

Dr. Therese Moretto Jorgensen

Space Plasma Physics Group
Department of Physics and Technology
University of Bergen
Bergen, Norway

Graduate Education and Postdoctoral Training

Post Doctoral fellowship at the Nordic Institute for Theoretical Physics (NORDITA), Copenhagen, Denmark (1993-1994)

Doc. Scient. Degree (PhD), Theoretical physics (Thesis: “Structure and Properties of Hadrons at Zero and Finite Temperature”), University of Oxford, UK (1993)

Basic Module in Pedagogy at Viby Amtsgymnasium, Denmark (1989)

Cand. Scient. Degree (MSc), Physics and Mathematics (Thesis: “Microscopic calculations of energy levels and widths, including their fine and hyperfine structure, for antiprotonic atoms”), Aarhus University, Denmark (1988)

Professional Experience

University of Bergen, Norway (2017-present)

Senior Adviser on research management and planning at the Faculty of Mathematics and Natural Sciences (5/2017 – present) Currently assigned to the Department of Physics and Technology where I work as a senior scientist and researcher in the Space Plasma Physics Group. My main research interest concerns the understanding of the coupled solar wind - magnetosphere - ionosphere system. I conduct studies based on the analysis and interpretation of large datasets from a wide variety of sources, counting ground-based ionospheric measurements, low-altitude polar orbiting magnetic satellite observations, plasma and field measurements from a large number of satellites in the solar wind and magnetosphere, and results from global magneto-hydro-dynamic simulations of the system. I am involved in investigations utilizing data from the AMPERE and SWARM satellite missions as well as both current and historic ground-based magnetometer observations.

Associate Coordinator, ESA Geomagnetic Expert Service Centre (8/2019 – present) On the management team for an international collaboration of geomagnetic data providers to maintain and expand ESA’s geomagnetic space weather service.

Group Leader, Birkeland Center for Space Science (5/2017-8/2019) Part of the leadership team and contributor to the research activities, which span a wide range of subjects within space physics.

National Science Foundation, USA (2004-2017)

Head, Geospace Science Section (2015-2017) As a member of the Senior Executive Service I led the foundation’s research and education activities in Geospace science and served as the principal spokesperson at the foundation in this area of research. With an annual budget of \$45 million, the Geospace Section funds basic research in the fields of aeronomy, magnetospheric physics, solar-terrestrial, and space weather as well as a Geospace Facilities program that supports a number of

large observatory facilities located both in the U.S. and internationally. The section processes about 300 new research project applications every year and manages on the order of 200 awards for new and ongoing projects.

Program Director (2004-2015) Significant achievements during my tenure at NSF include: managing more than 200 awards representing a total investment of more than \$85 million, including several large multi-million dollar projects; founding the CubeSat program at NSF, for which I received the Director's Award for Excellence in Program Management in 2008; defining and leading the implementation of a new dedicated program for space weather research, established in 2013; instituting a program in collaboration with NASA to foster the development of integrative space science models; establishing extended network observing capabilities, prominent examples of which are AMPERE and SuperDARN; increasing diversity of NSF staff, review panels, and award recipients; promoting science to a broad audience through high-visibility interviews and keynote presentations. I have

NASA Goddard Space Flight Center, USA (2000-2004)

Senior Research Scientist Contractor (2002-2004) & Senior NASA Resident Research Fellow (2000-2002) Scientific research in space physics and successful grant applications

Danish Space Research Institute, Denmark (1998-2001)

Senior Scientist in Solar system physics; external lecturer at the Niels Bohr institute for Astronomy, Physics and Geophysics, University of Copenhagen, Denmark; space science research and teaching; group leader for the solar wind-magnetosphere research group within the Solar System Physics section; co-lead on the original SWARM mission proposal, which was submitted as an explorer mission to ESA's Earth Observation program in 1998 (The SWARM mission was launched by ESA in 2013)

Danish Meteorological Institute, Denmark (1994-1998)

Research Scientist in the Solar-terrestrial Physics Division; project scientist for the Greenland magnetometer chains; project Scientist of the Ørsted geomagnetic satellite project

Awards

2008: National Science Foundation Director's Award for Excellence in Program Management.

