

Elizabeth A. MacDonald

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Current Position Scientist 3, Los Alamos National Laboratory (LANL)

Education BS, Physics, University of Washington, 1999
MS, Physics, University of New Hampshire, 2001
PhD, Physics, University of New Hampshire, 2004

Positions Held

2011-present ISR-1 Innovative Research and Integrated Sensing (IRIS) Team Leader
2007-present Scientist 3, Space Science and Applications (ISR-1), LANL
2005-2007 Postdoctoral Research Assistant, Space Science and Applications, LANL
1999-2004 Graduate Research Assistant, University of New Hampshire
1998 NSF REU Undergraduate Research Intern, University of Alaska-Fairbanks
1996-1999 NASA Space Grant Undergraduate Research Assistant, University of Washington

Awards

2010, 2011 Los Alamos Awards Program recognition
2004 National Research Council fellowship at the Naval Research Laboratory
(declined)
2003 Outstanding Student Paper Award, Fall AGU meeting
2002-2004 NASA Graduate Student Researchers Program (GSRP) fellowship
1999-2000 New Hampshire NASA Space Grant Consortium graduate fellowship
1995-1999 Washington NASA Space Grant Consortium scholarship

Professional Activities

Dr. MacDonald's research has focused on experimental particle measurement techniques and data analysis in the magnetosphere and ionosphere for the last 15 years. Currently she is the P.I. for the Z-Plasma Spectrometer on the DOE Space and Atmospheric Burst Reporting System (SABRS) geosynchronous payload and recently led the DoE-funded Technology Infusion Project entitled Modular Advanced Space Environment Instrumentation (from 2009-2011). She has served as the P.I. for the Advanced Miniaturized Plasma Spectrometer on the DOE SABRS Validation Experiment payload (2007-2008). Since 2005 she has served as a key team member leading instrument design and validation for the Helium, Oxygen, Proton, and Electron Spectrometer on the NASA Radiation Belts Storm Probe mission and was recognized as an RBSP-ECT Co-Investigator in 2011. Her unique blend of expertise in both instrument development and data analysis and interpretation has been honed with extensive sounding rocket and satellite instrumentation experience. This experience ranges over the complete cycle of instrument production, including design and modeling, integration and testing, satellite operations, and in situ scientific data analysis. These skills and a keen research interest in the near-Earth plasma environment allow her to make key contributions to instrument technology development, basic magnetospheric science, and space situational awareness national priorities. Her specific research interests include wave-particle interactions and the effect of plasma on radiation belt dynamics, mapping, coupling, and transport between the ionosphere and the inner magnetosphere, and the impact of heavy ions on geomagnetic storm processes. Dr. MacDonald is the author or co-author of

more than 10 publications, several invited talks, and more than 30 presentations. She has served on scientific review panels for the National Science Foundation and Los Alamos National Laboratory internal R&D grants. Dr. MacDonald has been an AGU member since 1998 and has refereed for 5 international journals.

Selected Publications

- MacDonald, E. A., L. W. Blum, S. P. Gary, M. F. Thomsen, and M. H. Denton, **High-speed stream driven inferences of global wave distributions at geosynchronous orbit; relevance to radiation belt dynamics**, Proc. of the Royal Society, 2010.
- Blum, L. W., E. A. MacDonald, S. P. Gary, M. F. Thomsen, H. E. Spence, **Ion Observations from Geosynchronous Orbit as a Proxy for Ion Cyclotron Wave Growth During Storm Times**, J. Geophys. Res., 114, A10214, doi:10.1029/2009JA014396.
- MacDonald, E., H. Funsten, E. Dors, M. Thomsen, P. Janzen, R. Skoug, G. Reeves, J. Steinberg, R. Harper, D. Young, J. -M. Jahn, and D. Reisenfeld, **New Magnetospheric Ion Composition Measurement Techniques**, FUTURE PERSPECTIVES OF SPACE PLASMA AND PARTICLE INSTRUMENTATION AND INTERNATIONAL COLLABORATIONS: Proceedings of the International Conference. AIP Conference Proceedings, Volume 1144, pp. 168-172, 2009.
- MacDonald, E. A., M. H. Denton, M. F. Thomsen, and S. P. Gary, **Superposed epoch analysis of a whistler instability criterion at geosynchronous orbit during geomagnetic storms**, J. of Atmospheric and Solar-Terrestrial Physics, 70, 14, 2008.
- MacDonald, E., K. A. Lynch, M. Widholm, R. Arnoldy, P. M. Kintner, E. M. Klatt, M. Samara, J. LaBelle, and G. Lapenta, **In Situ Measurement of Thermal Electrons on the SIERRA Nightside Auroral Sounding Rocket**, J. Geophys. Res., 111, A12310, doi:10.1029/2005JA011493, 2006.
- MacDonald, E., M. Thomsen, H. Funsten, **Background in Channel Electron Multiplier Detectors Due to Penetrating Radiation in Space**, IEEE Trans. Nucl. Sci., June 2006.

Leadership, Outreach, and Professional Development Activities

- Leading Teams for Impact course, Center for Creative Leadership, CO (2011)
- Service on the N.S.F. Geospace Environmental Modeling (GEM) Conference Steering Committee (2010 – 2013)
- GEM program Focus Group co-leader for *Scientific Magnetic Mapping and Techniques* (2010 – 2015)
- Mentor and research supervisor for two post-doctoral researchers (2009 - 2011), five post-baccalaureate students (2007 - 2011), a graduate student (2009-11), and a secondary school student (2010).
- Participation in LANL Protégé / Mentor program (2011), LANL Project Leadership seminar series (2010), On-Ramps into Academia workshop, University of Washington, NSF-ADVANCE program (2009), and the APS Communication and Negotiation Skills for Women Physicists in Industry workshop (2007).
- Presentations to external review committees for LANL capabilities: High Energy Density Plasmas (2009), Sensors, Remote Sensing, and Sensor Systems (2008, 2011), Earth and Space Science (2007), ISR Division (2006).
- Outreach presentations for Expanding Your Horizons (2010-2011), AAUW Wash. State convention (2010), LANL teacher outreach workshops (2005-2009), and to elementary school students (2009, 2010).
- Responsible for directing labs and grading lab reports for calculus-based introductory physics course. Received extremely positive comments concerning the clarity, structure, and helpfulness of teaching methods on student surveys (2000-2001).