



NEWS

Eastern Michigan Chapter *
http://aspe.org/Eastern_Michigan

Serving our membership since 1975

Vol. 15, Issue 9

Plumbing Design Classes

Date: Tuesday, May 15, 2012
Where: Plumbing Industry Training Center
SEE map on back page

No Code Class This Month

DINNER
5:30 - 6:00 PM

Cost: ASPE, ASSE, MBPA Mbrs: NC
Non-members: \$18.00 FOR DINNER

DESIGN CLASS
6:00 - 8:00 PM

Topic: "ASSE" Mixing Values
Speaker: **Tim Kilbane**
National Sales Manager,
with Symmons Industries
See page 3 for program & bio

See the full event schedule on our web site.

REGISTRATION REQUIRED

Dann Holmes, Director/ Chapter Affiliate:
dann.holmes7@gmail.com
(248) 939-2476

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From Joe Hernandez, CPD President Of EMC ASPE



Well, where has the year gone? We have one general membership meeting left and it is a very important one and I'll get to that later. In this year review, I have to say we covered a lot of new ground, beginning last September. We were given an overview of how the construction industry is now viewing the drawings being published by the engineers and it was hosted by John E. Green. The REVIT and Navis works have taken the lead on eliminating interferences before they hit the field.

October brought a panel discussion on a subject that affects us all, "What's wrong with our drawings?" "No finger pointing, just a very good banter of dialog to make our drawings better. Guess what the solution was? Take time to check, check and check. Mistakes hurt the owner, engineer and the contractor and in the end it affects budget, quality and schedules.

We were given a tour last November of the Richard Manoogian Art Collection and later a solid presentation on GREEN plumbing hosted by MASCO Industries. This will happen again because we have been invited back. The art tour is worth the trip alone!

Millipore sent Chris Yarima to give the membership a session on the types of Ultra-Pure Water. The presentation gave an in depth review of laboratory water and its applications.

We started 2012 with another panel discussion on Smart Pumps. The movement to the use of Variable Frequency pumps versus constant speed was alive and well. The weather cooperated and the January meeting went very well.

Speaking of VFDs, Norm Hall of R. L. Deppmann gave the chapter a well received program on Domestic Water Booster Pumps. This subject is not dead because as there is more than one route to Ann Arbor. So you better believe this topic is going to be revisited.

March brought out the Geothermal folks and we owe a great big thank you to Strategic Energy Solutions of Berkley for sponsoring the evening. Mr. Joe Schwartz, PE for giving the chapter a complete breakdown on the design, application and energy conservation of geothermal systems.

April brought out the flowers and a road trip to the University of Michigan. U of M invited the chapter to tour a Class 10 Nano-technology lab. The University was a gracious host and so I say, Go-blue!

Continued on page 3

* Chapters are not authorized to speak for the Society.

NOTICES.....

MICHIGAN BACKFLOW PREVENTION ASSOCIATION Annual Education Conference.

June 5, 2012

8:00 AM - 4:00 PM

At the Plumbing Industry Training Center

1911 Ring Drive, Troy, MI 48235

Details as they become available.

TRAINING CENTER GIVING ASSE BACKFLOW RE-CERTIFICATION

Class offered to any members who are eligible. If you're interested, please call the Training Center at 248.585.1435 and get your name on the sign-up list for the next class.

MED GAS INSTALLERS CERTIFICATION

Most members' Installer's certs will expire before the next Med Gas Standards are issued in 2012. Before your Installer certification expires, you need to apply for an extension with the NITC.

Extension forms are available at the Plumbers Union Hall and Training Center.

ASPE MEMBERS ARE ABLE TO VIEW SPONSORED ARCHIVED WEBINARS FOR FREE

Follow this link: <https://aspe.org/WebinarArchives>

ASPE Is ACCEPTING APPLICATIONS FOR THE ALFRED STEELE SCHOLARSHIP

The Alfred Steele Scholarship is awarded to full-time students enrolled in an engineering degree program at a college, university, or technical school and is limited to ASPE members and their immediate families. Contact Stacey Kidd with any questions @ (847) 296-0002.

2012 ASPE WEBINAR SERIES

Swimming Pool Design Webinar

Wednesday, May 16, 2012

2:00 pm ET / 1:00 pm CT / 12:00 pm MT / 11:00 am PT

Earn Continuing Education Credits: This one-hour contact program provides 0.1 CEU or 1.0 PDH.

This one-hour webinar will provide a basic overview of public indoor and outdoor swimming pool design. The presenter will discuss opportunities design firms can achieve by accepting projects involving swimming pool designs, as well as:

Control Systems for Accurate/Automatic Water Level Control

- Lay out a pool circulation and filtration system
- Components Describe "skimming" action and its importance
- Surge Capacity and its importance Detail level control options and how they function
- Disadvantages of loss of, or lack of control

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Patient Room	
Nurses Station	
Janitorial Closet	
Boiler Room	



HOSPITALITY

Public Restroom	
Guest Bathroom	
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Janitorial Closet	
Boiler Room	

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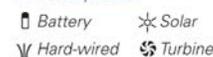


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Past President Report

John Nussbaum, IPP, FASSE



ITT Technical Institute – School of Drafting and Design Technology.

