

1 Personal information

Family name: Strauss

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Current position: Full professor in Physics (North-West University, NWU, South Africa)

2 Tertiary education

- Ph.D. in Space Physics, completed in 2013 (NWU). Title of thesis: *Modelling of cosmic ray modulation in the heliosphere by stochastic processes*. Supervisor: Prof. M.S. Potgieter. Co-supervisor: Prof. S.E.S. Ferreira.
 - M.Sc. in Physics (Cum Laude), completed in 2009 (NWU). Title of dissertation: *Modelling of anomalous cosmic rays*. Supervisor: Prof. M.S. Potgieter. Co-supervisor: Prof. S.E.S. Ferreira.
 - B.Sc. Hons. in Physics (Cum Laude), completed in 2007 (NWU).
 - B.Sc. in Physics, Mathematics and Applied Mathematics (Cum Laude), completed in 2006 (NWU).
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3 Employment history

- Full professor (2022 - present) in Physics at the NWU in the School of Chemical and Physical Sciences.
- Affiliate graduate faculty member (2020 – 2025) in the Department of Space Science at the University of Alabama in Huntsville, USA.
- Associate professor (2019 - 2021) in Physics at the NWU in the School of Chemical and Physical Sciences.
- Senior lecturer (2014 - 2018) in Physics at the NWU in the School of Chemical and Physical Sciences.

- Lecturer (2011 - 2013) in Physics at the NWU in the School of Chemical and Physical Sciences.
 - Junior lecturer (2008 - 2010) in Physics at the NWU in the School of Chemical and Physical Sciences.
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4 Awards and fellowships

- Appointed as a Visiting Fellow to the Space Physics Group at the Princeton University Department of Astrophysical Sciences (June – July 2023).
 - Received a 2023 Wiley Top Downloaded Article award for the paper *A Multi-Purpose Helio-physics L4 Mission* published in the journal *Space Weather* in 2021.
 - Awarded the 2021 American Geophysical Union (AGU) Africa Award for Research Excellence in Space Science. Citation: *He receives the AGU Africa Award for Research Excellence in Space Science for his outstanding contributions to the understanding of Cosmic Rays and energetic particle transport in the Heliosphere.*
 - Awarded a Prestigious (P) rating from the South African National Research Foundation (NRF) in 2019. Citation: *A “P” rating is assigned to researchers (normally under 35 years of age) who have held a doctorate or equivalent qualification for less than five years at the time of application. These researchers are considered likely to become future international leaders in their respective fields, on the basis of exceptional potential demonstrated in research performance and output during doctoral and/or early post-doctoral careers.*
 - Awarded the 2019 South African Institute of Physics Silver Jubilee medal. Citation: *The Silver Jubilee Medal is awarded for outstanding achievement by a younger physicist in any of the following facets of any branch of physics: research, education, technology and industrial development.*
 - Invited to University of Central Lancashire (UCLan) for a research visit in 2019 as part of their Distinguished Collaborator Program. During that visit, I collaborated with Dr Timo Laitinen of the UCLan’s Jeremiah Horrocks Institute.
 - Received a merit award from the Faculty of Natural Sciences for my teaching contribution in the Subject Group: Physics in 2012, 2017.
 - Received a Visiting Scholar award from the Fulbright Program for a sabbatical visit to the University of Alabama in Huntsville in the USA (March - May 2015).
 - Awarded the *Outstanding Paper Award For Young Scientists*, in COSPAR Scientific Commission D, presented during the 2014 COSPAR Assembly. This was for my 2013 paper, entitled *Modelling and observing Jovian electron propagation times in the inner heliosphere*, published in COSPAR’s flagship journal *Advances in Space Research (ASR)*. I received this award a second time in 2016 for my paper, *Where does the heliospheric modulation of galactic cosmic rays start?*, published in ASR in 2014.
 - Received a post-doctoral fellowship from the Alexander von Humboldt-Foundation for a research sabbatical at the Ruhr Universität in Bochum, Germany (January - June 2014).
 - Received the S2A3 (South African Association for the Advancement of Science) bronze medal for best M.Sc. dissertation in the fields of Science and Engineering at the North-West University (all campuses) in 2010.
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5 Service to the scientific community

