

2012

March 13-14 • Orlando, FL

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MAGNETICS

The World's Premier Forum on Magnetic Applications,
Technologies & Materials

- **Discover Market Trends & Opportunities**
- **Informative Pre-Conference Workshops**
- **Network with Industry Leaders**
- **Integrate New Technology**

Register by January 26th & Save!

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Schedule: Day 1

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 8:15 AM Opening Address
 8:20 AM Keynote Presentation
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 1:00 PM Track 1 Track 2
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 5:00 PM Cocktail Reception

Schedule: Day 2

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 2:15 PM Conference Conclusion

Contacts

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What's Next?

Attend these Sessions to Discover the Latest Advancements, Economics & Market Opportunities

Rare Earths and Corporate Social Responsibility

Avalon Rare Metals, Inc.

Efficient Use of Rare-Earth Materials - A New Challenge for Designers

MagnetoDynamics LLC

The Metallurgy of Rare Earth Recycling

Colorado School of Mines

Molycorp Update: Phoenix Rising

Molycorp, Inc.

Panel: The Uncertain Future of the Permanent Magnet Industry

Use, Reduction & Probable Remedies of Heavy Rare Earth Metals in Neodymium Iron Boron Alloy System

Tridus Magnetics and Assemblies

Magnetic Modeling, Simulation and Analysis for Space Applications

The Aerospace Corp.

Energy on Demand

Arnold Magnetic Technologies

Registration & Hotel Information

Magnetics 2011

Register by January 26 th	\$695
Register after January 26 th	\$995

Team Discount

If two people from your company will be attending the conference, \$100 will be deducted from each attendee's registration fee. If three or more people from your company will be attending the conference, \$200 will be deducted from each attendee's registration fee.

Federal Pass:

Register by January 26 th	\$495
Register after January 26 th	\$595

Single Day Conference Pass:

Register by January 26 th	\$495
Register after January 26 th	\$595

Expo Only Pass

\$50

Cancellation Policy

To receive consideration, all cancellations must be received in writing. Upon receipt, a refund or credit will be issued towards a future event produced by Webcom Communications, less a 25% administrative fee. (Cancellations which do not indicate preference will be issued credit.) No refunds will be issued within two (2) weeks of the event. Webcom Communications, Corp. will not be held responsible for cancellations or delays in programming due to acts of God, war, government disorder, curtailment of transportation facilities, or other emergency making it inadvisable, illegal or impossible to hold the meeting.

Motors 2011

Conference Upgrade	\$300
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Provides access to both days of the conference and all the conference proceedings.

Ways to Register

By Phone: 800-803-9488
 Web: www.MagneticsMagazine.com

Hotel Information

Rosen Plaza Hotel
 9700 International Drive, Orlando, FL 32819
 1-800-627-8258 • www.rosenplaza.com

A special room rate of \$159 is available for attendees when you reserve your room by February 20th, 2012. Be sure to mention Webcom Communications when reserving.



Register by January 26th for a Special Discounted Rate

Monday, March 12th



Magnetics Bootcamps

Instructor: Dr. Stan Trout • Spontaneous Materials

Basic - Bootcamp I

8:00 am - 12:00 pm
Beverages and Course Materials Provided

Register before February 10, 2012 \$395
Register after February 10, 2012 \$495

The Bootcamp Workshops focus on the basics of Magnetics. If you need to understand magnets better for your job, want to get more from the conference presentations or are new to the field, then Basic - Bootcamp I is the right place to start. Background: Assumes that one has little or no background in magnetics. The Bootcamp I workshop will cover the fundamental magnetic concepts such as hysteresis, what is magnetism, units, basic processing, magnetizing and thermal effects.

Advanced - Bootcamp II

1:00 pm - 5:00 pm
Beverages and Course Materials Provided

Register before February 10, 2012 \$395
Register after February 10, 2012 \$495

If something more advanced is what you are looking for, attend Bootcamp II. Background: Assumes someone has either taken a previous Bootcamp workshop at a Magnetics Conference, taken Bootcamp I, or has some basic technical understanding of magnetics. After a brief review of the basics, including self-demagnetization and loadlines, we will discuss raw materials and their pricing, advanced processing techniques, manufacturability, design basics, new design case studies and what's new on the horizon.