All A&E firms and contractors doing design build work, this information should be of interest to you. I attended a Program Advisory Committee Meeting at the ITT Technical Institute and was overwhelmed by what I heard and saw. I was sent by

Chris Freeman, of MCA Detroit, who was out of town and had asked me to attend in his place. I happened to be in a breakout group led by Pamela Liederbach, School of Drafting & Design at the Institute. Pamela led a discussion of core courses that were being taught at the institute, pointing out the Program Advisory Committee's (PAC) purpose and goals. Listed under campus wants and needs are guest speakers and field trips; local employment, market specific skill needs, brought me into the discussion regarding the needs of our design build contractors as well as the A&E firms who provide the drawings and specifications for the Plumbing & Mechanical portion of the construction industry. One of the goals that ITT Tech has is to assist students in obtaining some real world experience while enrolled at ITT Tech through classroom partnership projects and Student Professional Experience Programs (SPE). SPE's may be paid positions, unpaid - not for credit "internships," and/or volunteer work. Classroom Partnership Projects - Classroom Partnerships can be with a company or a non for profit organization. The curriculum department will focus on the courses most important to employers. Enclosed are two pages of core curriculum subjects you will find, some of which may meet your needs. It was also mentioned that before graduation, they require their students to have a minimum of 135 hours of intern hours. You will also note that on their list of class offerings are CAD Methods, Building Information Modeling (BIM) and Advanced CAD. I have been invited to address the new class coming in September regarding the needs of the plumbing and mechanical industry.

Engineering Society of Detroit (ESD): The ESD's Job Bank web address is: www.jobs.esd.org. Use Promo Code SP when you purchase your job posting. The ESD job bank is part of the Engineering & Science Career Network, a national consortium of 42 engineering and scientific societies. Since joining ESD and attending the affiliate council meetings, I have found that those who attend the council meetings know very little about MCA Detroit and the Plumbing & Mechanical Industry. They, for the most part, are in the automotive, civil and electrical engineering organizations. The president of ESD is a professor at LIT and a member of ASHRE. She has welcomed our presence and active participation. It is a friendly and warm diner atmosphere that we meet in and the speakers have been quality people. These meetings are from 5:30 to 7:30 PM.

Sincerely,

John R. Nussbaum, IPP, FASSE

May Program

"ASSE" Mixing Values



New ASSE standards regarding scalding keep pace with application needs and product advancements in plumbing.

Tim Kilbane is the National Sales Manager at Symmons Industries. Tim began his career at Symmons in 1988 as the Central Regional Sales Manager

and in 1996 he was promoted to National Sales Manager. Tim has over 35 years of plumbing experience including master plumber field expertise, product origination, codes and standards development and application experience. He has been an active member of various standards committees in the industry over the course of his career at Symmons. Tim served as Chairman of the ASSE 1016 Standard Development Working Group, is a member of the ASPE Working Group 15 Hot Water Temperature Committee, and was a member of the IPC Adhoc committee on Temperature Control. Tim currently sits on the Executive Board of Directors of the Plumbing Manufacturers Institute (PMI) and serves as a Co-Chairman of their Water Temperature Device Committee.

President's Report

continued from page 1

This brings us to our final meeting for the year on May 15, 2012; we will have an interesting program to discuss the misunderstood, ASSE mixing valve. Mr. Tim Kilbane, National Sales Manager with Symmons Industries will lead the presentation and discussion. Get your questions ready to fire away at a very knowledgeable person on the subject. The meeting will also usher in the new Board of Directors for the 2012-2013 year. A call for nominations will be conducted at the beginning of the meeting. If you would like to be on the board, let us know your wishes and we will place it on the ballot.

We still have a great roster of book bundles; so if you are interested, just check in with John Nussbaum and he go over the tremendous savings.

I want to thank a few people for all their hard work this year, John Nussbaum, Dann Holmes, Pam Hartsell, John Snyder, Ed Hawley, Barry Pines, George Johnston and especially Theresa Green for being the electronic voice of the Chapter. My friends and esteemed colleagues, the chapter owes you a debt of gratitude and so on behalf of our membership, I say thank you!

So what's doing for next year? That's up to you. We will have a planning session and at that time we brainstorm on building a program that is not only interesting but educational. Got some ideas send 'em to me at: joequalitywaterair@gmail.com. It's your chapter so get involved.

Your president,

Joe Hernandez, CPD

VP Membership Report

Pam Hartsell



The ASPE Eastern Michigan Chapter is one of the larger ones, currently boasting 104 members, and growing all the time.

When I first joined the Board of Directors, I didn't know much about how the chapter operated or how many people we really served. I have

to admit, I was a little surprised to find out how long the list really was.

Over the past year, I've had the pleasure of talking to or e-mailing with almost every one of you, and I have to say, that I honestly couldn't ask for a nicer, more professional group of people to be passionate about plumbing with. Thanks for making my first year so enjoyable and rewarding.

For those who are interested, here are our current numbers directly from ASPE National:

Full Members – 42, Associate Members – 3, Affiliate Members – 32, Special Members – 21, Student Members – 2, Life Members – 2, Retired Members – 2

Of those 104, we have 18 PE's, 12 CPD's.

