Curriculum Vitae for Peter Willendrup

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Education

- **Sep 1992-May 2000** Studies of Physics (M.Sc.) and Mathematics (B.Sc.) at the University of Copenhagen

- **2000-2002** Courses relevant to my employment at Neurobiology Research Unit

- **2002-** Courses relevant to my employments at Forskningscenter Risø Risø DTU and DTU Physics

Employment

- **Aug 1998-Feb 1999** Physics teacher at Skt. Annæ Gymnasium for 6 months

- **Jun 2000-Jun 2002** Research assistant at Neurobiology Research Unit,Rigshospitalet

- **Jul 2002-Dec 2006** Development Engineer (Technical project lead of McStas) at the Materials Research Department at RISØ

- **Jan 2007-Dec 2011** Development Engineer (Technical project lead of McStas) at the Materials Research Department, Risø DTU

- **Jan 2012-** Senior Research Engineer, Special Advisor (Technical project lead of McStas) at DTU Department of Physics

Secondments

- **Jun 2014-Jan 2023** Seconded (33% work time) to ESS DMSC

- **Apr 2023-** Seconded (100% work time) to ESS DMSC

Main software projects

- `McStas` - versions 1.7, 1.8, 1.9, 1.9.1, 1.10, 1.11, 1.12, 1.12a, 1.12b, 1.12c, 2.0, 2.1, 2.2, 2.2a, 2.3, 2.4, 2.4.1, 2.5, 2.6, 2.6.1, 2.7,2.7.1, 2.7.2,3.0,3.1,3.2,3.3 and 3.4 of the neutron ray tracing package - developed for Risø and later DTU Physics in collaboration with NBI, KU, PSI and ILL

- `McXtrace` v.1.0-1.7.1, 3.0-3.2 (- X-ray equivalent of `McStas`), developed for Risø and later DTU Physics in collaboration with NBI, KU and ESRF

- `d3view` - 3D visualisation package for brain images - developed for Neurobiology Research Unit. The 'Viden om' TV show on science has had two features about brain imaging and brain surgery once available in REAL video format in which d3view is used for visualisation. Also used for front cover illustrations in *Neuroimage* (1), (2), (3).

- `MARS` - *Multiple Algorithms for Registration of Scans* - image registration framework - developed for Neurobiology Research Unit

- Simulation package for investigating parameter significance in tomographic imaging - for my masters thesis

Selected Publications - Neutron Scattering

1. S. Samothrakitis, M.Bertelsen, **P.K. Willendrup**, E.B. Knudsen, C.B. Larsen, N. Rizzi, L. Zanini, V. Santoro and M. Strobl; Neutron instrument concepts for a high intensity moderator at the European spallation source; Scientific Reports 2024 pp. 9360
https://doi.org/10.1038/s41598-024-59506-5

2. A.R. McCluskely, P. Aulin, F. Blomsten, M. Bertelsen, C.M.C. Lobley, J. Lewis, M. Novelli, C. Somani, A. Stefanov, M Trajanovski, N. Vaytet, **P.K. Willendrup**, JL Wynen, S Yoo, T.H. Rod; The First European Spallation Source Data Management and Software Centre Summer School; Neutron News 2024 p. 1-3
https://doi.org/10.1080/10448632.2024.2331387

3. D.M. Rodríguez, **P. Willendrup**; W-T. Lee; A. Backs; F.J. Villacorta, R. Toft-Petersen, M. Morgano; Conceptual design of supermirror polarizers at the European Spallation Source; EPJ Web Conf. 286 2023
https://doi.org/10.1051/epjconf/202328603008