- Served on the International Advisory Committee (IAC) and International Scientific Program Committee (ISPC) for Solar and Heliospheric Physics (SH) of the 2023 International Cosmic Ray Conference (ICRC).
- Part of the NMDB@Athens2022 workshop organising committee and member of the editorial board.
- Associate member of the commission on Astroparticle Physics (C4) of the International Union of Pure and Applied Physics (IUPAP), 2022 – present.
- Associate editor for *Advances in Space Research*, 2021 – present.
- Main scientific organizer for the 2022 COSPAR (Committee on Space Research) symposium session D1.1 *Neutron monitor science: Current and future prospects*.
- Elected as an ordinary member of the South African Institute of Physics (SAIP) council for the terms 2021 – 2023 and 2023 – 2025.
- Chairperson of the local organising committee of the 2020 South African Institute of Physics (SAIP) conference. Due to the COVID-19 pandemic the conference was postponed to 2021 and moved on-line.
- Deputy scientific organizer for the 2020 (moved to 2021) COSPAR symposium session D1.4 *Propagation of solar energetic particles in the heliosphere*.
- Co-convener for the session *Advances and upcoming developments in solar and heliospheric physics* of the 2019 IAGA general assembly.
- Co-organizer of the 2019 and 2020 NWU-CHPC (Center for High Performance Computing) programming school, covering the basics of Linux and Python.
- Served as co-convener for the International Association of Geomagnetism and Aeronomy (IAGA) symposium *Boundary layers in the Heliosphere*, held in Cape Town, South Africa in 2017.
- Member of the Scientific Organizing Committee (SOC) for the 2018 COSPAR symposium on *Energetic particles in the heliosphere and in the interstellar medium: Acceleration anisotropy and anomalous transport*.
- Elected as chair of the Space Science division of the South African Institute of Physics for the 2017/2018 term.
- Main scientific organizer of the symposium D 1.5 on *Anisotropy of energetic particles from keV to TeV*, that was to be held during the 2016 COSPAR Assembly in Istanbul, Turkey. At the last minute, due to a coup d'état, the assembly was cancelled.
- Served on the *International Scientific Program Committee* for the 2015 International Cosmic Ray Conference (ICRC) held in August 2015 in Den Haag, The Netherlands.
- Reviewer for the following journals/funding agencies: *Nature Astronomy*, *Nature Communications*, *Space Science Reviews*, *ASTRA (Astrophysics and Space Science Transactions)*, *Astronomy and Astrophysics*, *Astrophysical Journal*, *Astrophysical Journal Letters*, *Journal of Geophysical Research*, *Solar Physics*, *Astroparticle Physics*, *NRF (National Research Foundation of South Africa)*, the *African Academy of Sciences*, the *Alexander von Humboldt foundation*, *Journal of Physics: Conference Series (JPCS)*, *Advances in Space Research (ASR)*, the *Journal of Space Weather*, the *Journal of Atmospheric and Solar-Terrestrial Physics*, the *Journal of Space Weather and Space Climate*, UK Science and Technology Facilities Council, and *NASA Heliophysics* as both a panel member as well as panel lead.

5.1 Memberships

- Member of the South African Institute of Physics (SAIP), the American Geophysical Union (AGU), the European Geophysical Union (EGU), AGNES (the African-German Network of Excellence in Science) and an associate of the Committee on Space Research (COSPAR), and an affiliate of both the South African National Institute of Theoretical Physics (NITheP) and The African Academy of Sciences. I'm also part of the Fullbright and Humboldt alumni programs.
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6 Student supervision history

6.1 Final year BSc undergraduate student internships

- Mr L Semous, (2018), Ms K du Plessis (2018), Mr L du Plessis (2017)

6.2 4th year BSc Hons. student projects

- Ms A Dumont (2022), Mr H le Roux (2022; co-supervisor), Mr JS Troskie (2021), Ms J Stevens (2021), Mr I Boshoff (2020), Mr M Venter (2020; co-supervisor), Mr R Wamenhoven (2020; co-supervisor), Ms A Molokwane (2019), Mr W Pretorius (2019), Mr R Du Toit (2019; co-supervisor), Mr G le Roux (2019; co-supervisor), Mr W Reitsma (2018; co-supervisor), Ms P Legodi (2018; co-supervisor), Ms HC Tleane (2018), Mr J Light (2017), Mr E Hoffman (2017; co-supervisor), Mr RT Hough (2017), Mr JHE Thiersen (2016), Mr TT Ayorinde (2016), Mr JP van den Berg (2016), Ms HM Schutte (2015)

6.3 MSc students

- Ms AM Dumont (supervisor), title of dissertation: *TBD*.
- Mr H le Roux (co-supervisor), title of dissertation: *Comparison of machine learning methods for solar radio burst classification*.
- Ms JT Stevens (supervisor), title of dissertation: *Observing the unobservable by inverting solar energetic particle events*.
- Mr PJD Swanepoel (co-supervisor), title of dissertation: *Sunspot detection and classification using deep learning techniques*.
- Mr R du Toit (co-supervisor; degree awarded in 2022), title of dissertation: *Sunspot detection and tracking using image processing techniques*.
- Mr PKN Heita (supervisor; degree awarded in 2019), title of dissertation: *Numerical investigation of solar energetic particle transport between the Sun, Earth, and Mars*.
- Mr JP van der Berg (supervisor; degree awarded in 2019), title of dissertation: *Modelling of solar energetic particles by stochastic processes*.
- Mr VWF Mattana (co-supervisor; degree awarded in 2018), title of dissertation: *Extracting the February 1956 ground level enhancement event from legacy cosmic ray recordings*.
- Mr PL Prinsloo (co-supervisor; degree awarded in 2016), title of dissertation: *Acceleration of cosmic rays in the outer heliosphere*.
- Mr JL Raath (co-supervisor; degree awarded in 2015), title of dissertation: *A comparative study of cosmic ray modulation models*.

6.4 PhD students

- Mr BT Lema (supervisor), title of thesis: *Analysis of correlation ratio of neutron monitor multiplicity and count rate.*
- Dr JP van den Berg (supervisor; degree awarded in 2023), title of thesis: *Modelling the perpendicular transport of energetic electrons in the inner heliosphere.*
- Dr PJ Steyn (supervisor; degree awarded in 2022), title of thesis: *A multi-wavelength approach to solar energetic particle transport using remote sensing and in-situ observations.*
- Dr MG Mosotho (supervisor; degree awarded in 2021), title of thesis: *Cosmic radiation measurements in the southern hemisphere, with the focus on aviation altitudes.*
- Dr PL Prinsloo (supervisor; degree awarded in 2020), title of thesis: *Particle acceleration at travelling shocks in the heliosphere.*
- Dr AE van der Schyff (co-supervisor; degree awarded in 2017), title of thesis: *Numerical modeling of the evolution of stellar wind cavities and supernova remnants.*

6.5 Post-doctoral researchers

- Dr O Ogunjobi (November 2015 - August 2016; July 2017 - July 2018), Dr CP Olivier (November 2016 - October 2018), Dr GM Mosotho (January 2021 - December 2022), Dr ET Desta (January 2023 - present).
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7 Experimental work, hardware development, and other related projects

