

Noé LUGAZ

Research Associate Professor

Space Science Center and Department of Physics

University of New Hampshire, 8 College Rd, Durham, NH 03824

Phone: (603)-862-5045 Email: noe.lugaz@unh.edu

Webpage: <https://physics.unh.edu/people/research-faculty/noe-lugaz>

Education

University of Michigan, Ann Arbor, MI	08/2002 – 12/2006
Ph.D. Space Science	2007
M.Sc. Atmospheric and Space Sciences	2003
Institute of Aeronautics and Aerospace (Supaéro), Toulouse, France	09/2000 – 06/2002
M. Eng. Aerospace Engineering (Diplôme d'ingénieur)	2003

Academic Appointments

Space Science Center, University of New Hampshire

Research Associate Professor (Dept. of Physics)	08/2016 – present
Research Assistant Professor	05/2013 – 08/2016
Research Scientist III	03/2012 – 05/2013

Institute for Astronomy, University of Hawaii

Assistant Astronomer (research faculty)	06/2009 – 03/2012
Postdoctoral Researcher (Mentor: I. I. Roussev)	01/2007 – 05/2009

Kyoto University, JSPS Fellow

Visiting Researcher (Host: K. Shibata)	10/2010 – 05/2011
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AOSS, University of Michigan

Graduate Student Research Assistant (Advisors: T. I. Gombosi & W. B. Manchester)	08/2003 – 12/2006
Research Assistant (Advisor: J. H. Waite)	11/2002 – 08/2003

Narrative

My research focuses on the investigation of coronal mass ejections (CMEs), particularly series of CMEs, and their consequences on Earth's magnetosphere and radiation belts. I received the 2014 Arne Richter award for Outstanding Young Scientists from the European Geosciences Union (awarded to 4 or 5 scientists per year within 7 years of their PhD), for which the citation noted that "[I] made a number breakthrough advances in the subject of coronal mass ejections". My past work encompasses solar, interplanetary, and magnetospheric/radiation belt physics. I have performed numerical simulations, analyzed remote-sensing observations and *in situ* measurements, and led a small complete mission proposal. I have received 12 research grants as Principal Investigator in the US for about 6 M\$, which has allowed me to develop, since 2008, an independent research program encompassing all these different aspects of space physics. Since 2005, I have published 24 first-authored articles and 50 co-authored articles in peer-reviewed journals (30 ApJ, 13 JGR, 11 Solar Physics, 2 GRL, 3 in Nature Journals), and I have a h-index of 33 with 2900 citations (Google Scholar). I was the PI of the only Category II IMAP mission of opportunity in 2018 (non-selected).

From October 2019 to December 2023, I am serving as the Editor-in-Chief of *Space Weather*. From 2019 to 2022, I am serving as the Steering Committee Chair of the Solar Heliospheric and Interplanetary Environment (SHINE) workshop. From 2013 to 2018, I was a SHINE steering committee member and served as the SHINE workshop coordinator. Under my tenure, SHINE has grown from 160 participants in 2013 to 310 in 2018. I have served as a guest editor for Solar Physics, and I have reviewed over 80 articles. I have been invited to give more than 25 presentations at the major conferences in my field (COSPAR, AGU, EGU, IAU General Assembly) and I have given an additional 35 first-authored oral presentations. I have conveyed and chaired over 20 sessions at SHINE and AGU since 2009. I am or have been on the PhD thesis committee for three students and I am currently advising a PhD student; since 2009, I also advised 6 undergraduate students. I co-taught a course on space plasma physics at UNH in 2014 and 2017.

Awards

2014 Arne Richter Award for Outstanding Young Scientists of the European Geosciences Union (EGU).

2016 Editors' Citation for Excellence in Refereeing for *JGR-Space Physics*.

2017 Editors' Citation for Excellence in Refereeing for *JGR-Space Physics*.

Grants (~ 6M\$ as PI since 2008)

Current or Past PI on NASA Living with a Star ($\times 2$), Heliophysics Supporting Research ($\times 2$), Grand Challenge Research (Theory Program), NSF Solar-Terrestrial ($\times 2$), SHINE and National Space Weather Program.

Current as PI

NASA/HGCR, 80NSSC17K0009, **PI** (\$1,587,000) 08/2017 – 07/2020

Physical Origins of Suprathermal Ion Populations Throughout the Heliosphere

NASA/HSR, 80NSSC19K0831, **PI** (\$664,000) 04/2019 – 03/2022

Successive Coronal Mass Ejections and Associated Solar Energetic Particles

Current as Co-I

LWS17/CME, **Co-I** (0.12 FTE) – PI: A. Savcheva (CfA) 10/2018 – 10/2022

SHINE, **SP** (0.04 FTE) – PI: R. Winslow (UNH) 2017 – 2019

Mission Involvement

STEREO/PLASTIC 1-2 months/year (PI: Galvin) 2015 – present

IMAP Student Collaboration Lead 2017 – present

RBSP/ECT 1-2 months/year (PI: Spence) 2016 – 2018

Non-selected Mission Proposal

MIMIS, PI IMAP Science Mission of Opportunity (2018) – 75M\$ Category II
Team: UNH, UCB, GSFC, IWF, BCT

