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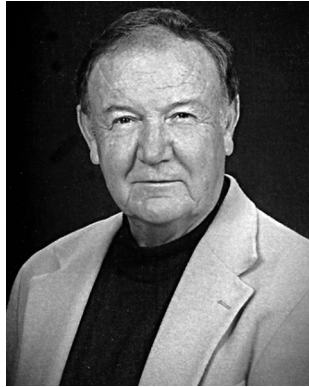
## About the Authors

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Joseph Exline, Arlene Levine and Joel Levine have collaborated on science educational activities for more than 25 years.

### **Joseph D. Exline**

Joe Exline served as Principal Investigator/Project Director for the CS3/NASA NLIST Initiative. He holds a bachelors degree from Glenville State College (1960), a masters degree from Ohio State University (1968), and a doctorate from the University of Maryland (1973). For twelve years, he was a middle school and high school science teacher in Fairfax County, Virginia. He joined the Virginia Department of Education in 1974 and served as Director of Science for the state of Virginia for about 18 years. During his last three years of state employment, he directed the state's National Science Foundation-funded systemic initiative Virginia Quality Education in Science & Technology (V-QUEST). He currently directs Exline Consulting Services, Inc., and served as Executive Secretary for the Council of State Science Supervisors for about twenty-six years. He has about twenty-five years experience in educational program implementation with an emphasis on student-centered learning through an analysis of how well the school-community system elements align with expected student outcomes. Joe has authored some 40 journal articles and authored/edited six books about student-centered science education. He helped develop the Education and Public Outreach (EPO) program for the Aerial Regional-Scale Environmental Survey (ARES) of Mars.



### **Arlene S. Levine**

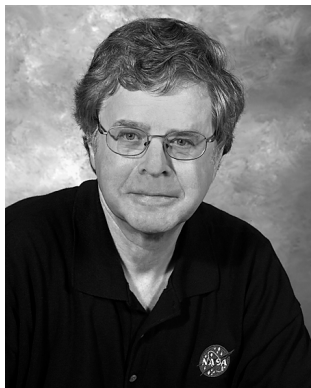
Arlene S. Levine is a Manager for Education and Public Outreach for NASA Earth and planetary missions and science projects in the Science Directorate at NASA's Langley Research Center. Dr. Levine received a bachelors degree in psychology from Queens College, City University of New York, and a Masters degree and a Doctorate in counseling, both from the College of William and Mary, Williamsburg, Virginia. Dr. Levine came to the Langley Research Center in 1984 as a Research Fellow under the American Association for Engineering Education (ASEE) Summer Research Faculty Program. In 1984, Dr. Levine worked in Langley's Space Station Office and performed research on the psychological effects of long duration space missions on astronauts. Following this, Dr. Levine worked on NASA's Long Duration Exposure Facility (LDEF) Mission and NASA's Geostationary Infrared Fourier Transform Spectrometer (GIFTS) Mission. Dr. Levine is Manager of Education and Public Outreach on the NASA Aerial Regional-scale Environmental Survey (ARES) Mission to Mars. ARES is a proposed rocket-powered, robotic airplane designed to fly through the atmosphere of Mars to investigate the atmosphere and surface of Mars and to search for life on the Red Planet. Dr. Levine has worked and continues to work with Girl Scouts, both locally and nationally, to provide more science information and activities for girls. She also works with the National Alliance of Black School Educators (NABSE) to promote science and inspire the next generation of scientists, engineers, mathematicians and technologists. Dr. Levine has authored, co-authored and edited over a dozen articles, reports, book chapters and books on the



psychological effects of long duration space missions on astronauts, on NASA's LDEF Mission and co-authored the GIFTS Water Vapor Monitoring Educator's Guide. Prior to coming to the NASA Langley Research Center in 1984, Dr. Levine taught psychology and human relations at Thomas Nelson Community College, Hampton, and later taught psychology, counseling and human behavior for graduate programs at Hampton University and the Hampton Campus of Golden Gate University. For her NASA education and outreach activities, Dr. Levine received the Aerospace Educator of the Year Award from Women In Aerospace (WIA), the Girl Scout Lifetime Achievement Award presented by the Colonial Coast Council of the Girl Scouts, and the NASA Langley Research Center Equal Opportunity Award. In addition, Dr. Levine received over 20 performance and superior accomplishment awards for her contributions to LDEF, GIFTS and ARES, among other projects.

### ***Joel S. Levine***

Joel Levine is Senior Research Scientist in the Science Directorate at the NASA Langley Research Center. Dr. Levine received a BS in physics from the Brooklyn College, City University of New York, an MS in meteorology from New York



University and an MS in aeronomy and planetary atmospheres and a Ph.D. in atmospheric science, both from the University of Michigan. Dr. Levine has authored or co-authored more than 150 scientific papers and reports and edited four books on atmospheric science, planetary atmospheres, biomass burning and global change.

Dr. Levine is the Principal Investigator of the Aerial Regional-scale Environmental Survey (ARES) of Mars. ARES is a proposed robotic, rocket-powered

airplane that will fly through the atmosphere of Mars to search for water and life and investigate the evolution of the surface and atmosphere of Mars. ARES was one of four finalists in the first NASA Mars Exploration Program (MEP) Mars Scout Mission competition. In 2007, Dr. Levine was selected as the Mars Scout 2011 Program Scientist and Co-Chair of NASA's Human Exploration of Mars Science Panel. Dr. Levine also serves as Principal Investigator for two other NASA research programs: The Titan Explorer Vision Mission Study and Human Mars Mission Robotic Precursors: Developing the Measurement Database Needed to Ensure the Safety of Humans Exploring and Living on Mars. Dr. Levine also served as Project Leader of the NASA Charters of Freedom Research Team. In 1998, at the request of the U. S. National Archives and Records Administration (NARA), Washington, D.C., Dr. Levine formed and directed a team of NASA scientists to determine the chemical composition and water vapor content of the atmosphere in the seven hermetically sealed encasements containing the Declaration of Independence, the U. S. Constitution, and the Bill of Rights, collectively called the "Charters of Freedom." Levine and his team used non-invasive and other measurement techniques and discovered that the helium atmosphere in the hermetically sealed encasements contained significantly more water vapor than previously believed (a relative humidity in excess of 60% compared to the expected relative humidity of 25 to 35%). Water vapor in its elevated concentration reacted with the encasement glass resulting in the leaching of alkaline material from the glass forming tiny white spots in the encasements. In 2002, in an effort to better preserve all seven documents, the Charters of Freedom were removed from their original encasements and placed in newly constructed, hermetically sealed encasements in an argon atmosphere with a relative humidity of only 25 to 35%.

Dr. Levine received the NASA Medal for Exceptional Scientific Achievement, the the NASA Medal for Outstanding Leadership, the New York Academy of Sciences Halpern Award, and was selected as Virginia's Outstanding Scientist.