Basic/Advanced Bootcamp Package

8:00 AM - 5:00 PM • Lunch and Course Materials Provided

Register before February 10, 2012 \$595
Register after February 10, 2012 \$695



Magnetic Materials in Finite Element Simulations & Their Application in Electrical Machines

Instructor: Chris Riley • Cobham Technical Services - Vector Fields Software

8:00 am - 5:00 pm
Lunch and Course Materials Provided

Register before February 10, 2012 \$595
Register after February 10, 2012 \$695

This workshop will give a greater understanding of the possibilities for accurately representing the behavior of magnetic materials in finite element simulation. For engineers and scientists who have not used electromagnetic design software before, the program introduces simple material models and assumptions, leading on to advanced topics, such as hard material magnetization and hysteresis, for more experienced designers. Users of the Opera software will find it a useful review of the facilities available and the techniques for accessing them.

Who Should Attend:

- Engineers and scientists using finite element software for modeling all types of magnetic equipment and devices
- Machine designers who are considering adopting finite element methods

Benefits: This workshop will give a greater understanding of the possibilities for accurately representing the behavior of magnetic materials in finite element simulation. For engineers and scientists who have not used electromagnetic design software before, the program introduces simple material models and assumptions, leading on to advanced topics, such as hard material magnetization and hysteresis, for more experienced designers. Users of the Opera software will find it a useful review of the facilities available and the techniques for accessing them.



EMI 401 - Designing Different Filter Topologies

Instructor: Richard Lee (Oz) Ozenbaugh • Ozenbaugh Engineering

8:00 AM - 5:00 PM
Lunch and Course Materials Provided

Register before February 10, 2012 \$495
Register after February 10, 2012 \$695

EMI 401 will offer a short designated "study time" of actual matrix applications so the attendee can use these on special filters. There will be allocated time for designing various filters. The course will use various tables to arrive at component values. At

the end of the class all EMI questions will be answered. When the attendee leaves the workshop, with assistance from the provided CD-ROM, he/she should be able to design a workable EMI filter for whatever topology is required in a matter of a few minutes. Attendees should bring his/her laptop, calculator and a notepad.

Who Should Attend: Power supply designers, system engineers, EMI filter designers, EMI test facility people and motor control people

Tuesday, March 13th

7:00 AM Registration & Continental Breakfast
8:15 AM Opening Address

8:20 AM Keynote Presentation

Rare Earths and Corporate Social Responsibility

This presentation will look at a growing important dimension of performance for current and emerging rare earth producers, that being CSR or Corporate Social Responsibility. In essence, Corporations today are expected conduct themselves in a manner that ensures positive environmental, social and economic performance within governance structures that encourage and ensure such and to be transparent about it. This presentation will not rate individual company performance, but rather, by example, it will describe a growingly accepted international reporting framework, and by way of example, discuss some of hot button issues facing the rare earth industry (e.g. the processing and storage of thorium, social license, water and environmental management, recycling and re-use). It will also share some of the innovative program initiatives that have and are being adopted.

*Ian M London, Energy & Market Development Advisor
 Avalon Rare Metals, Inc.*



9:25 AM
Cost Effective Drivetrains for Multi-Megawatt Wind Turbines with Medium-Speed Permanent Magnet Generators

This presentation will offer attendees an understanding of the drive-train system design trade-offs for a lowest cost of energy wind power generation system. The attendee will understand how magnet costs drive the optimal system solution including distinguishing between market-driven factors (time varying) and physics based constraints. The attendee will be able to articulate the trade-offs between DFIG-based systems and PMG-based systems; direct-drive and gearbox-based systems for multi-megawatt wind-turbine drivetrains.

Dan Saban, CTO • Danotek Motion Technologies



10:00 AM Exhibit Hall Opens / Networking Break

10:45 AM
Usage of Magnetics in Inducted Power Systems

During this presentation the magnetics required for different applications of wireless power transfer will be shown. These applications range from ultra slim designs for charging consumer devices to slip ring replacement systems for use in wind turbines, capable of delivering hundreds of watts wirelessly. Magnetic core shapes, frequencies, and sizes and shielding are discussed, as well as some commonly used magnetic structures. Attendees will leave this presentation with knowledge on the latest developments and breakthroughs concerning wirelessly powered solutions using magnetics, including the capabilities and limitations of this technology.