Commissions

2018 – now: Member of the Daedalus EE10 candidate Mission Advisory Group for ESA Earth Observation Program

2018: Expert panelist for ESA Earth Observation Program

2018: Expert reviewer for European Commission H2020 Program

2015 – 2017: US President's Office of Science and Technology Policy: National Science and Technology Council Subcommittee on Space Weather Operations, Research, and Mitigation

2015: Royal Institute of Technology (KTH), Stockholm, Sweden: Assignment as expert for promotion evaluation

2011 – 2014: QB50 Project, Van Karman Institute, Belgium: Member of the Steering Group

2013 – 2014: United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS): US representative on the Expert Meeting on Improving Space Weather Forecasting in the Next Decade, Vienna, February 2014

2012: Danish Technical University, Space Institute: Evaluation committee for position as Senior Researcher in Ionospheric Physics

2011: Danish Technical University, Space Institute: Committee for evaluation of PhD thesis

- 2010: United Nations Office of Outer Space Affairs: US representative at the symposium on Small Satellite Programmes for Sustainable Development. Graz, 2010
- 2009: University of Oslo, Department of Physics: Evaluation committee for position as Associate Professor in Plasma and Space Physics
- 2008 – 2017: US Department of Defense Space Test Program: Government Rideshare Working Group
- 2008 – 2017: US National Reconnaissance Office: Annual Government CubeSat Technical Interchange Meetings
- 2006 – 2015: US National Space Weather Program: Committee for Space Weather
- 2005: Niels Bohr Institute, University of Copenhagen, Denmark: Evaluation committee for position as Associate Professor in Planetary Physics
- 1996 – 2004: Geospace Environment Modeling Program, United States: International representative to the Steering Committee

Teaching and Public Outreach

- 2018 – now: Supervising one Postdoctoral researcher and one masterstudent
- 2017 - 2019: Team Lead for the Education and Public Outreach group at the Birkeland Centre for Space Science, UiB
- 2018: Guest Lecturer, Introduction to Plasma Physics, at University Center at Svalbard
- 2017: Tutorial Lecture on CubeSats, European Space Weather Week, Belgium
- 2017: Guest Lecturer, Space Challenges Program, EnduroSat, Bulgaria;
- 2008 - 2017: Interviews on NSF science programs, including to Science, Nature, and Space News; Keynote presentations, including at Appleton Space Conference, Rutherford Appleton Laboratory, UK (2015), Measurement Techniques in Solar and Space Physics Conference, Boulder, USA (2015), Ground System Architecture Workshop, Los Angeles, USA (2014), and CubeSat 10th Annual Developers Workshop, CalPoly, USA (2013)
- 2006 - 2017: NSF Program Manager for 10 new faculty positions created in the US under the Faculty Development in Space Sciences program
- 2004 - 2017: NSF Program Manager for numerous awards under the Research Experience for Undergraduates (REU) , Research at Undergraduate Institutions (RUI), Postgraduate Research Fellowship (PRF), and Faculty Early Career Development (CAREER) programs
- 1998 - 2000: External lecturer at the Niels Bohr institute for Astronomy, Physics and Geophysics, University of Copenhagen, Denmark; co-developer and teacher of a new course on space physics for third year undergraduate geophysics students, supervised and co-supervised bachelor and master student projects

Other Experiences

- 2018 & 2019: Co-convener of EGU sessions on New Scientific Space Weather Products and Forecasting Capabilities for Geomagnetic, Ionospheric, and Magnetospheric Conditions
- 2015 – 2016 Executive training: Harvard Kennedy School Executive Education Program: Women in Power (5 Days); NSF Academy: Executive Leadership Retreat (3 days); Federal Supervision at NSF (3 days)
- 2013: Co-organizer of NASA-NSF Space Weather Modeling Collaborations Kick-Off meeting
- 2012: Co-convener AGU special session on Small Satellites for Earth and Space Science
- 2011: Co-organizer Planning workshop for the GEOScan project
- 2008: Co-organizer special session AAS Guidance and Control Conference on CubeSats and Nanosats
- 2007: Organizer NSF workshop on Small Satellite Missions for Space Weather and Atmospheric Research

Scientific Productivity

44 papers in peer reviewed journals, 14 of these as first author; 5 other technical/ scientific publications, 3 of these as first author; more than 30 invited presentations at international conferences; **H-index of 18** (Google Scholar: <https://scholar.google.com/citations?user=P4c0KbcAAAAJ&hl=en>); **OrcID:** <https://orcid.org/0000-0002-2403-5561>

Therese Moretto Jorgensen, Ph.D.

