1996
27. Chairman: Panel on the role of ocean processes in Mixed Layer models, Ocean Sciences Meeting, February 1998, San Diego Ca.
28. Convenor and Chairman: ONR Workshop: Ocean Internal Solitary Waves, University Of Victoria,

October 1998

29. Convenor and Chairman: ONR Workshop: Coupled Boundary layer Air-Sea Transfer DRI, Airlie House, Warrenton, VA., January 2001
30. Turbulent Budgets and Model/Data Comparison for AUV-based Sampling in the FRONT Coastal Front, Ocean Science Meeting of the American geophysical Union, Honolulu, Hawaii, February 2002
31. Use of the Turbulent Kinetic Energy and Scalar Variance Budgets to Obtain Directly Eddy Viscosity and Diffusivity from AUV Turbulence Measurements, International union of Geodesy and Geophysics, Sapporo Japan, August 2003
- 32 Use of AUV for Physical/Biological Measurements, TOS, Paris France, June 2005
33. A Lagrangian Approach to the Role of Turbulence in Biological Physical Interactions
Invited Talk at ONR LAPCOD Conference La Spezia Italy, June 20
34. Observations of Turbulence in Thin Layers during the LOCO 2005 experiment
Ocean Science Meeting February 2006 Honolulu HI
35. A Lagrangian Approach to the Role of Turbulence in Biological Physical Interactions, Ocean Science Meeting February 2006 Honolulu HI
36. The Role of Turbulence in Thin Layers, Goodman, L. and Wang, Z.W. 39th International Liège Colloquium on Ocean Dynamics , May 2007
37. On the Theory of Turbulent Effects on Biological Physical Interactions in the Upper Ocean
Goodman, L. and Robinson A.R., 39th International Liège Colloquium on Ocean Dynamics , May 2007
- 38 On the Theory of Turbulent Effects on Biological Physical Interactions in the Upper Ocean,
Goodman, L. and Robinson A.R., June 2007, Gordon Research Conference: COASTAL OCEAN MODELING, New London, NH .
39. The impact of turbulence on phytoplankton thin layers, Wang, Z. and Goodman, L. , June 2007,
Gordon Research Conference: COASTAL OCEAN MODELING, New London, NH .
40. AUV Turbulence Observations in the LOCO , Ocean Science Meeting, Orlando Fl. Feb 2008,
Goodman, L and Wang, Z
41. On the Horizontal and Vertical Structure of Turbulence and Chlorophyll a Thin Layers, Ocean Science Meeting, Orlando Fl. Feb 2008, Goodman, L. and Wang, Z.

42. On the horizontal and vertical structure of turbulence and chlorophyll a thin layer, Wang, Z. and Goodman, L, March 2008, AGU/ASLO Ocean Sciences Meeting, Orlando, FL

43. The Role of Turbulence in Biological Physical Interactions, Goodman, L. and Robinson A.R, European Geophysical Union Annual Meeting, Vienna Austria April 2008