Mr. Fady Mishriki, CEO • PowerbyProxi



Rare Earth Crisis Dissected: Calculating the Future

2011 has been a year of tumultuous change in the Rare Earth Materials (REM) marketplace, particularly for NdFeB-based materials. Prices have skyrocketed beyond rhyme or reason. The supply chain has been strained beyond capacity. Projects have stalled or designs revamped to exclude or substitute NdFeB. Supplier relationships have been damaged or destroyed. Mines and factories have closed en masse. To predict the future, one must first understand the past and present. This presentation will review the events that led up to the REM crisis, the fall-out and what the future holds: the Causes, the Effects, the Future, and a REM Price Calculator. Every materials scientists, design engineer, purchasing manager, project manager and chief executive needs to take stock of the recent past to understand the future impact of REM on their designs, costing, procurement and supply chain.

John Ebert, Business Manager • Yunsheng USA

11:25 AM
Conserving Heavy Rare Earths Through Effective Utilization of Grain Boundary

Even though new sources of rare-earths will come online in the next few years, heavy rare-earths will continue to be in short supply, and it will remain important to conserve these scarce materials. The Grain Boundary Diffusion Process (GBDP) allows for reductions of heavy rare-earth content in NdFeB magnets. Attend this session to hear how GBDP reduces the need for scarce heavy rare-earths, and how this technology provides significant performance enhancements. The successful application of GBDP magnets in PM Motors will also be covered, along with the benefits this technology brings in terms of performance, material savings and cost reduction.

*Nobuhiro Saito, Magnet Application Specialist
 Shin-Etsu Chemical Co., Ltd Magnet Division*



High Precision and Simple Analog Through-Shaft Magnetic Sensors for the Control of Electric Drives

This presentation introduces the application of a through shaft rotary magnetic position sensor technology developed by MMT to the case of large diameter shafts (typically > 50 mm), which can be used to determine accurately the position of the rotor of an electric machine for smooth control and optimized efficiency.

*Gerald Masson, Business Development
 Moving Magnet Technologies*



12:00 PM Networking Luncheon

1:00 PM

Forward to Alnico

It is known Alnico alloys belong to widespread commercial precision material for permanent magnets. Most current “magneticians” (researchers, metallurgists, technologists, executive officers, etc.) were grown from Alnico alloys. Attend this presentation to hear the fundamental problems of AlNiCo family, from understanding of external temperature and compositional dependences of magnetic properties and up to development of processing of single crystal. Problems of Alnico alloys are important in connection with searching of alternatives to R-E based magnetic materials.



Yuri Rabinovich, CEO • Applied Magnet Technology LLC

Superconducting Rotating Machines – Opportunities & Challenges

The application of superconductivity enables rotating machines which are smaller, lighter, quieter, more efficient, more reliable and scalable. Applied to large motors and generators, these machines could have a major impact for addressing global energy by significantly reducing the cost of energy production and increasing energy efficiency. In addition, the use of superconductivity for machines eliminates the need for rare earth materials and is environmentally benign. This presentation will provide an overview of the opportunities and challenges of superconducting machines and how the Advanced Magnet Lab is applying superconductivity for next generation wind turbines, industrial motors and turbo-electric propulsion.

*Dr. Rainer Meinke, Chief Scientist
Vernon Prince, GM AML Energy
Advanced Magnet Lab, Inc.*

1:40 PM

Use, Reduction and Probable Remedies of Heavy Rare Earth Metals in Neodymium Iron Boron Alloy System

The advent of NdFeB permanent magnets ushered in a slate of new applications that were virtually impossible with the existing families of permanent magnet alloys. The lower Curie Temperatures and the associated thermal magnetization losses of Br and Hci, made the use of NdFeB magnets difficult if not downright impossible, in host of high temperature devices. To enhance the anisotropy field of this family of alloys, a portion of light rare earths was replaced by heavy rare earth metals. The latter enhancement was accompanied by some loss of remanence and the problems of a poor balance between the heavy and light rare earth metals. Attend this presentation to hear about the benefits and the problems associated with the heavy rare earths and the potential attempts to reduce and or avoid the dependence on heavy rare earths wherever and whenever possible.

Shuk Rashidi, Vice President • Tridus Magnetics and Assemblies

**Monte-Carlo Method for Calculating Complex Magnetic Systems**

Fields of magnetized iron structures in the vicinity of current carrying conductors or of permanent magnets are conventionally calculated with Finite Element Analysis by meshing the iron structures or permanent magnet materials. A novel method has been developed that uses a phenomenological approach to calculate even the most intricate assemblies of current carrying coils, soft iron and permanent magnet materials. The method uses the Monte-Carlo technique to model the magnetic domains in the described materials with their proper hysteresis curves. The novel method does not require any meshing and enables determination of magnetic fields of systems that are almost intractable with conventional FEA analysis. Examples of complex systems calculated with the new method are presented.



