

CV of the researcher

1. Personal Information

Väisänen, Pauli Kalervo

Date of Birth 7.8.1991

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CV date: Thursday, 09 October 2025

2. Degrees

PhD in Space Physics, University of Oulu, 22/8/2023

Thesis: [Validation of neutron monitor data for studies of cosmic ray modulation](#)

Defended on 30.6.2023

Supervisors: Prof. Ilya Usoskin, Prof. Kalevi Mursula

Master of Science in Space Physics, University of Oulu, 2016

Thesis: **Long-term evolution of solar wind turbulence (4/5)**

Supervisors: Prof. Kalevi Mursula, Doctor Ilpo Virtanen

Bachelor of Science in Space Physics, University of Oulu, 2014

Thesis: **Solar wind turbulence and nonlinear analysis methods**

Supervisors: Prof. Kalevi Mursula, Doctor Ilpo Virtanen

3. Other education and expertise

Pedagogic Training: University Pedagogics, 25 ECTS, University of Oulu, 2019–2021

4. Language skills

Finnish: native

English: excellent

Swedish: passable

Italian: basics

5. Current employment

Postdoctoral Researcher 1/9/2024-31/12/2029

Sodankylä Geophysical Observatory (University of Oulu)

Projects and memberships: [GERACLIS](#) (2023-2027) [GERACLE](#) (2025-2031)
[AMS-02 Collaboration](#) (2023-) [CERN USER](#) (2024-)

6. Previous positions

2023-2024

Postdoctoral Researcher 1/10/2023-31/8/2024

Italian National Institute for Nuclear Physics (INFN) Sezione di Perugia

Projects: INFN-ASI (Italian Space Agency)

Space Science Data Center (SSDC) collaboration

AMS-02-Collaboration

CERN USER

2017-2023

Doctoral Researcher, 1/1/2017–30/8/2023

Projects: [ESPERA](#) (2019-2023)

[ReSoLVE Centre of Excellence](#) (2014-2019)

External Research Grant periods 1/7/2018-30/6/2019 and 1/1/2020-31/1/2021)

Visiting Researcher, May-June 2019

University of Reading (UK), Department of Meteorology,

Space and Atmospheric Electricity Research Group

2012-2016

Research Assistant 2012–2016

University of Oulu (Space Climate Research Unit)

Projects: [ReSoLVE Centre of Excellence](#) (2014-2019)

[STORM](#) (2013-2015)

7. Research Funding and Grants

Total 108 419 €

Postdocpooli (Väisälän rahasto): For conducting research in Italy	30 000 €
Emil Aaltosen säätiö: Travel grant to Italy.	5 000 €
INFN Research Grant 2023: Astroparticle Physics Research	25 419 €
PhD Research grant from the Finnish Cultural Foundation in 2017 and 2019,	48 000 €

Research Interests:

I am a space physicist interested in Space Climate, Solar & Heliospheric Physics, Cosmic ray physics, turbulence, and big data analysis methods. My work is focused on uncovering the long-term variation of solar activity and its effects at Earth and near-Earth space. I am experienced in spectral analysis and combining, validating, and error analysis of datasets. I have worked with many different high-resolution spacecraft datasets, especially measurements of the heliospheric magnetic field and solar wind variables, and ground-based neutron monitors. I take pride in validating and using reliable data, and my view is that scientific results and conclusions are only as good as the data that are used to obtain them. My main research software/language is MATLAB, but I am familiar with, e.g., Python, C, R and others.

8. Research output

Total number of peer-reviewed publications: 8

Total number of non-reviewed publications: 8

Väisänen, P., Bertucci, B., Tomassetti, N., Orcinha, M., Usoskin, I., & Koldobskiy, S. (2025). Simulation of galactic cosmic ray proton fluxes with the daily modulation parameter: Validation with AMS-02 data for 2011–2019. *Journal of Geophysical Research: Space Physics*, 130, e2025JA033805.

<https://doi.org/10.1029/2025JA033805>

Aquilar et al., (AMS Collaboration), (2025), Properties of Cosmic Lithium Isotopes Measured by the Alpha Magnetic Spectrometer, *Physical Review Letters*, 134, 201001,

<https://doi.org/10.1103/PhysRevLett.134.201001>

Aquilar et al., (AMS Collaboration), (2025), Solar Modulation of Cosmic Nuclei over a Solar Cycle: Results from the Alpha Magnetic Spectrometer, *Physical Review Letters*, 134, 051001

<https://doi.org/10.1103/PhysRevLett.134.051001>

Aquilar et al., (AMS Collaboration), (2025) Antiprotons and Elementary Particles over a Solar Cycle: Results from the Alpha Magnetic Spectrometer, *Physical Review Letters*, 134, 051002

<https://doi.org/10.1103/PhysRevLett.134.051002>

Väisänen P., Usoskin I., Kähkönen R., Koldobskiy S. & Mursula K. (2023), Revised Reconstruction of the Heliospheric Modulation Potential for 1964–2022, *Journal of Geophysical Research: Space Physics*.

