

## PUBLICATIONS

- M. H. Acuna and J. K. Alexander (NASA/Goddard), R. A. Brown (Univ. Arizona), T. W. Hill (Rice Univ.), S. M. Krimigis (APL), L. J. Lanzerotti (Bell Labs.), and G. L. Siscoe (Univ. Calif.), "Physics of the Jovian and Saturnian Magnetospheres: Highlights of a Conference held at the Applied Physics Laboratory, The Johns Hopkins University, October 22-24, 1981," *Space Sci. Rev.* **35**, 269-292 (1983).
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- C. B. Barger, B. H. Nall, and A. N. Jette, "Current Image Diffraction (CID) of Single Crystal Metal Surfaces," *J. Vac. Sci. Technol.* **A1**, 1130-1133 (1983).
- P. F. Bythrow and T. A. Potemra, "The Relationship of Total Birkeland Currents to the Merging Electric Field," *Geophys. Res. Lett.* **10**, 573-576 (1983).
- M. Candidi (Istituto Plasma Spazio, Italy), H. W. Kroehl (NOAA), and C.-I. Meng (APL), "Intensity Distribution of Day-side Polar Soft Electron Precipitation and the IMF," *Planet. Space Sci.* **31**, 489-498 (1983).
- R. B. Decker, A. T. Y. Lui, and S. M. Krimigis, "Modeling of the Interaction of Artificially Released Lithium with the Earth's Bow Shock," *Geophys. Res. Lett.* **10**, 525-528 (1983).
- S. N. Foner and R. L. Hudson, "Molecular Beam Mass Spectrometric Studies of Energy Transfer and Chemical Reactions on Heated Surfaces" *J. Vac. Sci. Technol.* **A1**, 1261-1264 (1983).
- W. J. Geckle and R. E. Jenkins, "Computer-Aided Measurement of Transverse Axon Sections for Morphology Studies," *Comput. Biomed. Res.* **16**, 287-299 (1983).
- H. E. Gilreath and A. Brandt, "Experiments on the Generation of Internal Waves in a Stratified Fluid," paper AIAA-83-1704, *Proc. 16th Fluid and Plasma Dynamics Conf.* (1983).
- A. D. Goldfinger "Estimation of Spectra from Speckled Images," *IEEE Trans. Aerosp. Electron. Syst.* **AES-18**, 675-681 (1983).
- W. L. Goodfellow, Jr., D. T. Burton, W. C. Graves, and L. W. Hall, Jr. (APL) and K. R. Cooper (Rutgers Univ.), "Acute Toxicity of Picric Acid and Picramic Acid to Rainbow Trout, *salmo gairdneri*, and American Oyster, *crassostrea virginica*," *Water Resour. Bull.* **19**, 641-648 (1983).
- R. A. Greenwald, "New Tools for Magnetospheric Research," *Rev. Geophys. Space Phys.* **21**, 434-449 (1983).
- J. S. Hansen, D. Bowser, and H. Ko (APL), D. Brenner (Rockwell Intl.), and F. Richer and J. Beatty (Univ. California), "Adaptive Noise Cancellation in Neuromagnetic Measurement Systems," *Il Nuovo Cimento* **2**, 203-213 (1983).
- R. H. Jackson (Rockwell Intl.) and H. M. South (APL), "A Reconfigurable Signal Processor for High Throughput Applications," in *Proc. IEEE International Conf. on Acoustics, Speech, and Signal Processing*, pp. 459-461 (1983).
- E. H. Kidera and S. A. Mack, "Motion Compensation System for Ocean Profiling," *Ocean Eng.* **10**, 201-208 (1983).
- T. J. Kistenmacher and R. Destro, "Polymorphism in Low-Dimensional Materials: X-ray Diffraction Studies on the Temperature Dependence of the Structure of  $\alpha$ -Bis(1,2-benzoquinone dioximato)palladium(II)," *Inorg. Chem.* **22**, 2104-2110 (1983).
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- K. Makita and C.-I. Meng (APL), and S.-I. Akasofu (Univ. Alaska), "Comparison of the Auroral Electron Precipitations in the Northern and Southern Conjugate Regions by Two DMSP Satellites," in *Proc. 5th Symp. on Coordinated Observations of the Ionosphere and the Magnetosphere in the Polar Regions*, Memoirs of National Inst. of Polar Res., Special Issue No. 26, pp. 149-159 (1983).
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- L. Monchick (APL) and S. Hess (Univ. Erlangen-Nürnberg), "Diffusion Controlled Reactions of Gases with Surfaces and State Dependent Reactivity. II. Diffusion Slip and Knudsen Corrections," *J. Chem. Phys.* **79**, 2098-2099 (1983).
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- T. A. Potemra, "Birkeland Currents: Present Understanding and Some Remaining Questions," in *High-Latitude Space Plasma Physics*, D. Hultqvist and T. Hagfors, eds., Plenum Pub. Corp., pp. 335-353 (1983).
- E. C. Roelof, H. W. Dodson, and E. R. Hedeman, "Dependence of Radio Emission in Large  $H\alpha$  Flares 1967-1970 upon the Orientation of the Local Solar Magnetic Field," *Solar Phys.* **85**, 339-349 (1983).
- D. M. Silver, R. M. Fristrom, N. deHaas, and S. Favin, "Fire Safety Criterion for the Selection of Insulation Materials for Cryogenic Oxygen Service," in *Proc. International Cryogenic Materials Conf.*, Kobe, Japan, pp. 459-462 (May 1982).
- D. M. Weintraub (APL) and L. A. Russell (STSC, Inc.) eds, *APL 83: Proc. 1983 International Conf. on the Iverson Language*, ACM, New York (1983).
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- L. J. Zanetti (APL), W. Baumjohan (Max-Planck Inst.), and T. A. Potemra (APL), "Ionospheric and Birkeland Current Distributions Inferred from the MAGSAT Magnetometer Data," *J. Geophys. Res.* **88**, 4875-4884 (1983).



