

## Curriculum vitae with track record



### PERSONAL INFORMATION

Family name, First name: LUNDERVOLD, Arvid  
 Date of birth: 13-FEB-1952  
 Sex: Male  
 Nationality: Norwegian  
 Researcher unique ID: ORCID 0000-0002-0032-4182  
 URL for GitHub repo: <https://github.com/arvidl>

### EDUCATION

1995 PhD (Quantitative MR imaging, 25.05.95), Department of Physiology, University of Bergen  
 1982 MD, Faculty of Medicine, University of Oslo, Oslo, Norway  
 1975 BSc (Mathematics, Analytic philosophy), University of Oslo, Oslo, Norway

### CURRENT POSITIONS

2022 - Professor em.  
 2005 - 2022 Professor I (physiology / medical information technology), Neural Network Research Group, Department of Biomedicine, University of Bergen, Norway (Head: Prof. Mathias Ziegler / Prof. Frode Berven)  
 2018 - 2022 Professor II (computational radiography), Department of Health and Functioning, Western Norway University of Applied Sciences,

### PREVIOUS POSITIONS

2005 – 2016 Research scientist (20% position), Department of Radiology, Haukeland University Hospital, Bergen, Norway (Head: Prof. Aslak Aslaksen)  
 1998 - 2002 Chief Engineer (20% pos.), Dept. Clinical Engineering, Haukeland University Hospital.  
 1997 - 2005 Associate Professor, Department of Physiology, University of Bergen  
 1994 - 1997 Research scientist, Department of Physiology, University of Bergen  
 1989 - 1994 Research scientist, Image Analysis and Pattern Recognition (BILD) Group, Norwegian Computing Center (Norsk Regnesentral), Oslo  
 1988 Civil service, MRI Laboratory, The Norwegian Radium Hospital / Oslo University Hospital & Norwegian Computing Center, Oslo.  
 1984 - 1988 Consultant / Research scientist, Computer Department & Center for Medical informatics, The National Hospital (Rikshospitalet) / Oslo University Hospital  
 1982 – 1983 Internship for medical authorization (Bærum sykehus / Skjetten legesenter)

### FELLOWSHIPS AND AWARDS

2013 (10) Visiting Professor, Mayo Clinic, Rochester, MN, USA, Department of Radiology, Informatics Division (Head: Prof. Bradley Erickson; <https://www.mayo.edu/research/labs/radiology-informatics>)  
 1993 - 1996 RCN Research fellow, University of Bergen, Department of Physiology, Section for Medical Image Analysis and Informatics (Head: Prof. Torfinn Taxt)  
 1991 - 1993 50% NAVF research fellow in Medical image analysis, Norwegian Computing Center, Oslo / University of Bergen, Department of Physiology (Head: Prof. Torfinn Taxt)  
 1978 Student research fellow (NAVF) in neuroscience (hippocampal slice preparation), Department of Neurophysiology, University of Oslo (Head: Prof. Per Andersen)

### MOBILITY

2013 (06-12) Sabbatical (Meltzer fellowship), UC Berkeley, CA, USA, Helen Wills Neuroscience Institute (Prof. Robert Knight Lab).  
 1991 Visiting scholar, Michigan State University, Department of Computer Science, Pattern Recognition and Image Processing Laboratory (Head: Prof. Anil K. Jain)

### SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

*(Medical Faculty PhD Supervision course - date of completion 10/3/2019)*

Current 1 PhD (Saruar Alam, MedFak 3.1.19 – 2.1.23); 1 PhD (Peder Lillebostad, MedFak 1.9.21 – 31.08.25)  
 2014 – now. 3 PD mentorships (with their PhD from medical image analysis)  
 2001 – now 8 PhD supervisions (their MSc from mathematics, computer science, physiology, medicine)  
 1993 – now 20 MSc supervisions (with their BSc from mathematics, informatics, physics, biology)

**COLLABORATIVE RESEARCH PROJECTS LED BY APPLICANT**

- 2018 – 2023 “Computational medical imaging and machine learning – methods, infrastructure and applications”; PI: A.L., co-PI: Assoc. Prof. Alexander S: Lundervold Western Norway University of Applied Sciences; Funded by the TMF/ UoB. Tot. 27.7 MNOK (<https://mmiv.no/machinelearning>)
- 2010 - 2011 “A hybrid approach to motion correction of MRI of human kidney”; Partners: Lundervold; Prof. L. Schad / Frank Zöllner, U Heidelberg, DE; Funded by RCN, (DAADppp)
- 2006 – 2007 “Brain tissue segmentation and morphometry ...”; Partners: Lundervold; Prof. V Barra, Blaise Pascal University, FR; Funded by RCN / French Ministry of Research (AURORA)