Past as PI

NASA/LWS NNX15AB87G, **PI** (\$536,000) 12/2014 – 11/2018

NSF/AGS AGS1601877 *SHINE Workshop*, **PI** (\$907,000) 02/2016 – 11/2018

NSF/SHINE AGS1460179, **Local PI**, (\$59,000) 07/2015 – 06/2018

NSF/ST AGS1435785, **PI**, (\$335,500) 06/2015 – 05/2018

NSF/ST AGS1433213, **Local PI**, (\$63,500) 06/2015 – 05/2018

NSF/PLR PLR1430750 *SHINE Workshop*, **PI** (\$324,000) 01/2014 – 07/2016

NASA/SHP NNX12AB28G, **PI** (\$366,000) 10/2011 – 05/2016

NSF/SHINE AGS1239699, **PI** (\$252,000) 03/2012 – 02/2015

NSF/ST AGS1239704, **PI** (\$307,000) 12/2011 – 11/2014

NSF/NSWP AGS0819653, **PI** (\$193,000) 08/2008 – 07/2012

NASA/LWS TR&T NNX08AQ16G, **PI** (\$364,000) 05/2008 – 04/2012

Japanese Society for the Promotion of Science Post-doctoral Fellowship (\$37,000) 10/2010 – 05/2011

Advising and Support of Students and Researchers

PhD advisor Dept of Physics, University of New Hampshire
Tarik Salman (4th year student) 2017 – present

PhD co-advisor Dept of Physics, University of New Hampshire
Dr. Wenyuan Yu (graduated 11/2016) 2013 – 2016

PhD committee member Dept of Physics, University of New Hampshire
Sam Bingham (graduated 03/2019) 2017 – 2019

PhD committee member Institute for Astronomy, University of Hawaii
Dr. Cooper Downs (graduated 10/2011) 2007 – 2011

Advisor of undergraduate students

C. Maillet, *Senior Thesis Advisor*, UNH
O. Orellana, UNH
C. Small & T. Manion, UNH

University of New Hampshire

AY17-18

Fall 2017

Spring 2017

REU Program

P. Kintner (U. Rochester, USA)
J. Hernandez-Charpak (U. de los Andes, Colombia)
D. Hoving and J. Harper (with I. Roussev)

Institute for Astronomy, University of Hawaii

Summer 2011

Summer 2009

Summer 2007

Post-doctoral Mentor

Matthew Young (suprathermal simulation)
Gen Li (SEP and ESP theory and analysis)
Bin Zhuang (CME simulation and analysis)

University of New Hampshire

2019/01 – present

2019/09 – present

2019/09 – present

Teaching Experience

- Co-lecturer at UNH of senior/graduate 4-credit class PHYS 712/812: *Intro to Space Plasma Physics* in Fall 2014 (20 hours taught, 16 students; 4.05/5 average evaluation) with Dr. Farrugia and in Spring 2017 with Dr. Jichun Zhang (20 hours taught, 10 students, 4.81/5 average evaluation).
- Co-lecturer for graduate seminar: *Solar and Stellar Magnetism* in Fall 2010 at U. Hawaii (4 hours taught).
- Instructor for the *Numerical and Visualization Laboratory* at the SPD/SPS Summer School in Maui, HI in July 2008 (6 hours taught).
- Graduate Student Instructor for AOSS 464: *Introduction to Space Environment* in the Fall Semesters of 2005 and 2006 at Univ. Michigan (grader, office hours, substitute lecturer).
- Participant in the CfAO workshop *Rethinking Science Learning and Thinking* in Maui, HI (2007).

Public Outreach Experience

- Mentor for high school students as part of the UNH/SMART program (1 month/year, 2014–2015, 2017).
- *Ballon Launches Introduce Students to Space Science* by Smith, Bloser, **Lugaz**, Broad, Gloezler, and Levergood, *EOS*, **97 (23)**, 14-19, 2016, http://eos.org/wp-content/uploads/2016/11/01-Dec_magazine.pdf
- Co-Investigator (PI: M. Kadooka) for the NASA-funded Hawaii Center for Advancing Systemic Helio-physic Education (EPO grant: 01/2010 –03/2012).
- Participant in the yearly IfA Manoa open house (2007–2010, speaker in 2010).

Professional Organizations

Service and Memberships

- NSF/SHINE Workshop Steering Committee Chair (2019 – 2022).
- IAGA Division IV Co-Chair (2019 – 2023).
- NSF/SHINE Workshop Coordinator and Steering Committee Member (2013 – 2018).
- NCAR Non-NSF Proposal Review Panelist (2018–2019).
- Member of the Scientific Organizing Committee (SOC) of the International Study of Earth-Effecting Solar Transients (ISEST) program of SCOSTEP (2012 – 2018).
- Member of the SOC of session D2.5 at COSPAR 2014 and D2.1 at COSPAR 2012.
- Convener and Chair of 11 SPA/SH sessions at the Fall AGU meetings (2009–2019).
- Session convener for AGU-AOGS 2012 and AGU-Meeting of the Americas 2013 meetings.
- Working Group Leader for 8 sessions at SHINE workshops (2010–2015, 2017).
- Organizer of CME-CME interaction workshop in Oxford, UK (2014).
- Member of the SOC: 2nd workshop on Remote-Sensing of the Heliosphere, Aberystwyth, Wales, 2011.
- Organizer of New England Space Science Consortium meeting on CMEs in October 2012.
- Chair (2012–2014) and Member (2009 – 2015) of the Popular Writing Award Committee of the Solar Physics Division of the American Astrophysical Society.
- Member of American Geophysical Union (2004 – present) and American Astrophys. Society (2007 – 2011).