## PRESENTATIONS

- D. T. Burton, "Compensatory Physiological Responses of Estuarine Organisms Exposed to Moderate Temperature Changes," Seminar, Chesapeake Bay Institute, Shady Side, Md. (1 Sep 1983).
- D. T. Burton, "Power Plant Chlorination," 1982-83 Severn Technical Society Speakers Program, Annapolis (27 Jan 1983).
- L. W. Ehrlich, "The Ad Hoc SOR Method—A Local Relaxation Scheme," Meeting, Implicit Methods for PDE's, Los Alamos (26 Jul 1983).
- R. A. Farrell, R. L. McCally, and C. B. Barger, "CO<sub>2</sub> Laser Damage Thresholds in Rabbit Corneal Epithelium: Deviations from a Simple Critical Temperature Model," Spring Meeting, Association for Research in Vision and Ophthalmology, Sarasota (2-6 May 1983).
- M. H. Friedman, O. J. Deters, F. F. Mark, C. B. Barger, and G. M. Hutchins, "The Effect of Arterial Geometry on Hemodynamic Stress at the Vascular Wall," Meeting, Federation of American Societies for Experimental Biology, Chicago (12 Apr 1983).
- J. E. Garey, D. T. Burton, and E. P. Taft, "Marine Biofouling," EPRI Symp. on Condenser Macrofouling Control Technologies State of the Art, Hyannis, Mass. (1-3 Jun 1983).
- H. W. Ko, "Microwave Propagation Modeling," 7th Joint Working Group on Tropospheric Propagation, Air Force Geophysics Lab., Hanscom AFB (23 Jun 1983).
- V. O'Brien, "Oscillatory Flows of Oldroyd Fluids," 3rd Workshop on Numerical Methods in Viscoelastic Fluid Mechanics, Fairlee, Vt. (8 Jun 1983).
- R. S. Potember, "Electronic Devices from Conductive Organics, 1983 Summer Institute for Polymer Science and Technology, New Paltz, N. Y. (17 Jun 1983).
- R. S. Potember, "Optical Switching in Organic Charge Transfer Complexes," Seminar, Wright-Patterson AFB (8 Jul 1983).
- R. S. Potember and T. O. Poehler, "Erasable Optical Switching in Semiconductor Thin Films," 2nd Workshop on Molecular Electronic Devices, Naval Research Lab., Washington, D.C. (13 Mar 1983).
- R. Turner, R. E. Lee, and R. A. Murphy, "Particle Sizing in a Fuel Rich Ramjet Combustor," Meeting, American Association for Aerosol Research, Univ. Maryland (19 Apr 1983).
- D. J. Webb and S. M. Bhagat (Univ. Maryland) and K. Moorjani, T. O. Poehler, and F. G. Satkiewicz (APL), "Magnetic Resonance in Amorphous Fe<sub>x</sub>B<sub>100-x</sub> Sputtered Films," International Magnetism Conf., Philadelphia (5-8 Apr 1983).
- The following papers were presented at the Vought/DARPA Semiannual Review Meeting at APL, 15 Mar 1983:
- T. E. Phillips and T. O. Poehler, "Titanium and Tungsten Doped VO<sub>2</sub>—Electrical and Optical Properties."
- R. S. Potember, T. O. Poehler, and R. C. Benson (APL) and R. C. Hoffman (JHU), "Organic Switching Materials."
- The following papers were presented at the American Physical Society Meeting, Los Angeles, 22-25 Mar 1983:
- C. B. Barger, A. N. Jette, and B. H. Nall, "Current Image Diffraction (CID) of the Basal Plane of Titanium;"
- W. A. Bryden, T. J. Kistenmacher, and T. O. Poehler, "DBTSF-TCNQF<sub>4</sub>: A Mott Insulator with a Sharp High-Temperature Magnetic Transition;"
- A. N. Jette, B. H. Nall, and C. B. Barger, "Bragg Scattering in Low-Energy Current Image Diffraction (CID);"
- R. S. Potember and T. O. Poehler (APL), R. C. Hoffman (JHU), and R. B. Givens and R. C. Benson (APL), "Electron Beam Induced Switching in Thin Films of Organometallic Charge Transfer Complexes;"
- R. S. Potember and T. O. Poehler (APL), R. C. Hoffman (JHU), and R. C. Benson (APL), "Erasable Optical Switching in Semiconductor Organic Thin Films."
- The following papers were presented at the International Union of Geodesy and Geophysics Meeting, Hamburg, West Germany, 15-28 Aug 1983:
- S. A. Mach, "The Two-Dimensional Character of Ocean Microstructure;"
- J. H. Smart, "Shear Energy Levels in the Upper Ocean;"
- D. P. Vasholz and L. J. Crawford, "Dye Dispersion in the Oceanic Thermocline."



