CV

Emil Christiansen

Born: February 9, 1991
Nationality: Norwegian
Present position: Postdoctoral Researcher (50%) – Department of Structural Engineering, Norwegian University of Science and Technology (NTNU)
Head Engineer (50%) – Department of Physics, NTNU
Degrees: PhD in physics, NTNU, 2019. MSc in physics, NTNU, 2015. BSc in physics, NTNU 2013.

Contact details

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Research interests

- **Material physics**. Correlating large deformations of macro-scale aluminium structures with changes in microstructure. Transmission electron diffraction and microscopy (TEM) characterization of aluminium alloys subjected to large loads at low triaxiality. Deformation mechanisms in precipitate free zones. Dislocation-precipitate interactions in aluminium alloys. Influence of microstructure on fracture mechanisms.
- **Electron microscopy**. Aberration corrected High-resolution TEM and atomic resolution scanning TEM. Scanning (precession) electron diffraction (S(P)ED). Phase analysis. Orientation mapping. Dislocation imaging. *In situ* deformation.

Education

- **PhD in Physics**, NTNU, 2019. "Nanoscale characterisation of deformed aluminium alloys".
- **Master of Science in Physics**, NTNU, 2015, final grade B. Condensed matter physics, functional materials, characterization techniques, TEM, oxide thin films.
- **Bachelor of Science**, NTNU, 2013. Physics, mathematics, signal processing, measurement techniques, programming

Experience

- **PhD teaching duties**, NTNU. Supervising student laboratory exercises in condensed matter physics and basic physics courses at NTNU as part of the PhD programme (four months).
- **Research assistant**, R. Holmestad, TEM Gemini Centre, NTNU, Trondheim. Updating publication lists, preparing TEM samples, TEM characterization, and instrument calibrations. (June 2014 – January 2015).
- **Student assistant**, Department of Physics, NTNU, Trondheim. Supervising student exercises (laboratory and theoretical) in NTNU courses on undergraduate level (September 2013 – December 2014).

    - Measurement Techniques (TFY4185). Design and analysis of electronic circuits.
    - Physics (TFY4102 and TFY4125). Basic physics.

Languages

- **English**. Listening (C2), reading (C2), spoken interaction (C1), spoken production (C1), writing (C1).

Levels are based on unofficial self-evaluation and refer to the "Common European Framework of Reference for Languages" (A: basic user, B: independent user, C: proficient user).

Skills

- Electron microscopy (HRTEM, STEM, SPED, WBDF, EDS, EELS, multislice image simulations).
- Metallurgy and deformation of aluminium alloys. Dislocation theory.
- Data analysis and machine learning (MATLAB, Python, C++).

Authored publications

Christiansen, Emil; Marioara, Calin Daniel; Holmedal, Bjørn; Hopperstad, Odd Sture; Holmestad, Randi. (2019) Nano-scale characterisation of sheared β" precipitates in a deformed Al-Mg-Si alloy. Scientific Reports. vol. 9.

Christiansen, Emil; Marioara, Calin Daniel; Marthinsen, Knut; Hopperstad, Odd Sture; Holmestad, Randi. (2018) Lattice rotations in precipitate free zones in an Al-Mg-Si alloy. Materials Characterization. vol. 144.

Christiansen, Emil; Nord, Magnus Kristofer; Hallsteinsen, Ingrid; Vullum, Per Erik; Tybell, Per Thomas Martin; Holmestad, Randi. (2015) Structural investigation of epitaxial LaFeO_3 thin films on (111) oriented SrTiO_3 by transmission electron microscopy. Journal of Physics, Conference Series. vol. 644:012002.

Theses

Christiansen, Emil; Holmestad, Randi; Hopperstad, Odd Sture; Marioara, Calin Daniel. (2019) Nanoscale Characterisation of Deformed Aluminium Alloys. Norges teknisk-naturvitenskapelige universitet. 2019. ISBN 978-82-326-4100-0. Doktoravhandlinger ved NTNU (252).

Christiansen, Emil; Tybell, Per Thomas Martin; Holmestad, Randi. (2015) TEM Characterization of LaFeO3 Thin Films on SrTiO3 (111) Substrates. 2015

Co-authored publications

Frodal, Bjørn Håkon; Christiansen, Emil; Myhr, Ole Runar; Hopperstad, Odd Sture. (2020) The role of quench rate on the plastic flow and fracture of three aluminium alloys with different grain structure and texture. International Journal of Engineering Science. vol. 150.