<https://doi.org/10.1029/2023JA031352>

Väisänen, P., Usoskin, I., & Mursula, K. (2021). Seven decades of neutron monitors (1951–2019): Overview and evaluation of data sources. *Journal of Geophysical Research: Space Physics*, 126, e2020JA028941.

<https://doi.org/10.1029/2020JA028941>

Väisänen, P., Usoskin, I., & Mursula, K. (2019). Long-term and solar-cycle variation of galactic cosmic rays: Evidence for variable heliospheric turbulence. *Journal of Geophysical Research: Space Physics*, 124, 804–811.

<https://doi.org/10.1029/2018JA026135>

Väisänen, P., Usoskin, I., & Mursula, K. (2017). Structure of the Power Spectral Density of Galactic Cosmic Ray Variation during 1953–2016. *Proceedings of the International Astronomical Union*, 13(S335), 82–86.

<https://doi.org/10.1017/S1743921317010122>

Non-refereed scientific articles

Väisänen P., Usoskin I., Mursula K. (2022), Quality survey of Neutron Monitor data sources for 1951–2019, *Proceedings of Science*, <https://doi.org/10.22323/1.395.1244>

Väisänen P., Usoskin I., Mursula K. (2019), Spectral slope analysis of long-term cosmic ray variations at Earth, *Proceedings of Science*, <http://dx.doi.org/10.22323/1.358.1165>

Publications intended for professional communities

Echim, M; Voitenko, Y; Lamy, H; Yordanova, E; Andre, M; Breuillard, H; Macek, W; Wawrzaszek, A; Kovacs, P; Koppan, A; Voitcu, G; Munteanu, C; Teodorescu, E; Negrea, C; Bruno, R; Consolini, G; Marcucci, MF; Pallochchia, G; Giannattasio, F; Laurenza, M.; Narita, Y; Voeroes, Z; Dwivedi, N; Virtanen, I.; Mursula, K; Väisänen, P; Qvick, T, (2016), *STORM Periodic Report, 01/07/2014-31/12/2015 : Project objectives, work progress and achievements, project management*

Qvick, T.; Holappa, L.; Mursula, K.; Virtanen, I.; Väisänen, P.; Echim, M.; Munteanu, C.; Kovacs, P. (2015), *STORM Deliverable 4.1 report: Catalog of PDFs and PSD for geomagnetic indices -solar max and min.*

Yordanova, E.; Macek, W.; Wawrzaszek, A.; Munteanu, C.; Voitcu, G.; Mursula, K.; Väisänen, P.; Kovacs, P.; Bruno, R.; Pallochchia, G.; Consolini, G.; Narita, Y.; Voeroes, Z.; Schmid, D.; Dwivedi, N. K.; Echim, M. (2014), *STORM project: Deliverable 3.1 report.*

Echim, M.; Wawrzaszek, A.; Teodorescu, E.; Väisänen, P.; Munteanu, C.; Yordanova, E.; Macek, W.; Virtanen, I.; Mursula, K.; Kovacs, P.; Voitcu, G.; Lamy, H.; Bruno, R.; Pallochchia, G.; Consolini, G.; Narita, Y.; Voeroes, Z. (2014), *STORM Deliverable 2.2 report: Catalog of Probability Density Functions (PDFs) in the solar wind.*

Virtanen, I; Mursula, K.; Väisänen, P.; Echim, M.; Lamy, H.; Consolini, G.; Bruno, R.; Pallochchia, G.; Yordanova, E.; Munteanu, C.; Teodorescu, E.; Voitcu, G.; Macek, W.; Wawrzaszek, A. (2014), *STORM project: Deliverable 2.1 report.*

Echim, M; Wawrzaszek, A; Teodorescu, E.; Väisänen, P.; Munteanu, C.; Yordanova, E.; Macek, W.; Virtanen, I; Mursula, K.; Kovacs, P.; Voitcu, G.; Lamy, H.; Bruno, G.; Pallochchia, G.; Consolini, G.; Narita, Y.; Voeroes, Z. (2014), *STORM Periodic Report, 01/01/2013 – 30/06/2014: Project Objectives, Work progress and achievements, Project management.*

