

Curriculum Vitae, Randi Holmestad, May 2012.

Date of birth: 19. October, 1967.
Nationality: Norwegian.
Present position: Professor, Dept. of Physics, NTNU
Scientific Adviser, SINTEF Materials and Chemistry
Marital status: Married, two children.
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Research interests

Holmestad's present research interests are focussed on materials physics; transmission electron diffraction and microscopy (TEM), materials microstructure and the relation to macroscopic properties. Ongoing projects are on quantitative electron diffraction, aluminium alloys, hydrogen storage materials, solar cell materials, thermoelectric materials and new functional materials.

Education

'**Sivilingeniør**' (MSc) in Materials Physics, Norwegian Institute of Technology (NTH), University of Trondheim. 1991, Final Mark: 1.6 ('Very Good').

'**Doktor Ingeniør**' (PhD), Dept. of Physics, NTH, 1994. Title of thesis: "Quantitative Electron diffraction. Energy filtering and studies of bonding effects in TiAl." Mark : 1.0. ('Outstanding')

Pedagogical Education (PUFS), 1992. Average mark: 2.2

Experience

Postdoc, Dept. of Physics (TEM group) NTH (1994 - 1995)

Researcher, SINTEF Materials Technology, Applied Physics (1995 –1996)

Postdoc (NFR) 'Electronic structure of intermetallic alloys', NTNU, ASU and MPI (1996-1999)

Professor, Dept. of Physics, NTNU (1999 -

Scientific adviser, SINTEF Materials and Chemistry (2001-

Visiting appointments

1993: 6 months stay at Arizona State University (ASU) visiting Prof. John Spence, working with Drs. Jian Min Zuo and Andreas Weickenmeier.

1995: 2 weeks at Max Planck Institute (MPI) in Stuttgart, Germany, March, in Professor Manfred Rühle's group, visiting Dr. Andreas Weickenmeier.

1996: 4 weeks stay at MPI in Stuttgart, Nov., as a part of the Postdoc study.

1997: 6 months stay at ASU, Feb.-Aug. as a part of the Postdoc study.

2005: 6 months sabbatical at University of Illinois (UIUC), visiting Prof. Jian Min Zuo.

2006: 1 months stay at UIUC

Scientific publications and lectures

101 articles listed in ISI Web of Science; H-index 15, 674 citations, plus ~80 articles in conference proceedings (~half international) 8 technical reports, 5 invited talks at int. conferences

Professional memberships:

The Royal Norwegian Society of Sciences and Letters, Norwegian Academy of Technological Sciences, Norwegian Physical Society, Electron Microscopy Society of America, European Microscopy Society, Scandinavian Society for Electron Microscopy, Materials Research Society.

International contacts:

Arizona State University, USA: Regent's Prof. John Spence (QCBED bonding charge density)
University of Illinois, Urbana-Champaign, USA, Prof. Jian Min Zuo (QCBED)
Paul-Scherrer Institute, Switzerland: Dr. Peter Derlet (atomistic modelling)
TU Delft, Netherlands: Prof. Henny Zandbergen, Dr. Jouk Jansen (HREM; quant. diffraction)
McMaster University, Ontario, Canada: Prof. Gianluigi Botton, Dr. Carmen Andrei (EELS)
Rouen University/CNRS, France: Dr. Frederic Danoix, Prof. Williams Lefebvre (atom probe)
Toyama University, Japan: Prof. Kenji Matsuda (Aluminium)
Poitiers University, France: Dr. Jerome Pacaud (QCBED)

Project management

Project leader, *Quantitative convergent beam electron diffraction* (1.4 MNOK in total, 2000-03)
Project leader SUP *Micro and nanostructural materials development* (12.1 MNOK in total, 2001-06)
Steering committee; KMB *Heat treatment fundamentals*, NorLight (19.4 MNOK in total, 2001-07)
Project leader NTNU, BIA *Nucleation control for optimised properties* (58 MNOK in total, 2007-12)
Project leader, FRINAT *Fundamental investigations of clustering ..* (11.7 MNOK in total, 2007-11)
Project leader, BILAT KMB, *Japanese-Norwegian Al-Mg-Si prec. project*, (9,6 MNOK, 2009-14)
Leader of TEM Gemini Centre (SINTEF, NTNU) 2006, 2008-
Organised Nordic network (NorFA) for material research 1994-97, and main organiser of a workshop in Electron Diffraction with 20 participants in Trondheim in June 95. Organised a Diffraction Workshop with international participation in Trondheim in May 2008. Leader for a Nordic network within TEM in Nordforsk, NorTEMnet, 2010-2014.
Project leader *NORTEM, Norwegian Centre of transmission electron microscopy*, Large scale infrastructure in TEM, SINTEF, UiO, NTNU, (total project 115 MNOK, 2011-20)

Teaching/Supervision experience

Teaching several courses in physics, and organising laboratory training at NTNU.
Total number of students educated: 43 diploma/Master students, 10 PhD (2 co-supervised). Currently the main supervisor for 3 postdocs, 4 PhD students (co-supervisor for 3) and 3 MSc students.