## THE AUTHORS



FREDERICK S. BILLIG was born in Pittsburgh in 1933. He earned the Ph.D. degree in mechanical engineering from the University of Maryland in 1964. In 1955 he joined APL, where he has participated in experimental programs involving hypersonic wind tunnels and external burning, and developed theoretical and experimental techniques for analyzing supersonic combustion. Dr. Billig has published extensively in the fields of high-speed gas dynamics, combustion, and engine analysis. Since 1977 he has been assistant supervisor of the Aeronautics Division.

He received the Distinguished Young Scientist Award of the Maryland Academy of Sciences in 1966 and the Silver Combustion Medal of The Combustion Institute in 1970. He has completed eight years as a director and vice president of the AIAA.



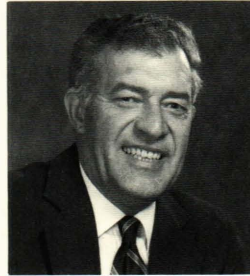
JAMES L. KEIRSEY was born in Brownwood, Tex., in 1925 and received the B.S.M.E. degree from Texas A&M in 1948. After testing ramjet engines at the Navy's Ordnance Aerophysics Laboratory, he joined APL in 1951. He has specialized in internal aerodynamics (air inlets) and combustor development for application to Naval air-breathing propulsion systems and has worked on the development of the Ocean Thermal Energy Conversion heat exchangers. Having been involved in the detailed design and development of various airbreathing engines and components for missiles such as Talos, Typhon LR, Triton, the Augmented Thrust Propulsion (ducted-rocket) system, and the Advanced Surface-to-Air Ramjet, he is currently concentrating on development of the new hypersonic dual-combustion ramjet for potential application to long-range Fleet defense. He headed operation of the Propulsion Research Laboratory during 1974-81 and became supervisor of the Propulsion Group in 1982.

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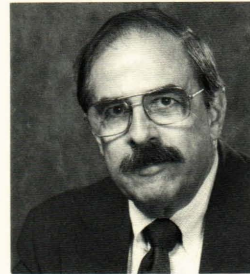
RICHARD T. CUSICK was born in Detroit in 1936 and received the B.S. degree in electrical engineering from the University of Detroit in 1962. He joined APL after graduation and, until 1968, was responsible for the design of the 14-megawatt arc heater power supply at PRL as well as for various signal conditioning and data acquisition systems.

