Volume 10, Issue 3
February/March 2003

Chem nEws

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

Central Jersey Section

February Dinner Meeting

Tuesday, Feb 18, 2003

Effective Mechanical Seal Performance Monitoring; A Key Component to Reducing Fixed Plant Costs"

by Lino Dimichino &
Ronald V. Mumbray

This presentation will outline how manufacturing plants can reduce costs through the use of a mechanical seal tracking system. The speakers will discuss the basics of mechanical seals, how they relate to pump failures, and how to set up a tracking system that helps manufacturing and maintenance personnel identify root causes to manufacturing process problems.

The presentation also shows how one plant – U. S. Steel's Clairton, Pa., coking facility – used this system to **decrease the average cost per day for mechanical seals by over 78 percent.** This straight-forward information will be of use to every manufacturing engineer interested in reducing fixed costs.

Ron Mumbray has been the Vice President – Sales for Anchor Seals, Inc., in Coraopolis, Pa., since 1995. Prior to that, he was the sales manager for the company. Mumbray began his career in the mechanical seal industry with Anchor Packing when he joined that company in 1984. At Anchor Seals,

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March Dinner Meeting

Tuesday, March 18, 2003

Making Polymer Membrane Fuel Cells Work with Practical Fuels

by Jay Benziger
Department of Chemical Engineering
Princeton University

The news has been filled with the eminent arrival of fuel cells as the solution to the zero emission vehicles and improved fuel economy. If we go back 100 years one can find the same claims about fuel cells. In this talk we will review the major types of fuel cells and what has limited their adoption. We will then focus on Polymer Electrolyte Membrane Fuel Cells which are an attractive power source for "zero" emission vehicles.

PEM fuel cells are very sensitive to carbon monoxide in the hydrogen fuel source; yet we have demonstrated CO tolerant operation of PEM fuel cells at 400 K. The operation of Polymer Electrolyte Membrane Fuel Cells to be tolerant of reformed fuels requires proper temperature and humidification control. At temperatures above 100 C we demonstrate the fuel cell must be operated at elevated pressures to keep the polymer membrane properly humidified and the fuel cell functioning.

Elevated temperature and pressure operation of PEM fuel cells requires a systems approach

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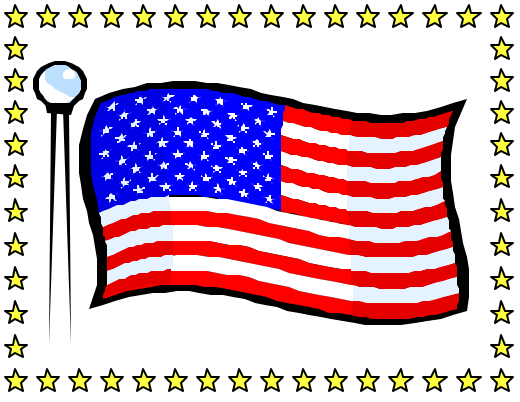
Inside this issue:



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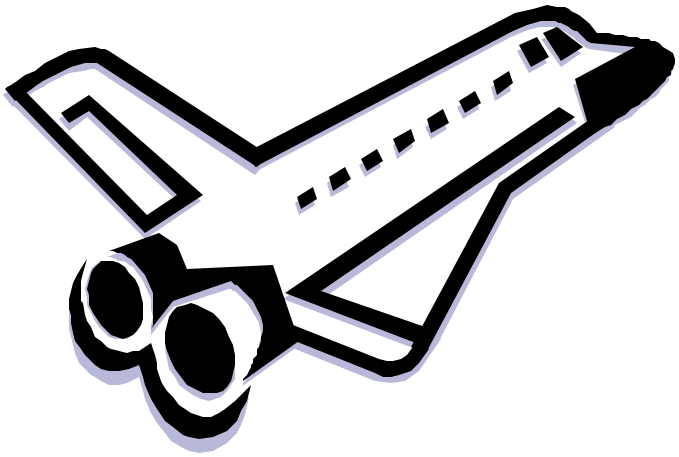
* If you have a change in your mailing address, contact Martha Pelensky
* If you have an article to contribute or want to help out with E-Week, contact David Marabello
* If you have an idea for a meeting, contact Prof Jay Benzinger, Derk Huibers or any section officer
* If you are job hunting, contact Mark DeLuca



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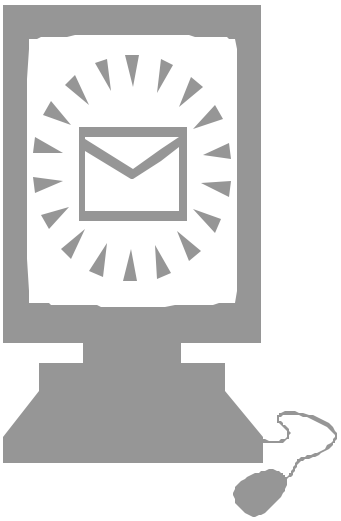


Visit the Central Jersey Local Section website for back copies of the newsletter and other interesting items.