Sunde, Jonas Kristoffer; Christiansen, Emil; Thronsen, Elisabeth; Wenner, Sigurd; Marioara, Calin Daniel; Van Helvoort, Antonius; Holmestad, Randi. (2019) Scanning Precession Electron Diffraction to aid Aluminum Alloy Development. Microscopy and Microanalysis. vol. 25.

Hallsteinsen, Ingrid; Moreau, Magnus; Chopdekar, R.V.; Christiansen, Emil; Nord, Magnus Kristofer; Vullum, Per Erik; Grepstad, Jostein; Holmestad, Randi; Selbach, Sverre Magnus; Scholl, A; Arenholz, E; Folven, Erik; Tybell, Per Thomas Martin. (2017) Magnetic domain configuration of (111)-oriented LaFeO3 epitaxial thin films. APL Materials. vol. 5 (8).

Presentations, conferences and seminars

Christiansen, Emil; Ringdalen, Inga Gudem; Bjørge, Ruben; Marioara, Calin Daniel; Holmestad, Randi. (2019) TEM image simulations of overlapping phases - a case study of sheared β" precipitates in Al-Mg-Si alloys. EMAG. Institute of Physics, Electron Microscopy and Analysis Group; Manchester. 2019-07-01 - 2019-07-04.

Christiansen, Emil; Sunde, Jonas Kristoffer; Lervik, Adrian; Bergh, Tina; Thronsen, Elisabeth; Marioara, Calin Daniel; Wenner, Sigurd; Holmestad, Randi. (2019) Activities on aluminium alloy design in the TEM Gemini Centre. Workshop of the Aluminium Innovation Hub: Digitalisation for smart processes and product design. European Aluminium; Trondheim. 2019-06-12 - 2019-06-13.

Christiansen, Emil; Marioara, Calin Daniel; Marthinsen, Knut; Hopperstad, Odd Sture; Holmestad, Randi. (2018) Lattice rotations in precipitate free zones in an Al-Mg-Si alloy. Topics in ductile fracture of metals. FractAl; Hotel Scandic Nidelven, Trondheim. 2018-10-17 - 2018-10-18.

Christiansen, Emil; Sævareid, Sondre; Frodal, Bjørn Håkon; Marioara, Calin Daniel; Hopperstad, Odd Sture; Holmestad, Randi. (2018) Precipitate Free Zones and Crack Propagation in Al-Mg-Si Alloys. 16th International Conference on Aluminium Alloys (ICAA16). MetSoc; McGill Univeristy, Montréal, Québec. 2018-06-17 - 2018-06-21.

Christiansen, Emil; Chrominski, Witold; Marioara, Calin Daniel; Hopperstad, Odd Sture; Holmestad, Randi. (2017) Precipitate Free Zones in Deformed Al-Mg-Si Alloys. SCANDEM2017. University of Iceland and SCANDEM; Reykjavik. 2017-06-05 - 2017-06-09.

Christiansen, Emil; Marioara, Calin Daniel; Hopperstad, Odd Sture; Holmestad, Randi. (2016) Subgrain-formation in precipitate free zones in aluminium alloys subjected to uniaxial compression. Nasjonal konferanse for Materialteknologi 2016. Norsk Materialteknisk Selskap, Norsk Metallografisk forening, Institutt for Materialteknologi NTNU; Trondheim. 2016-08-24 – 2016-08-25.

Christiansen, Emil; Marioara, Calin Daniel; Hopperstad, Odd Sture; Holmestad, Randi. (2016) Transmission Electron Microscopy of Precipitate Free Zones in Aluminium Alloys Subjected to Uniaxial Compression. SCANDEM2016. Scandem, Nordic Microscopy Society; Trondheim. 2016-06-07 – 2016-06-10.

Christiansen, Emil; Nord, Magnus Kristofer; Hallsteinsen, Ingrid; Vullum, Per Erik; Tybell, Per Thomas Martin; Holmestad, Randi. (2015) Structural investigation of epitaxial LaFeO_3 thin films on (111)

oriented SrTiO_3 by transmission electron microscopy. EMAG (Poster). Electron Microscopy and Analysis Group; Manchester. 2015-06-29 - 2015-07-02.

Education and social contributions

Wenner, Sigurd; Christiansen, Emil; Holstad, Theodor S.; Holmestad, Randi. (2015) Krystaller på atomnivå / Se innsiden av et elektronmikroskop. Researchers' Night. NTNU; 2015-09-25 - 2015-09-25.

Wenner, Sigurd; Nord, Magnus Kristofer; Christiansen, Emil. (2013) Se et elektronmikroskop i aksjon. Researchers' night. NTNU; Trondheim. 2013-09-27.