**TEACHING ACTIVITIES (several hands-on courses are fully digital on GitHub with lectures on YouTube)**

- 2017 – 2020 Work Package leader (Computational biomedicine and machine learning) in “Open Educational Resources in Computational Biomedicine”, Funded by EU Erasmus+ Strategic Partnership for Higher Education: <https://github.com/oercombiomed> with KI(sv), SDU(dk), UEF(fi), UTU(fi), UiB(no). Responsible for the coding part (Python Jupyter notebooks) of the Summer schools: <https://github.com/oercombiomed/Seili-2019> and <https://github.com/oercombiomed/Seili-2020>
- 2018 Awarded 50 KNOK for «The best teacher at the Faculty of Medicine in 2018»
- 2019 – Initiated «Artificial Intelligence and Computational Medicine» ([ELMED219](#); 6 ECTS at UiB/HVL)
- 2006 – Initiated «In vivo imaging and physiological modelling» (BMED360; 10 ECTS), MSc / PhD level. Course material publicly available on <https://github.com/computational-medicine/BMED360-2021>
- 1999 – Teaching postgraduate courses (lectures / labs) in Molecular and Cellular Neuroscience, Gastro-intestinal physiology, Circulatory Physiology, and Neurobiology (MED3, [BMED320](#), BMED340, BMED350) at Medical School and Masters’ Programme in Biomedical Sciences, University of Bergen.
- 1979 Organizer/lecturer at Summer school in algebraic group theory for young scientists (Foreningen Unge Forskere), Voss, Norway, supported by the RCN.
- 1974 - 1975 Teaching assistant, undergraduate mathematics, Department of Mathematics, University of Oslo

**ORGANISATION OF SCIENTIFIC MEETINGS**

- 2007 Functional Renal MR Imaging and Modelling Workshop, Oct 4-6, Bergen, Norway  
- <http://www2.die.upm.es/costb21> (funded by COST B21; 14 participants, 6 nations)
- 2006 Renal MRI Workshop, Dec 8, Bergen, Norway - <http://www2.die.upm.es/costb21> (funded by COST B21; 21 participants from 8 countries)
- 2002 Tissue texture in MRI, May 2-4, Bergen, Norway (European workshop funded by COST B11 / UiB; 28 participants from 10 countries)

**INSTITUTIONAL RESPONSIBILITIES**

- 2021 - Member of the leadership group, [KIN](#) (Artificial Intelligence in Norwegian Health Care)
- 2017 - 2020 Board member, Centre for Digital Life Norway Research School (<https://www.ntnu.edu/dln/dlnrs>)
- 2009 - 2016 Board Chairman, Norwegian Research School in Medical Imaging (RCN-funded -> 2016)
- 2013 Faculty member, IEEE SPS Summer School on Biomedical Image Processing and Analysis, June 8-14, Dubrovnik, Croatia
- 2002 - 2004 Board member, Bergen Center for Computational Science

**COMMISSIONS OF TRUST**

- 2021 - Editor Board, “Diagnostics” IF 3.1 (MDPI)
- 2010 - Review Editor, “Frontiers in Neuroinformatics” IF 2.6 (Frontiers)
- 1997 - Associate Editor, “Computerized Medical Imaging and Graphics” IF 3.75 (Elsevier)
- 2021 Review panel member, ANR CE45 Mathematics and digital sciences for biology and health (France)
- 2014 & 2015 Review panel member, Neuroscience, Research Council for Health of the Academy of Finland
- 2015 Review Board: EU Joint Programme for Neurodegenerative Disease Research (pre-proposals), JPNP Joint Call Secretariat, Bonn Germany
- 2015 Referee Royal Society Medal and Awards nominations, UK (Prof. Ke Chen, Applied Mathematics)
- 2012 Scientific Evaluation: The Royal Society Industry Fellowship - University of Liverpool, Department of Mathematical Sciences, UK.
- 2017 - 2021 European COST CA16103 – PARENCHIMA (“Magnetic Resonance Imaging Biomarkers for Chronic Kidney Disease” - <https://www.cost.eu/actions/CA16103>). MC subst. & WG member.
- 2016 - 2020 European COST CA15124 – NEUBIAS (“A new Network of European Bioimage Analysts to advance life science imaging” - <https://www.cost.eu/actions/CA15124>). MC & WG member.