Mr. Cusick became supervisor of the Research and Instrumentation Section at PRL in 1968. In 1972, he was responsible for the Post Transpo Test Program conducted on four candidate Personal Rapid Transit Systems at Dulles Airport. In 1974, he was appointed to the Principal Professional Staff. He became assistant group supervisor of the Propulsion Group, with responsibility for PRL, in 1983. In addition, he is program manager for the Arc Fault Detector Development Program. Mr. Cusick is associate director of the Aerospace Industries Division of ISA.



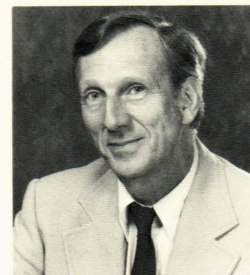
WILLIAM C. CAYWOOD received the M.S. degree in mechanical engineering from the Massachusetts Institute of Technology in 1949. During 1947-48 and 1949-51, he was engaged in structures and materials research for the National Advisory Committee for Aeronautics. In 1952, he joined APL, where he is assistant supervisor of the Engineering Group.

Mr. Caywood has been involved in the development of airframe structures for nearly all the major missile programs at APL, including TALOS, TYPHON LR, Standard Missile, Poseidon, and TOMAHAWK. He has directed investigations of the vehicle dynamics of high-speed ground transportation systems and is manager of exploratory development programs on structures and composite materials for advanced high-speed tactical missiles.



ROBERT M. RIVELLO was born in Washington, D.C., in 1921 and received the M.S. degree in the aeronautical option of mechanical engineering at the University of Maryland in 1948. He served as an engineering officer in the Air Force during 1943-46 and 1951-53. After 31 years on the University of Maryland faculty, he retired as professor emeritus of aerospace engineering in 1979.

He began full-time employment at APL in 1979. However, prior to that, he had held summer or consultant appointments with the Engineering Group of APL since 1950. He participated in the structural development of the Talos, Typhon, and SM-2 missiles, and is currently involved in the development of design concepts for a hypersonic wide area defense missile.



LOUIS B. WECKESSER was born in Baltimore in 1928 and received the M.S. degree in mechanical engineering from the University of Maryland in 1956. He has been employed at APL since 1952. As supervisor of the Thermal Analysis and Test Section, he has directed work on the Talos, Terrier, ALBIS, Standard Missile, AWADM, and ENNK missile programs. During the past 20 years, Mr. Weckesser

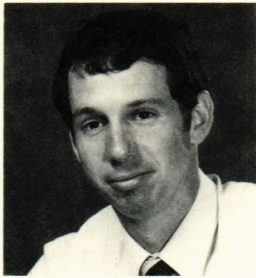
has been a leader in the mechanical design aspects of supersonic and hypersonic homing missile radomes. He authored the chapter "Thermal-Mechanical Design Principles" in the *Radome Engineering Handbook*. During 1979-81, he conducted an intensive short course on radomes with Dr. E. Joy of Georgia Tech at several locations in this country and in Zurich.





LESTER L. CRONVICH received his Ph.D. in applied mathematics at the University of Wisconsin in 1942. He then worked as a stress analyst and air loads group leader at McDonnell Aircraft Corp. He joined APL in 1945 as a mathematician assigned to the aerodynamics group, and became its group supervisor in 1958. Dr. Cronvich has been involved in the aerodynamic development connected with all the

major missile programs at the Laboratory, in the research programs in aerodynamics and hydrodynamics, and in the production of the multivolume BuOrd Handbook on Supersonic Aerodynamics. He has also chaired or been a member of several APL, Navy, AIAA, and NASA committees on aerodynamics. In 1974, he became assistant supervisor of the Aeronautics Division and supervisor of the Fluid Dynamics Group.



