AMSER QUARTERLY
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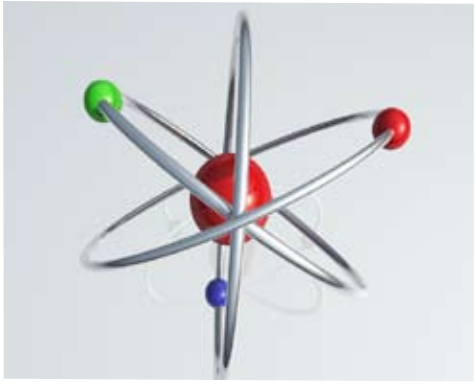
AMSER Spotlight: NACK Center

In addition to collecting individual web resources, AMSER often partners with existing digital collections to bring their excellent materials to AMSER users. One of these AMSER partners is the NACK Center, a National Advanced Technological Education (ATE) Center for Nanotechnology Applications and Career Knowledge. The NACK Center's goals are to: "Support development of two-year degree programs in micro and nanotechnology across the country; Emphasize hands-on laboratory education and attention to the full range of micro and nanotechnology applications; Develop and deliver incumbent worker education programs; Create pathways from secondary schools through associate and baccalaureate degrees; and provide national coordination of micro and nanofabrication workforce development programs and activities."

Nano4Me.org

The NACK Center was established at Penn State College of Engineering and, in addition to the Center, they have created Nano4Me.org, a "community of individuals that serves the national nanotechnology education and workforce development initiatives." Nano4Me.org is maintained by the Penn State College of Engineering and contributers include educators and industry personnel from across the country. On the Nano4Me.org site, the NACK Center confirms their support for the development of two-year degree programs in micro and nanotechnology by offering teaching



resources "suitable for the post-secondary level" as well as for K-12 use. Included in the NACK Center's Nano4Me.org collection is a fantastic selection of nanotechnology teaching resources. AMSER has partnered with the NACK Center to integrate these high quality materials into AMSER's own library. Resources from Nano4Me.org require a quick, easy, and free registration to access, and the high quality content is well worth it. Some examples from this impressive collection include:

Module One: Nanotechnology: What is it, and Why is it so "BIG" now? [ppt]

http://nano4me.live.subhub.com/categories/mod1terms

This module gives an overview of nanotechnology, what the word nanotechnology means, and where it comes from. It also explores the differences between the macro-scale, micro-scale, and nano-scale. Finally, this module explores how old the discipline of nanotechnology is with a brief history and it concludes with an explanation of why nanotechnology is so popular today. This module is the first in a series of ten introductory level modules offered by the NACK Center.

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Materials, Safety, and Equipment Overview for Nanotechnology Laboratory [ppt, doc]

http:// nano4me.live.subhub.com/categories/211labs

This laboratory features an overview of safety, equipment, and materials information regarding nanofabrication. There is an overview and five laboratory modules including Chemical and Hazardous Waste Handling; Vacuum Function, Operation, and Systems; EHS Equipment Safety Awareness; Vacuum Equipment Simulation Lab; and Vacuum Equipment Components and Systems. Each lab includes an objective, background information, detailed procedure, charts and tables, and follow-up questions.

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Basic Nanotechnology Processes

http:// nano4me.live.subhub.com/categories/esc212

Here, AMSER users will find a course that focuses on basic nanotechnology processes. The material is a "hands-on introduction to the processing involved in 'top-down', 'bottom-up', and hybrid nanofabrication." Downloadable features include topics such as introductions to basic pattern transfer, wet etching, and uses of plasmas in processing. Additionally, resources on chemical vapor and physical deposition can be found within this unit.

Module 6: How Do You Make Things So Small? Introdution to Nanofabrication

http:// nano4me.live.subhub.com/downloads/20090506_4

This PowerPoint presentation discusses the basics of nanofabrication, different types of nanofabrication – including top-down, bottom-up and hybrid – and demonstrates these introductory concepts with helpful illustrated examples. This module would be a great resource to use for any introductory lesson in nanofabrication.

You can find the NACK Center at: *http://www.nano4me.org/*

Do you know of a great collection of resources that you'd like to see integrated into AMSER? Do you have a learning object that helps students truly understand a specific concept? If so, e-mail us at resources@amser.org, *or follow the link at the bottom of the AMSER home page to submit a resource suggestion.*

AMSER Features: The Big Bang Theory

Within the AMSER Collection, the AMSER staff has created series of Featured Folders. These Featured Folders are sets of resources aimed at illustrating a given topic by combining six to eight resources on a related topic in a single shared folder. The individual resources in each folder were selected from AMSER's extensive collection and were chosen because each resource helps to demonstrate various aspects of the specific folder's topic. For more details on how to use and find AMSER's Featured Folders, see the Summer 2008 issue of the AMSER Quarterly, which can be found in the About section of AMSER in the "AMSER Quarterly" tab.

With the Scientists at the European Organization for Nuclear Research (CERN) hard at work testing the Large Hadron Collider, the AMSER staff thought it would be fitting to highlight our Featured Folder on the Big Bang Theory and the expansion of the Universe, one of the over 50 Featured Folders within the AMSER collection. This Featured Folder provides links to resources that help illustrate the theories, principles, and concepts of cosmology and the study of the formation and evolution of the universe including the Big Bang Theory. Resources within this folder include:

Cambridge Relativity

http://www.damtp.cam.ac.uk/user/gr/public/

The University of Cambridge's Relativity site provides users with a glimpse at the major issues within theoretical physics and cosmology. Sections cover such diverse issues as black holes, the big bang, cosmic strings, and quantum gravity. Written in a style accessible to the non-scientist and with useful illustrations, the sections describe currently accepted theories, their possible consequences for the fate or origin of the universe, and their limitations. Users may also be interested in a link to Stephen Hawking's website and an introduction to COSMOS, the supercomputer on which many cosmological models are tested. The site also links to a collection of Quicktime movies modeling such things as black hole formation and the interactions and behaviors of cosmic strings.