- Principal investigator (PI) of South African Neutron Monitor (NM) program. This includes development and expansion of the mini-NM programme, including the establishment of a mini-NM station (ENTOTO) in Addis Ababa, Ethiopia.
 - PI of the NWU dosimetry project, the aim of which is to develop an active dosimeter to measure the radiation levels at aviation altitudes. The development, testing, calibration, and first flight tests were conducted as part of the PhD project of Dr Mosotho. The hardware development is a collaborative project with the Christian-Albrecht University in Kiel, Germany.
 - PI of the NWU e-Callisto (Compound Astronomical Low frequency Low cost Instrument for Spectroscopy and Transportable Observatory) solar radio burst spectrometer. As part of this project three different spectrometers were installed at the NWU Nooitgedacht research farm to scan for solar radio bursts at different frequencies and, in several cases, different polarizations.
 - PI of the NWU Raspberry Pi lab and resulting outreach. This includes management of the Raspberry Pi lab which hosts the equipment to conduct several hands-on projects for postgraduate students to enhance their basic hardware and programming skills. Several campus-wide Raspberry Pi Hackathons were also held in the past. During the COVID-19 pandemic, the Raspberry Pi lab was used to develop a cost-effective assisted breathing device using COTS (commercial off the shelf) components.
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8 Grants and funding

(Listing only grants for which I am/was the (or one of the) Principle Investigator(s).)

- “Anisotropic energetic particle transport” (TTK13060518539), funded through the Thuthuka program (Post-PhD track) of the South African National Research Foundation (NRF). Funding period: 2014 – 2016.
- “Computational space weather” (PHYS0918), a project receiving computation time (approximately 28M CPU hours allocation) on the Center for High Performance Computing (CHPC) computer cluster in South Africa. Period: 2016 – 2021.
- “Simulating solar energetic particle transport” (CSUR160405161553), funded through the Competitive Support for Unrated Researchers (CSUR) program of the South African National Research Foundation (NRF). Funding period: 2017 – 2019.
- “Upgrading of the SANA neutron monitor”, funded through the North-West University’s strategic funding program. Funding period: 2017 – 2020.
- “Maintenance and upgrading of the NWU neutron monitor network”, funded through the North-West University’s strategic funding program. Funding period: 2017 – 2020.
- “Joint South Africa-Germany Space Weather Studies During Solar Cycle 25 and Beyond”, a bilateral grant, funded by the Research Group Linkage Program of the Alexander von Humboldt Foundation. Funding period: 2019 – 2023.
- Received a “P rating” (i.e. Prestigious Award) from the South African National Research Foundation (NRF) for research excellence in the young researcher category. Award and funding period: 2019 – 2024.
- “Simulating and observing solar wind electrons” (SRUG190208414933), funded through the Competitive Support for Rated Researchers (CSRR) program of the South African National Research Foundation (NRF). Funding period: 2020 – 2022.
- “Probing the turbulent origin of the solar wind”, a MeerKAT radio telescope Director’s Discretionary Time (DDT) proposal: Telescope time in September 2020.
- “Solar energetic particles; proton and electron acceleration” (SRUG220322419), funded through the Competitive Support for Rated Researchers (CSRR) program of the South African National Research Foundation (NRF). Funding period: 2023 – 2025.

In addition to these mentioned above, I’ve been a co-investigator on various national and international grants.

9 Invited scientific presentations

1. Presented a highlight talk at the 2022 European Cosmic Ray Symposium: *Recent observations and modelling of low-energy cosmic rays near Earth*
2. Presented a non-specialist talk at the 2022 South African Institute of Physics meeting: *Stochastic differential equations as a powerful numerical tool.*
3. Invited contributed talk in the 2022 COSPAR session, D1.3 Understanding and Predicting Solar Energetic Particle Events across the Heliosphere: *The transport of solar energetic particles.*

4. Presented an invited talk at the 2021 American Geophysical Union fall meeting: *Computational space weather as an effective research, capacity building, and outreach tool.*
 5. Presented the 2021 ICRC rapporteur (summary) talk for the solar and heliospheric (SH) division.
 6. Present an invited review talk during the virtual European Cosmic Ray Symposium in 2021: *Cosmic rays at ground level; a brief introduction.*
 7. Presented an invited highlight talk during the European Cosmic Ray Symposium in Turin, Italy in 2016: *The solar modulation of cosmic rays.*
 8. Presented an invited talk during the XXVII IUPAP Conference on Computational Physics Pretoria, South Africa in 2016: *Computational Heliospheric Physics; A South African Perspective.*
 9. Presented an invited talk during the Workshop *Cosmic Ray Anisotropies*, held in Bad Honnef, Germany, January 2015: *Low energy cosmic ray anisotropies in the heliosphere.*
 10. Presented a solicited talk during the 40th COSPAR Assembly in Moscow, Russia in 2014: *Transport of cosmic rays in the heliosphere: Theory and models.*
 11. Presented a solicited during the 2012 AGU Fall Meeting in San Francisco, USA in 2012: *The transport of cosmic rays in the heliosheath.*
 12. Presented a solicited talk during the 39th COSPAR Assembly in Mysore, India in 2012: *Modelling anomalous cosmic ray gradients over successive solar cycles.*
 13. Presented a solicited talk during the 39th COSPAR Assembly in Mysore, India in 2012: *Modelling charge sign dependent modulation of cosmic rays with stochastic transport models.*
 14. Presented an invited talk during the 3rd IAGA symposium in Luxor, Egypt in 2011: *The acceleration and transport of anomalous cosmic rays in the heliosphere.*
 15. Presented an invited talk during the 13th ICATPP conference in Como, Italy in 2011: *Modelling the heliospheric modulation of cosmic rays by stochastic processes.*
 16. Presented a solicited talk during the 38th COSPAR Assembly in Bremen, Germany in 2010: *Modelling ground and space based cosmic ray observations.*
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10 Published peer-reviewed papers

(Listing only publications in ISI accredited journals. Entries starting with an asterisk (*) indicate student-led publications.)