Congrats Eastern Michigan Chapter – your stats look great!

VP Membership,

Pam Hartsell

About ASPE

ASPE is the only professional organization devoted to the training and certification of plumbing engineers and designers. ASPE and its 6,200 worldwide members are dedicated to protecting the health, welfare, and safety of the public through the dissemination of technical data and information to expand the base of knowledge among plumbing engineers, designers, contractors, code officials, inspectors, and manufacturers. For more information, visit ASPE.org.



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Affiliate Liaison Report

Dann Holmes



I want start my article by again thanking our April meeting host Dennis Schweiger, Sr. Research Supervisor at the Lurie Nanofabrication Facility at the University of Michigan in Ann Arbor. Our offsite meeting was nothing less than IMPRESSIVE as well as informative!!! Dennis and Dave, his assistant did a great job educating us while we walked through the lower level, climbed

stairs, rode the material elevator, toured the upper levels and stepped onto “sticky-mats” that allowed us to enter a room that was part of the ventilation system.

Nearly forty (40) people made the trip, found a free place to park and toured this local treasure, all for an unbelievably low price. It was great to see a strong engineering presence from our industry PE’s and CPD’s. This is what our ASPE EM Chapter is trying to do for you. It’s hard to soak-in everything that was heard and seen in the short 1-1/2 hour tour. For some of us, it was information overload. Please take the time to read Ed Hawley’s article and view the photos. He has captured the facility in all its glory.

As we enter our last month of this season, be sure to attend our meeting on ASSE Mixing Devices. This is a subject everyone has questions on. Come and get yours answered. Tim Kilbane, National Sales Manager for Symmons Industries. He served as Chairman of the ASSE 1016 Standard Development Working Group, is a member of the ASPE Working Group 15 Hot Water Temperature Committee, and was a member of the IPC Adhoc committee on Temperature Control. He currently sits on the Executive Board of Directors of the Plumbing Manufacturers Institute (PMI) and serves as a Co-Chairman of their Water Temperature Device Committee.

I feel confident our manufactures reps involved with ASSE mixing devices will surely find the time and money to sponsor tabletops. Our Chapter needs the funds and you need to show our professionals what you have to offer.

We’re still looking for topics and speakers for next year. If you have suggestions or wish to present to our Eastern Michigan Chapter, please let us know right away. The board will be meeting later this month to put next year’s program together.

As always, I can be reached at dann.holmes7@gmail.com and/or (248) 939-2476.

Regards,
Dann Holmes

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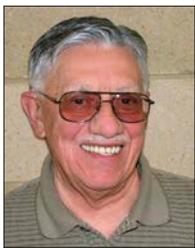


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VP Technical Report

Edwin Hawley CPD



On Tuesday April 17th, 2012, ASPE EMC members were invited to take a tour of the world of tomorrow. Our April monthly Design Program, took us to the University of Michigan in the city of Ann Arbor. Offsite from the main campus sits the University of Michigan's, Lurie Nanofabrication Laboratory, which includes a number of other supporting

systems, as we will describe, towards the center of this article.

The tour of our lifetime was guided by Dennis Schweiger, of the University of Michigan Department of Electrical Engineering and Computer Science (EECS). In his current role as Senior Research Supervisor – LNF Infrastructure, Dennis has been totally involved from the time of conception, design, development, construction, commissioning, start-up, and has been living with it day in and out.

Let's start our article with Geosciences and Environmental Sciences, which can provide the missing link to the micro/nano world. These are found in the NSF-National Nanotechnology Infrastructure Network.

Services . Research . Society & Ethics . Education & Training



NNIN Sites

- Cornell NanoScale Science & Technology Facility at Cornell University
- Stanford Nanofabrication Facility at Stanford University
- Lurie Nanofabrication Facility at the University of Michigan
- Nanotechnology Research Center at the Georgia Institute of Technology
- Center for Nanotechnology at the University of Washington

- Penn State Nanofabrication Facility at the Pennsylvania State University
- Nanotech at the University of California at Santa Barbara
- Nanofabrication Center at the University of Minnesota
- Microelectronics Research Center at University of Texas in Austin
- Center for Nanoscale Science at Harvard University
- Howard Nanoscale Science and Engineering Facility at Howard University
- Colorado Nanofabrication Lab at University of Colorado
- Nanolab at the Arizona State University
- Nano Research Facility at Washington University in St. Louis

Benefits that are offered at NNIN's such as the LNF

- NSF-funded partnership of 14 user facilities strategically located across the country.
- Network above are locations of competence in micro/nanotechnology.
- Open-access to leading-edge tools and capabilities that support research and development goals.
- Technical support from process engineers and domain experts.
- Domain experts in Geosciences
- Free individualized assistance and equipment training.
- Affordable fees to use NNIN capabilities.
- Remote processing available thru NNIN staff.
- Proposal development support for prospective users.
- Workshops and seminars that cater to the needs of the Geosciences and Environmental Community.
- Training, education, and outreach activities.
- Access to a world-class facility that provides broad set of technologies and processes.
- Free proposal development support and project consultation for prospective users.