NASA Cosmology: The Study of the Universe

http://map.gsfc.nasa.gov/m_uni.html

NASA furnishes a fabulous cosmology tutorial about the big bang theory and the evolution of the universe. Visitors can discover the foundation of the big bang theory (general relativity, the Cosmological Principle), the observational tests, and the limitations and extensions of the theory. There is also an extensive list of links that guide users to further information about our universe, including matter, measuring expansion, and the shape of the universe.

To view all the resources from this folder or to see all the AMSER Featured Folders visit http://amser.org/index.php?P=AMSER--FeaturedFolders.

Don't forget to become a fan of AMSER on Facebook - we can be found by searching for The Applied Math and Science Education Repository - or check out our tweets on Twitter at AmserDotOrg. We'll keep you connected with updates on AMSER resources, AMSER events, and all things new in AMSER.

AMSER User's Corner

Lynn Mack teaches mathematics and is the director of instructional development at Piedmont Technical College in Greenwood, SC. She has been a mathematics instructor for over 30 years and believes in using problem-based learning (PBL) to teach mathematics. In addition to her years of instruction and instructional development, Lynn has also worked on a NSF grant, the South Carolina Advanced Technological Education Center for Engineering Technology (SC ATE), for the 16 technical colleges in South Carolina for over 10 years. SC ATE serves as a central resource center for the two-year college engineering technology community and provides a "one-stop shopping website for accessing best practices and exemplary materials for recruiting and retaining students, as well as for teaching engineering technology." SC ATE also provides resources for potential and current ET students and for those who hire associate degree ET graduates." For more information check out SC ATE at http://www.scate.org and be sure to check out the SC ATE resources found within AMSER.

Lynn discovered AMSER at a national NSF meeting and recently began using AMSER in her mathematics classes. She found the tools and resources in AMSER particularly useful when teaching algebra to her Contemporary Mathematics students. In addition to using AMSER in her classrooms, Lynn also gives workshops for K-12 teachers and demonstrates the resources and tools on AMSER in these workshops. In these demonstrations she shows them how to use AMSER to enhance their teaching, to encourage their students to use it for career exploration, and how it can be used as tutorial help in math/science courses.

Below are a few of Lynn's favorite resources from AMSER that she showcases in her workshops:

Algebra: In Simplest Terms

http:// www.learner.org/resources/series66.html

In the 26 half hour segments that comprise this instructional series, Algebra In Simplest Terms, host Sol Garfunkel uses real-world examples to help learners understand complex algebra applications. This approach keeps the learner engaged by connecting algebra to their lives. The material found here could easily be used by community college instructors teaching a variety of courses for adult learners including Contemporary Mathematics. For students in majors such as early childhood education, public service, and health science, algebra is often intimidating and algebraic applications in their field are not always obvious. This series helps students not only see that algebraic applications exist everywhere in the world around them but it shows how theory is put into practice—a must for adult learners.

Sloan Career Cornerstone Center

http://www.careercornerstone.org/

The Sloan Career Cornerstone Center is "a non-profit resource center for those exploring career paths in science, technology, engineering, and mathematics (STEM)." For each discipline the website provides students a sense of what it's like to be a mathematician, engineer, or technician in an industry, business, or government. The website includes a collection of profiles of individuals working in these fields, and each profile includes details on the individual's educational background and job description as well as video footage of each interview. Other features of the website include an overview of applications for each discipline, ranges of compensation for jobs in the field, and descriptions of the sectors in which they might work. Additionally, the site contains resources and advice on how to prepare for and research jobs, as well as ways to continue one's professional development. The Day in the Life section reviews some typical problems, work environments, skills, activities, and offers additional advice for career seekers. The Center offers all this information on a variety of engineering careers including Aerospace Engineering, Industrial Engineering, Engineering Technology, and Nuclear Engineering. The content on the website was originally part of a CD-ROM and video series completed with contributions from various national organizations and associations.

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Focus on AMSER Resources

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Profiles in Ocean Careers

http:// www.oceancareers.com/2.0/profiles.php

This page, from the Centers for Ocean Sciences Education Excellence at Monterey Peninsula College, presents information on Ocean Careers including individual Career Profiles, Employer Profiles, Educational Profiles, and Profiles of Interesting People. In the first section, Career Profiles, visitors can find profiles by description or category, including Aquarists, Electrical Engineers, Environmental Consultants, Fish Hatchery Managers, Hydrologists, and many more.

The Profiles of Interesting People has professional biographies of individual people working in ocean careers, including information about their career path, changes in the profession, and what is needed from the future workforce. This is a great site to help faculty and administrators develop their own ocean technology programs and recruit students for them.

Would you like to be featured in a future AMSER Quarterly? We'd love to hear from you and learn about your favorite AMSER resources and how you've been using them in an educational setting. Please e-mail us at amser@amser.org *for details.*

Calendar of AMSER Events

Where in the world is AMSER?

We'll be at various conferences and meetings this year and we'd love to talk to you about what you're doing with digital resources and how we can make AMSER more useful to you and your students. Here's where we'll be and when:

May

NISOD Annual Conference
May 30-June 2, 2010
Austin, Texas

July

HI-TEC Conference
July 26-29, 2010
Orlando, Florida

August

Annual Conference on Distance Teaching and Learning
August 4-6, 2010
Madison, Wisconsin

For more AMSER events and links go to *http://www.amser.org/events*

Contact Information

Have a question? Want to share information about how you're using AMSER or other digital materials in your classroom? Please contact us!

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