2023:

1. **Strauss, R.D.**, Dresing, N., Richardson, I.G., van den Berg, J.P., Steyn, P.J. *On the onset delays of solar energetic electrons and protons: Evidence for a common accelerator* The Astrophysical Journal, *accepted*, 2023.
2. **Strauss, R.D.**, Giday, N.M., Seba, E.B., Chekole, D.A., Garuma, G.F., Kassa, B.H., Dugassa, T., Diedericks, C. *First results from the ENTOTO neutron monitor: Quantifying the waiting time distribution.* Advances in Space Research (Special issue: *Space and Geophysical Observations and Recent Results related to the African Continent*), 72, 805 2023.

3. Moloto, K.D., Engelbrecht, N.E., **Strauss, R.D.**, Diedericks, C. *The Southern African Neutron Monitor Program: A Regional Network to Study Global Cosmic Ray Modulation*. Advances in Space Research (Special issue: *Space and Geophysical Observations and Recent Results related to the African Continent*), 72, 830, 2023.
 4. Whitman, K., Egeland, R., Richardson, I.G., . . . **Strauss, R.D.**, . . . Zhang, M. *Review of solar energetic particle models*. Advances in Space Research, 74, A105, 2023.
 5. Dresing, N., Rodríguez-García, L., Jebaraj, I.C., **Strauss, R.D.**, ..., Veronig, A.M., Wijsen, N. *The 17 April 2021 widespread solar energetic particle event*. Astronomy and Astrophysics, *accepted*, 2023.
 6. *Mosotho, G.M., **Strauss, R.D.**, Böttcher, S., Diedericks, C. *The radiation environment over the African continent at aviation altitudes: First results of the RPiRENA-based dosimeter*. Journal of Space Weather and Space Climate, 13, 10, 2023.
 7. **Strauss, R.D.**, Rankin, J.S., Leske, R.A. *The modulation of anomalous and galactic cosmic ray oxygen over successive solar cycle minima*. The Astrophysical Journal, 944, 114, 2023.
 8. Lotz, S., Nel, A.E., Wicks, R.T., Roberts, O.W., Engelbrecht, N.E., **Strauss, R.D.**, Botha, G.J.J., Kontar, E.P., Pitňa, A., Bale, S.D. *The radial variation of the solar wind turbulence spectra near the kinetic break scale from Parker Solar Probe measurements*. The Astrophysical Journal, 942, 93 2023.
- 2022:**
9. **Strauss, R.D.** *Living with cosmic radiation*. Perspectives of Earth and Space Scientists, 3, e2022CN000185, 2022.
 10. *Brüderer, M., Berger, L., Heber, B., Heidrich-Meisner, V., Klassen, A., Kollhoff, A., Köhl, P., **Strauss, R.D.**, Wimmer-Schweingruber, R., Dresing, N. *A new method to determine solar energetic particle anisotropies and their associated uncertainties demonstrated for STEREO/SEPT*. Astronomy and Astrophysics, 663, A89, 2022.
 11. Herbst, K., Baalman, L.R., Bykov, A., Engelbrecht, N.E., Ferreira, S.E.S., Izmodenov, V.I., Korolkov, S., Levenfish, K.P., Linsky, L.L., Meyer, D.M.-A., Scherer, K., **Strauss, R.D.**, *Astrospheres of Planet-Hosting Cool Stars and Beyond: When Modeling meets Observations*. Space Science Reviews, 218, 29, 2022.
 12. Engelbrecht, N.E., Vogt, A., Herbst, K., **Strauss, R.D.**, Burger, R.A. *Revisiting the Revisited Palmer Consensus: New Insights from Jovian Electron Transport*. The Astrophysical Journal, 929, 8, 2022.
 13. **Strauss, R.D.**, Rankin, J.S., van den Berg, J.P. *Cosmic ray transport near the Sun*. The Astrophysical Journal, 928, 22, 2022.
 14. Rankin, J.S., McComas, D.J., Christian, E.R., Cohen, C.M.S., Cummings, A.C., Joyce, C.J., Labrador, A.W., Leske, R.A., Mewaldt, R.A., Schwadron, N.A., Stone, E.C., **Strauss, R.D.**, Wiedenbeck, M.E. *Anomalous Cosmic Ray Oxygen in to 0.1 au*. The Astrophysical Journal, 925, 9, 2022.
- 2021:**
15. *van den Berg, J.P., Engelbrecht, N.E., **Strauss, R.D.**, Wijsen, N. *On the Turbulent Reduction of Drifts for Solar Energetic Particles*. The Astrophysical Journal, 922, 200, 2021.