What is Nanotech?

Nanotechnology is the science and technology of small things – in particular things that are less than 100 nm in size. One nanometer, or nanometre, is a unit of length equal to one billionth of a meter or one millionth of a millimeter. It is denoted as nm and is written as such 10^{-9} . For comparison, a human hair is about 60,000-80,000 nanometers wide.

Scientists have discovered that material at small dimensions – small particles, thin films, etc – can have significantly

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different properties than the material at the larger scale. There are thus endless possibilities for improved devices, structures, and material if we can understand these differences, and learn how to control the assembly of small structures.

There are many different views of precisely what is included in Nanotechnology. In general, however, most agree to that three things are important:

1. Small size, measured in 100s of nanometers or less.
2. Unique properties because of the small size.
3. Control the structure and composition on the nm scale in order to control the properties.

Nanostructures---objects with nanometer scale features---are not new nor were they first created by man. There are many examples of nanostructures in nature in the way that plants and animals have evolved. Similarly there are many natural nanoscale materials....catalysts, porous materials, certain minerals, soot particles, etc that have unique properties particularly because of the nanoscale features. What is new about nanotechnology is that we can now, at least partially, understand and control these structures and properties to make new functional materials and devices. We have entered the era of engineered nanomaterials and devices.

One area of nanotechnology has been evolving for the last 40 years and is the source of the great microelectronics revolution – the techniques of micro – and nano – lithography and etching. This is sometimes called “top-down” nanotechnology. Here, small features are made by starting with larger materials and patterning and “carving down” to make nanoscale structures in precise patterns. Complex structures including microprocessor containing 100s of millions of precisely positioned nanostructures can be fabricated. Of all forms of nanotechnology, this is the most well established. Production machines for these techniques can cost millions of dollars and a full scale microprocessor factory can cost one billion dollars. In recent years, the same “top down” nanoprocessing technique have enabled many non – electronic applications, including micro-mechanical, microoptical, and microfluidic devices.

The other fundamental different area of nanotechnology results from starting at the atomic scale and building up material and structures, atom by atom. It is essentially molecular engineering – often called molecular or chemical nanotechnology. Here we are using forces of nature to assemble nanostructures – the term “self assembly” is often used. Here, the forces of chemistry are in control and we have, at least to date, somewhat less flexibility in making arbitrary structures. The nano materials created this way, however, have resulted in a number of consumer products.

Significant advances are expected in the next decade in this area as we understand more completely in the area of chemical nanotechnology.

And there are many exciting application that combine both

bottom - up and top - down processing – to create for example single molecule transistors that have large (microscopic) leads fabricated by top - down and single molecule assembled from bottom – up.

These materials have unique properties because of their small size. At the nanoscale, properties of materials behave differently and are said to behave under atomic and molecule rules. Researchers are using these unique properties of materials at this small scale to create new and exciting tools and products in all areas of science and engineering.

Nanotechnology combines physics, chemistry, biology, materials science and several engineering departments. It is a highly interdisciplinary area – meaning that involves ideas integrated from many traditional disciplines. Some universities have begun to issue degrees in nanotechnology; others view it as a portion of existing academic areas. Either way many trained scientist, engineers, and technicians in this areas will be required in the next 30 years.

The Federal Government believes that nanotechnology is one of the most important research endeavors for our country. In 2001 it established the National Nanotechnology Initiative (NNI) as an umbrella organization to promote and organize nanotechnology research across the government. Under NNI: ten federal agencies fund nanotechnology research with a current budget of approximately \$1 billion per year. An aggressive set of technology milestones and grand challenges have been set by NNI. In 2004, President Bush signed the 21st Century Nanotechnology Research and Development Act which will further promote nanotechnology research. Other countries around the world have followed with significant programs in nanotechnology.

This website is part of the National Technology Infrastructure Network (NNIN), The National Nanotechnology Infrastructure Network (NNIN), which consists of specialized nanotechnology laboratories at the 14 universities across the nation that was funded in 2004 by the National Science Foundation as a part of the NNI program. The NNIN provides researchers across the nation with economic access to the State – of the – Art nanotechnology facilities.

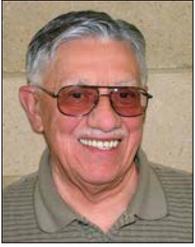
Many are predicting that nanotechnology is the next technical revolution and products resulting from it will affect all areas of our economy and lifestyle. It is estimated that by 2015 this exciting field will need 7 million workers worldwide. The workforce will come from all areas of science and engineering and will include those with two-year technical degrees up to PhD researchers in all universities and industry.

Above “What is Nanotech?” article Authored by Lynn Rathburn, of Cornell, and Nancy Heally, Georgia Tech. Submitted by: ELH.

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The Robert H. Lurie Nanofabrication Facility (LNF) is one of the most advanced and outstanding facilities in United States of America, for research on nanoscale, photonics, quantum electronics, nanotechnology, silicon and compound semiconductor devices, and Microsystems. The LNF offers the following capabilities.