MICHAEL D. GRIFFIN was born at the Aberdeen Proving Ground, Md. in 1949 and received the Ph.D. degree in aerospace engineering from the University of Maryland in 1977. He has worked in underwater acoustics and signal processing at Link Division of Singer, in spacecraft mission analysis and operations at Computer Science Corp. and in guidance and control at the Jet Propulsion Laboratory

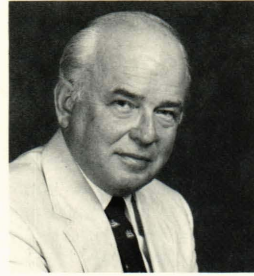
After joining APL in 1979, Dr. Griffin worked on the application of modern computational fluid dynamics techniques to the design and analysis of high-speed inlets for tactical missiles. In 1983, he joined the Space Department as supervisor of the Systems Development Section and is currently participating in the design of an advanced fine guidance sensor for the Space Telescope. He teaches at the University of Maryland, is a Registered Professional Engineer, and was named the Outstanding Young Scientist/Engineer of the AIAA National Capitol Section in 1983.



ROLAND E. LEE was born in Canton, China, in 1930. He received his doctorate in mechanical engineering from The Catholic University of America in 1973. While employed at the Naval Ordnance Laboratory (later the Naval Surface Weapons Center) during 1952-78, he worked on heat transfer and viscous flow problems related to re-entry nose-cone and wind tunnel designs. He also

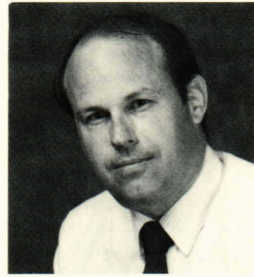
headed a group that specialized in boundary layer flow research. During 1971-77, he participated in programs related to high-energy lasers and headed the working group that initiated the site definition for the High Energy Laser Systems Test Facility at White Sands.

Since joining the Aeronautics Division at APL in 1978, Dr. Lee has been involved in combustion flow studies, evaluating non-intrusive diagnostic instruments for ramjet-engine flow application, and, presently, thermodynamic analysis of the Hopkins Ultraviolet telescope.



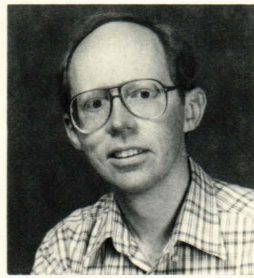
ROBERT TURNER was born in Boston in 1925 and received an M.S. degree in electrical engineering from Harvard University in 1948. After working with Sperry Gyroscope Co. and the Operations Evaluation Group, he joined the Talos Systems Group at APL in 1955 and participated in the initial installation of Talos aboard the USS *Galveston*. In 1960, Mr. Turner joined the Plasma Dynam-

ics Group to work in the field of controlled nuclear fusion. The activities of the Group led to significant advances in the development of far-infrared lasers and in their use to measure the properties of high density, high temperature plasmas. In 1973, he transferred to the Research Center, where he has been principally concerned with the development of lasers and their application in light scattering measurements.



RICHARD C. BENSON received the Ph.D. degree in physical chemistry from the University of Illinois in 1972. His dissertation research was in the field of microwave spectroscopy and radio astronomy of interstellar molecules.

Since joining APL in 1972, he has been a member of the Research Center and has worked on chemical lasers, energy transfer, fluorescence, chemiluminescence, laser-induced processes, and Raman spectroscopy. Currently, he is collaborating with the Microelectronics Group and the Aeronautics Division on problems in surface science and the use of optical techniques to study heterogeneous processes.



LAWRENCE W. HUNTER was born in London, Ontario, in 1945 and received the Ph.D. degree in theoretical chemistry from the University of Wisconsin in 1972. He was a postdoctoral fellow at the University of British Columbia and at APL before joining the staff in 1974. Dr. Hunter has been involved in research on molecular collision theory, the kinetic theory of gases, and combustion and fire problems.

In addition, he has helped develop methods for calculating heat transfer and ablation in aerospace insulating materials and has worked on theories of laser damage. He joined the Propulsion Group of the Aeronautics Division in 1983.



HUGH M. SOUTH is supervisor of the Sonar Evaluation Program Analysis System (SPAN) Laboratory of the Strategic Systems Department. He was born in 1947 in Houston and earned a Ph.D. degree in electrical engineering from The Johns Hopkins University in 1981.

Dr. South joined APL in 1976 as a senior engineer in the Sonar Evaluation Program, and was appointed to his present position in 1979. In 1982, he was named to the Principal Professional Staff. He is presently working to improve sonar signal processing techniques and serves as problem sponsor for the next generation SPAN.