Reviewing and Editing Activities

- Editor-in-Chief of *Space Weather* (2019–2023).
 - Panel Chair for NASA ROSES panel (2013).
 - Panelist for NASA Heliophysics Theory Program (2010), SR&T/HSR (2012, 2016) and HGI (2016, 2017).
 - Panelist for NSF/SHINE 2012 program, NSF/AGS 2014 post doctoral program and NSF/AGS 2017 program.
 - Mail-in reviewer since 2009 for NSF/SHINE and NSF/ST, NASA/SHP, NASA/HTP, NASA/HGI, NASA Post-doctoral Program (NPP), as well as Flemish and Georgian programs (~10 proposals/year).
 - Guest Editor for Topical Issue of Solar Physics (07/2013).
 - Multiple manuscripts refereed for Nature Physics, the Astrophysical Journal, ApJ Letters, Astronomy & Astrophysics, GRL, Journ. Geophys. Res., Solar Physics, JASTP, Space Weather and Adv. Space Res.
 - Additional manuscripts refereed for Nature Comm., Nature Astronomy, Space Science Reviews, Annales Geophysicae, among others.
- 83 manuscripts reviewed since 2006 (~10/year since 2015).
- Judge for SPA Student Poster Award at the Fall AGU meeting (2009–2013, 2015).

Service at UNH

- Member of the Physics Department Graduate Curriculum Committee (2013 – 2018).
- Elected Member of the Research Faculty Council (Two terms: 2015 – 2018), Chair of the RFC (2017–2018).
- Member of the Ad-Hoc UNH Senate Committee for Lecturers, Clinical, Extension and Research Faculty Involvement in UNH Senate (2015).

Presentations

Seminars and Colloquia (29)

- 2019:** University of Montréal (Montréal, QC) – National Science Foundation (Alexandria, VA) – Natural Resources Canada/Canadian Space Weather Forecast Centre (Ottawa, ON)
- 2018:** University of Massachusetts at Lowell (Lowell, MA)
- 2016:** University of Massachusetts at Lowell (Lowell, MA) – University of Delaware (Newark, DE)
- 2015:** Boston University (Boston, MA)
- 2014:** NRL (Washington, DC) – Harvard/SAO (Cambridge, MA)
- 2013:** NASA/GSFC (Greenbelt, MD) – KU Leuven (Leuven, Belgium) – University of Texas at Dallas (Richardson, TX).
- 2012:** Boston College (Boston, MA) – University of New Hampshire (Durham, NH) – Southwest Research Laboratory (Boulder, CO).
- 2011:** University of Alabama in Huntsville (Huntsville, AL) – UNH (Durham, NH) – University of Nagoya (Nagoya, Japan) – NAOJ (Tokyo, Japan) – Tokyo University (Tokyo, Japan) – NOAC (Beijing, China) – Key Laboratory for Space Weather (Beijing, China) – Kyoto University (Kyoto).
- 2010:** Kyoto University (Kyoto, Japan) – Observatoire de Meudon/LESIA (Paris, France).
- 2009:** NASA/GSFC (Greenbelt, MD) – George Mason University (Fairfax, VA) – JAXA (Tokyo, Japan).
- 2006:** University of Hawaii (Honolulu, HI).

Invited Oral Presentations as First Author (28)

- 2020:** COSPAR E2.3 (Sidney, Australia)
- 2019:** AGU Chapman on Space Weather (Pasadena, CA) – SHINE Workshop (Boulder, CO)
- 2018:** SCOSTEP Quadrennial Symposium (Plenary Talk) (Toronto, ON) – European Geosciences Union meeting (Vienna, Austria) – 17th Annual International Astrophysics Conference (Santa Fe, NM)
- 2017:** Joint JpGU/AGU Meeting (Tokyo, Japan)
- 2016:** AGU Fall Meeting (San Francisco, CA) – First VarSITI General Assembly (Albena, Bulgaria)

2015: IAU General Assembly (Honolulu, HI) – ASTRONUM 2015 (Avignon, France).

2014: LWS Science Meeting (Portland, OR) – SHINE workshop (Telluride, CO) – European Geosciences Union meeting Award Lecture (Vienna, Austria).

2013: IAU 300 (Paris, France) – European Geosciences Union meeting (Vienna, Austria).

2012: In-situ Heliospheric Science Symposium (Laurel, MD) – COSPAR D2.1 (Mysore, India) – COSPAR E2.6 (Mysore, India) – IRAP Heliosphere workshop (Toulouse, France).

2011: ILWS 4 (Beijing, China) – ISROSES-II meeting (Borovets, Bulgaria).

2010: Fall AGU (San Francisco, CA) – COSPAR (Bremen, Germany) – Western Pacific Geophysics Meeting (Taipei, Taiwan) – European Geosciences Union meeting (Vienna, Austria).

Earlier: SHINE 2009 (Wolfville, N. S., Canada) – SHINE 2007 (Whistler, B. C., Canada).