Publishing as T. Moretto

Journal Publications, Sep 2019

- 1 Laundal, K. M., Hatch, S. M. & Moretto, T. (2019). Magnetic effects of plasma pressure gradients in the upper f region. *Geophysical Research Letters*, 46(5), 2355–2363. doi:10.1029/2019gl081980
- 2 Moretto, T., Hesse, M., Vennerstrøm, S. & Tenfjord, P. (2018). Estimating the rate of cessation of magnetospheric activity in AMPERE field-aligned currents. *Geophysical Research Letters*, 45(23), 12, 713–12, 719. doi:10.1029/2018gl080631
- 3 Robinson, R. M., Behnke, R. A. & Moretto, T. (2018). The critical role of the research community in space weather planning and execution. *Space Weather*, 16(3), 200–204. doi:10.1002/2017sw001778
- 4 Hesse, M., Liu, Y.-H., Chen, L.-J., Bessho, N., Wang, S., Burch, J., ... Tenfjord, P. (2018). The physical foundation of the reconnection electric field. *Physics of Plasmas*, 25(3).
- 5 Vennerstrom, S., Lefevre, L., Dumbovic, M., Crosby, N., Malandraki, O., Patsou, I., ... Moretto, T. (2016). Extreme geomagnetic storms - 1868 - 2010. *Solar Physics*, 291(5), 1447–1481. doi:10.1007/s11207-016-0897-y
- 6 Vennerstrom, S. & Moretto, T. (2013). Monitoring auroral electrojets with satellite data. *Space Weather*, 11(9), 509–519.
- 7 Moretto, T. & Robinson, R. (2008). Small satellites for space weather research. *Space Weather*, 6(5).
- 8 Moretto, T. (2008). Cubesat mission to investigate ionospheric irregularities. *Space Weather-the International Journal of Research and Applications*, 6(11).
- 9 Moretto, T. (2007). Workshop on small satellite missions for space weather research. *Space Weather*, 5(3).
- 10 Vennerstrom, S., Christiansen, F., Olsen, N. & Moretto, T. (2007). On the cause of imf by related mid- and low latitude magnetic disturbances. *Geophysical Research Letters*, 34(16).
- 11 Moretto, T., Vennerstrom, S., Olsen, N., Rastatter, L. & Raeder, J. (2006). Using global magnetospheric models for simulation and interpretation of swarm external field measurements. *Earth Planets and Space*, 58(4), 439–449.
- 12 Vennerstrom, S., Moretto, T., Rastatter, L. & Raeder, J. (2006). Modeling and analysis of solar wind generated contributions to the near-earth magnetic field. *Earth Planets and Space*, 58(4), 451–461.
- 13 Moretto, T., Sibeck, D. G., Lavraud, B., Trattner, K. J., Reme, H. & Balogh, A. (2005). Flux pile-up and plasma depletion at the high latitude dayside magnetopause during southward interplanetary magnetic field: A cluster event study. *Annales Geophysicae*, 23(6), 2259–2264.
- 14 Vennerstrom, S., Moretto, T., Rastatter, L. & Raeder, J. (2005). Field-aligned currents during northward interplanetary magnetic field: Morphology and causes. *Journal of Geophysical Research-Space Physics*, 110(A6).
- 15 Moretto, T., Sibeck, D. G. & Watermann, J. F. (2004). Occurrence statistics of magnetic impulsive events. *Annales Geophysicae*, 22(2), 585–602.
- 16 Keller, K. A., Hesse, M., Kuznetsova, M., Rastatter, L., Moretto, T., Gombosi, T. I. & DeZeeuw, D. L. (2002). Global mhd modeling of the impact of a solar wind pressure change. *Journal of Geophysical Research-Space Physics*, 107(A7).
- 17 Lu, G., Cowley, S. W. H., Milan, S. E., Sibeck, D. G., Greenwald, R. A. & Moretto, T. (2002). Solar wind effects on ionospheric convection: A review. *Journal of Atmospheric and Solar-Terrestrial Physics*, 64(2), 145–157.

