
September 2008

Rock River Valley Section

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Event

Sense

The Institute of Electrical and Electronic Engineers, Inc.

Sponsored by Rock Valley College, RRVS and IAS Chapter

Advanced Electric Vehicle Concepts for Designing Electric Bicycles

WHEN Thursday, October 2,
2008

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

4:00 PM Bike test ride-open to public
6:00 PM Networking
6:30 PM Dinner
7:30 PM Presentation

PROGRAM

A team of 15 engineers spent almost
3 years using the most advanced
electric vehicle concepts in develop-
ing E+, a state of the art electric bicy-
cle consisting of a hub mounted elec-
tric motor, a hub mounted battery
pack and an advanced electric vehi-
cle controller, all mounted on a sleek
frame which emphasizes the tradi-
tional bicycle look.

The 3-phase brushless motor is
world's first bicycle hub motor to pro-
duce 1000W of output power and
85Nm of torque in package weighing
just 8 Kilograms. The motor has em-
bedded power electronics and digital
controller in the stator of the motor.
The overall efficiency of the motor
and controller of 85% is highest in the
industry. The motor employs Texas
Instrument's TMS320F2801, 32-bit,
100MHz DSP with state of the art

field oriented control.

The 36V, 10 Ahr, NiMH E+ hub pack is
made of 30 D-Cells connected in se-
ries. This first of its kind pack in the
world is capable of sourcing and sink-
ing 50 Amps of motor/regeneration cur-
rent with an advanced Battery Manage-
ment System. The Battery Manage-
ment System protects the cells against
a number of hostile conditions such as
localized over temperature, under-
voltage, and short circuit conditions.
The E+ pack learns fuel gauging based
on charge and discharge patterns of
the user. The whole pack is subdivided
into 6 modules to ensure rapid repar-
ability in the field.

The E+ vehicle controller consists of an
LCD screen and four push buttons. It
displays regular bicycle data such as
Speed, Odometer etc. in addition to in-
formation specific to electric bicycles
such as Battery Gauge, Ahr remaining,
and Time Remaining etc. The E+ vehi-
cle controller also acts as a security
key once removed from the vehicle. It
acts as master on a RS485 network to
control the motor and the battery.

The E+ system has been designed to
be scalable to accommodate auxiliary
battery packs and other accessories
such as iPod, USB interface, etc.

The presentation will discuss design,
development and production of E+ mo-
tor, battery pack and vehicle controller.
The presentation will also discuss engi-
neering challenges related to motor de-
sign, battery pack design, cell perform-
ance variance, packaging, thermal per-

formance, repeatability and manufac-
turability during development in addi-
tion to system integration issues and
future enhancements of E+.

SPEAKER

Mr. **Rakesh Dhawan**, presi-
dent of Electric Motion Systems LLC,
received his BTech in EE from the In-
dian Institute of Technology, the
MSEE from Univ of Minnesota-Twin
Cities, and the MBA from Old Domini-
on University. Mr. Dhawan has held a
number of engineering management
and executive management positions
with a number of companies.

MEAL INFORMATION

Dinner will feature Grilled Chicken
Breast and Vegetable Lasagna. The
costs are: member: \$5, non-member:
\$10, student members: \$2, student
non-members: \$5. Please make **dinner
reservations by calling Ginger
at 815-394-5696 or sending
her an email (ginger.spinasant
@hs.utc.com) by Monday, Sep-
tember 29, at 5pm.** Please include
the following: your name, phone num-
ber, email address, IEEE member
number, and choice of entree. Unem-
ployed members may call the treas-
urer for special arrangements.

NOTE

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

IEEE Chicago/Rockford Consultants' Network Meeting

**** A joint Affinity Group of the IEEE Chicago and Rock River Valley Sections ****

The next meeting will be on Monday, September 29, 2008. The optional informal dinner is at 5:30 PM at Bakers' Square, 270 E. Northwest Highway (corner of North Court), just south of the library, and the meeting at 6:45 PM at the Palatine Public Library, 700 North Court, Palatine, IL 847-358-1216. Please go to <http://ewh.ieee.org/r4/chicago/cn/> for more info. The subject is "**Wind Power Generation Industry in Illinois**" and the speaker is **Kevin Borgia**, Executive Director of Wind for Illinois (WFI), a state-based trade association for the wind energy industry.

Kevin will discuss the basics of wind energy technology, provide a short history of the wind power industry and where it is today, and prognosticate the future for the sector. He will also discuss the wind resource potential in Illinois and other states, and the roles of state and federal policy in expansion. This growth industry will provide many engineering opportunities.

May RRVS Meeting Recap — Annual Election/Picnic

The slate of candidates put forth in the April 2008 RRVS newsletters was approved unanimously by voice vote: Chair — Alkesh Patel, Vice Chair — Paul Hofmann, Treasurer — Adrian Vandergrift, Secretary — Larry Wachowiak, Computer/Control Systems Chapter Chair — Don Zinger, PELS Chapter Chair — Neal Clements, IAS Chapter Chair — Joe Etminan, EMC Chapter Chair — Jamal Shafii. All enjoyed the picnic!

October RRVS Meeting Preview

Roy Leventhal, co-owner of Leventhal Design & Communications, will speak on how signal integrity, power integrity and EMI/EMC performances affect each other and how computer-aided analysis facilitates better designs in a talk entitled "Modeling and Simulation for Signal Integrity & EMI".

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Northern Illinois University Student Branch Officers

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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 colleges for supporting Section Officers:

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Rock Valley College • River North Solutions**

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Rock River Valley Section
Established 1947

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RRVS Calendar

- September RRVS Section Meeting** **October 2**
Advanced Electric Vehicle Concepts for Designing Electric Bicycles, Rock Valley College, Rockford, IL
- October RRVS Section Meeting** **October 30**
Modeling and Simulation for Signal Integrity & EMI, Rock Valley College, Rockford, IL
- November RRVS Joint Section-Student Branch Meeting** **November 20**
TBD, Engineering Building, DeKalb, IL
- January RRVS Section Meeting** **January 29**
Design for Reliability of Energy Processing Systems, Rock Valley College, Rockford, IL

Rock River Valley Section Chapters




Industry Applications Society Chapter

Established 1992




Joint Computer/Control Systems Society Chapter

Established 1995



Power Electronics Society Chapter

Established 1996



Electromagnetic Compatibility Society Chapter

Established 2007

Time-Sensitive Material

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