
September 2006

Rock River Valley Section

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Event

Sense

The Institute of Electrical and Electronic Engineers, Inc.

RRVS Section and Computer/Control Systems Chapter Meeting

Precision Control for Micro-Scale Manufacturing

WHEN Thursday, September 28, 2006

WHERE

Rock Valley College, Woodward Technology Center, Rooms 117/119. I-90 to Riverside Blvd., exit and go west to Mulford Rd. Go south to 2nd light, turn east into RVC. Follow road to left to last building on right.

AGENDA

6:00 PM Networking
6:30 PM Dinner
7:30 PM Presentation

PROGRAM

Established tools for the manufacture of systems with micro-scale features include standard lithography techniques. This talk examines a different method for micro-scale manufacture called Micro-scale Robotic Deposition (MRD). This is a solid freeform fabrication technique whereby material is deposited to rapidly "build up" complex 3 dimensional structures. We will introduce a system that focuses on the creation of periodic, lattice-like structures with several potential applications. This is truly an interdisciplinary research effort involving Materials Science, Manufacturing, and Controls.

The main topic of this talk centers on the control aspects of the MRD problem, particularly the precision motion control problem. The peri-

odic nature of the systems under construction allow for the use of an Iterative Learning Control (ILC) approach to positioning problem. ILC utilizes information from a previous attempt at a task to update a feed-forward signal and better the tracking performance on future attempts at the identical task. In this talk we will extend the approach of stabilizing filtering mechanisms that provide robustness to the learning process found in most practical ILC designs by introducing time varying and adaptive filtering techniques. The adaptation is based on Time-Frequency analysis. By identifying where high frequency system dynamics are evident, we are able to adjust a stabilizing filtering mechanism so as to circumvent the standard tradeoff between performance and robustness. In addition to presenting the algorithms, this talk will briefly discuss stability guarantees associated with the method. The talk will present several experimental results that validate the analysis.

SPEAKER

Professor Andrew Alleyne



received his B.S. in Engineering Degree from Princeton University in 1989, in Mechanical and Aerospace Engineering. He received his M.S. and Ph.D. degrees in Mechanical Engineering in 1992,

and 1994, respectively, from The University of California at Berkeley. He joined the Department of Mechanical and Industrial Engineering at the University of Illinois, Urbana-Champaign in 1994. His research interests are a mix of theory and implementation with a broad application focus. He is a Fellow of the ASME, a senior member of the IEEE, and is involved with several other societies where he has contributed extensively as an editor, author, reviewer, and organizer. Further information can be found at <http://mr-roboto.me.uiuc.edu>.

MEAL INFORMATION

Dinner menu: Chicken Primavera, Pasta Primavera entrees, Italian salad, green beans, rolls and fresh fruit for dessert. The costs are: member and student non-members: \$7, non-member: \$11, and student members: \$5. Please make your **dinner reservations** by calling Ginger at 815-394-5696 or sending her an email (ginger.spinasanta@hs.utc.com) by Monday, September 25, at 5pm. Please include the following information: your name, phone number, email address, IEEE member number, and choice of dinner entrée. Unemployed members may call one of the officers for special arrangements.

NOTE

The meeting is open to the general public. You need not be an IEEE member. Guests are welcome. Please call Ginger at 815-394-5696 for questions.

May RRVS Elections-Picnic Recap

The slate of candidates for elected office in the Rock River Valley Section put forth by the Nominating Committee were all unanimously elected by voice vote during the May 26 RRVS Elections-Picnic. That election was for offices to be held during the 2007 calendar year. These were:

Section Chair — Joe Etminan

Section Vice Chair — Paul Hofmann

Section Secretary — Nolan Wanner

Section Treasurer — Adrian Vandergriff

Computer and Control Systems Societies (C&CS) Chapter Chair — Byron Mehl

Power Electronics Society (PELS) Chapter Chair — Neal Clements

Industry Applications Society (IAS) Chapter Chair — Alkesh Patel



It was good to network with old acquaintances and new friends (see pictures below and above).



October RRVS Preview

Dr. Jacek Gieras, currently with Hamilton Sundstrand in Rockford, will discuss the state-of-the-art of electric machines, associated components and contemporary trends of their development. Recently, new topologies of high torque density motors, high speed motors, integrated motor drives and special motors have been developed. Progress in electric machines technology is stimulated by new materials, new areas of applications, impact of power electronics, need for energy saving and new technological challenges. The development of electric machines in the next few years will mostly be stimulated by computer hardware, residential and public applications and transportation systems (land, sea and air).

Chicago/Rockford IEEE Consultants Network Meeting

The next meeting will be on Monday, **September 25, 2006**. The optional informal dinner is at 6:15 PM at Bakers' Square (270 E. Northwest Highway and North Court), and the meeting at 7:30 PM at the Palatine Public Library (700 North Court, Palatine, IL. Please go to <http://www.drblank.com/coaction.htm> for more info. The subject is "How To Find Clients" and the speaker is Dr. Gary Blank.



Submissions to *Event Sense*

Send articles and job ads to the *Event Sense* editor, Bob Parro, via e-mail. Please make submissions by the twenty-fifth of the month. All submissions are subject to editing for style, clarity, and space considerations.

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*Messages for student officers can be left at the NIU Dept of Electrical Engineering,
(815) 753-9974 or e-mail at sb.niu@ieee.org*

The Rock River Valley Section gratefully acknowledges the following companies and university for supporting Section Officers:

Hamilton Sundstrand • Northern Illinois University • BP Technologies

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Rock River Valley Section
Established 1947

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RRVS Calendar

- September RRVS Section Meeting** **September 28**
"Precision Control for Micro-Scale Manufacturing" at Rock Valley College, Rockford, IL
- October RRVS Section Meeting** **October 26**
"Advancements in Electric Machines" at Rock Valley College, Rockford, IL
- November RRVS Section/Student Branch Meeting** **November 30**
TBD at NIU, DeKalb, IL



Joint Computer/
Control Systems
Society Chapter
Established 1995



Industry
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Inside This Issue

- September RRVS Section Meeting Notice1
- October RRVS Section Meeting Preview2
- May RRVS Meeting/Picnic Recap2
- Chicago/Rockford IEEE Consultants Network Meeting2
- 2006 RRVS Officer Contact Information3
- RRVS Calendar4