Contributed Presentations (130+)

38+ contributed oral talks as first or presenting author since 2006 (including at AGU, EGU, COSPAR, IUGG, TESS, IAU Symposium 257, CAUSES-2 symposium, Solar Wind 12 and STEREO-4 meetings).

30+ poster presentations as first author since 2004.

85+ conference presentations as co-author, including 10 invited talks.

Published Work

Book Chapters (2)

Lugaz, N., Eruptive Prominences and Their Impact on the Earth and Our Life, *in Solar Prominences*, editors: J.-C. Vial and O. Engvold, *Astrophysics and Space Science Library, Springer*, 2015, **415**, 433-453.

Lugaz, N., Space Weather at Earth and in the Solar System, *in The Sun: A Guide to Stellar Astrophysics*, editors: O. Engvold, J.-C. Vial and A. Skumanich, *Elsevier*, 2019, 335-361, doi:10.1016/B978-0-12-814334-6.00012-1, ISBN 9780128143346.

Articles in Refereed Journals (77)

24 first authored publications in peer-reviewed journals.

16 second or third-authored and 37 additional co-authored publications in peer-reviewed journals.

ISI/WoS: Citations: 2263 – h-index: 29 – Citations in 2017/2018: 363/328 – 19 articles with more than 50 citations each.

<http://tinyurl.com/NLugazADS>

<http://www.researcherid.com/rid/C-1284-2008>

First-authored Articles (24)

1000+ citations, h = 17, 9 articles with more than 50 citations. 145/90 citations in 2017/2018.

2 first-authored articles published per year, on average, since 2008.

[F24] **Lugaz, N.**, Farrugia, C. J., Winslow, R. M., Al-Haddad, N., Galvin, A. B., Nieves-Chinchilla, T., Lee, C. O., Janvier, M., On the Spatial Coherence of Magnetic Ejecta: Measurements of Coronal Mass Ejections by Multiple Spacecraft Longitudinally Separated by 0.01 AU, *Astrophys. J. Lett. (ApJL)*, 2018, **864**, 7.

[F23] **Lugaz, N.**, Farrugia, C. J., Winslow, R. M., Small, C., Manion, T. and Savani, N. P., Importance of CME Radial Expansion on the Ability of Slow CMEs to Drive Shocks, *Astrophys. J. (ApJ)*, 2017, **848**, 75.

[F22] **Lugaz, N.**, Temmer, M., Wang, Y., Farrugia, C. J., The Interaction of Successive Coronal Mass Ejections: A Review, *Solar Physics*, 2017, **292**, 64.

[F21] **Lugaz, N.**, Farrugia, C. J., Winslow, R., Al-Haddad, N., Kilpua, E. K. J., Riley, P., Factors Affecting the Geo-effectiveness of Shocks and Sheaths at 1 AU, *Journ. Geophys. Res. (JGR)*, 2016, **121**, 10,861-10,879.

[F20] **Lugaz, N.**, Farrugia, C. J., Huang, C.-L., Winslow, R. M., Spence, H. E., Schwadron, N. A. Earth's magnetosphere and outer radiation belt under sub-Alfvénic solar wind, *Nature Communications*, 2016, **7**,

13001.