Prizes/Awards

Poster Prize at SCANDEM in 1991 and 1993. 'Esso forskerpris' 1994; for best Dr.ing. in basic research at NTH in 1994. NIFs (Norsk Sivilingeniøres forbund) prize for young scientist in 1996. Supervisor for Anders Frøseth who got 'Esso forskerpris' in 2003.

Committees and boards

External evaluator for ASU (1), PhD. evaluation committees, Chalmers (1), UiO (1), NTNU (7)
Prof. II evaluation committees, NTNU (3), Ass. Professor evaluation committee, Chalmers (1), UiO (1), Ås (1), UiS (1) and external evaluator Christian Doppler lab (2007),
Board member Dept. of Physics, NTNU (1999-2001)
Member, reference group on Materials Technology, NFR (1999-2000)
Board member Scandinavian Society of Electron microscopy (SCANDEM) (2003 -
Board member UNINETT Sigma, for high performance computing, Norway (2004-2008).
Advisory board for Dept. of Physics, NTNU (2006-2009), Deputy head, Dept. of Physics (2009-2011), Faculty board, Faculty of Natural Sciences and Technology (2009-2011).

Referee

Referee of papers for *Acta Crystallographica*, *Materials Research and Technique*, *Scanning Microscopy Supplements* and *Institute of Physics conference series*, *Journal of physical Chemistry*, *Ultramicroscopy*, *Journal of Applied Crystallography*, *Philosophical Magazine*....

List of educated PhD candidates

- Christophe Birkeland (1997) *Quantitative methods in electron diffraction and microscopy*

(co-supervisor with Ragnvald Høier)

- Knut Lie (2000) *Experimental and ab initio Transmission EELS Near edge fine Structure*

(co-supervisor, with Ragnvald Høier)

- Anders Frøseth (2003) *Atomistic/electronic modelling of precipitation phases in Al-Mg-Si alloys*

(took over from Ragnvald Høier)

- Jesper Friis (2003) *Quantitative Convergent Beam Electron Diffraction and Charge density Studies*

- Carmen Andrei (2004) *Electron microscopy studies of Materials used for hydrogen storage*

- Per Erik Vullum (2005) *Ferroelastic LaCoO₃-based Polycrystalline Ceramics. A Transmission Electron Microscopy and X-ray Diffraction Study*

- Håkon K. Hasting (2006) *Clustering and precipitation in 6xxx Al alloys, TEM and APT studies*

- Heidi Nordmark (2009) *Silicon solar cells –trace elements and hydrogen implantation*

- Wakshum Mekonnen Tucho (2009) *Hydrogen permeable palladium based membranes*

- Ragnhild Sæterli (September 2010) *Electronic structure of thermoelectric and ferroelectric materials*

- Ruben Bjørge (September 2011) *Advanced TEM studies of precipitation in aluminium Alloys*

- Malin Torsæter (September 2011) *Nucleation and precipitation studies in aluminium Alloys*

Doctoral students presently under supervision (4 + 3):

- Astrid Marie F. Muggerud (planned 2014) *3xxx Al alloys*

- Sigurd Wenner (Planned 2014) *Vacancies in 6xxx aluminium alloys*

- Takeshi Saito (Planned 2014) *6xxx aluminium alloys*

- Magnus Nord (Planned 2015) *Thin films, multiferroics*

Co-supervising

- Roya Niri-Dehghan (planned 2012) *Advanced TEM in catalysis* (main; John Walmsley)

- Hanne Kauko (planned 2013) *Quantitative STEM* (main; Ton van Helvoort)

- Jon Holmestad (planned 2013) *Thin films of Al alloys* (main; John Walmsley)

List of selected journal publications for the last 5 years

Marioara, CD, Andersen SJ, Stene TN, Hasting H, Walmsley JC, van Helvoort ATJ, Holmestad R, The effect of Cu on precipitation in Al-Mg-Si alloys, *Philosophical Magazine*, 87, 3385 – 3413, 2007.

