IEEE Madison Section Newsletter

Volume 12, Number 6 Serving IEEE Members of South Central Wisconsin June 2009

Chemistry in the Extreme: Deep Sea Investigation of Hydrothermal Vents and Surrounding Biological Communities

Date/Time: Thursday, June 18, 2009, 11:45 AM – 1:00 PM
(NOTE: June meeting!)
Speaker: Dr. Donald Nuzzio, President, Analytical Instrument Systems, Inc.
Location: Rocky Rococo's Pizza, 7952 Tree Lane (Madison Beltline Hwy. at Mineral Pt. Rd.), 608.829.1444
Menu: Pizza buffet, salad and soft drinks ($5.00 members, $10.00 non-members, free for UW-Madison student members)
RSVP: by June 15th to David Marca via e-mail (dmarca@openprocess.com) or call 617.645.1358

Non-member guests are always welcome!

Due to the water sampling errors that occur at depth, ~2500 meters, a simpler real time solution to understand the chemistry at the bottom of the Ocean was required.

In order to understand why certain species of animals near hydrothermal vents lived in certain proximity to the vents has been a puzzle that scientists have been trying to understand for years. Here at Analytical Instrument Systems, Inc. we have developed an instrument which allows the researcher to look at the chemistry of the water at hydrothermal vents and diffuse flows in real time. Using our instruments aboard Alvin and Jason DSV (Deep Submergence Vehicles) researchers can probe various areas of the ocean floor to understand the chemistry in and around hydrothermal vent area. We have investigated areas on the ocean floor which are on the tectonic plate boundaries. These are the most volcanically active areas on the surface of the planet. In and around these areas life has evolved like nowhere on earth. Bacteria evolved to eat the hydrogen sulfide chemicals which come from hydrothermal vents on the ocean floor. These vents are like the geysers at Yellowstone but they never stop producing hydrothermal fluids which are the food for this unique bacteria that live there. All types of animal species have evolved at these depths and to understand how these animals live and survive here is the question that we are trying to answer.

The AIS ISEA III is the latest in underwater electrochemical instruments designed to produce real time chemical data of hydrothermal fluids and diffuse flow areas. The talk which will be presented will show how we developed this new electrochemical instrument and sensor to investigate one of the last frontiers on earth.

Dr. Nuzzio is president of Analytical Instrument Systems, Inc. (AIS), located in Flemington, New Jersey. He is also an Adjunct Associate Professor at the University of Delaware College of Marine Studies. He has a Bachelor of Science degree in chemistry from Fairleigh Dickinson University in Madison, New Jersey, a Master of Science degree in chemistry and a Doctor of Philosophy degree in analytical chemistry from Rutgers University. His major focus is to develop high-quality, compact, field-portable analytical instrumentation for use in environmental and oceanographic research. What got him into this business was observing the need for analytical instruments to be used at the source, thus allowing for more accurate and precise scientific measurements to be performed.

IEEE Madison Section's 100th Anniversary Celebration!

A Perspective on the Role of IEEE—Past, Present and Future

Date/Time: Friday, September 18, 2009, 5:30 – 7:30 PM
(NOTE: Friday evening meeting!)
Speaker: Russell Harrison, IEEE-USA Sr. Legislative Representative
Location: The Pyle Center, 710 Langdon Street, Madison, WI 53706 (Google map link: <http://tinyurl.com/nfqe6x>)
Menu: There will be a Chicken, Beef and Vegetarian option available for dinner. Exact Menu to be determined in the coming weeks. Cost TBD. (FREE to IEEE Fellows and a Guest)
RSVP: by September 14th to David Marca via e-mail (dmarca@openprocess.com) or call 617.645.1358

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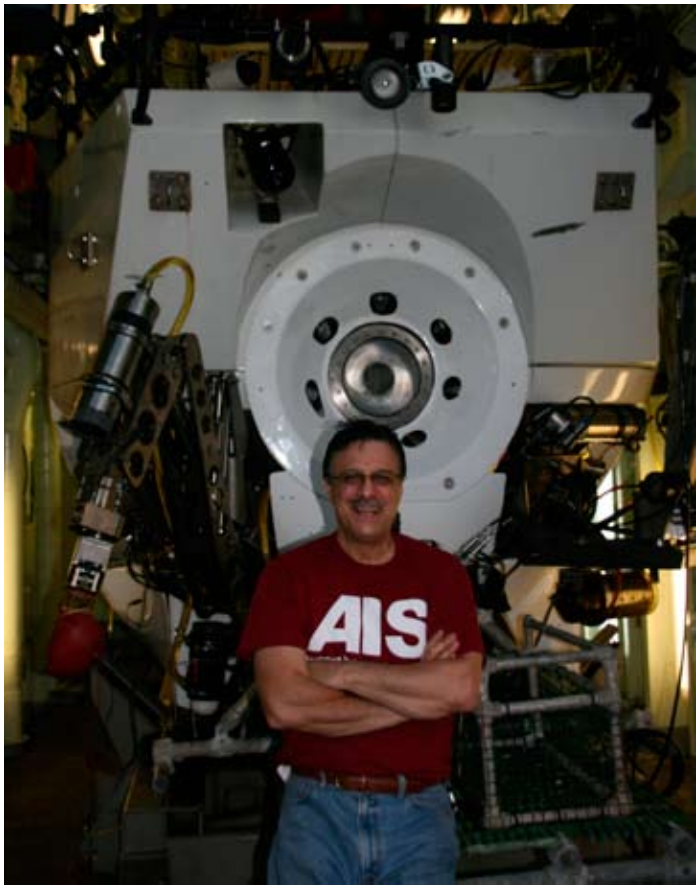
2009 has proven to be a banner year for technology engineers. Our elected leaders in Washington have focused on our profession and our issues like never before. Alternative energy, intellectual property, the Smart grid, Medical IT, and basic research have all been at the center



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of major debates in Congress. K-12 engineering education, small business support and high-skill immigration were also on the table this year. This kind of attention from our elected leaders is usually, but not always, a good thing.