- [F19] **Lugaz, N.**, Farrugia, C. J., Huang, C.-L., Spence, H. E., Extreme Geomagnetic Disturbances Due to Shocks Within CMEs, *Geophys. Rev. Lett. (GRL)*, 2015, **42**, 4694-4701.
- [F18] **Lugaz, N.**, Farrugia, C. J., Smith, C. W., Paulson, K., Shocks inside CMEs: A Survey of Properties from 1997 to 2006, *JGR*, 2015, **120**, 2409-2427.
- [F17] **Lugaz, N.** and Farrugia, C. J., A New Class of Complex Ejecta Resulting From the Interaction of Two CMEs and Its Expected Geo-Effectiveness, *GRL*, 2014, **41**, 769-776.
- [F16] **Lugaz, N.**, Farrugia, C. J., Manchester, W. B. and Schwadron, N., The Interaction of Two Coronal Mass Ejections: Influence of Relative Orientation, *ApJ*, 2013, **778**, 20.
- [F15] **Lugaz, N.**, Kintner, P., Effect of Solar Wind Drag on the Determination of the Properties of Coronal Mass Ejections from Heliospheric Images, *Solar Physics*, 2013, **285**, 281-294.
- [F14] **Lugaz, N.**, Farrugia, C. J., Davies, J. A., *et al.* The Deflection of the Two Interacting CMEs of 2010 May 24 as Revealed by Combined In-situ Measurements and Heliospheric Imaging, *ApJ*, 2012, **759**, 68.
- [F13] **Lugaz, N.**, Kintner, P., Jian, L., *et al.*, Heliospheric Observations of STEREO-Directed CMEs in 2008–2010: Lessons for Future Observations of Earth-Directed CMEs, *Solar Physics*, 2012, **279**, 497-515.
- [F12] **Lugaz, N.**, Downs, C., Shibata, K., *et al.*, Numerical Investigation of a Coronal Mass Ejection from an Anemone Active Region: Reconnection and Deflection of the 2005 August 22 Eruption, *ApJ*, 2011, **738**, 127.
- [F11] **Lugaz, N.**, Roussev, I. I., Gombosi, T. I., Determining CME Parameters by Fitting Heliospheric Observations: Numerical Investigation of the Accuracy of the Methods, *Adv. Space Res.*, 2011, **48**, 292-299.
- [F10] **Lugaz, N.** & Roussev I. I., Numerical Modeling of Interplanetary Coronal Mass Ejections and Comparison with Heliospheric Images, *JASTP*, 2011, **73**, 1187-1200.
- [F9] **Lugaz, N.**, Accuracy and Limitations of Fitting and Stereoscopic Methods to Determine the Direction of Coronal Mass Ejections from Heliospheric Imagers Observations, *Solar Physics*, 2010, **267**, 411-429.
- [F8] **Lugaz, N.**, Hernandez-Charpak, J. N., Roussev, I. I., *et al.*, Determining the Azimuthal Properties of CMEs from Multi-Spacecraft Remote-Sensing Observations with SECCHI, *ApJ*, 2010, **715**, 493-499.
- [F7] **Lugaz, N.**, Vourlidas, A., & Roussev, I. I., Deriving the Radial Distances of Wide CMEs from Elongation Measurements in the Heliosphere – Application to CME-CME Interaction, *Ann. Geophys.*, 2009, **27**, 3479-3488.
- [F6] **Lugaz, N.**, Vourlidas, A., Roussev, I. I., & Morgan, H., Solar-Terrestrial Simulation in the STEREO Era: The January 24-25, 2007 Eruptions, *Solar Physics*, 2009, **256**, 269-284.
- [F5] **Lugaz, N.**, Vourlidas A., Roussev I. I., Jacobs, C., Manchester, IV, W. B., & Cohen, O., The Brightness of Density Structures at Large Solar Elongation Angles: What is Being Observed by STEREO/SECCHI? *ApJL*, 2008, **684**, L111-114.
- [F4] **Lugaz, N.**, Manchester, IV, W. B., Roussev, I. I., & Gombosi, T. I., Observational Evidence of CMEs Interacting in the Inner Heliosphere Based on MHD Simulations, *JASTP*, 2008, **70**, 598-604.
- [F3] **Lugaz, N.**, Manchester, IV, W. B., Roussev, I. I., Tóth, G., & Gombosi, T. I., Numerical Investigation of the Homologous Coronal Mass Ejections from Active Region 9236, *ApJ*, 2007, **659**, 788-800.

[F2] **Lugaz, N.**, Manchester, IV, W. B., & Gombosi, T. I., Numerical Simulation of the Interaction of Two Coronal Mass Ejections from Sun to Earth, *ApJ*, 2005, **634**, 651-662.

[F1] **Lugaz, N.**, Manchester, IV, W. B., & Gombosi, T. I., The Evolution of Coronal Mass Ejection Density Structures, *ApJ*, 2005, **627**, 1019-1030.

Second and Third-authored Articles (16)

340+ citations, 5 articles with more than 30 citations.

[S16] Al-Haddad, N., **Lugaz, N.**, Poedts, S., Farrugia, C. J., Nieves-Chinchilla, T., Roussev, I. I., Evolution of CME Properties in the Inner Heliosphere: Prediction for Solar Orbiter and Parker Solar Probe, *Astro-physical Journal*, 2019, *accepted*.

[S15] Kilpua, E. K. J., **Lugaz, N.**, Mays, M. L., Temmer, M., Forecasting the Structure and Orientation of Earthbound Coronal Mass Ejections, *Space Weather*, 2019, **17**, 498–526.

[S14] Salman, T. M., **Lugaz, N.**, Farrugia, C. J., Winslow, R. M., Galvin, A. B., Schwadron, N. A., Forecasting Periods of Strong Southward Magnetic Field Following Interplanetary Shocks, *Space Weather*, 2018, **16**, 2004-20211.

[S13] Yu, W., Farrugia, C. J., **Lugaz, N.**, Galvin, A. B., Möstl, C., Paulson, K., Vemareddy, P., The Magnetic Field Geometry of Small Solar Wind Flux Ropes Inferred from their Twist Distribution, *Solar Physics*, 2018, **293**, 165.

[S12] Winslow, R. M., Schwadron, N., **Lugaz, N.**, Guo, J., Joyce, C. J., Jordan, A. P., Wilson, J. K., Spence, H. E., Lawrence, D. J., Wimmer-Schweingruber, R. F., Mays, M. L., Opening a Window on ICME-driven GCR Modulation in the Inner Solar System, *ApJ*, 2018, **856**, 139.

[S11] Farrugia, C. J., **Lugaz, N.**, Alm, L., Vasquez, B., Argall, M., Kucharek, H. *et al.*, MMS Observations of Reconnection at Dayside Magnetopause Crossings During Transitions of the Solar Wind to Sub-Alfvénic Flow, *JGR*, 2017, **122**, 9934.

[S10] Winslow, R., **Lugaz, N.**, Schwadron, N., Farrugia, C. J., Yu, W., Raines, J., Mays, M. L., Galvin, A. B., Zurbuchen, T. Longitudinal conjunction between MESSENGER and STEREO A: development of ICME complexity through stream interactions, *JGR*, 2016, **121**, 6092-6106.

