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Southern Minnesota Section Newsletter

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The Crop of the Future

The Department of Energy has a goal of generating 5% of all U.S. electricity from wind generators by the year 2020. Many people forecast that by that time, 100,000 MW of power will come from wind sources.

The Southern Minnesota Municipal Power Agency (SMMPA) has just completed installing its first two wind power generators, near Fairmont, MN. Dan Hayes from SMMPA and Stephanie Yrjo from Rochester Public Utilities will be providing details of that installation as well as their future plans for wind power in Minnesota.

Topics covered by the presentation on April 21 will include the background of why there's a push for wind power, the noise and intermittency of wind power, and the list of benefits derived through wind power generation.

The Future of Biomedical Imaging: Fusion of Feature and Scale Space

By Richard A. Robb, Ph.D.

In the past three decades, there has been a remarkable acceleration of advanced technology into the world of medicine and biology, especially biomedical imaging. Current technology permits digital 3-D, 4-D and even 5-D images obtained from medical and biologic imaging systems to be faithfully transformed into multidimensional representations with physical and functional properties synchronized and melded into unified visualizations.

With such representations the viewer can "enter the body or cell", take up any viewpoint (3-D), and observe regional function (4-D, 5-D). Applications extend across a vast range of scale from individual molecules and cells through the varieties of tissue to organs and organ systems, including functional attributes of these systems, such as biophysical and physiological properties. Medical applications include enhanced diagnosis, and treatment planning, surgical rehearsal and intra-operative execution. Biologic applications include cellular, molecular and genetic investigations.

However, even with significant progress in data processing, challenges remain for routine application. These include rapid and accurate multimodality image registration, real-time volume rendering, automated image segmentation and classification and dynamic quantitative measurement.

We will move toward the future successfully the same as we have done in the past, through a synergistic combination of ideas and tools. Good ideas and good tools together are the key to future success, and what a bright future it is. Eventually we will have the kind of totally non-invasive real-time technology that we see in Star Wars and Star Trek movies – devices that simultaneously perform diagnosis and treatment – sort of "one-stop shopping" healthcare.

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IEEE Section Meeting

Dan Hayes & Stephanie Yrjo

Windpower: The Crop of the Future

Monday, April 21, 6:30 pm
Mayo Medical Sciences Building
(321 3rd Avenue SW, Rochester)

► *Pizza at 6:30; Meeting at 7:00* ◄

Stephanie Yrjo is a commercial account representative at RPU, working with commercial customers in Austin, Owatonna, and Rochester to resolve their energy and water issues. She has a bachelor's degree in business from Bemidji State University.

Dan Hayes is manager of Member Support Programs and Agency Communications for Southern Minnesota Municipal Power Agency (SMMPA). He provides technical energy management assistance to customers of SMMPA member utilities, and he is responsible for all communications functions at SMMPA. He has an MBA from Northern Illinois University.

IEEE Computer Society Meeting

Richard A. Robb, Ph.D.
Mayo Foundation

The Future of Biomedical Imaging: Fusion of Feature and Scale Space

Monday, May 5, 6:30 pm
Mayo Medical Sciences Building
(321 3rd Avenue SW, Rochester)

► *Pizza at 6:30; Meeting at 7:00* ◄

Dr. Richard A. Robb is the Scheller Professor in Medical Research and Professor of Biophysics and Professor of Computer Science in the Mayo Medical School and Mayo Graduate School. He is Associate Dean for Academic Affairs in the Mayo Graduate School. He is Director of the Mayo Biomedical Imaging Resource at Mayo Foundation/Clinic.

Dr. Robb has been involved in the development and application of computer systems for processing, analysis, and display of biomedical image data for over thirty years. He has been principal investigator on several research grants and has over 300 publications in the field of biomedical image processing, including five books and 30 book chapters. He has patented several inventions related to display, manipulation and analysis of computer-generated medical images. He has directed development of comprehensive software packages which provide advanced capabilities for multidimensional biomedical image visualization and analysis in basic research, clinical practice and education. These software packages are used in over 300 institutions around the world and have been licensed to several companies.

(Continued from page 1) Multidimensional and multispectral images of structure and function in the human body obtained over a large scale of size, ranging from microscopic to macroscopic, will be synergistically integrated and fused together, facilitating understanding of disease and minimally interventional treatment far beyond current applications.

For example, as we learn more from the identification and dissemination of the human genome, characteristics of normal function and of specific diseases will be identified at the genetic and cellular level, each having correspondence in expression at the organ and system level. Knowing the unique relationships and connecting pathways between these "cause and effect" molecular, biologic, physiologic and anatomic elements will vastly improve diagnosis and guide development of effective treatments based on image guided technology. Future systems will permit rapid navigation and detailed exploration of all regions and objects in the body, from entire torso to individual organs to interstitial spaces to single cells, with instantaneous translocation, if desired, and appropriate scaling provided automatically or as selected by the navigator. Physiologic processes may be observed as well, at systemic, organ or cellular levels of detail and mapped precisely onto anatomy.

This mode of visualizing anatomy and physiology simultaneously over large differences in size may be referred to as "fusion of feature and scale space". Such capabilities will provide highly specific and synchronous diagnosis and therapy.

The Institute of Electrical and Electronics Engineers, Inc.
Southern Minnesota Section

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