4. W-T. Lee, J. Hagman, D.M. Rodríguez, A. Stellhorn, A. Backs. T. Arnold, E. Blackburn, P. Deen, C. Durniak, M. Feygenson, A.T. Holmes, J. Houston; S. Jaksch, O. Kirstein, D. Mannix, M Månsson, M. Morgano, G. Nilsen, D. Noferini, T. Nylander; D. Orlov, V. Santoro, S. Schmidt, M. Schulz, W. Schweika, M. Strobl, A. Tartaglione, R. Toft-Petersen, F.J. Villacorta, **P. Willendrup**, M. Wolff, R. Woracek; Polarisation Development at the European Spallation Source; EPJ Web Conf. 286 2023
https://doi.org/10.1051/epjconf/202328603004

5. M. Østergaard, E.B. Naver, A. Kaestner, **P.K. Willendrup**, A. Brüel, H.O. Sørensen, J.S. Thomsen,S. Schmidt, H.F. Poulsen, L.T.Kuhn, H. Birkedal; Polychromatic neutron phase-contrast imaging of weakly absorbing samples enabled by phase retrieval J. Appl. Cryst. (2023). 56 73-682
https://doi.org/10.1107/S1600576723003011

6. M. Jamalipour, L. Zanini, E.B. Klinkby, G. Gorini, **P.K Willendrup** Improved beam extraction at compact neutron sources using diamonds nanoparticles and supermirrors Nuclear Inst. and Methods in Physics Research, A – Volume 1033, pp. 166719
https://doi.org 10.1016/j.nima.2022.166719

7. W. G. Bouwman, E. B. Knudsen, L. Udby and **P. Willendrup**; Simulations of foil-based spin-echo (modulated) small-angle neutron scattering with a sample using McStas J. Appl. Cryst. (2021). 54, 195-202
https://doi.org/10.1107/S1600576720015496

8. **P. Willendrup** and K. Lefmann; McStas (ii): An overview of components, their use, and advice for user contributions, Journal of Neutron Research, pre-press 2021
https://doi.org/10.3233/JNR-200186

9. **P. Willendrup** and K. Lefmann; McStas (i): Introduction, use, and basic principles for ray-tracing simulations DOI: Journal of Neutron Research, vol. 22, no. 1, pp. 1-16, 2020
https://doi.org/10.3233/JNR-190108

10. T. Kittelmann, E. Klinkby, E.B. Knudsen, **P. Willendrup**, X.X. Cai, K. Kanakia; Monte Carlo Particle Lists: MCPL, Computer Physics Communications, Volume 218, September 2017, Pages 17-42, ISSN 0010-4655,
https://doi.org/10.1016/j.cpc.2017.04.012

11. A. Cereser et. al. Time-of-Flight Three Dimensional Neutron Diffraction in Transmission Mode for Mapping Crystal Grain Structures, Scientific Reports 7, 2017, Article number: 9561

12. Schönfeldt T, Batkov K, Klinkby E.B., Lauritzen B., Mezei F., Muhrer G., Pitcher E., Takibayev A., **Willendrup P.K.**, Zanini L.; Broad spectrum moderators and advanced reflector filters using Pb-208. Nuclear Inst. and Methods in Physics Research, A – Volume 769, Issue 1, pp 1-4

13. Thomsena M., Knudsen E.B., **Willendrup P.K.**, Bech M., Willner M., Pfeiffer F., Poulsen M., Lefmann K., Feidenhans'l R.; Prediction of beam hardening artefacts in computed tomography using Monte Carlo simulations. Nuclear Inst. and Methods in Physics Research, B – Volume 342, Issue 1, pp 314-320

14. Farhi E.; Debab Y., **Willendrup P.**; iFit: A new data analysis framework. Applications for data reduction and optimization of neutron scattering instrument simulations with McStas. Journal of Neutron Research **17**, 2014 pp. 5-18

15. Knudsen E.; Tranum-Rømer A.; Christiansen P.; **Willendrup P.**; Lefmann K.; Investigation of propagation algorithms for ray-tracing simulation of polarized neutrons. Journal of Neutron Research **17**, 2014 pp. 27-34

16. **Willendrup, P.**; Farhi E.; Knudsen E.; Filges U.; Lefmann K; McStas: past, present and future. Journal of Neutron Research **17**, 2014 pp. 35-43

17. Farhi E.; Monzat C.; Arnerin R.; van Vuure T.; Castán-Guerrero C.; Hennane C.;, Harraud P.A., G; Campioni M.; Fuard S.; Ollivier J.; **Willendrup P.**; Journal of Neutron Research **17**, 2014 pp. 63-74 Advanced sources and optical components for the McStas neutron scattering instrument simulation package.