The Laboratories and the entire facility operate on the 24 / 7 / 365 mood and can never shut down. It's primarily designed with all systems having everything backed up with spares and redundancy for every type of systems. This is due to the type of research programs running around the clock with people working their projects. There can be as many as 40 plus people in this facility working at any given time, with as many as 500 different users in the course of a year. Of this total number of user they could comprise of 70% internal and 30% of external, giving the new users greatly benefitting from targeted special incentive programs and the expansive knowledge base of the diverse LNF research community. The support are provided from the local site 71%, Other Colleges / Universities 10%.

Small Companies 14% and Large Companies 5%. The other groups involvement are MEMS 29%, Physical Sciences 6%, Life Sciences 3%, Others 8%, Electronics 27%, Optics 18%, Materials 9%, even a project for Cochlear ear implants (hearing processors).

All divisions of Engineering such as: Electrical, Mechanical, Chemical, Nuclear, Biomedical, Material Science and Engineering, Aerospace, Atmospheric, Oceanic, Physics, Chemistry, Molecular, Cellular, and Developmental Biology are part of and are representative in their contributions as needed and in supportive roles.

LNF can boast of more than 11,000 Square feet (area under filter) of state-of-the-art class, Cleanrooms.

Cleanliness Classifications

Federal Standard 209e ISO Standard 14446

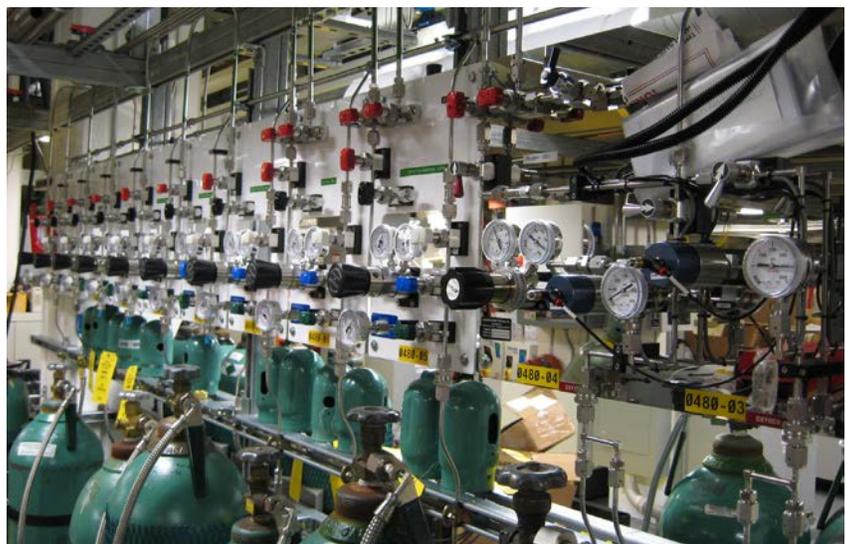
- Class 1 ISO 3
- Class 10 ISO 4
- Class 100 ISO 5
- Class 1000 ISO 6
- Class 10,000 ISO 7
- Class 100,000 ISO 8



Picture No. 1 - Boiler Room and 3rd Floor



Picture No. 2 - Tube Furnace Vacuum Pumps



Picture No. 3 - Inert Gas Delivery Panels

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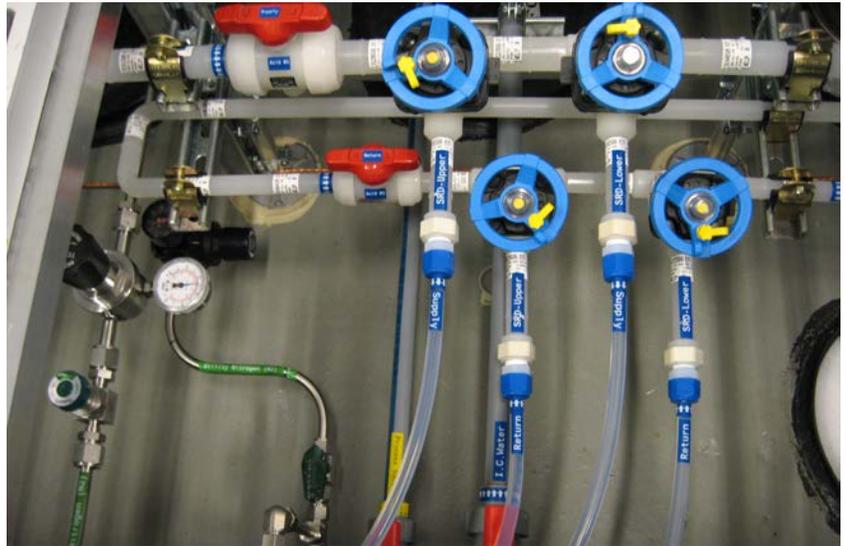
There are critical requirements for Cleanrooms, laboratories to a fully functional, production, and fabrication systems, starting with contamination control, code compliance, and process tool fit-up and hook-up, for all Equipment.

We were able to secure a number of field construction pictures to help me better to identify some of the areas in this facility. I will share them and find the right moment in this report, by including them whenever possible. The pictures highlight some of the very important segments of the facility. The tour took us thru the areas that play a very important role in the operation of this fabulous engineering marvel of a building.

