

Scientific Engineer (Physicist, PhD)
Department of Science and Environment
Roskilde University

Citizenship: Danish
Date of birth: 09 February 1975
E-mail: boj@ruc.dk
Web: dirac.ruc.dk/~boj

Academic qualifications and Appointments

- 2016 **Scientific Engineer (Specialkonsulent)** Dept. of Science and Environment, Roskilde University.
- 2010 **Associate Professor** Physics, Dept. of Sciences, Roskilde University.
- 2007 **Postdoc** Physics, Dept. of Sciences, Roskilde University.
- 2007 **Ph.D.** in Physics, Materials Research Department, Risø National Laboratory.
- 2003 **M.Sc.** in Physics and Mathematics, Roskilde University.

Research and development

I have for the last \approx 13 years focused on experimental materials physics. My main results stem from the development and use of unique methods addressing questions which cannot be investigated by standard techniques.

Large technical projects

- Main “Technical Project Leader” on the RUC–ESS “Huginn” project (2016–2017).
Designed two sample environment devices in close collaboration with the ESS “Sample environment group” and the technical staff at RUC. Managed the production processes at the RUC workshop. Developed a production ready Matlab/EPICS based hardware/software control system.
Main responsible for all project management including documentation.
- Developed software for performing dielectric measurements simultaneous with large scale neutron measurements. Participated in the process of integrating this system with the ILL control system.
- Led the application process and negotiations (2013–2015) for the collaborative project between RUC and ESS: “Huginn — Peltier Based Temperature Controlled Sample Platforms for Neutron Scattering”
- Scientifically responsible in all stages (from specifications to commissioning) of acquiring a physical vapor deposition system for the “Glass and Time” center. An investment of approximately 1.5Mkr (2009).
- Designed and maintains the Matlab based software platform used on the cryostat setups (currently 9 setups) at the Dept. of Science and Environment, Roskilde University (2003 – and continued).

Experimental techniques and development

- Led the adaptation of the spherical geometry specific heat spectroscopy technique (as described below) to high pressure. First results has led to a high profile publication [Roed *et al.*, JCP-comm. (2015)]
- Use and continued improvement of *broadband shear-mechanical spectroscopy* (as developed at Roskilde University), *dielectric spectroscopy*, and related analysis tools. This work has led to a number of publications (most significant [Jakobsen *et al.*, JCP (2005); Niss *et al.*, JCP (2005); Jakobsen *et al.*, JCP (2008); Gainaru *et al.*, PRL (2014)]; Hecksher and Jakobsen, JCP-comm (2014)]).
- Co-developer of a spherical geometry specific heat spectroscopy technique at Roskilde University. The technique has been brought to production level [Jakobsen *et al.*, PRE (2010)], and results used in two high profile publications [Jakobsen *et al.*, JCP-comm. (2012); Gundermann *et al.*, Nature Phys (2011)].
- Developed an X-ray based technique: “High angular resolution 3DXRD” at the Advanced Photon Source (APS, Argonne National Laboratory, USA) (2004 – 2006). The technique was developed in close collaboration with APS scientists and technicians and led to a number of high profile publications [Jakobsen *et al.*, Science (2006); Jakobsen *et al.* Acta. Mat. (2007)].

Techniques: Shear-mechanical spectroscopy, dielectric spectroscopy, specific-heat spectroscopy, wide angle X-ray scattering, X-ray line broadening analysis, complex model based data analysis, and “computer algebra” for modeling experimental techniques.

Hardware-Software integration: Expert in software integration of scientific hardware. Expert Matlab programmer (instrument control and data analysis). Highly experienced in large scale facility control software (EPICS, SPEC, and others). Very skilled in adaptation to new software and programming languages.

Publications in peer-review journals

Co-author of 28 publications published in peer-review journals. First author of 11 of these, including a paper in *Science* (2006), and a Communication in *J. Chem. Phys.* (2012). Senior author on three recent papers, including two Communications in *J. Chem. Phys.*.

Other Publication and dissemination

Other publications: Co-author of a book chapter on “High angular resolution 3DXRD” and 5 not peer-reviewed conference proceedings papers.

Scientific meetings: Participated in 16 international meetings with a total of 10 oral and 7 poster presentations, including two invited talks on mechanical spectroscopy: “7th IDMRCs” (Barcelona, 2013); “6th IDMRCs” (Rome, 2009). Participated in 6 national meetings with 2 oral presentations and 4 poster presentations.

Outreach: Given 12 talks for visiting high-school students on materials physics, (Roskilde university, 2009-2014). Interviewed about glass-science for “Ideer, Weekendavisen” (2009).

International collaborations

- Dr. Alex Holmes (Scientific Engineer, Platform leader for temperature and fields, European Spallation Source, Sweden).
- Dr. Arno Hiess (Head of Neutron Science Division, European Spallation Source, Sweden).
- Dr. Catalin Gainaru (Dept. of Physics, Technische Universität Dortmund, Germany).

Research visits

2004 – 2006	In total 2.5 months spent at “The Advanced Photon Source” (APS), Argonne National Laboratory, USA
2001	Ten weeks international summer school at the “CERN Summer student Program” in Geneva, Switzerland

Teaching

Lecturer: Supplementary course in physics (7.5 ECTS points, 2007 and 2008). Thermodynamics course (7.5 ECTS points, 4 times in the period 2009 – 2012). Experimental physics course (7.5 ECTS points, 7 times over the period 2009 – 2015). Co-developed and lectured on the physics part of a “general introduction to experimental methods” (*BK2*) course (2013 – 2015).

Summer School Lecturing: Lectured at the summer school: “Applications of X-ray and Neutron Scattering in Biology, Chemistry and Physics”-school on KU/DTU (August 2012, 2013, 2015, and 2015).

Supervision: Ph.D. co-supervisor of one student (2012– ongoing, Roskilde University). *De facto* supervisor of one Ph.D.-student on a number of subproject (2007 – 2010, Roskilde University). Supervised five project groups on master’s level (Physics, Roskilde University). Supervised four project groups at bachelor level (Natbas and Nat Bach, Roskilde University).

Organization

- External examiner (censor) in physics (Ingeniøruddannelsernes censorkorps, from 2014).
- Head of Ph.D.-Committee (Roskilde University, 2012).
- Organizer of the weekly *IMFUFA-seminar* (Roskilde University, 2014 and spring 2015).
- Organizer of the “Alumni - annual meeting” for Physics and Mathematics at Roskilde University (2012 and 2013).
- Editor of the “Glass and Time” - Online data repository: glass.ruc.dk/data.
- Editor of “collection of exam problems” IMFUFA-tekst nr. 495 (2013– and continued).