18. **Willendrup, P.K.**; Cussen, L.D.; Numerical simulation study of the performance of a small neutron three axis spectrometer In: Nuclear Inst. and Methods in Physics Research, A – 2011, Volume 637, Issue 1, pp. 109-118

19. Klenø Kaspar H; **Willendrup, Peter K.**; Knudsen, Erik; Lefmann, Kim; Eliminating line of sight in elliptic guides using gravitational curving In: Nuclear Inst. and Methods in Physics Research, A – 2011, Volume 634, Issue 1, pp. S100-S103

20. Udby, L.; **Willendrup, P.K.**; Knudsen, E.; Niedermayer, Ch.; Filges, U.; Christensen, N.B.; Farhi, E. ; Wells, .B.O. ; Lefmann, K.; Analyzing neutron scattering data using McStas virtual experiments In: Nuclear Inst. and Methods in Physics Research, A – 2011, Volume 634, Issue 1, pp. S138-S143

21. **Willendrup, Peter K.**; Udby, Linda; Knudsen, Erik; Farhi, Emmanuel; Lefmann, Kim; Using McStas for modelling complex optics, using simple building bricks In: Nuclear Inst. and Methods in Physics Research, A – 2011, Volume 634, Issue 1, pp. S150-S155

22. Knudsen E.; Udby L.; **Willendrup P.**;, Lefmann K.; Bouwman, W.G.; McStas-model of the delft SESANS Physica B-Cond Matt Volume 406 p 2361 (2011)

23. Prodi, A.; Knudsen, E.; **Willendrup, P.**; Schmidt, S.; Ferrero, C.; Feidenhans'l, R.; Lefmann, Kim; A Monte Carlo approach for simulating the propagation of partially coherent x-ray beams In: Proceedings of SPIE, the International Society for Optical Engineering – 2011, Volume 8141, Issue 1

24. Knudsen, E.; Prodi, A.; **Willendrup, P.**; Lefmann, K.; Baltser, J.; Gundlach, C.; Del Rio, M.S.; Ferrero, C.; Feidenhans'l, R.; McXtrace: A modern ray-tracing package for X-ray instrumentation In: Proceedings of SPIE, the International Society for Optical Engineering – 2011, Volume 8141, Issue 1

25. H Schober, E Farhi, F Mezei, P Allenspach, K Andersen, PM Bentley, P Christiansen, B Cubitt, RK Heenan, J Kulda, P Langan, K Lefmann, K Lieutenant, M Monkenbusch, **P Willendrup**, J Saroun, P Tindemans, G Zsigmond: *Tailored instrumentation for long-pulse neutron spallation sources*, (Nuclear Instruments and Methods A., **589**, (2008), 34-36.)

26. Geza Zsigmond, Sergey Manoshin, Klaus Lieutenant, Philip A. Seeger, Peter Christiansen, **Peter Willendrup**, Kim Lefmann: *Monte Carlo simulations for the development of polarized neutron instrumentation: An overview*, Physica B, **397**, (2007), 115-119.)

27. **Peter Willendrup**, Uwe Filges, Lukas Keller, Emmanuel Farhi, Kim Lefmann: *Validation of a realistic powder sample using data from DMC at PSI*,
ICNS 2005 (Physica B, **386**, (2006), 1032.)

