SEMINAR

APPLIED MATHEMATICS AND MECHANICS

FS1031 1 June 2026

A DCAMM seminar No. 805 will be presented by

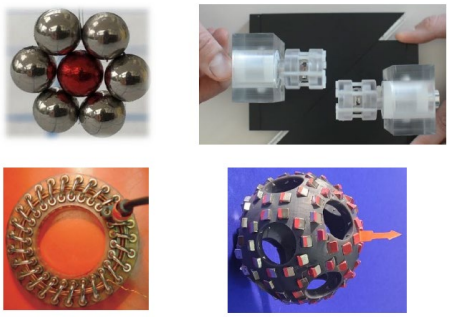
Professor Ingo Rehberg
University of Bayreuth, Germany

The title of the lecture is

From Magnetic Pumps and Gears to Halbach Spheres: Applying permanent magnets

Abstract:
Using magnetic spheres [1] together with an open-source graphical user interface [2], this talk illustrates basic features of magnetic interaction leading to three applications based on magnetic particles:

1) Two dipoles realize two different cogging-free magnetic gears [3].
2) No moving parts are needed to pump magnetic fluids [4].
3) Icosahedral ordering of magnets is best for achieving homogenous fields [5].



[1] S. Hartung et al., Physical Review B 98, 214424 (2018).
[2] I. Rehberg & P. Blümler. Halbach_two_point_oh: Optimize Uniform Fields with Clusters and Rings of Permanent Magnets. Zenodo https://doi.org/10.5281/zenodo.17185412 (2025).
[3] S. Hartung, I. Rehberg, Arch Appl Mech **91**, 1423 (2021).
[4] R. Krauß et al., Pumping fluid by magnetic surface stress, New Journal of Physics 8, 18 (2006).
[5] I. Rehberg and Peter Blümler, Discretized Halbach spheres: Icosahedral symmetry for optimal field homogeneity, Phys. Rev. Appl. (2026).

DATE: **Tuesday, 16 June 2026**

TIME: **13:00 -13:45**

PLACE: **Building 5510, room 104,**
Aarhus University
Åbogade 15, 8200 Aarhus N

Virtual participation: Teams Link Meeting ID: 396 354 126 706 701; Passcode: Xq7xQ6kU

Danish pastry, coffee and tea will be served 15 minutes before the seminar starts.

All interested persons are invited.

Zoran Cenev/Jan Becker Høgsberg