Sandberg N, Slabanja M and Holmestad R, Ab initio simulations of clustering and precipitation in Al–Mg–Si alloys, *Computational Materials Science*, 40, 309-318, 2007.

Vullum PE, van Helvoort ATJ, Mastin J, Andersen ØE, Einarsrud MA, Grande T, Holmestad R, Grain boundary analysis and secondary phases in LaCoO₃-based perovskites, *Journal of Materials Science*, 42, 6267-6273, 2007.

Vullum PE, Holmestad R, Lein HL, Mastin J, Einarsrud MA and Grande T, Ferroelastic nano-twinned domains in LaCoO₃-based perovskites, *Advanced Materials*, 19, 4399-4403, 2007.

Vullum PE, Lein HL, Einarsrud M-A, Grande T, Holmestad R, TEM observations of ferroelastic domains in LaCoO₃-based ceramics, *Philosophical Magazine*, 88(8), 1187, 2008.

Rørvik PM, Almli Å, van Helvoort A T J, Holmestad R, Tybell T, Grande T and Einarsrud MA, PbTiO₃ Nanorod arrays grown by self-assembly of nanocrystals, *Nanotechnology*, 19, 225605, 2008.

Eberg E, Monsen AF, Tybell T, van Helvoort ATJ and Holmestad R, Comparison of TEM specimen preparation of perovskite thin films by tripod polishing and conventional ion milling, *Jour of Electron Micr.*, 57 (6) , 175-179, 2008.

Pitt MP, Vullum PE, Sørby MH, Sulic MP, Jensen CM, Walmsley JC, Holmestad R, Hauback BC, Structural properties of the nanoscopic Al₈₅Ti₁₅ solid solution observed in NaAlH₄+0.1TiCl₃ system, *Acta Materiala*, 56, 4691-701, 2008.

Rørvik PM, Lyngdal T, Sæterli R, van Helvoort ATJ, Holmestad R, Grande T, Einarsrud MA, Influence of volatile chlorides on the molten salt synthesis of ternary oxide nanorods/ particles, *Inorganic Chemistry*, 47, 3173-3181, 2008.

Nordmark H, Ulyashin A, Walmsley JC, Holmestad R, TEM study of hydrogen defect formation at extended defects in H plasma treated mc silicon, *Journal of Applied Physics*, 105, 033506, 2009.

Vullum PE, Pitt M, Walmsley JC, Hauback B, Holmestad R, Observations of nanoscopic, face centered cubic Ti and TiHx, *Applied Physics A*, 94, 787-793, 2009.

Sæterli R, Flage-Larsen E, Prytz Ø, Taftø J, Marthinsen K, Holmestad R, Electron energy loss spectroscopy of the L-2,L-3 edge of phosphorus skutterudites and electronic structure calculations , *Phys. Rev. B*, 80, 075109, 2009.

Hasting HS, Frøseth AG, Andersen SJ, Vissers R, Walmsley JC, Marioara CD, Danoix F, Lefebvre W, Holmestad R Composition of β'' precipitates in Al-Mg-Si alloys by atom probe tomography and first principles calculations, *Journal of Applied Physics*, 106, 123527, 2009.

Tucho W, Venvik HJ, Stange M, Walmsley JC, Holmestad R, Bredesen R, Effects of thermal activation on hydrogen permeation properties of thin, Pd/Ag membranes, *Separation and purification Technology*, 68, 403-410, 2009.

Sæterli R, Flage-Larsen E, Prytz Ø, Taftø J, Marthinsen K, Holmestad R, Electron energy loss spectroscopy of the L-2,L-3 edge of phosphorus skutterudites and electronic structure calculations, *Phys. Rev. B*, 075109, 2009.

Bjørge R, Marioara CD, Andersen SJ and Holmestad R, Germanium network connecting precipitates in an Mg-rich Al-Mg-Ge alloy, *Journ. of Electron micr.*, 59, 129-133, 2010.

Tucho WM, Mauroy H, Walmsley JC, Deledda S, Holmestad R , Hauback BC The effects of ball milling intensity on morphology of multiwall carbon nanotubes, *Scripta Mat.*, 63, 637-640, 2010.