28. **Willendrup P.** Farhi E. Lefmann K. *McStas 1.7 - A New Version of the Flexible Monte Carlo Neutron Scattering Package.* Appeared at ECNS 2003 and 24th Risø symposium

29. Andersen P. Lefmann K. **Willendrup P.** Farhi E.*Monte Carlo Simulations as part of the Instrument Configuration in Neutron Scattering.* Appeared at ECNS 2003

30. *Popular article:* Author: **Willendrup, Peter Kjær**, Jørgensen, Mads Ry Vogel, Lefmann, Kim; Haldrup, Kristoffer; Tre tigerspring for materialeforskningen In:
Aktuel Naturvidenskab 2015(1), p. 8-13

31. *Popular article:* Author: Lefmann, Kim; Arleth, Lise; Christensen, Niels Bech; Pape Møller, Søren; Skelboe, Stig; **Willendrup, Peter Kjær**; Supermikroskopet ESS -
DM fagligt forum 2013

32. *Popular article:* Author: Lefmann, Kim; Arleth, Lise; Christensen, Niels Bech; Pape Møller, Søren; Skelboe, Stig; **Willendrup, Peter Kjær**; Under motorhjelmen på supermikroskopet ESS -
DM fagligt forum 2013

33. *Popular article:* Author: Lefmann, Kim; Arleth, Lise; Christensen, Niels Bech; Pape Møller, Søren; Skelboe, Stig; **Willendrup, Peter Kjær**; ESS: en forskningsfacilitet i verdensklasse under opbygning i Lund In:
Kvant 2011(1), p. 25-32

34. *Book:* S. Peggs et al (more than 400 co-authors), *ESS Technical Design Report*, ISBN 978-91-980173-2-8, Lund (S), April 2013

35. *Book(s):* **Willendrup P.** Farhi E. Lefmann K. *User and Programmers Guide to the Neutron Ray-Tracing Package McStas, Version 1.12* (Risø-R-1416(rev.ed.)(EN), 978–87–550–3679–6) - and similar manuals for older releases

36. *Book(s):* Lefmann K. **Willendrup P.** Farhi E. *Component Manual for the Neutron Ray-Tracing Package McStas, Version 1.12* (Risø-R-1538(rev.ed.)(EN), ISBN 978–87–550–3680–2) - and similar manuals for older releases

Selected Publications - Neuroscience

1. **Willendrup P.** Svarer C. Hanson LG. Paulson OB. *A simple approach to combined inhomogenity correction and tissue segmentation of MR MPRAGE images.* BrainPET'01. J Cereb Blood Flow Metab 2001;21(suppl.1):S580

2. Svarer C. **Willendrup P.** Holm. S. Pinborg L. Hasselbalch S. Paulson O.B. Knudsen G.M. *The Impact of Partial Volume Effects.* EWCBR2002

3. **Peter Willendrup**, Lars H. Pinborg, Steen G. Hasselbalch, Karen H. Adams, Karin Stahr, Gitte M. Knudsen, and Claus Svarer. *Assessment of the precision in co-registration of structural MR-images and PET-images with localized binding*, in *International Congress Series Volume 1265 , August 2004, Pages 275-280 Quantitation in Biomedical Imaging with PET and MRI. Proceedings of the International Workshop on Quantitation in Biomedical Imaging with PET and MRI*, Elsevier, 2004

4. **Willendrup P** , Svarer C, Hasselbalch SG, Knudsen GM. Comparison of Coregistration Techniques for Neuroreceptor PET images. Society of Nuclear Medicine. Society of Nuclear Medicine, 2002.

5. **Willendrup P** , Svarer C, Hasselbalch SG, Knudsen GM. Precision of Coregistration Techniques for F18-Altanserin PET Images. Cunningham VJ, Myers R. The Fourth International Symposium on Functional Neuroreceptor Mapping of Living Brain. San Diego, CA, USA: NeuroImage, 2002: S85.