To access our page go to www.princeton.edu/~cjaiche

Linked, The New Science of Networks and What it Means for Chemical Engineers.

Looking back, networks were important in the way our professional careers developed. We formed links with important academic and industrial contributors, rather than random connectors. Maurice Gladwell, the author of "The Tipping Point" found that a random group of 400 educated academics showed an average of 39 social links, with the most social person having 118 links. A network is not a random universe. For example, studies have shown that most Hollywood actors are connected within three links of each other.

The discovery that on the Web, a few hubs grab most of the links, initiated a frantic search for hubs in many areas. On the Internet, the network of physical lines connecting computers worldwide, a few hubs play a crucial role in guaranteeing the Internet's robustness against failures. Hubs also surface in biological cells in the network of molecules connected by chemical reactions. It was recently suggested in Nature that the hublike nature of the p53 protein is the key to understanding the processes behind many forms of cancer at the molecular level. The hubs in food webs are key in maintaining the ecosystem's stability. Indeed, hubs appear in most large complex networks that scientists and engineers have been able to study so far.

This network theory is hot. The popular book "Linked" by Albert-Laszlo Barabasi, a native of Transylvania, who is now a physics professor at the University of Notre Dame, describes the scale free networks of the Internet. Perhaps we can invite him as a speaker during his next visit East. It is clear Chemical Engineers can be hubs too. A good start is to attend our Princeton Meetings on a regular basis.

See you soon, Derk Huibers

In celebration of Engineer's Week, members of the local section are planning on visiting the South Brunswick High School AP Chemistry students. We are scheduled for Friday, February 21st in the morning. We have two volunteers and can use a third. Its not too late to volunteer. Please call David Marabello for details at 732-225-7000.

As you know, National Engineers' Week is the time to reach out to our local communities and celebrate the many contributions engineers' make to the quality of our lives. For more information about how to get involved in these programs please visit the Engineers' Week Web site -- http://www.eweek.org/ or contact AIChE's Government Relations / K-12 Outreach Associate, Karen Person, at 202-962-8696 or karep@aiche.org

The FEBRUARY meeting will be held at Princeton University. Dinner will be at Prospect House and the presentation will be in the Friend Center – Room 108. This will require a 5 minute walk between locations.

Social hour…..…5:30 - 6:00 PM
Dinner……..…6:00 - 7:30 PM
Presentation……...7:30 - 9:00 PM

Members & Guests…..…....$20
Students w/ ID……..…..…$10
Unemployed & Retired...…$10