- 18 Moretto, T., Hesse, M., Yahnin, A., Ieda, A., Murr, D. & Watermann, J. F. (2002). Magnetospheric signature of an ionospheric traveling convection vortex event. *Journal of Geophysical Research-Space Physics*, 107(A6).
- 19 Moretto, T., Olsen, N., Ritter, P. & Lu, G. (2002). Investigating the auroral electrojets with low altitude polar orbiting satellites. *Annales Geophysicae*, 20(7), 1049–1061.
- 20 Olsen, N., Moretto, T. & Friis-Christensen, E. (2002). New approaches to explore the earth's magnetic field. *Journal of Geodynamics*, 33(1-2), 29–41.
- 21 Vennerstrom, S., Moretto, T., Olsen, N., Friis-Christensen, E., Stampe, A. M. & Watermann, J. F. (2002). Field-aligned currents in the dayside cusp and polar cap region during northward imf. *Journal of Geophysical Research-Space Physics*, 107(A8).
- 22 Amm, O., Kauristie, K., Pulkkinen, T. I., Engebretson, M. J., Greenwald, R. A., Luhr, H. & Moretto, T. (2000). Combining multi-point spacecraft and two-dimensional ground-based observations: Theory and example of an imf b-y-related cusp current system. In R. A. Harris (Ed.), *Cluster-ii workshop multiscale/multipoint plasma measurements, proceedings* (Vol. 449, pp. 327–330). Esa Special Publications.
- 23 Huang, C. S., Murr, D., Sofko, G. J., Hughes, W. J. & Moretto, T. (2000). Ionospheric convection response to changes of interplanetary magnetic field b-z component during strong b-y component. *Journal of Geophysical Research-Space Physics*, 105(A3), 5231–5243.
- 24 Koba, A. T., Richmond, A. D., Emery, B. A., Peymirat, C., Luhr, H., Moretto, T., ... Amory-Mazaudier, C. (2000). Electrodynamical coupling of high and low latitudes: Observations on may 27, 1993. *Journal of Geophysical Research-Space Physics*, 105(A10), 22979–22989.
- 25 Moretto, T., Friis-Christensen, E., Gjerlov, J. W., Olsen, N. & Primdahl, F. (2000). The near-earth magnetic satellite missions, orsted and sac-c/orsted-2, in relation to the cluster ii mission. In R. A. Harris (Ed.), *Cluster-ii workshop multiscale/multipoint plasma measurements, proceedings* (Vol. 449, pp. 363–366). Esa Special Publications.
- 26 Moretto, T., Ridley, A. J., Engebretson, M. J. & Rasmussen, O. (2000). High-latitude ionospheric response to a sudden impulse event during northward imf conditions. *Journal of Geophysical Research-Space Physics*, 105(A2), 2521–2531.
- 27 Amm, O., Engebretson, M. J., Greenwald, R. A., Luhr, H. & Moretto, T. (1999). Direct determination of imf b-y-related cusp current systems, using superdarn radar and multiple ground magnetometer data: A link to theory on cusp current origin. *Journal of Geophysical Research-Space Physics*, 104(A8), 17187–17198.
- 28 Engebretson, M. J., Murr, D. L., Hughes, W. J., Luhr, H., Moretto, T., Posch, J. L., ... Bitterly, M. (1999). A multipoint determination of the propagation velocity of a sudden commencement across the polar ionosphere. *Journal of Geophysical Research-Space Physics*, 104(A10), 22433–22451.
- 29 Huang, C. S., Sofko, G. J., Murr, D., Hughes, W. J. & Moretto, T. (1999). High-latitude ionospheric convection during strong interplanetary magnetic field b-y. *Geophysical Research Letters*, 26(3), 405–408.
- 30 Korotova, G. I., Sibeck, D. G., Moretto, T. & Reeves, G. D. (1999). Tracking transient events through geosynchronous orbit. *Journal of Geophysical Research-Space Physics*, 104(A5), 10265–10273.
- 31 Lu, G., Baker, D. N., McPherron, R. L., Farrugia, C. J., Lummerzheim, D., Ruohoniemi, J. M., ... Hayashi, K. (1998). Global energy deposition during the january 1997 magnetic cloud event. *Journal of Geophysical Research-Space Physics*, 103(A6), 11685–11694.
- 32 Moretto, T. & Yahnin, A. (1998). Mapping travelling convection vortex events with respect to energetic particle boundaries. *Annales Geophysicae-Atmospheres Hydrospheres and Space Sciences*, 16(8), 891–899.