IEEE-USA's Senior Legislative Representative for Grassroots Activities Russell Harrison will explain how all of these debates have impacted the high-tech industry, higher education and the lives of IEEE members. He'll also give us a preview of what to expect the rest of this year and next. He will be helping us celebrate our section's history by putting IEEE into a broader, societal perspective. Our association has helped improve the lives of hundreds of thousands of engineers and their families, but we've also made our country better. Join us for an entertaining discussion of how and what Congress has planned for us next.

The IEEE Madison Section would like to honor the Fellows of its section with a program of their achievements.

The IEEE Madison Section will also be presented with a banner commemorating 100 years of service to Madison area IEEE members.

Controlling signals and return currents on PCB's

Signal integrity, including the relationship between signals, their return currents and EMC/EMI, is now included in-depth in Donald L. Sweeney and Roger Swanberg's seminar/workshop EMC by Your Design. In addition to the textbook Controlling Radiated Emissions and printed handouts, students will receive the textbook PCB Design for Real-World EMI Control by Dr. Bruce Archambeault of IBM. They will see computer simulations of signal currents flowing on PCB's and learn how to control these signals and their return currents. This is in addition to a three-day review of EMC theory, a hands-on practical application workshop, proprietary EMI software, new filter design software with PSPICE simulations, including a student version of PSPICE, and a free product review.

EMC by Your Design
A Practical Application Seminar/Workshop
October 15, 16, 19 & 20, 2009
Northbrook, IL
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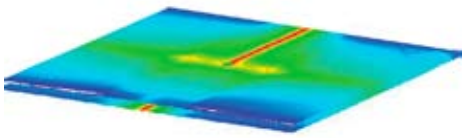
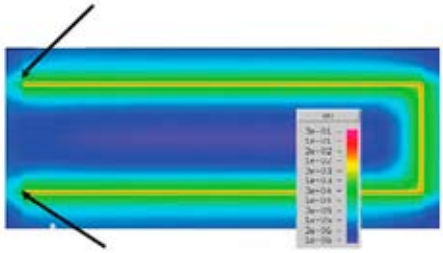


Current changing planes using two capacitors



Current density at 1MHz from source to load

The Parts Box

BY DONALD CHRISTIANSEN

When I was six or seven I had a cardboard carton in which I stored a variety of unrelated parts—coils, resistors, tube sockets, and various other hardware my dad had not needed in constructing his many home-built radios; a door bell that my grandmother had retired because she no longer liked the sound (in later years I became sympathetic to her conclusion that it had become "too quiet"); cabinet hardware that my grandfather had replaced; and bell wire on which I had spent part of my weekly allowance at Woolworth's Five and Ten; to name but a few. I would select parts from the box that I could use in building my own projects. Some were usable in my Lionel tin-plate railroad set-up (and later in my HO-scale layout), others in a less than perfect homemade telegraph key. Still others would end up as an incongruous part of something I had built with my Erector set.

This ancient parts box came to mind as I sat down to write this column. It occurred to me that I have a parts box from which these Backscatter columns emanate, if that is the appropriate verb. It consists of numerous folders into which I file notes, clippings, articles, and partially written columns which, in some cases, may never reach the printed stage. Some of the folder topics are broad: "Engineering Education" or "Ethics" are examples. Others are quite specific: "The Obsolete CD" is one. As my deadline approaches, I riffle through a few of the files, hoping the process will yield from among the disparate topics something that will finally crystallize into a useful theme. The process has not thus far failed me, I think, though you are the better judge of that than I.

I have since discovered that several noted authors admitted to having their own versions of a parts box. F. Scott Fitzgerald, for example, would write sentences or paragraphs that appealed to him, having no notion of which novel or short story he might place them in, if any. He would catalog them for possible opportunistic use at some later date.

Inventing from the Parts Box

Prolific inventor Jacob Rabinow postulated a figurative parts box to describe the successful process of inventing. It is, he said, as if you were to record many related ideas on index cards and then toss them into the air. You would then examine the resulting patterns and juxtapositions as they lay on the floor. By rejecting unpromising groupings and selecting the good ones, he said, a successful invention might then reveal itself. I never had the opportunity to check it out, but I'm guessing that, in his case, the index cards to which Rabinow referred were in his head, where he skillfully tossed them until the concept for one of his more than two hundred inventions emerged.

That thought leads me to my final proposition, namely, that our brain is the most sophisticated parts box of all. As with my cardboard box of yore, we put lots of stuff into it, hoping something useful will emerge. It usually does.

Christiansen is the former editor and publisher of IEEE Spectrum and an independent publishing consultant. You can write to him at donchristiansen@ieee.org.

Free Evaluation for New Medical Standard

D.L.S. Conformity Assessment, Inc. offers compliance testing to the new IEC/EN 60601 Third Edition Medical Device Standard scheduled to go into effect September 2009. To ensure your products are compliant to the new requirements, contact D.L.S. today at 1-847-537-6400 for a free evaluation. www.dlsemc.com/medical

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