16. Posner, A., Arge, N., Staub, J., StCyr, O.C., Folta, D., Solanki, S.K., **Strauss, R.D.**, Effenberger, F., Gandorfer, A., Heber, B., Henney, C.J., Hirzberger, J., Jones, S.J., Kuehl, P., Malandraki, O. *A Multi-purpose HelioPhysics L4 Mission*. Space Weather, 19, e2021SW002777, 2021.
 17. *Mosotho, G.M., **Strauss, R.D.** *The use and validation of the Convection-Diffusion approximation in cosmic-rays modulation studies*. Advances in Space Research, 68, 2974, 2021.
 18. **Strauss, R.D.**, van der Merwe, C., Diedericks, C., Krüger, H.G. Krüger, H., Moloto, K.D., Lotz, S., Mosotho, G.M. *The updated SANA E neutron monitor*. Advances in Space Research, 68, 2661, 2021.
 19. Rankin, J.S., McComas, D.J., Leske, R.A., Christian, E.R., Cohen, C.M.S., Cummings, A.C., Joyce, C.J., Labrador, A.W., Mewaldt, R.A., Posner, A., Schwadron, N.A, **Strauss, R.D.**, Stone, E.C., Wiedenbeck, M.E. *First Observations of Anomalous Cosmic Rays in to 36 Solar Radii*. The Astrophysical Journal, 912, 139, 2021.
 20. *Similä, M., Usoskin, I., Poluianov, S., Mishev, A., Kovaltsov, G.A., **Strauss, R.D.** *High-altitude polar NM with the new DAQ system as a tool to study details of the cosmic-ray induced nucleonic cascade*. Journal of Geophysical Research, 126, 5, e2020JA028959, 2021.
 21. *Mosotho, G.M., **Strauss, R.D.**, Nndanganeni, R.R., van den Berg, J.P. *The North-West University's High Altitude Radiation Monitor programme*. South African Journal of Science, 117, 1, 2021.
- 2020:**
22. *Steyn, J.P., **Strauss, R.D.**, Effenberger, F.J., Pacheco, D. *The soft X-ray Neupert effect as a proxy for solar energetic particle injection: A proof-of-concept physics-based forecasting model*. Journal of Space Weather and Space Climate, 10, 64, 2020.
 23. *van den Berg, J.P., **Strauss, R.D.**, Effenberger, F.J. *A primer on focused solar energetic particle transport: Basic physics and recent modelling results*. Space Science Reviews, 216, 146, 2020.
 24. Posner, A., **Strauss, R.D.** *Warning Time Analysis from SEP Simulations of a Two-Tier Relativistic Electron Alert System for Exploration (RELeASE) Applied to Mars Exploration*. Space Weather, 18, e02354, 2020.
 25. **Strauss, R.D.**, Dresing, N., Kollhoff, A., Brüdern, M. *On the shape of SEP electron spectra: The role of interplanetary transport*. The Astrophysical Journal, 897, 24, 2020.
 26. **Strauss, R.D.**, Poluianov, S., van der Merwe, C., Krüger, H., et al. *The mini-neutron monitor: A new approach in neutron monitor design*. Journal of Space Weather and Space Climate, 10, 39, 2020.
 27. *Vogt, A., Engelbrecht, N.E., **Strauss, R.D.**, Heber, B., Kopp, A., Herbst, K. *On the residence-time of Jovian electrons in the inner heliosphere*. Astronomy and Astrophysics, 642, A170, 2020.
 28. Herbst, K., Scherer, K., Ferreira, S.E.S., Baalman, L.R., Engelbrecht, N.E., Fichtner, H., Kleimann, J., Mohammed, S., **Strauss, R.D.** *On the diversity of M-star astrosphere and the role of galactic cosmic rays within*. The Astrophysical Journal Letters, 897, L27, 2020.
- 2019:**
29. **Strauss, R.D.** *Voyager 2 enters interstellar space*. Nature Astronomy, 3, 963, 2019.

30. *Prinsloo, P.L., **Strauss, R.D.**, le Roux, J.A. *Acceleration of solar wind particles by travelling interplanetary shocks*. The Astrophysical Journal, 878, 144, 2019.
31. **Strauss, R.D.**, le Roux, J.A. *Solar energetic particle propagation in wave turbulence and the possibility of wave generation*. The Astrophysical Journal, 872, 125, 2019.
32. Olivier, C.P., Engelbrecht, N.E., **Strauss, R.D.** *Permutation entropy analysis of magnetic field turbulence at 1AU revisited*. Journal of Geophysical Research: Space Physics, 124, 4, 2019.
33. *Moloto, K.D., Engelbrecht, N.E., **Strauss, R.D.**, Moeketsi, D.M., van den Berg, J.P. *Numerical integration of stochastic differential equations: a parallel cosmic ray modulation implementation on Africa's fastest computer*. Advances in Space Research, 63, 626, 2019.
- 2018:**
34. *Vogt, A., Heber, B., Kopp, A., Potgieter, M.S., **Strauss, R.D.** *Jovian electrons in the inner heliosphere: Proposing a new source spectrum based on 30 years of measurements*. Astronomy and Astrophysics, 613, A28, 2018.
35. Engelbrecht, N.E., **Strauss, R.D.** *A tractable estimate for the dissipation range onset wavenumber throughout the heliosphere*. The Astrophysical Journal, 856, 159, 2018.
36. *Marquardt, J., Heber, B., Potgieter, M.S., **Strauss, R.D.** *Energy spectra of carbon and oxygen with HELIOS E6 – Radial gradients of anomalous cosmic ray oxygen within 1 AU*. Astronomy and Astrophysics, 610, A42, 2018.
- 2017:**
37. Pogorelov, N., Fichtner, H., Czechowski, A., Lazarian, A., Lembege, B., le Roux, J.A., Potgieter, M.S., Scherer, K., Stone, E., **Strauss, R.D.**, Wiengarten, T., Wurx, P., Zank, G.P., Zhang, M. *Heliosheath Processes and the Structure of the Heliopause: Modeling Energetic Particles, Cosmic Rays, and Magnetic Fields*. Space Science Reviews, 212, 193, 2017.
38. **Strauss, R.D.**, Effenberger, F. *A Hitch-hiker's Guide to Stochastic Differential Equations: Solution Methods for Energetic Particle Transport in Space Physics and Astrophysics*. Space Science Reviews, 212, 151, 2017.
39. Engelbrecht, N.E., **Strauss, R.D.**, le Roux, J.A., Burger, R.A. *Towards a greater understanding of the reduction of drift coefficients in the presence of turbulence*. The Astrophysical Journal, 841, 107, 2017.
40. **Strauss, R.D.**, Ogunjobi, O., Moraal, H. McCracken, K.G., Caballero-Lopez, R.A. *On the pulse shape of ground level enhancements*. Solar Physics, 292, 51, 2017.
41. **Strauss, R.D.**, Dresing, N., Engelbrecht, N.E. *Perpendicular diffusion of solar energetic particles; model results and implications for electrons*. The Astrophysical Journal, 837, 43, 2017.
42. *Prinsloo, P.L., Potgieter, M.S., **Strauss, R.D.** *The re-acceleration of galactic electrons at the heliospheric termination shock*. The Astrophysical Journal, 836, 100, 2017.
- 2016:**
43. Luo, X., Zhang, M., Potgieter, M.S., Pogorelov, N.V., Feng, X., **Strauss, R.D.** *A Numerical Simulation of Cosmic Ray Modulation Near the Heliopause II: Some Physical Insights*. The Astrophysical Journal, 826, 182, 2016.
44. **Strauss, R.D.**, le Roux, J.A., Engelbrecht, N.E., Ruffolo, D., Dunzlaff, P. *Non-Axisymmetric Perpendicular Diffusion of Charged Particles and their Transport Across Tangential Magnetic Discontinuities*. The Astrophysical Journal, 825, 43, 2016.