- 2007 - 2011 European COST BM0601 – NEUROMATH (“Advanced methods for the estimation of human brain activity and connectivity” - <https://www.cost.eu/actions/BM0601> MC & WG member.
- 2003 - 2007 European COST B21 (“Physiological modelling of MR image formation” - <https://www.cost.eu/actions/B21>). MC & WG member.
- 1998 – 2002 European COST B11 (“Quantification of magnetic resonance image texture” - <https://www.cost.eu/actions/B11>). Management Committee and Working Group member.
- 2000 Evaluator: European Science Foundation; Wellcome Trust Joint Infrastructure Fund; the NATO scientific and Environmental Affairs Division.
- 2019 /2020 Invited expert to Paris by the French National Agency for Research (ANR) being on the evaluation panel regarding the call “Research and teaching chairs in Artificial Intelligence” under the 1.5 B€ EURO program “AI for Humanity” ([www.aiforhumanity.fr](http://www.aiforhumanity.fr))
- 1996 – Reviewer: Acta Radiologica, BMC Medical Imaging, Computer Methods and Programs in Biomedicine, Frontiers in Neuroscience, Human Brain Mapping, IEEE Trans. on Medical Imaging, Neuroimage, PLoS ONE, Medical Image Analysis and more.

### MEMBERSHIPS OF SCIENTIFIC SOCIETIES

- 2008 - Founding member: the MedViz research cluster (now in MMIV <https://mmiv.no>)
- 1994 - Founding member: the Bergen fMRI Group - <http://fmri.uib.no>
- 1984 - Memberships: the Norwegian Medical Association, the International Society for Magnetic Resonance in Medicine, the Society for Neuroscience, IEEE Computer Society (Life time member), and the American Mathematical Society.

### MAJOR COLLABORATIONS

Prof. Kenneth Hugdahl, fMRI, Department of Biological and Medical Psychology, U Bergen. NO  
 Prof. Helwig Hauser, medical visualization / cohort analysis, Department of Informatics, U Bergen, NO  
 Prof. Antonella Zanna Munthe-Kaas, image registration, Department of Mathematics, U Bergen, NO  
 Prof. Astri J. Lundervold, cognitive aging, Dept. of Biological and Medical Psychology, U Bergen, NO  
 Prof. Andrzej Materka, image analysis, Inst. of Electronics, Lodz University of Technology, Lodz, PL  
 Prof. Bogdan Matuszewski, Head of Robotics and Computer Vision Research Laboratory, UCLAN, UK  
 Prof. Lothar Schad, MRI physics, Chair in Computer Assisted Clinical Medicine, U Heidelberg, DE  
 Prof. Jan Modersitzki, image processing, Inst of Mathematics and Image Computing, U Lübeck, DE  
 Prof. Vincent Barra, brain MRI, Engineering School in Computer Science, Blaise Pascal University, FR  
 Prof. Andres Santos, MRI processing, Director of BIT, Technical University of Madrid, ES  
 Profs. Kristine Walhovd and Anders Fjell (both ERC Starting & Consolidator grantees), LCBC, U Oslo, NO  
 Assoc. Prof. Alexander S. Lundervold, machine learning / computational medicine, HVL/MMIV, NO

### TEN YEAR TRACK-RECORD

Current research interests are in the fields of medical image processing and pattern recognition; multimodal and functional imaging (in brain and aging, kidney and in oncology); image segmentation; image registration; longitudinal imaging; imaging-based biomarkers; mathematical and statistical modeling including machine learning. Lundervold has been programming in C and later MATLAB, R, and PYTHON/Jupyter Notebooks - <https://github.com/arvidl> (on a weekly basis) for the last 30 years.