[S9] Winslow, R., **Lugaz, N.**, Philpott, L., Schwadron, N., Farrugia, C. J., Anderson B., Smith, C. W., Interplanetary Coronal Mass Ejections from MESSENGER orbital observations at Mercury, *JGR*, 2015, **120**, 6101-6118.

[S8] Yu, W., Farrugia, C. J., **Lugaz, N.**, Galvin, A., Kilpua, K. *et al.* A Statistical Analysis of Properties of Small Transients in the Solar Wind 2007-2009: STEREO and Wind Observations, *JGR*, 2014, **119**, 689-708.

[S7] Liu, Y. D., Luhmann, J. G., **Lugaz, N.**, Möstl, C., Davies, J. A., Bale, S. D., Lin, R. P., On Sun-Earth Propagation of Coronal Mass Ejections, *ApJ*, 2013, **769**, 45.

[S6] Bisi, M. M., Harrison, R., **Lugaz, N.**, van Driel-Gesztelyi, L. and Mandrini, C. H., Observations and Modelling of the Inner Heliosphere: Preface and Tribute to the Late Dr. Andy Breen, *Solar Physics*, 2013, **285**, 1-7.

[S5] Möstl, C., Rollett, T., **Lugaz, N.**, Farrugia, C. *et al.*, Arrival Time Calculation for ICMEs with Circular Fronts and Application to STEREO Observations of the 2009 February 13 Eruption, *ApJ*, 2011, **741**, 34.

[S4] Jacobs, C., Roussev, I. I., **Lugaz, N.**, & Poedts, S., The Internal Structure of Coronal Mass Ejections: Are all Regular Magnetic Clouds Flux Ropes, *ApJL*, 2009, **695**, L171-174.

[S3] Morgan, H., Habbal, S. R. & **Lugaz N.**, Mapping the Structure of the Corona Using Fourier Backprojection Tomography, *ApJ*, 2009, **690**, 1119-1129.

[S2] Roussev, I. I., **Lugaz, N.**, & Sokolov, I. V., New Physical Insight on the Changes in Magnetic Topology During CMEs: Case Studies for the 2002 April 21 and August 24 Events, *ApJL*, 2007, **668**, L87-90.

[S1] Elsner, R. F., **Lugaz, N.**, Waite, J. H., *et al.* Simultaneous Chandra X ray, Hubble Space Telescope ultraviolet, and Ulysses Radio Observations of Jupiter's Aurora, *JGR*, 2005, **110**, A01207.

Other Articles with Significant Contributions (15)

[C15] Al-Haddad, N., Poedts, S., Farrugia, C. J., **Lugaz, N.**, Yu, W. and Roussev, I. I., The Magnetic Morphology of Magnetic Clouds: Multi-Spacecraft Investigation of Twisted and Writhed CMEs, *Astrophys. J.*, 2019, **870**, 100.

[C14] Manchester, W. B., Kilpua, E., Liu, Y. D., **Lugaz, N.**, Riley, P., Török, T. and Vrsnak, B., The Physical Processes of CME/ICME Evolution, *Space Science Reviews*, 2017, **212**, 1159.

[C13] Winslow, R., Philpott, L., Paty, C., **Lugaz, N.**, Schwadron, N., Johnson, C., Korth, H., Statistical study of ICME effects on Mercury's magnetospheric boundaries and northern cusp region from MESSENGER, *JGR*, 2017, **122**, 4960-4975.

[C12] Yu, W. Farrugia, C. J., Galvin, A. B., **Lugaz, N.**, Luhmann, J., Siminac, K., Kilpua, E. Small Solar Wind Transients at 1 AU: STEREO Observations (2007-2014) and Comparison with Near-Earth Wind Results (1995 - 2014), *JGR*, 2016, **121**, 5005-5024.

[C11] Lee, C. O., Arge, C. N., Odstrcil, D., Millward, G., Pizzo, V., **Lugaz, N.**, Ensemble Modeling of Successive Halo CMEs: A Case Study, *Solar Physics*, 2015, **290**, 1207-1229.

[C10] Liu, Y. D., Yang, Z., Wang, R., Luhmann, J. G., Richardson, J. D. and **Lugaz, N.** Sun-to-Earth Characteristics of Two Coronal Mass Ejections Interacting Near 1 AU: Formation of a Complex Ejecta and Generation of a Two-step Geomagnetic Storm, *Astrophysical Journal Letters*, 2014, **793**, L41.

[C9] Davies, J. A., Perry, C. H., Trines, R. M., Harrison, R. A., **Lugaz, N.**, Möstl, C., Steed, K., Establishing a Stereoscopic Technique for Determining the Kinematic Properties of Solar Wind Transients Based on a Generalised Self-Similarly Expanding Circular Geometry, *ApJ*, 2013, **777**, 167.

[C8] Rollett, T., Temmer, M., Möstl, C., **Lugaz, N.**, Veronig, A. M. and Möstl, U. V., Assessing a New Method for Deriving the Kinematics of ICMEs with a Numerical Simulation, *Solar Physics*, 2013, **283**, 541-556.

[C7] Roussev, I., Galsgaard, K., Downs, C., **Lugaz, N.**, Sokolov, I., Moise, E. & Lin, J., Explaining Fast Ejections of Plasma and Exotic X-Ray Emission from the Solar Corona, *Nat. Phys.*, 2012, **8**, 845-849.