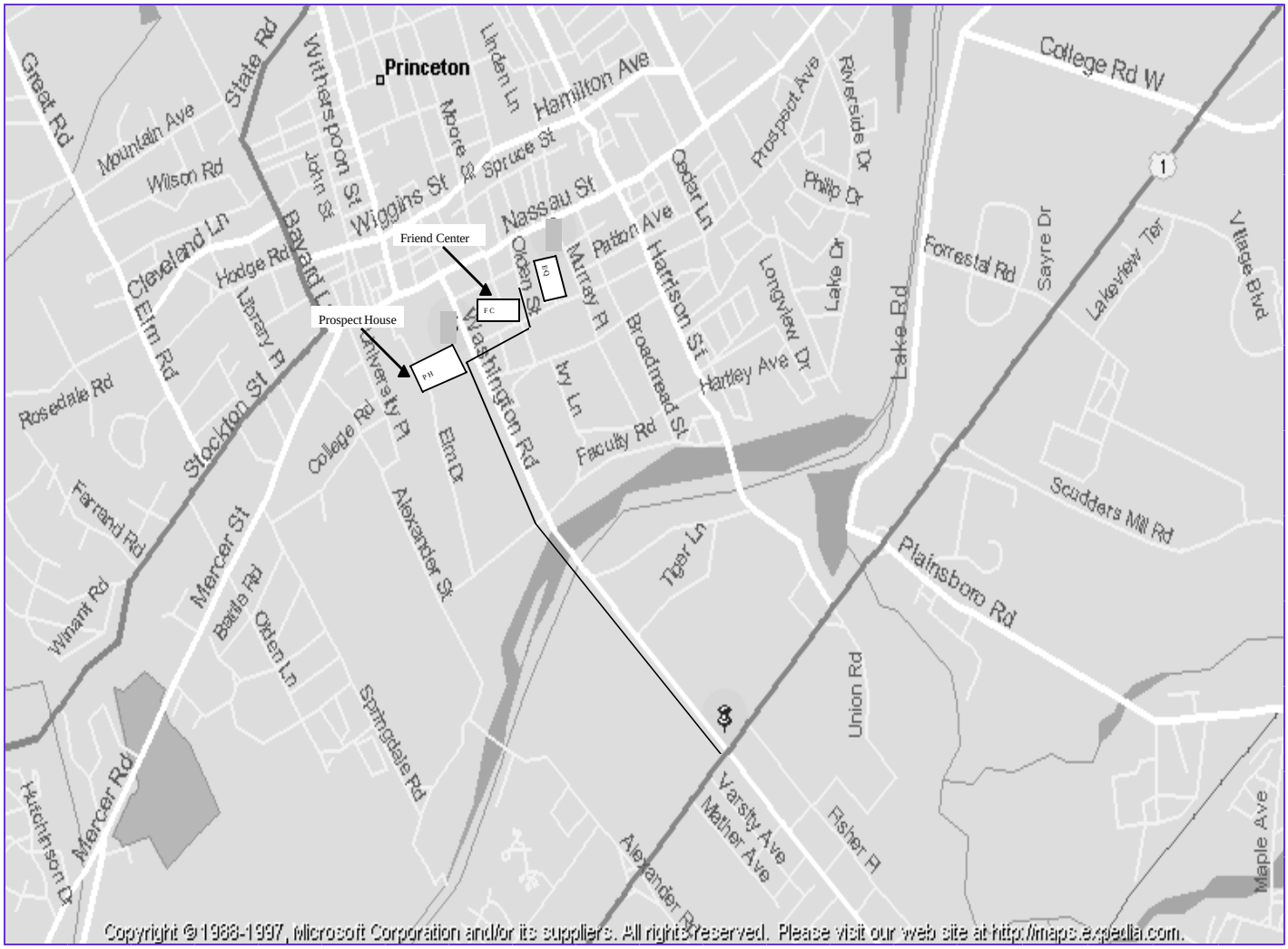
For dinner reservations call Amanda Meyer at 609 258-4572 or email at (ameyer@princeton.edu)

The MARCH meeting will be held at Princeton University. Dinner will be at Prospect House and the presentation will be in the Friend Center – Room 108. This will require a 5 minute walk between locations.

Social hour…..…5:30 - 6:00 PM
Dinner……..…6:00 - 7:30 PM
Presentation……...7:30 - 9:00 PM

Members & Guests…..…....$20
Students w/ ID……..…..…$10
Unemployed & Retired...…$10

For dinner reservations call Amanda Meyer at 609 258-4572 or email at (ameyer@princeton.edu)



DIRECTIONS to PRINCETON UNIVERSITY

Directions to Engineering Quadrangle:
Take Washington Street (Rt 571) West into Princeton from Rt 1 South or Rt 1 North. At the light at the top of the hill, make right turn onto Prospect Street. Continue to the first street on left and turn onto Olden Street. The E-Quad Bldg will be on your right and the Friend Center on your left behind the building that fronts onto Olden across from the E-Quad. Parking is available on the street along Prospect Street, William Street, Olden Street, and at night in the University Parking lots in back of the Engineering Quadrangle or on William Street. If you cannot find the Friend Center easily, remember to ask a student for the building location as the campus is always changing..
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To get to Prospect House:
There is NO parking available in front of Prospect House which is in the center of campus. Park near the E-Quad and walk to Prospect House. Walk east on Olden Street (away from Rt 27) and walk south on Prospect Street to the light at Washington Road (Rt 571). Cross Washington Road and proceed through the arch into the main part of campus. After going through the arch you will be facing the Music Building and Architecture Buildings. Prospect House is directly in back of the Music Building (on left). Continue straight on the walk between the two buildings and you will get to the front entrance of Prospect House just beyond the pavement circle & grass center.