Having the very high demands for its existents, with the highest requirements and compliances that were all met in full, across all fields of science.

Requirements: Mechanical / Electrical:

1. Cleanroom HVAC & Controls
Air Handlers
Temperature setting at 67 - 69F Degrees
with 6 high volume exhaust fans of 25,000 CFM each, for a total of 150,000 CFM with one of the fans being a redundant spare delivery. [PICTURE NO.7]
2. Process exhaust & scrubbers, VAV, CAV.
Volume of 25,000 CFM
[PICTURE NO. 6]
3. Mechanical mezzanines and floors, 2nd & 3rd
4. Environmental Controls
5. Control Panels accessible at each equipment
6. Steam (clean) boilers
[SEE PICTURE NO. 3]
7. Chiller water pumps and Cooling Towers
[SEE PICTURE NO. 9]
8. Cold rooms
9. Switch Gear in Electrical room
10. Primary power for the fab area is supplied by several substations located in the subfab (basement) areas, with the newest one rated at 2,500 KW.
11. The Emergency back power for the Life Safety systems is provided by two natural gas fired generators, one at 800 KW and one at 880 KW; other generators; transformers; distribution panels; UPS and power distributing and lighting.
12. Typical Cleanroom
[SEE PICTURE NO. 5]



Picture No. 4 - High Purity Water Supply and Return for Lab Equipment under Clean Room Floor



Picture No. 5 - Inside Clean Room Before Equipment

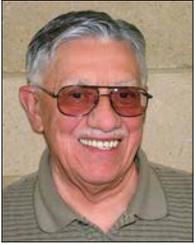


Picture No. 6 - Acid Exhaust Duct After the Air Scrubber, Teflon Coated Stainless Steel

Continued on page 10

VP Technical Report

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13. Acid Exhaust ductwork after the scrubbers
[SEE PICTURE NO. 6]
14. High Purity water supply and return
[SEE PICTURE NO. 4]
15. Heating Hot Water Pumps
[SEE PICTURE NO. 8]

16. Gaseous Nitrogen Storage Tank system that supplies the labs a very large quantity is required. [SEE PICTURE NO. 10]
17. Fire Protection
18. Life Safety
19. All motors in this project are controlled variable speed equipped.
20. The building facility operations are controlled from the U of M Central Campus control building

Architectural / Structural

- Raised access Flooring (RAF)
- 2'-0". (Two feet) for piping and return air
- Chemical and Statics Resistant/Dissipative
- Flooring
- Interstitial Strut support systems
- Modular system integration
- Personnel and product flow programming
- cGMP Architectural envelopes,
- Walkable ceiling systems for Air Supply
- 20 to 40 air changes per hour
- Plenum modules
- Casework, Sealed type Storage Cabinets
- Vibration isolation for Building and Equipment
- Modular prefabrication Mezzanine
- EMI Shielding.
- No.3 UV films/windows and lights

Process Utilities

- RO / DI Water systems capable of processing
- 50,000 gallons of raw water a day generating 25,000 gallons of pure water and 25,000 of waste water to Acid Waste Neutralization systems
- WFI
- 1,100 tons of cooling capacity



Picture No. 7 - Air Handler with HEPA Filters and Clean Steam for Humidity



Picture No. 8 - Heating Hot Water Pumps



Picture No. 9 - Chilled Water Pumps

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VP Technical Report

continued from page 10

- 150,000 CFM of exhaust capacity generated by a plenum arrangement six remotely located Strobic fans.
- 160,000 CFM of make-up air capacity
- Clean High Pressure 150 psig Steam supply, 4 Boilers totals, 4 Million Btu/Hr.
SEE PICTURE NO. 1 - Third floor
- Tube Furnace Vacuum Pumps
[SEE PICTURE NO. 2]
- Inert Gas Delivery Panels
[SEE PICTURE NO. 3]
- Tool fit-up and hook-up
- P&IDs System Layouts/Diagrams
- High Purity piping systems
Examples
[SEE PICTURE NO. 3 and 4]
- Gas Cabinets
- Process Exhaust Systems
Acid Exhaust Ducts etc.
[SEE PICTURE NO. 6]
 - » CDA Systems
 - » Bulk Chemical Distribution

Simple technologies

Many nanotechnology capabilities can greatly enhance geosciences and environmental research projects. The LNF offers access to world-class facilities providing a broad set of technologies and processes with technical support.

Coating and material deposition

Electrical, e-beam evaporation, sputtering.

Micro to nanoscale characterization using a large collection of electron microscopy and analysis tools. Scanning and transmission electron microscopes, atomic force microscope, focused ion beam, laser interferometer, Raman spectroscope, x-ray diffraction systems, nano-indentation.

High-precision dicing mechanical and chemical polishing. Dicing saw, lapper with height gauge, chemical mechanical polishing machine.

Patterning at micro/nano scale

Optical and e-beam lithography dry and wet etching, class10/100/1000 cleanroom environment.

Modeling and simulation

Multiscale simulation, characterization and analysis of Nanoscale devices.

Sensors and Integrated Systems

All who are interested in utilizing LNF expertise to develop devices and or systems that are non-commercially available?