45. Scherer, K., **Strauss, R.D.**, Ferreira, S.E.S., Fichtner, H. *Cosmic ray flux anisotropies caused by local astrospheres*. *Astroparticle Physics*, 82, 93, 2016.

46. *Raath, J.L., Potgieter, M.S., **Strauss, R.D.**, Kopp, A. *The effects of magnetic field modifications on the solar modulation of cosmic rays with a SDE-based model*. *Advances in Space Research*, 57, 1965, 2016.

2015:

47. Engelbrecht, N.E., **Strauss, R.D.** *A detailed calculation of neutral hydrogen ionization frequencies used in turbulence transport models in the heliosphere*. *Astronomy and Astrophysics – Research Note*, 579, A120, 2015.

48. Dunzlaff, P., **Strauss, R.D.**, Potgieter, M.S. *Solving Parker’s Transport Equation with Stochastic Differential Equations on GPUs*. *Computer Physics Communications*, 192, 156, 2015.

49. Scherer, K., van der Schyff, A., Bomans, D.J., Ferreira, S.E.S., Fichtner, H., Kleimann, J., **Strauss, R.D.**, Weis, K., Wiengarten, T., Wodzinski, T. *Cosmic rays in astrospheres*. *Astronomy and Astrophysics*, 576, A97, 2015.

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11 Published conference proceedings

2023:

1. **Strauss, R.D.**, van den Berg, J.P., Engelbrecht, N.E., Wijsen, N. *On the causality problem in focused particle transport*, Journal of Physics: Conference Series (JPCS), Proceedings to the 20th Annual International Astrophysics Conference (AIAC), accepted, 2023 (**Peer reviewed**).

2022:

2021:

2. **Strauss, R.D.** *Rapporteur talk: Solar and heliospheric physics*. Proceedings of Science (Proceedings of the 2021 International Cosmic Ray Conference), 395, 049, 2021.

3. *Similä, M., Poluianov, S., Usoskin, I., Mishev, A., Kovaltsov, G.A., **Strauss, R.D.** *Pulse height-length analysis of data from neutron monitors DOMC/DOMB with a new data acquisition system*. Proceedings of Science (Proceedings of the 2021 International Cosmic Ray Conference), 395, 1237, 2021.

4. Poluianov, S., Usoskin, I., **Strauss, R.D.** *Upgrade of electronics of neutron monitors DOMC and DOMB*, NMDB@Home 2020: Proceedings of the 1st virtual symposium on cosmic ray studies with neutron detectors, Kiel University Publishing, Kiel, 1, 167 – 171, 2021.

2020:

5. **Strauss, R.D.**, van den Berg, J.P., Steyn, P.J., Effenberger, F., Wijzen, N., Laitinen, T., le Roux, J.A. *Perpendicular diffusion of solar energetic particles: When is the diffusion approximation valid?*, Journal of Physics: Conference Series (JPCS), Proceedings to the 19th Annual International Astrophysics Conference (AIAC), 1620, 012021, 2020 (**Peer reviewed**).
6. *du Toit, R., Drevin, G., Maree, N., **Strauss, R.D.** *Sunspot Identification and Tracking with OpenCV*, 2020 International SAUPEC/RobMech/PRASA Conference, Cape Town, South Africa, 1-6, 2020 (**Peer reviewed**).

2019:

7. Blanco, J.J., García-Población, O., . . . , **Strauss, R.D.**, Yanke, V. *ORCA (Antarctic Cosmic Ray Observatory): 2018 Latitudinal Survey*, Proceedings to the 36th ICRC, 1059, 2019.

2018:

2017:

8. *Mattana, V., Drevin, G., **Strauss, R.D.** *Extracting the ground level enhancement event of February 1956 from legacy cosmic ray recordings*. Proceedings to the 14th IAPR International Conference on Document Analysis and Recognition, 2, 43, 2017.
9. Ogunjobi, O., **Strauss, R.D.** *Cosmic ray ground level enhancements: Power of the pulse shape*. Journal of Physics: Conference Series (JPCS), Proceedings to the 61st SAIP conference, 325, 2017 (**Peer reviewed**).
10. Potgieter, M.S., Prinsloo, P.L., **Strauss, R.D.** *Acceleration of galactic electrons at the solar wind termination shock and Voyager 1 observations*. Proceedings of Science (POS), Proceedings to the 35th ICRC, 058, 2017.
11. Potgieter, M.S., **Strauss, R.D.** *Computational modelling of cosmic rays in the neighbourhood of the Sun*. Journal of Physics: Conference Series (JPCS), Proceedings to the 28th IUPAP Conference on Computational Physics, 905, 012002, 2017 (**Peer reviewed**).