Google scholar (November 2022): 9470 citations in total; h-index: 47

- [1] Lundervold, AS, **Lundervold A.** An overview of deep learning in medical imaging focusing on MRI. Zeitschrift für Medizinische Physik, 2019;29(2):102-127 (most downloaded and cited article from ZMP ever, and awarded best paper in 2019 (1285 citations; <https://www.sciencedirect.com/science/article/pii/S0939388918301181>)
- [2] Lundervold A.J, Bøe T, **Lundervold A.** Inattention in primary school is not good for your future school achievement – A pattern classification study. PLoS One 2017 Nov 28;12(11):e0188310 (manuscript, data, and code by A.L. at <https://github.com/arvidl/inattention-populationsample> )
- [3] Hodneland E, Kögel T, Frei DM, Gerdes H-H, **Lundervold A.** CellSegm - a MATLAB toolbox for high-throughput 3D cell segmentation. Source Code for Biology and Medicine 2013;8(1):16. (99 citations; <https://github.com/ehodneland/cellsegm>)
- [4] Lundervold AJ, Vik A, **Lundervold A.** Lateral ventricle volume trajectories predict response inhibition in older age - A longitudinal brain imaging and machine learning approach. PLoS One 2019;14(4):e0207967. (<http://MMIV-ML/lvv-ri-new>)
- [5] Hodneland E, Ystad M, Haász J, Munthe-Kaas AZ, **Lundervold A.** Automated approaches for analysis of multimodal MRI acquisitions in a longitudinal study of cognitive aging. Computer Methods and Programs in Biomedicine 2012;106:328-341. (23 citations)
- [6] Westlye ET, **Lundervold A,** Rootwelt H, Lundervold AJ, Westlye LT. Increased hippocampal default mode synchronization during rest in middle-aged and elderly APOE e4-carriers: relationships with memory performance.

Journal of Neuroscience 2011;31(21):7775-7783. (178 citations; ET Westlye was my PhD student)

[7] Ystad M, Hodneland E, Adolfsdottir S, Haász J, Lundervold AJ, Eichele T, Lundervold A. Cortico-striatal connectivity and cognition in normal aging: a combined DTI and resting state fMRI study. *Neuroimage* 2011;55(1):24-31. (137 citations)

[8] Ystad M, Eichele T, Lundervold AJ, **Lundervold A**. Subcortical functional connectivity and verbal episodic memory in healthy elderly - A resting state fMRI study. *Neuroimage* 2010 Aug 1;52(1):379-388. (125 citations)

[9] Klauschen F, Goldman A, Barra V, Meyer-Lindenberg A, **Lundervold A**. Evaluation of automated brain MR image segmentation and volumetry methods. *Human Brain Mapping* 2009 Apr;30(4):1310-1327. (263 citations)

[10] Lu Z, **Lundervold A**, Tjøstheim D, Yao Q. Exploring spatial nonlinearity using additive approximation. *Bernoulli* 2007;13(2):447-472. (Google scholar: 43 citations; providing Erdős number 4 <https://wwwwp.oakland.edu/enp>)

**[Most cited publications:]** Lundervold AS, **Lundervold A**. An overview of deep learning in medical imaging focusing of MRI. *Zeitschrift für Medizinische Physik* 2019;29(2):102-127 (IF: 7.2, 1285 citations, ); Lysaker M, **Lundervold A**, Tai X-C. Noise removal using fourth-order partial differential equations with applications to medical magnetic resonance images in space and time. *IEEE Transactions on Image Processing* 2003;12:1579-1590 (IF: 11.2, 1071 citations)

**[Most pioneering publications:]** **Lundervold A**, Erslund L, Gjesdal KI, Smievoll AI, Tillung T, Sundberg H, Hugdahl K. Functional magnetic resonance imaging of primary visual processing using a 1.0 T scanner. *International Journal of Neuroscience*, 1995;81:151-168. (the first fMRI paper in Scandinavia, and also in whole of Continental Europe; the #9 fMRI publication (#1-#7 from the US, #8 from UK) in the ISI Web of Science sorted from “oldest to newest”)

Taxt T, **Lundervold A**. Multispectral analysis of the brain using magnetic resonance imaging. *IEEE Transactions on Medical Imaging* 1994;13(3):470-481 (138 citations)

**[First international publication:]** Hablitz J, **Lundervold A**. Hippocampal excitability and changes in extracellular potassium. *Experimental Neurology* 1981;71:410-420. (87 citations; three most recent citations: *Journal of Physiology* 2014;592(1):87-102, *PLoS Computational Biology* 2015;11(3):e1004137), *Progr in Neurobiology* 2020 online 13.05)

**[Most scholarly publication:]** **Lundervold A**. On consciousness, resting state fMRI, and neurodynamics. *Nonlinear Biomedical Physics* 2010 Jun 3;4 Suppl 1:S9 (27 citations; incl. *Neuron* 2014;81:35-48, and *The Lancet* 2012;379:1517-1524).