[C6] Downs, C., Roussev, I. I., van der Holst, B., **Lugaz, N.**, and Sokolov I. V., On the Thermodynamic Nature of EUV Waves: Understanding SDO/AIA Observations via Global MHD Simulations, *ApJ*, 2012, **750**, 134.

[C5] Davies, J. A., Harrison, R. A., Perry, C. H., Möstl, C., **Lugaz, N.** *et al.*, A Self-Similar Expansion Model for Use in Solar Transient Propagation Studies, *ApJ*, 2012, **750**, 23.

[C4] Al-Haddad, N., Roussev, I. I., Möstl, C., Jacobs, C., **Lugaz, N.**, *et al.*, On the Internal Structure of the Magnetic Field in Magnetic Clouds and ICMEs: Writhe Vs. Twist, *ApJL*, 2011, **738**, L18.

[C3] Downs, C., Roussev, I. I., van der Holst, B., **Lugaz, N.**, Sokolov, I. V., Gombosi, T. I., Studying EUV Wave Transients with a Digital Laboratory: Direct Comparison of EUV Wave Observations to Global MHD Simulations, *ApJ*, 2011, **728**, 2.

[C2] Downs, C., Roussev, I. I., van der Holst, B., **Lugaz, N.**, Sokolov, I. V., Gombosi, T. I., Towards a Realistic Thermodynamic MHD Model of the Global Solar Corona, *ApJ*, 2010, **712**, 1219-1231.

[C1] Manchester, W. B., Vourlidas, A., Tóth, G., **Lugaz, N.**, *et al.*, Three-dimensional MHD Simulation of the 2003 October 28 Coronal Mass Ejection: Comparison with LASCO Coronagraph Observations, *ApJ*, 2008, **684**, 1448-1460.

Other Articles (22)

[O22] Heinemann, S., Temmer, M., *et al.* (incl. **Lugaz, N.**), CME – HSS interaction and characteristics tracked from Sun to Earth, *Solar Physics*, *accepted*.

[O21] Janvier, M., Winslow, R., Good, S., Bonhomme, E., Démoulin, P., Dasso, S., Möstl, C., **Lugaz, N.**, Amerstorfer, T., Soubrié, E. and Boakes, P., Generic Magnetic Field Intensity Profiles of Interplanetary Coronal Mass Ejections at Mercury, Venus and Earth from Superposed Epoch Analyses, *J. Geophys. Res.*, 2019, **124**, 812-836.

[O20] McComas, D. J., Christian, E. R., Schwadron, N. A. and 53 co-authors (incl. **Lugaz, N.**), Interstellar Mapping and Acceleration Probe (IMAP): A New NASA Mission, *Space Science Reviews*, 2018, **214**, 116.

[O19] Al-Haddad, N., Nieves-Chinchilla, T., Savani, N. P., **Lugaz, N.**, Roussev, I. I., Fitting and Reconstruction of Thirteen Simple Coronal Mass Ejections, *Solar Physics*, 2018, **293**, 73.

[O18] Farrugia, C. J., Cohen, I. J., Vasquez, B. J., **Lugaz, N.**, Alm, L. *et al.*, Effects in the Near-Magnetopause Magnetosheath Elicited by Large-Amplitude Alfvénic fluctuations terminating in a field and flow discontinuity, *JGR*, 2018, **123**, 8984-9004.

[O17] Schwadron, N., Rahmanifard, F., Wilson, J. and 18 co-authors (incl. **Lugaz, N.**) Update on the Worsening Particle Radiation Environment Observed by CRaTER and Implications for Future Human Deep-Space Exploration, *Space Weather*, 2018, **16**, 289.

[O16] Rahmanifard, F., Schwadron, N., Smith, C. W., McCracken, K. G., Duderstadt, K. A., **Lugaz, N.**, Goelzer, M. L. Inferring the Heliospheric Magnetic Field Back through Maunder Minimum, *Astrophysical Journal (ApJ)*, 2017, **837**, 165.

[O15] Lavraud, B., Liu, Y. and 48 co-authors (incl. **Lugaz, N.**) A small mission concept to the Sun-Earth Lagrangian L5 point for innovative solar, heliospheric and space weather science, *Journal of Atmospheric and Solar-Terrestrial Physics (JASTP)*, 2016, **146**, 171-185.

[O14] Schwadron, N. A., Lee, M. A., Gorby, M., **Lugaz, N.**, Spence, H. E., Desai, M., *et al.*, Particle Acceleration at Low Coronal Compression Regions and Shocks, *ApJ*, 2015, **810**, 97.

[O13] Janvier, M., Dasso, S., Démoulin, P., Masias, P., **Lugaz, N.**, Best Generic Model for Interplanetary Shocks and Magnetic Clouds Axis at 1 AU, *JGR*, 2015, **120**, 3328-3349.

[O12] Webb, D. F. and 11 co-authors (incl. **Lugaz, N.**) An Ensemble Study of a January 2010 CME: Connecting a Non-obvious Solar Source with its ICME, *Solar Physics*, 2014, **289**, 4173.

[O11] Schwadron, N. and 22 co-authors (incl. **Lugaz, N.**) Synthesis of 3-D Coronal-Solar Wind Energetic Particle Acceleration Modules, *Space Weather*, 2014, **12**, 323.