Sasha Ishmael, Research Scholar • North Carolina State University

2:20 PM

Magneto-Optical Visualization and Analysis of Magnetic Fields

Magneto-optical sensors are capable of visualizing magnetic fields directly without any time consuming scanning effort. Attend this presentation to learn about the manufacturing of magneto-optical sensors and the use of Faraday effect for direct two-dimensional quantitative measurement of magnetic fields. Different sensor types and imaging behavior will be discussed and examples for applications of magneto-optical visualization will be presented.

Morris Lindner, Head of Magneto-Optics Group • Matesy GmbH

The Pull of Stronger Magnets

Nanostructured magnets have great potential for future applications. However, traditional processing techniques are ill-suited for producing nano-magnets. Progress has been made recently by adopting novel “bottom-up” approaches to fabrication of nano-magnets. Salt-matrix annealing, severe plastic deformation and surfactant-assisted ball milling have been applied to prepare nanostructured powder particles including FePt, Sm-Co, Nd-Fe-B and Fe-Co based materials. Warm compaction and explosive compaction have been used to produce bulk nano-magnets. Strong magnetic exchange coupling has been achieved in the compacted samples, making the bottom-up approaches promising for large scale production of strong magnets in the future.

J. Ping Liu, Professor Dept. of Physics • Univ. of Texas - Arlington



3:00 PM

Networking Break

3:30 PM

Energy on Demand

This presentation will describe the theory, design, building and testing of the passive magnetic bearing stabilizing system, which is the core of the passive magnetic bearing system. Arnold Magnetic Technologies (Arnold) and Lawrence Livermore National Laboratory (LLNL) are collaborating on a passive magnetic bearing system initially intended for bulk storage flywheel energy storage systems, but one that may also be transferable to other applications.

*John De Leon, Corporate Marketing Communications Manager
Arnold Magnetic Technologies*



Efficient Use of Rare-Earth Materials - A New Challenge for Designers

The recent volatility in the rare-earth materials markets has not only been a challenge for everyone involved in the supply chain, but has also raised issues for application designers that previously had been only of minor concern. These new issues revolve around how cost effective a design will be during the lifetime of a product (or even by the time a product is launched), and the need to create a number of alternative designs that could be implemented if there is a shift in relative costs. This presentation highlights some of the factors which designers need to consider in order to make the most effective use of these expensive materials.



James Bell, Consultant • MagnetoDynamics LLC

4:15 PM

The Metallurgy of Rare Earth Recycling

This presentation will focus on the metallurgical principles employed in the recycle of magnets. From a metallurgical standpoint, the primary characteristics of magnets will also be described. Then, the unit operations employed will be elucidated. Finally, several known process routes will be presented for effective magnet recycling.



Dr. Corby G. Anderson, Harrison Western Professor at Kroll Institute for Extractive Metallurgy • Colorado School of Mines

5:00 PM

Cocktail Reception

Wednesday, March 14th

7:30 AM

Registration & Breakfast

8:00 AM

Keynote Panel Discussion

The Uncertain Future of the Permanent Magnet Industry

The 2011 industry upheaval regarding the availability and price escalation of NdFeB magnets may have permanently changed the future landscape of the global permanent magnet industry. Future dynamics involving material selection and system designs will likely have a significant long-term industry impact. In addition, some domestic industry participants have been pursuing Federal government support for the development of a domestic NdFeB manufacturing capability. This panel will discuss these and other significant issues challenging both magnet producers and magnet users.

Walter T. Benecki • Walter T. Benecki LLC

John Calico • Moog Components Group

Steve Constantinides Arnold Magnetic Technologies

Lee Langolf • Hitachi Metals America

9:15 AM

Featured Presentation

Molycorp Update: Phoenix Rising

America's largest expansion and development project in rare earth mining and separations is Molycorp's "Project Phoenix" at Mountain Pass, Calif. Attend this presentation to hear an update on the progress in the first two phases of the project. In addition, we will discuss "Molycorp Minerals and Alloys" of Arizona and "Molycorp Sililämae" of Estonia, their contributions to the company, and to that of the overall magnetics space. Other topics will include decoding some of the more confusing aspects of the rare earth situation, Molycorp's physical production of Minerals and Alloys, as well as suggested strategies for dealing with the current global state of affairs.