2016:

12. Scherer, K., Bomans, D.J., Ferreira, S.E.S., Fichtner, H., Kleimann, J., **Strauss, R.D.**, Weiss, K. *Comparison of astrospheres around cool vs hot stars*, Journal of Physics: Conference Series (JPCS), Proceedings to the 15th Annual International Astrophysics Conference (AIAC), 767, 012024, 2016 (**Peer reviewed**).

2015:

13. *Vogt, A., Dunslaff, P., Heber, B., Kopp, A., Köhl, P., **Strauss, R.D.** *Jovian electrons in the inner heliosphere: A parameter study on intensity profiles near Earth*, Proceedings to the 34th International Cosmic Ray Conference, ID 207, 2015.
14. **Strauss, R.D.**, Fichtner, H., le Roux, J.A. *Cosmic ray anisotropies near the heliopause*, Proceedings to the 34th International Cosmic Ray Conference, ID 194, 2015.
15. **Strauss, R.D.**, Fichtner, H. *On the perpendicular diffusion of solar energetic particles*, Proceedings to the 34th International Cosmic Ray Conference, ID 195, 2015.
16. **Strauss, R.D.**, Fichtner, H., Potgieter, M.S., le Roux, J.A., Luo, X. *Cosmic ray transport near the heliopause*, Journal of Physics: Conference Series (JPCS), Proceedings to the 14th Annual International Astrophysics Conference (AIAC), 642, 012026, 2015 (**Peer reviewed**).

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17. Kühl, P., Dresing, N., Dunzlaff, P., Fichtner, H., Gieseler, J., Gómez-Herrero, R., Heber, B., Klassen, A., Kleimann, J., Kopp, A., Potgieter, M., Scherer, K., **Strauss, R. D.** *Simultaneous Analysis of Recurrent Jovian Electron Increases and Galactic Cosmic Ray Decreases*, Central European Astrophysical Bulletin, Vol. 37, p. 643-648, 2013.
18. **Strauss, R.D.**, Potgieter, M.S., Ferreira, S.E.S., Fichtner, H., Scherer, K. *Galactic cosmic ray modulation beyond the heliopause: When will Voyager 1 measure the LIS?* ICRC Conference Proceedings, ID 0154, 2013.
19. **Strauss, R.D.**, Potgieter, M.S. *The wavy heliospheric current sheet: Insights from a stochastic transport model.* ICRC Conference Proceedings, ID 0155, 2013.
20. Potgieter, M.S., **Strauss, R.D.** *At what rigidity does the solar modulation of cosmic rays begin?* ICRC Conference Proceedings, ID 0156, 2013.
21. Potgieter, M.S., **Strauss, R.D.**, De Simone, N., Boezio, M. *The highest galactic proton spectrum since the beginning of the space age.* ICRC Conference Proceedings, ID 0119, 2013.
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23. Di Felice, V. for the PAMELA collaboration, Potgieter, M.S., **Strauss, R.D.**, Vos, E. *Solar modulation of galactic hydrogen and helium over the 23rd solar minimum with the PAMELA experiment.* ICRC Conference Proceedings, ID 0219, 2013.
24. Munini, R. for the PAMELA collaboration, Potgieter, M.S., **Strauss, R.D.**, Vos, E. *Solar modulation of galactic cosmic rays electrons and positrons over the 23rd solar minimum with the PAMELA experiment.* ICRC Conference Proceedings, ID 0337, 2013.

2012:

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26. **Strauss, R.D.**, Potgieter, M.S., Boezio, M., de Simone, N., di Felice, V., Kopp, A., Büsching, I. *The heliospheric transport of protons and anti-protons: A stochastic modelling approach to PAMELA observations.* Proceedings to the 13th ICATPP, Cosmic Rays for Particle and Astroparticle Physics, edited by Giani, S., Leroy, S., Rancoita, P.G. 7: 288-294, 2012 (**Peer reviewed**).

2011:

27. Fichtner, H., Effenberger F., Scherer, K., Büsching, I., **Strauss, R.D.**, Ferreira, S.E.S., Potgieter, M.S., Heber, B., Fahr, H.-J. *Cosmic ray transport in the heliosphere and its connection to the interstellar proton spectrum.* Mem. S.A. It., 82, 852, 2011.
28. Manuel, R., Ferreira, S.E.S., Potgieter, M.S., **Strauss, R.D.**, Engelbrecht, N.E. *Long-term galactic cosmic ray modulation in the heliosphere.* ICRC Conference Proceedings. ID 0092, 2011.
29. Büsching, I., Kopp, A., Effenberger, F., **Strauss, R.D.**, Potgieter, M.S., Fichtner, H. *Stochastic approach to galactic propagation.* ICRC Conference Proceedings. ID 0841, 2011.
30. **Strauss, R.D.**, Potgieter, M.S., Kopp, A., Büsching, I. *Modelling the heliospheric transport of Jovian electrons by stochastic processes.* ICRC Conference Proceedings. ID 0122, 2011.