- [O10] Wang, Y., Wang, B., Shen, C., Shen, F. and **Lugaz, N.** Deflected Propagation of a Coronal Mass Ejection from the Corona Into the Interplanetary Space, *JGR*, 2014, **119**, 5117.
- [O9] Moestl, C. and 17 co-authors (incl. **Lugaz, N.**) Connecting Speeds, Directions and Arrival Times of 22 Coronal Mass Ejections from the Sun to 1 AU, *ApJ*, 2014, **787**, 119.
- [O8] Liu, Y., Luhmann, J., Kajdic, P., Kilpua, E., **Lugaz, N.**, Nitta, N., Moestl, C., Lavraud, B., Bale, S., Farrugia, C., Galvin, A. Cause and Properties of an Extreme Space Weather Event, *Nature Communications*, 2014, **5**, 3481.
- [O7] Lavraud, B., Ruffenach, A., Rouillard, A., Kajdic, P., Manchester, W. B. and **Lugaz, N.** Geoeffectiveness and radial dependence of magnetic cloud erosion by magnetic reconnection, *JGR*, 2014, **119**, 26-35.
- [O6] Savani, N. P., Vourlidas, A., Shiota, D., Linton, M., Kusano, K., **Lugaz, N.**, Rouillard, A. P., A Magnetic Boundary Layer Creating a Quasi-cylindrical Substructure Within a Propagating Flux Rope Leading to a Plasma-beta Transition, *ApJ*, 2013, **779**, 142.
- [O5] Farrugia, C. J., Erkaev, N. V., Jordanova, V. K., **Lugaz, N.**, Sandholt, P. E., Muehlbachler, S. and Torbert, R. B., Features of the Interaction of Interplanetary Coronal Mass Ejections with the Earth's Magnetosphere, *Journal of Atmospheric and Solar-Terrestrial Physics*, 2013, **99**, 14-26.
- [O4] Savani, N., Shiota, D., Kusano, K., Vourlidas, A. **Lugaz, N.**, A Study of the Heliocentric Dependence of Shock Standoff Distance and Geometry Using 2.5D MHD Simulations of CME-driven Shocks, *ApJ*, 2012, **759**, 103.
- [O3] Aschwanden, M. J., Burlaga, L. F., Kaiswe, M. L., Ng, C. K., Reames, D. V., Reiner, M. J., Gombosi, T. I., **Lugaz, N.**, *et al.*, Theoretical Modeling for the STEREO Mission, *Space Science Reviews*, 2008, eds. C. T. Russel and M. L. Kaiser, **136**, 565-604.
- [O2] Cohen, O., Sokolov, I. V., Roussev, I. I., **Lugaz, N.**, *et al.*, Validation of a Global 3D Heliospheric Model With Observations for the May 12, 1997 CME Event, *JASTP*, 2008, **70**, 583-592.
- [O1] Cravens, T. E., Waite, J. H., Gombosi, T. I., **Lugaz, N.**, *et al.*, Implications of Jovian X-ray Emission for Magnetosphere-Ionosphere Coupling, *JGR*, 2003, **108**, 1465.

Peer-reviewed Conference Proceedings

- [P5] Schwadron, N. A., Lee, M. A., Gorby, M., **Lugaz, N.**, Spence, H. E. *et al.*, Broken Power-law Distributions from Low Coronal Compression Regions or Shocks, *Journal of Physics: Conference Series*, 2015, **642**, 12025.
- [P4] **Lugaz, N.**, Farrugia, C. J., Al-Haddad, N., Complex Evolution of Coronal Mass Ejections in the Inner Heliosphere as Revealed by Numerical Simulations and STEREO Observations: A Review, *IAU 300 Symposium*, 2014, **300**, 255-264, doi:10.1017/S174392131301106X.
- [P3] W. Yu, C. J. Farrugia, A. B. Galvin, K. D. C. Simunac, E. K. J. Kilpua, M. A. Popecki, Moestl, C., **Lugaz, N.** *et al.* Small Solar Wind Transients: STEREO-A Observations in 2009, *Solar Wind 13*, 2013, **1539**, 311-314.
- [P2] Farrugia, C., Yu, W., Galvin, A., Vasquez, B., Kucharek, H., **Lugaz, N.** *et al.* A Planar, Pressure-Balanced, Reconnecting Structure Embedded in a Solar Wind Transient, *Solar Wind 13*, 2013, **1539**, 163-166.
- [P1] **Lugaz, N.**, Roussev I. I., Sokolov, I. V., & Jacobs, C., Solar-Terrestrial Simulations of CMEs with

a Realistic Initiation Mechanism: Case Study for Active Region 10069, *Solar Wind 12*, 2010, **1216**, 440-443.

Other Conference Proceedings

[OC2] **Lugaz, N.**, Roussev I. I., & Sokolov, I. V., The August 24, 2002 Coronal Mass Ejection: When a Western Limb Event Connects to Earth, *IAU 257 Symposium*, 2009 **257**, 391-398.

[OC1] Roussev, I. I., **Lugaz, N.**, & Sokolov, I. V., MHD Simulations of CME Shocks From Complex Active Regions and Consequence for SEP Production, *AIP conference Proceedings*, 2008, **1039**, 286-294.