#### **Invited presentations to peer-reviewed, internat. established conferences and/or international advanced schools:**

- Schloss Dagstuhl Seminar (“*Inverse biophysical modelling and machine learning in personalized oncology*”) DE, Jan 8-13, 2023
- *Visual Data Science and its Role in Computational Medicine*. Workshop at TU Delft, February 6<sup>th</sup> 2018.
- *IEEE SPS Summer School on Biomedical Image Processing and Analysis*, Center for Advanced Academic Studies, Dubrovnik, Croatia, June 8-14, 2013. Lecture 1: Texture analysis; Lecture 2: Brain connectivity.
- *2013 Informatics Division Visiting Professor*, Department of Radiology, Mayo Clinic, Rochester, MN, USA, October 29-30, 2013. Lecture 1: Multimodal MR imaging and neuropsychology in a longitudinal project on ‘cognitive aging’; Lecture 2: Methodological and cross-disciplinary challenges in quantitative imaging - integration of tools, algorithms, and competences; Lecture 3: The MedViz research cluster in Bergen - collaborative opportunities.
- *Health Research with Real Impact*, Research School of Health, University of Central Lancashire, Preston, UK, May 15, 2013. Invited lecture: Quantitative medical imaging in health research – Impact on the study of cognitive aging.
- *UCLan’s Distinguished Visitor Programme*, University of Central Lancashire, Preston, UK, May 13, 2013. Invited talk: Imaging of connections in brains and cells - the role of graph theory and network analysis.
- *IEEE 2012 Joint Conference New Trends in Audio & Video and Signal Processing: Algorithms, Architectures, Arrangements, and Applications (NTAV/SPA)*. Lodz University of Technology, Lodz, Poland September 27-29, 2012. Invited talk (in IEEE Explore): Functional MRI – Signal processing algorithms and applications.
- *International Workshop on Image Processing Techniques and Applications*, Centre for Mathematical Imaging Techniques (CMIT), University of Liverpool, UK, June 22-23, 2011. Invited talk: Structural and functional brain connectivity assessed with multimodal MRI and graph metrics.
- *19<sup>th</sup> Annual Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM 2011)*, Montreal, Canada, May 7-13, 2011. Invited speaker for the Sunrise Session on Image Analysis. Lecture: Analysis of texture.
- *4<sup>th</sup> International Conference on Applied Mathematics, Simulation, and Modeling*, Corfu Island, Greece, July 22-25, 2010. Plenary lecture: The role of mathematics in the study of structural and functional brain connectivity.
- *ERASMUS Basic MRI Physics Course*, Lodz, Poland, September 13-17, 2010. Lecture series on functional MRI.
- *IEEE CVPR’96 (Computer Vision and Pattern Recognition): Tutorial on Medical Image Analysis*, San Francisco, CA USA, June 16-20, 1996.

#### **Recent publications (printed or in press):**

[a] Ousdal OT, Kaufmann T, ..., **Lundervold A**, Westlye LT. Longitudinal stability of the brain functional connectome is associated with episodic memory performance in aging. *Human Brain Mapping* 2020;41(3):697-709.

[b] Kaufmann T, ..., **Lundervold A**, ..., Westlye LT. Common brain disorders are associated with heritable patterns of apparent aging in the brain. *Nature Neuroscience* 2019;22(10):1617-1623.

[c] Rahman A, ....., **Lundervold A**, ....., Chekenya M. Sequential bortezomib and temozolomide treatment promotes immunological responses in glioblastoma patients with positive clinical outcomes: A phase 1B study. *Immunity, Inflammation and Disease* 2020;8(3):342-359 (related to <https://clinicaltrials.gov/ct2/show/NCT03643549>)

[d] Hodneland E, ..., **Lundervold A**, ..., Haldorsen I. Automated segmentation of endometrial cancer on MR images using deep learning. *Sci Rep* 2021;11(1):179.

[e] Hillestad EMR, ..., **Lundervold A**, Berentsen B. Gut bless you: the microbiota-gut-brain axis in irritable bowel syndrome. *World Journal of Gastroenterology* 2022;28(4):412-431.