31. **Strauss, R.D.**, Potgieter, M.S., Kopp, A., Büsching, I. *On the modulation of cosmic rays as described by a stochastic transport model*. ICRC Conference Proceedings. ID 0121, 2011.
 32. Potgieter, M.S., Ferreira, S.E.S., **Strauss, R.D.** *Galactic cosmic rays in the dynamical heliosphere*. Proceedings to the 12th ICATPP (International Conference on Technology and Particle Physics), Cosmic Rays for Particle and Astroparticle Physics, edited by Giani, S., Leroy, S., Rancoita, P.G. 6, 441-453, 2011 (**Peer reviewed**).
 - 2010:**
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 33. Potgieter, M.S., Ferreira, S.E.S., **Strauss, R.D.** *The dynamical heliosphere*. Proceedings to the 2nd IAGA symposium on *The Solar Wind-Space Environment Interaction*, Cairo, Egypt, editors Luc Damé and Ahmed Hady, Cairo University Press, pp 33-42, 2009.
 34. **Strauss, R.D.**, Potgieter, M.S., Ferreira, S.E.S., Webber, W.R. *The acceleration and modulation of multiple charged anomalous cosmic rays revisited*. ICRC Conference Proceedings. ID 0847, 2009.
 35. **Strauss, R.D.**, Potgieter, M.S., Ferreira, S.E.S., Hill, M.E. *Anomalous cosmic ray modulation in the heliosheath*. ICRC Conference Proceedings. ID 0845, 2009.
 36. **Strauss, R.D.**, Potgieter, M.S., Ferreira, S.E.S. *Modelling anomalous cosmic ray Oxygen in the heliosphere*. ICRC Conference Proceedings. ID 0848, 2009.
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12 Other publications

1. **Strauss, R.D.**, Engelbrecht, N.E. *Disentangling the Sun's Impact on Cosmic Rays* (Viewpoint article). Physics Magazine, 16, 52, 2023.
 2. Corti, C., Whitman, K., Rankin, J., **Strauss, R.D.**, Desai, R., Nariaka, N., Turner, D., Chen, T.Y. *Galactic Cosmic Rays and Solar Energetic Particles in Cis-Lunar Space: Need for contextual energetic particle measurements at Earth and supporting distributed observations*. Decadal Survey for Solar and Space Physics (Heliophysics) 2024–2033 White Paper, 2022.
 3. Whitman, K., . . . , **Strauss, R.D.**, Upton, L. *Sun Chaser: A Mission to the Earth-Sun Lagrangian Point 4.*, Decadal Survey for Solar and Space Physics (Heliophysics) 2024–2033 White Paper, 2022.
 4. Posner, A., Arge, A., . . . , StCyr, O.C., **Strauss, R.D.** *Focused space weather strategy for securing Earth, and human exploration of the Moon and Mars*. Heliophysics 2050 White Papers. 4061, 2021.
 5. Potgieter, M.S., **Strauss, R.D.** *Heliospheric physics: Shock acceleration in the heliosphere and anomalous cosmic rays*. Nigerian Journal of Space Research. 8, 144, 2009.
 6. Potgieter, M.S., **Strauss, R.D.** *Heliospheric physics: The heliosphere and galactic cosmic rays, the tiny messengers from outer space*. Nigerian Journal of Space Research. 8, 119, 2009.
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13 Courses, modules, and lectures presented

Various undergraduate and graduate level courses including:

- FSKS 222/NPHY 221: Introduction to quantum mechanics; 2008 – 2017, 2019 – 2020.
 - FSKH 621: Quantum mechanics II; 2010 – 2013.
 - FSKS 321/NPHY3 21: Thermodynamics; 2016 – 2020.
 - FSKH 622/NPHY 622: Statistical Physics; 2017 – 2018, 2020.
 - FSKH 671/2/NPHY 622: 4th year graduate projects; 2015 – present.
 - NPHY 615: Astrophysical fluids; 2021 – present.
 - FSKM 812: Transport theory; 2021 – present.
 - FSKM 814: Heliospheric physics; 2021 – present.
 - FSKM 816: Advanced plasma physics; 2021 – present.
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14 Additional academic training

- Attending various teaching seminars and courses, including themes such as “The use of multi-media” and “Introduction to assessment”, presented by the Centre for Teaching and Learning of the NWU.
 - Completed the course *Strengthening Doctoral Supervision*, which introduces novice post-graduate study leaders to the doctoral supervision process. This course is recognized as a 30 credit, level 8, elective course as part of a Postgraduate Diploma in Higher Education.
 - Attended various seminars on the use of *E-fundi*; an on-line platform used by the NWU to enhance electronic and blended learning at the university.
 - Completed Part I and II of a course on the *Foundations and Ethics of Science*, presented by the North-West University (School of Philosophy).
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15 Services rendered on the NWU campus

- Served as the Research Group Leader for Space Science within the Centre for Space Research (2022 – present).
- Served as the Subject Group Leader for Physics in the School for Physical and Chemical Sciences (2019 – 2020).
- Served on the advisory committee of the NWU Instrument Making Department (2019 – present).
- Served as the radiation protection officer of the Physics subject group (2017 – present).
- Appointed as a mentor for a young academic in the nGap (next generation of academics) program of the Department of Higher Education and Training.

- Served on the library committee of the Faculty of Natural Sciences of the North-West University (Potchefstroom Campus) as the representative from the Physics Subject Group (2008 - 2017).
 - Served on the Physics Subject Group Teaching and Learning Committee (2008 - present).
 - Served on the Center for Space Research Management Committee (2013 - present).
 - Internal examiner for various MSc and PhD dissertations and theses.
 - Internal moderator for various physics modules.
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16 References

Possible references that can be contacted are:

- 1. Prof Adri Burger, Center for Space Research, North West University, South Africa.
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 - 2. PD Dr Horst Fichtner, Ruhr University, Bochum, Germany.
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– *fin* –