Talks in scientific meetings

- *Hourly cadence cosmic ray modulation parameter ϕ at first glance: Challenges and possibilities*, ICRC 2025
- *High-cadence modulation potential for study of cosmic ray variation, solar activity and data quality*, SGO Observatory Days 2025
- *Revised neutron monitor scaling factor and modulation potential determination for 1964-2021*, NMDB@Home meeting, 26 – 30 September, online, 2022
- *Correction of snow effects on Oulu data using local snow depth data*, NMDB@Home meeting, 26 – 30 September, online, 2022
- *Extensive survey of NM databases with source recommendation list*, The 27th European Cosmic Ray Symposium (ECRS 2022), 25-29 July, Nijmegen, The Netherlands, 2022
- *Quality survey of Neutron Monitor data sources for 1951-2019*, 37th International Cosmic Ray Conference, 12-23 July, Berlin, Germany – Online, 2021.
- *Multi-NM spectral slope analysis of long-term cosmic-ray variations at Earth*, 36th International Cosmic Ray Conference (ICRC2019), July 24th-August 1st, U.S.A., 2019
- *Spectral properties of long-term galactic cosmic ray variability in the heliosphere*, EGU General Assembly, 7-12 April, Vienna, Austria 2019
- *Variation of the PSD slopes of cosmic rays in 1953-2016*, COSPAR42, 14-22 July, Pasadena, USA, 2018
- *Analysis of power spectral density slopes of neutron monitor measurements in 1953-2016*, SCOSTEP 14th Quadrennial Solar-Terrestrial Physics Symposium (STP14), York Univ., Toronto, Canada, July 9-13, 2018
- *Long-term evolution of the power spectrum of galactic cosmic ray variability*, International Astronomical Union Symposium 335, Exeter, UK, 2017
- *Long-term evolution of solar wind turbulence observed by Cluster*, ReSoLVE Centre of Excellence meeting, Oulu, Finland, 2015
- *Analysis of Cluster data in the solar wind*, STORM project meeting, Mamaia, Romania, 2014
- *Solar wind turbulence and nonlinear methods for analysing it*, ReSoLVE Centre of Excellence meeting, Kuusamo, Finland, 2014

Posters

- *Daily modulation parameter ϕ validated with AMS-02 for estimating GCR fluxes*, ICRC 2025
- *Cosmic ray modulation potential ϕ in high resolution: Recent developments and future plans*, Finnish Physical Society Physics Days 2025
- *Daily heliospheric modulation potential (V_{23}) and modelled GCR dataset compared to space measurements*

of the GCR energy spectrum, EGU 2024 General Assembly

- *Updated heliospheric modulation potential of cosmic rays and station-specific scaling factors for 1964-2021, EGU 2023 General Assembly*
- *Compiled “multi-NM” recommended dataset of global NM network, The 27th European Cosmic Ray Symposium (ECRS 2022), Nijmegen, the Netherlands, July 25th to 29th, 2022.*
- *Survey of Neutron Monitor data source discrepancies 1951-2019, 37th International Cosmic Ray Conference, Berlin, Germany – Online, 12-23 July 2021.*
- *Global neutron monitor network data for the period of 1951-2019: Survey for quality control, NMDB@Home meeting, 13 – 17 July, online, 2020*
- *Long-term evolution of the power-law spectrum of galactic cosmic rays in 1953-2016, EGU 2018 General Assembly*
- *Long-term evolution of the power spectrum of galactic cosmic ray variability, Cosmic Ray Physics in Space summer school, 12-16 June, L’Aquila, Italy 2017*
- *Evolution of solar wind turbulence and intermittency over the solar cycle, EGU16, 8–13 April, Vienna, Austria, 2016 + Space Climate 6, 4-7 April, Levi, Finland 2016*
- *Long-term evolution of solar wind turbulence observed by Cluster, The 26th General Assembly of the International Union of Geodesy and Geophysics, June 22 to July 2, Prague, the Czech Republic, 2015 + STORM summer school, Mamaia, Romania, 2015*

9. Research supervision and leadership experience

Tutor teacher (Bachelor students): 6 students

Master’s thesis (co-)supervisor: 1 student

Visiting doctoral researcher mentor: 1 doctoral researcher

Doctoral training follow-up groups: 1x chair, 1x member

10. Teaching Merits

Pedagogic Training: University Pedagogics, 25 ECTS, University of Oulu, 2019–2021

Lecturing experience (responsible teacher): Physical World View, 5 ECTS, Autumn 2020