Bjørge R, Marioara CD, Andersen SJ, Holmestad R, Precipitation in Two Al-Mg-Ge Alloys, *Metallurgical and Materials Transactions A*, 41A, 1907-1916, 2010.

Sæterli R, Selbach SM, Ravindran P, Grande T, Holmestad R, Electronic structure of multiferroic BiFeO₃ and related compounds: Electron energy loss spectroscopy and density functional study, *Phys Rev. B*, 82, 064102, 2010.

Andersen SJ, Marioara CD, Vissers R, Torsæter M, Bjørge R, Ehlers FJH and Holmestad R, The dual nature of precipitates in Al-Mg-Si alloys, *Materials Science Forum*, 638-642, 390-395, 2010.

Sæterli R, Rørvik PM, You CC, Holmestad R, Tybell T, Grande T, van Helvoort ATJ and Einarsrud MA, Change in polarization direction and structure of ferroelectric PbTiO₃ nanorods during heat treatment, *Journ of Appl Phys*, 108, 124320, 2010.

Torsæter M, Hasting HS, Lefebvre W, Marioara CD, Walmsley JC, Andersen SJ and Holmestad R, The influence of composition and natural aging on clustering during preaging in Al-Mg-Si alloys, *Journ of Appl Phys*, 108, 073527, 2010.

Eberg E, van Helvoort ATJ., Takahashi R, Gass M, Mendis B, Bleloch A, Holmestad R, and Tybell T, EELS investigation of Pb and Ti hybridization with O at the PbTiO₃/SrTiO₃ interface, *Journ. of Appl. Phys.* 109, 034104, 2011.

Vullum PE, Pitt, MP, Walmsley, JC, Hauback, BC, Holmestad, R, TEM characterization of pure and transition metal enhanced NaAlH₄ *Journal of Alloys and Compounds*, 509, 281, 2011.

Sæterli R, Flage-Larsen E, Friis J, Løvvik OM, Pacaud J, Marthinsen K, Holmestad R, Experimental and theoretical study of electron density and structure factors in CoSb₃, *Ultramicroscopy*, 111, 847, 2011.

Torsæter M, Lefebvre W, Marioara CD, Andersen SJ, Walmsley JC and Holmestad R, Study of intergrown L and Q' precipitates in Al-Mg-Si-Cu alloys, *Scripta Materiala*, 64, 817, 2011.

Madaro, F, Sæterli, R, Tolchard, JR, Einarsrud, MA, Holmestad, R and Grande, T, Molten salt synthesis of K₄Nb₆O₁₇, K₂Nb₄O₁₁ and KNb₃O₈ crystals with needle- or plate-like morphology, *Cryst. Eng. Comm.* 13, 1304, 2011.

Bjørge, R, Nakashima, PNH, Marioara, CD, Andersen, SJ, Muddle BC, Etheridge, J, Holmestad, R, Precipitates in an Al-Mg-Ge alloy studied by aberration-corrected STEM, *Acta Materialia*, 59, 6103, 2011.

Weigand CC, Bergren MR, Ladam C, Tveit J, Holmestad R, Vullum PE, Walmsley JC, Dahl O, Furtak TE, Collins RT, Grepstad J Weman H, Formation of ZnO Nanosheets Grown by Catalyst-Assisted Pulsed Laser Deposition, *Cryst. growth and design*, 11, 5298-5304, 2011.

Pitt, MP, Vullum, PE, Sørby, MH, Blanchard, D, Sulic, MP, Emerich, H, Paskevicius, M, Buckley, CE Walmsley, J Holmestad, R, Hauback, BC, The location of Ti containing phases after the completion of the NaAlH₄ + xTiCl₃ milling process, *Journ. of Alloys and Compounds*, 513, 597, 2012.

Marioara CD, Nakamura J, Matsuda K, Andersen SJ, Holmestad R, Sato T, Kawabata T, Ikeno S, HAADF-STEM study of beta'-type precipitates in an over-aged Al-Mg-Si-Ag alloy, *Philosophical Magazine*, 92, 1149-1158, 2012.

Pitt MP, Vullum PE, Sørby MH, Emerich H, Paskevicius M, Buckley CE, Gray EM, Walmsley JC, Holmestad R, Hauback BC, Amorphous Al_{1-x}Ti_x, Al_{1-x}V_x, and Al_{1-x}Fe_x phases in the hydrogen cycled TiCl₃, VCl₃ and FeCl₃ enhanced NaAlH₄ systems, *Journ. of Alloys and Compounds*, 521, 112-120, 2012.