



You are all invited to the lecture:

"Fundamentals of Permanent Magnets: Materials, Basic Design Considerations & Applications"

by

**Gareth Hatch
Dexter Magnetic Technologies**

October 9 2009, 13:00 – 16:00

Aalborg University, Department of Energy Technology,
Pontoppidanstraede 101, room 23

About the lecturer:

Gareth Hatch is Director of Technology at Dexter Magnetic Technologies, a leader in the design, engineering & manufacture of permanent magnet components, devices and systems. His team helps clients in the aerospace, defence, medical, data storage, oil & gas, renewables and industrial sectors. Gareth holds five US patents on a variety of magnetic devices. He is based at Dexter's headquarters in the suburbs of Chicago, Illinois, USA.

Gareth has a B.Eng. with Honours in Materials Science & Technology and a Ph.D. in Metallurgy & Materials, both from the University of Birmingham in the UK. He is a Fellow of the UK's Institute of Materials, Minerals & Mining, a Senior Member of the IEEE, a Member of ASTM Committee A06 on Magnetic Properties and a Chartered Engineer.

Gareth is Newsletter Editor and Chicago Chapter Chair of the IEEE Magnetics Society, a member of the IEEE Industrial Applications Society and a member of the UK Magnetics Society. He is Creator of the Terra Magnetica blog, Founder of the Magnetism & Electromagnetics Interest Group at LinkedIn.com and is a Contributing Editor to the RareMetalBlog.

Gareth can be reached via email at ghatch@dextermag.com. You can also follow him via twitter at <http://www.twitter.com/terramagnetica>.

**All students and employees at the Department of Energy Technology are welcome.
No registration is required.**



Agenda

Part I: Materials (45 minutes)

- 1) The historical perspective
- 2) The magnet material families: Alnico, hard ferrite, Sm-Co & Nd-Fe-B
- 3) Corrosion protection for permanent magnets
- 4) The hysteresis loop

Part II: Basic Design Considerations & Applications (45-60 minutes)

- 5) The effects of magnet geometry on performance
- 6) Dealing with demagnetization
- 7) The principle of magnetic superposition
- 8) Practical applications of magnetic superposition
 - Halbach & Stelter arrays
 - Improved sputtering magnetrons
 - High field gradient biomagnetic separation
- 9) Other lesser-known applications of permanent magnets
 - Pipeline inspection tools
 - Oil well surface-controlled sub-surface safety valves
 - Magnetic couplings
 - Magnetic gears