Teacher/Exercise assistant: Solar Physics 2025, Cosmic Rays, 2017, 2020, Basics of Space Physics, 2016, Waves and Optics, 2013, Mathematics of Physics, 2012, Student Tutor, 2012

11. Awards and Honourable Mentions

- Journal of Geophysical Research: Space Physics, Wiley
- Top downloaded/viewed article in the first 12 months of publication:*
 1. *Revised Reconstruction of the Heliospheric Modulation Potential for 1964–2022*
 2. *Seven decades of neutron monitors (1951–2019): Overview and evaluation of data sources (2021)*
 3. *Long-Term and Solar Cycle Variation of Galactic Cosmic Rays: Evidence for Variable Heliospheric Turbulence (2019)*
- Honorary member of the Physics and Mathematics Student Guild Sigma-kilta ry
For commendable activities in the communities in field of Physics and/or Mathematics
- European Geophysical Union Outstanding Student Poster and Pico award 2018
Long-term evolution of the power-law spectrum of galactic cosmic rays in 1953-2016
- Honorary member of the University of Oulu Scientific Community, 4.5.2018
For commendable work for the University of Oulu as a board member in 2016–2017
- University of Oulu Honorary Diploma, 31.8.2015
For being a primus motor and conceiving the ECTS-credit studying campaign
- 1st Class Honorary Medal of the Student Union of the University of Oulu
As a commendation for the exceptional work done for the Student Union

12. Other key academic merits

Peer review

22 reviewed manuscripts in these journals:

Advances in Space Research, Astrophysics and Space Science, Journal of Geophysical Research: Space Physics, New Journal of Physics, Scientific reports, Space Weather: The International Journal of Research and Applications, Solar Physics, Indian Journal of Physics, The Revista Mexicana de Astronomia y Astrofisica.

Organizing scientific meetings and sessions

Space Climate 10 symposium (9.-12.6.2026), LOC co-chair

Session (co-org.): Energetic Particles and Shocks in the Heliosphere and as a Space Weather Hazard, EGU2024 Space Climate 6 -winter school and conference (30.3.-7.4.2016) organizer (LOC)

Space Climate 5 -conference (15.-19.6.2013) organizer (LOC member)

Invited participant in panel discussions:

Evaluation of Science Education conclusion seminar, Finnish Education Evaluation Centre, 2025

Shaping the Future of Doctoral Training, Tiedekulma, 2024

Why is it important to discuss research careers?, Tieteentekijäpäivät, 2023

Physicists’ clear future, Finnish Young Minds panel, 2017

Academic Responsibilities and Memberships

University of Oulu

University Board member 2016–2017, 2025

Responsible Researcher Evaluation work group member 2020

Research Assessment Exercise (RAE) 2020 Steering group member

Research Council Member 2017–2019

University of Oulu Graduate School Executive Board member 2018

Education Council member 2014–2015

Faculty of Science

Faculty Board member 2014–2015, 2018–2022

Executive Board vice member 2016–2017

Premises work group member 2015–2016

Physics Education Development Group member 2012–2015

European Geophysical Union: member **Finnish Physical Society:** member

International Astronomical Union: Junior Member

13. Scientific and Societal impact

Finland's Ministry of Education and Culture

Finland Doctoral Training Pilot Monitoring Group 2024-2027

Finnish Union of University Researchers and Teachers

Vice President 2023-2024, Board member 2020–2022, 2025-2026, vice member 2019

Early Career Researchers' Committee chair 2021-2024, member 2020, vice member 2019

University of Oulu Academics' Association

Chair 2020–2022 Board member 2018–2019

Student Union of the University of Oulu

Doctoral Researchers' Section chair 2018

Finnish Physics Students Association

Board vice chair 2014 Board member 2013

Physics and Mathematics Students' Guild Sigma-kilta

Departmental Mentor 2019, 2020 Board chair 2013, 2014 Board member 2012

Science Outreach

- Young Academy Finland, Meet a researcher visits:
 - Savonlinna High School, Moon Camp Week (8.4.2025)
 - Keltinmäki School 2nd grade (30.1.2025)
 - Knuutilankangas School 2nd grade (28.1.2025)
- Aurora Entrepreneurialis, STEAM Into Entrepreneurship Innovation Camp, 23.-25.4.2025 in Oulu
- Bring your child to work day workshop, University of Oulu, November 2024
- Cosmic Rays and Space Climate -workshop in Researchers' Night Oulu, September 2024, 2025
- Solar Activity Workshop, Technology Days Oulu, February 2014, Science Days Oulu, September 2013

14. Other merits

Future Council deputy member, Pohde, 2022-2025

Military rank: Sergeant (reserve), Finnish army