- 33 Nilsson, H., Kirkwood, S. & Moretto, T. (1998). Incoherent scatter radar observations of the cusp acceleration region and cusp field-aligned currents. *Journal of Geophysical Research-Space Physics*, 103(A11), 26721–26730.
- 34 Ridley, A. J., Moretto, T., Ernstrom, P. & Clauer, C. R. (1998). Global analysis of three traveling vortex events during the november 1993 storm using the assimilative mapping of ionospheric electrodynamics technique. *Journal of Geophysical Research-Space Physics*, 103(A11), 26349–26358.
- 35 Lyons, L. R., Blanchard, G. T., Samson, J. C., Lepping, R. P., Yamamoto, T. & Moretto, T. (1997). Coordinated observations demonstrating external substorm triggering. *Journal of Geophysical Research-Space Physics*, 102(A12), 27039–27051.
- 36 Moretto, T. & FriisChristensen, E. (1997). Ground observations of dayside small-scale dynamic features. In C. T. Russell (Ed.), *Results of the iastp program* (Vol. 20, pp. 863–872). Advances in Space Research-Series.
- 37 Moretto, T., FriisChristensen, E., Luhr, H. & Zesta, E. (1997). Global perspective of ionospheric traveling convection vortices: Case studies of two geospace environmental modeling events. *Journal of Geophysical Research-Space Physics*, 102(A6), 11597–11610.
- 38 Nilsson, H., Yamauchi, M., Mukai, T., Yamamoto, T. & Moretto, T. (1997). Observations of an enhanced convection flow channel for northward turning imf. *Geophysical Research Letters*, 24(24), 3137–3140.
- 39 Oieroset, M., Sandholt, P. E., Luhr, H., Denig, W. F. & Moretto, T. (1997). Auroral and geomagnetic events at cusp/mantle latitudes in the prenoon sector during positive imf b-y conditions: Signatures of pulsed magnetopause reconnection. *Journal of Geophysical Research-Space Physics*, 102(A4), 7191–7205.
- 40 Tavares, M., Friis-Christensen, E., Moretto, T. & Vennerstrøm, S. (1997). Semiannual variation of geomagnetic activity in the greenland magnetometer chain. *Physics and Chemistry of the Earth*, 22(7-8), 685–689.
- 41 Luhr, H., Lockwood, M., Sandholt, P. E., Hansen, T. L. & Moretto, T. (1996). Multi-instrument ground-based observations of a travelling convection vortices event. *Annales Geophysicae-Atmospheres Hydrospheres and Space Sciences*, 14(2), 162–181.
- 42 Oieroset, M., Luhr, H., Moen, J., Moretto, T. & Sandholt, P. E. (1996). Dynamical auroral morphology in relation to ionospheric plasma convection and geomagnetic activity: Signatures of magnetopause x line dynamics and flux transfer events. *Journal of Geophysical Research-Space Physics*, 101(A6), 13275–13292.
- 43 Yahnin, A. & Moretto, T. (1996). Travelling convection vortices in the ionosphere map to the central plasma sheet. *Annales Geophysicae-Atmospheres Hydrospheres and Space Sciences*, 14(10), 1025–1031.
- 44 Moretto, T. (1993). Enhancement of heavy quarkonium production in hadron-collisions at finite-temperature. *Zeitschrift Fur Physik C-Particles and Fields*, 60(3), 541–555.
- 45 Jørgensen, T., Jensen, A., Miranda, A. & Oades, G. (1990). The strong-interaction fine and hyperfine structure of antiprotonic atoms. *Nuclear Physics A*, 506(3), 615–636.
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- 46 Jørgensen, T. M., Heiselberg, H., Jensen, A. S., Miranda, A. & Oades, G. C. (1989). The fine- and hyperfine structure of antiprotonic atoms. *Nuclear Physics B Proceedings Supplements*, 8, 277–280.
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