Dr. Stan Trout, Director, Magnet Business • Molycorp, Inc.

10:00 AM

Exhibit Hall Opens / Networking Break

10:45 AM

High Electrical Resistivity Permanent Magnets for Advanced Motors and Generators

Attend this session to learn about a new magnet technology, which will allow the manufacture of a new class of rare earth permanent magnets with high electrical resistivity. These materials are comprised of a rare earth magnetic phase and ceramic phases, which disrupts or reduces the flow of electrons through the bulk magnet material. This technology is being applied to both rare earth permanent magnet types. Magnets with higher electrical resistivity will enhance electrical efficiency in higher speed motor and generator applications and help enable lower temperature operation, increase power density, reduce complexity and cost, enable higher pole counts, and even mitigate usage of heavy rare earth elements. This presentation will review the current status of development of this Department of Energy SBIR Phase III sponsored work and highlight magnetic, mechanical and electrical resistivity performance.



Peter C. Dent, Vice President of Business Development Electron Energy Corp.

Testing Soft Magnetics – Using Wire

Researching and developing inductive devices that incorporate wire form factor for magnetics was, and is, challenging. But wire (the "easiest" part) became the most challenging. Suitable wire had not yet been produced. In order to produce it, we enlisted smart partners and big organizations to help. The process required testing lots of samples in various configurations from tiny pieces of wire to entire coils. Tests on saturation intensity, coercivity, remanence and relative permeability were required. Attend this session to hear and discuss the results of these new tests.



Harrie Buswell, CEO • Buswell Energy, LLC

11:25 AM

Permanent Magnet Motors in Low Voltage High Speed Applications

Attend this presentation to learn about issues of designing a permanent magnet motor to be used in low voltage applications. These applications would tend to be remote applications that will need to be powered off grid. The power sources for the PM Motors discussed would be constant voltage types as in 12 to 48 volt DC battery powered applications or varying low voltage from remote site sources such as a solar panels or wind generators. The presenter will discuss the design methods of a permanent magnet motor to address and overcome these design issues to produce a high efficient total application of a permanent magnet motor, drive and power source.



*Lowell Christensen, Vice President of Engineering
TruTech Specialty Motors*

Injection Molded Magnets for Electrical Machines

Injection molded magnets are applied for electrical machines in high quantities especially when less power but complex field distributions or geometrical shapes are needed. The magnets are either pole oriented cost effective Ferrites that are magnetized directly in the mold or rare earth magnets, which are mainly magnetized by external pulse magnetizing. For an adequate prediction of the magnets behavior specific analysis tools are needed. After an overview over injection molded magnets including materials, tooling and mechanical system aspects, the analysis methods will be explained by practical examples on magnets where predictions from calculations will be compared to measurements.



*Thomas Schliesch, Head of Research & Development
Max Baermann GmbH*

12:00 PM

Networking Luncheon

1:00 PM

Transformer Modeling Using Finite Element Methods

Finite element methods for simulation of electromagnetic devices are a well established tool. However, their wider uptake for engineering design is often inhibited by the complexity of constructing appropriate models and extracting results. This presentation will discuss developments to overcome this issue using an advanced scripting language, included within a commercial software package, to create macro files that capture the engineering design process for a range of transformer and reactor designs. Topics covered will include the methods used to construct parameterized models, the subsequent analysis and simulation options and the presentation of engineering results. Further developments to integrate the parametric models with design optimization software will also be presented.



*Chris Riley, Technology Manager • Cobham Technical Services
Vector Fields Software*

1:40 PM

Magnetic Modeling, Simulation and Analysis for Space Applications

The Aerospace Corp. has applied magnetic modeling and simulation to qualitatively inspect performance of magnetic parts and components, and their influences on space systems. Space missions require cost effective test programs to safeguard space systems from magnetic interferences and electromagnetic radiations. To reduce risk and increase safety leading to successful test programs, magnetic modeling and simulation was implemented to add value and provide analytical inspection to assist with the test programs. We will present our approach on modeling and simulation of problems such as remnant magnetization as well as application of external magnetic fields on hard and soft magnetic inclusions within targeted space systems.



Mary Boghosian and Ray Herman • The Aerospace Corp.

2:15 PM

Conference Conclusion

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Kolektor Magnet Technology



Contact Sue Hannebrink at 330-725-5812 or SueH@infowebcom.com for information on exhibitor and sponsorship packages.

Supporting Organizations & Media Sponsors



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