Picture No. 10 - Gaseous Nitrogen Tank That Supplies the Lab

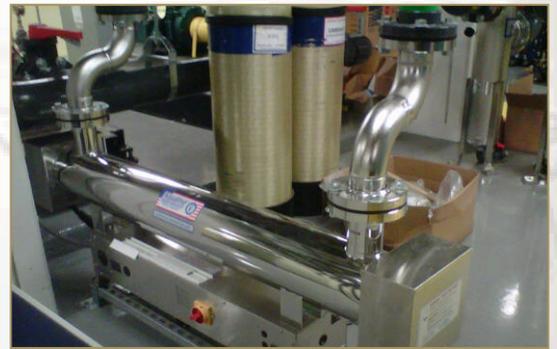
- Small, sensitive, accurate sensors
- Specific detection of parameters of interest.
- Applications to lab-field studies
- Systems for use in extreme environmental conditions.
- Integrated microsystem packaging for gyro scope a Versatile solution for sensors survival in harsh environment.
 - » The development of sensors and complex integrated systems will require expertise and
 - » Collaborations with the NNIN community. Our geosciences domain expert is here to assist those in all the project microsystems related needs.

*A special thank you to Randy Schnabelrauch for providing these high quality photos of the Tour at the Lurie Nanofabrication Lab.

Ed Hawley, CPD.

VP Tech

Photos from April 2012 - University of Michigan - Lurie Nanofabrication Lab
THANKS TO OUR HOST DENNIS SCHWEIGER FOR HIS CONTRIBUTION TO THIS INDUSTRY!



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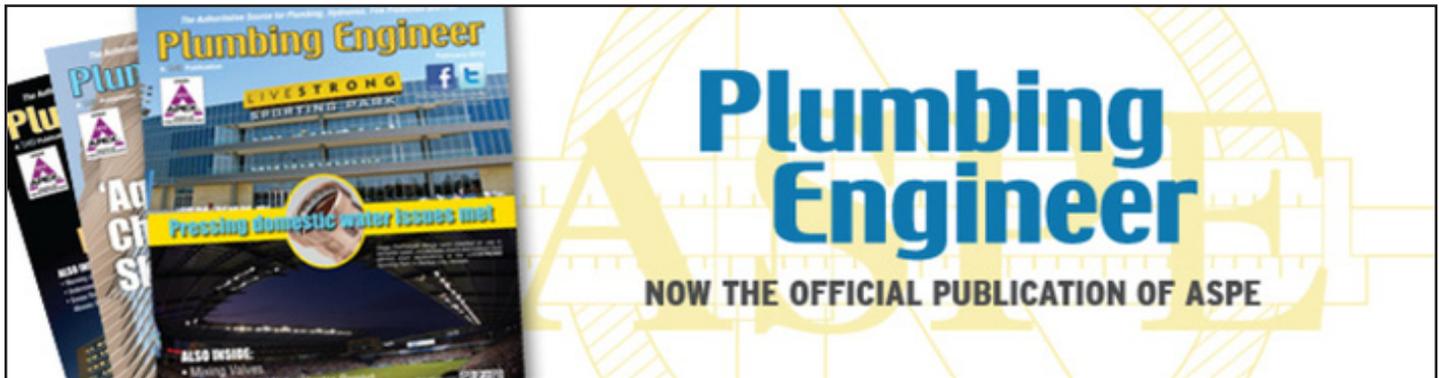
ABOVE PHOTOS PROVIDED BY CINDY ZATTO, ASPE EMC DIRECTOR / CHAPTER AFFLITATE

2012–2015 Strategic Blueprint

The ASPE Board of Directors began the process of developing a strategic blueprint to guide ASPE during the next three years in January 2011. As the Board moved forward, draft proposals were shared with ASPE Chapter leaders and members, many of whom provided input, and the Board is very appreciative of all those who took the time to submit comments.

The final document was approved by the Board on October 26, 2011.

Follow this link http://www.aspe.org/sites/default/files/webfm/pdfs/Strategic_Blueprint.pdf to view ASPE's 2012–2015 Strategic Blueprint.