Go to **http://www.princeton.edu/cgi/map** or look under Travel and Weather on the Princeton University main website and you can find directions to Princeton and a detailed campus map. Or call 609 258-2222 for general directions to the Princeton University area.

Professional Development Corner

CareerEngineer is Open for Business.

AIChE's full-service job and resume posting resource is now available online to both engineers and employers, and is helping to take the "monster" out of job search and recruiting.

A free service for engineers, CareerEngineer is a targeted and cost-effective recruiting alternative for employers. Go to the link below for more information.

http://develop.aiche.org/careerengineer/

Dr. David Olson will be the speaker for April 15th. Dr. Olson had a long career at Mobil Research, where he was part of the research team that developed zeolite catalysts. He is now an adjunct professor and does research at the ChemE Dept at the University of Pennsylvania. His talk will address the Benefits of Diffusion Control in Chemical Processes

GO TO PAGE 3/4 FOR MEETING LOCATION, TIMES, DIRECTIONS & DINNER COST INFORMA-

February Dinner Meeting

Mumbray is responsible for managing the company's sales force, and personally handles some of the distributor's largest accounts. Mumbray earned a Bachelor's degree from Allegheny College, Meadville, Pa.

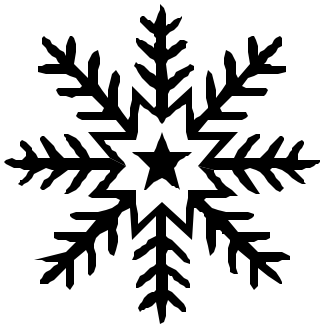
Lino Dimichino has been a Sales Representative for Anchor Seals, Inc., with responsibility for the New England and New York metro regions since 1999. Prior to that, he spent ten years with John Crane, Inc., Fairfield, N. J. During his tenure at John Crane, Dimichino aided in the engineering and design of special mechanical seals for the mixer industry. Dimichino graduated from Passaic County Technical & Vocational in New Jersey majoring in auto body repair.

March Dinner Meeting

to achieve proper control. Humidification control over the fuel cell is critical. Steady state multiplicity has important implications in the design of the flow channels for supply of the reactants. It is critical to match convective and diffusive transport rates in the reactor to maintain the humidification of the membrane. Parallel co-current flow requires humidification of both of the reactant streams for sustained operation. Parallel countercurrent flow only requires humidification of the hydrogen stream. Re-entrant flow schemes can minimize the need for humidification of the reactant streams.

Jay Benziger is Professor of Chemical Engineering at Princeton University. He was educated at Carleton College (BA Mathematics), Columbia University (MS Chemical Engineering) and Stanford University (PhD Chemical Engineering). He has been on the faculty at Princeton for 22 years, where his research has been principally in the area of heterogeneous catalysis and surface chemistry. Over the past two years Professor Benziger has teamed with Professor Andrew Bocarsly to develop new membranes for CO tolerant PEM fuel cells. Professor Benziger has co-authored over 100 papers in refereed journals. He has received the Exxon Award in Solid State Chemistry from the American Chemical Society, and the Purdy Award from the American Ceramic Society.

AIChE Central Jersey Section Chairman's Message



Happy New Year to all our Central Jersey Chemical Engineers and Friends,

We had a fascinating meeting in January with Dr. Al Bourquin from Camp Dresser McKee telling us of new bioremediation efforts to take care of chlorinated aliphatic hydrocarbon compounds in the environment. In our upcoming program for February and March we will have contributions that represent two of the more traditional aspects of chemical engineering. Anchor Seals will make a presentation about the equipment associated with the steel industry. Then in March I thought it would be good to let the local section know more about the activities going on with Fuel Cell Research at Princeton.

I am preparing to travel off for a national meeting examining the revitalization of the Chemical Engineering Curriculum. Major issues face the profession concerning its relevance to the modern world. This has been much worse in Europe where the development of the science base of engineering has been neglected. In the US we see the decline of the petrochemical industry and the rise of biotechnology and information technology, and we need to see how the chemical engineers can contribute to these areas.

We also see the imminent threat of war in the Middle East and we need to wonder what that will do to the energy industry and the ways in which chemical engineers can contribute. I hope to be able to report back to you in the near future about the exciting new initiatives for chemical engineering in the 21st century.

We hope to see you at some of the upcoming meetings.

Jay Benziger

AIChE Newsletter Editor
David Marabello

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