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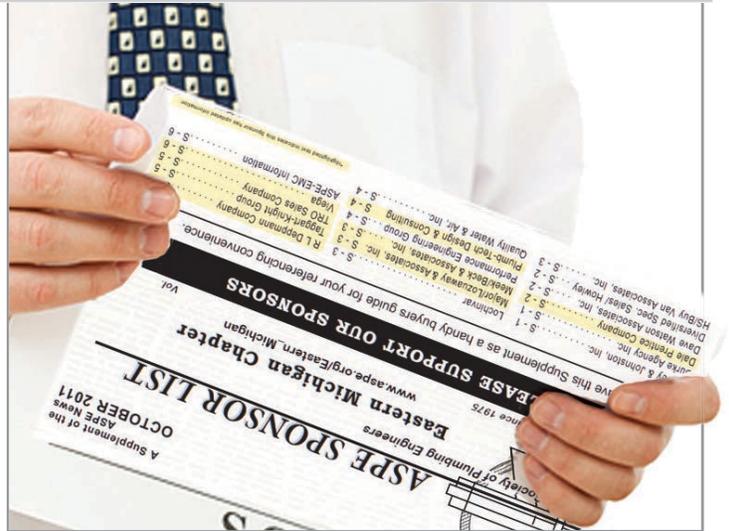
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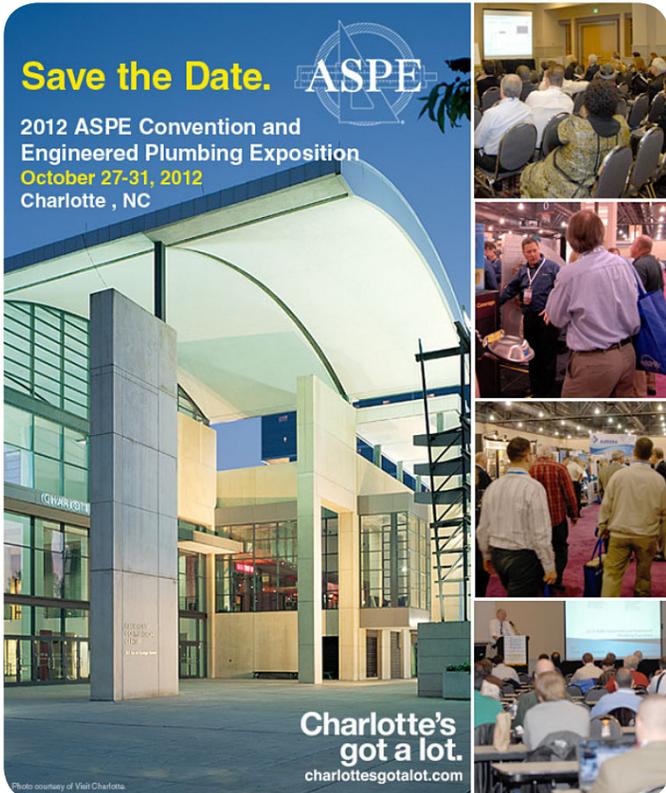
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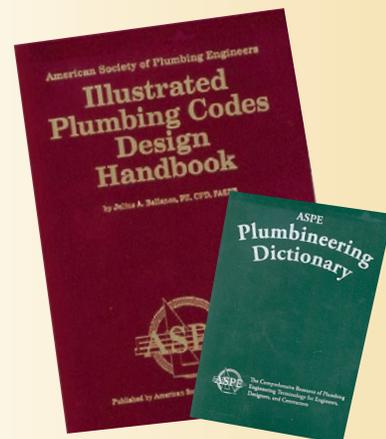
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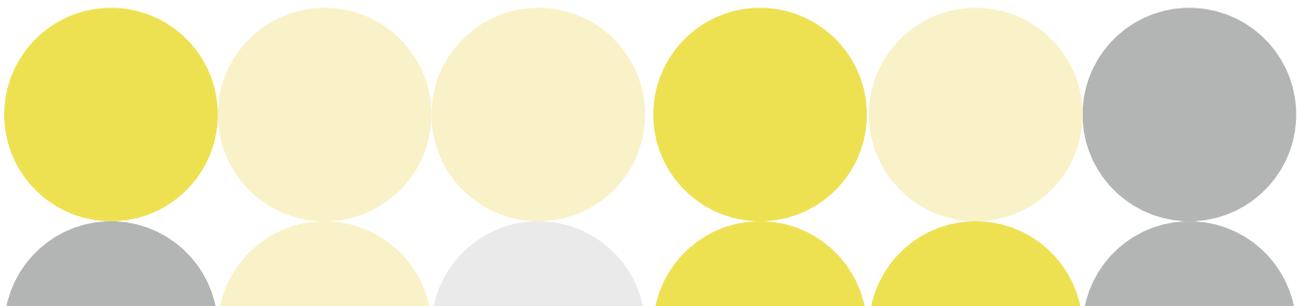
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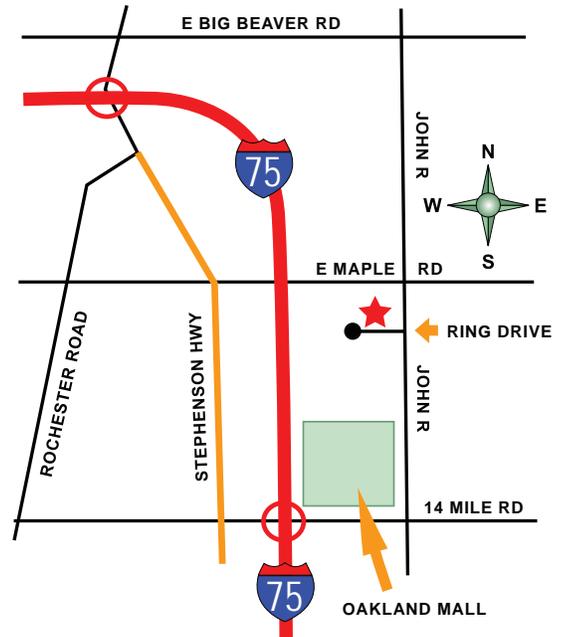
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