

The NorthCoast Interfacer



2008 2009 – 2013, 2015 2014

New Chapter Members

We welcome four new members to the Chapter: Joseph Nowell at Philips, Patrick Sebastian, a Lead Systems Engineer at Steris plc, Ravi Chand Koneru at Invacare Corp, and Vyasgowtham Prabhakar, a University of Toledo student.

Patrick provided a little more information about himself, so that we can get to know him: “I have been in my current position since December 2014 where I am leading the development of an endoscope reprocessing system. Prior to this position I worked for about 19 years at Lockheed Martin in Akron, Oh. At the time of my departure I held the position of Technical Lead of JSF Pilot Training Devices. I was responsible for the engineering approach of the pilot training devices (flight simulator).”

Ravi Chand also provided a little more information: I have a Master's degree in Mechanical Engineering (with a major in Tool Design). I am a Sr. Project Engineer with 10+ years of experience majorly in the Medical Device Domain. I am currently employed with Invacare Corp in the Power Wheelchairs division. I am looking forward to learn and implement the best practices of Systems Engineering in my line of work.

The Board of Directors looks forward to meeting all of you at future Chapter meetings or events.

Dennis Rohn
Cleveland-Northern Ohio Chapter Membership Chair

EnergyTech 2016

Please note the date change for EnergyTech to November 28-30, 2016.

EnergyTech 2016 conference attendees will gather from the diverse segments of the Energy Sector to discuss and present their insights on the vital issues affecting the evolving energy sector, and related critical infrastructure.

CALL FOR PAPERS: Speakers, presenters, panelists, and session moderators interested in contributing their knowledge are welcome. [Download the ET2016 brochure](#) for more details and a program overview, or please visit EnergyTech2016.com.

Chapter Elections Are Coming

The return to school signals many things. One of those things is that it is almost election time for the Cleveland Northern-Ohio Chapter. Per our Chapter Bylaws, elections for the Board of Directors for 2017 will occur in October.

Three positions are voted on each year: Vice President, Secretary, and Treasurer. A strong Chapter requires active participation by its members. Serving on the Board in an elected position is one way that you can help the Chapter. It also can help to build your leadership skills. Please consider becoming a candidate for one of these positions.

The Nominations and Election Committee will be seeking individuals to be candidates. If you are interested in being a candidate, please contact Carl Dister.

INCOSE Great Lakes Regional Conference Register Now!

The tenth-annual GLRC will be held Sunday through Wednesday, September 18-21, 2016.

Join us on Mackinac Island, Michigan, at the casually elegant Mission Point Resort:

www.missionpoint.com

GLRC10: Connecting the World to System Solutions.

The Conference Program currently offers:

- 32 Technical Presentations
- 4 Panel Sessions
- 5 Tutorials
- a Workshop
- 5 Keynote or Featured Speakers, and
- an INCOSE SE Certification Exam (at a discounted price).

A new feature is the first-ever INCOSE SE Professional Development Day (Monday, September 19). A virtual-conferencing system, funded by an INCOSE Foundation Grant, will bring selected sessions from Mackinac Island to four satellite sites: Chicago, Detroit, Wichita, and Purdue University.

See the entire program at the GLRC10 Website:

www.incosegreatlakes.org/

Phone the Mission Point Reservations Office at (800) 833-7711, to reserve your lodging immediately! Very few rooms remain available.

Highlights of the INCOSE 26th International Symposium

The INCOSE 26th International Symposium was held at the Edinburgh International Conference Centre in Edinburgh, Scotland from July 18 to 21, 2016. There were 852 delegates and 80 guests in attendance. The conference featured several keynote talks and 10 parallel tracks of papers, panels, and roundtables, along with vendor exhibits from industry, academia, and other organizations. The following paragraphs cover a few of the highlights.

There are two new Working Groups: 1) PM-SE and 2) Oil and Gas. In 2011, INCOSE, PMI, and MIT formed a strategic alliance. They focused on executive level systems engineering and Program Management. Their output is in the form of a book that is ready to go to publication. The alliance is now being reformulated as an INCOSE PM-SE Working Group and they are looking for participants. Contact Tina Srivastava, INCOSE Board of Directors Secretary, for additional information. There were also several panel discussions about the interactions of systems engineering with program and project management.

One keynote presented an interesting view of the future. Ms. Julie Alexander, Director for Urban Development at Siemens, presented “The Future Belongs to Innovators.” The Siemens tag line is “Ingenuity for Life.” She talked about megatrends of the future and showed a vision for Smart Cities and building for economic value, efficiency, and connectivity. Siemens is doing big data analytics and has a project in Denmark of a data exchange where companies can market their data (similar to a board of trade for commodities, except here it is data). She is looking at the ROI for the critical infrastructure of cities. Siemens has projects in 6 cities - Aberdeen, London, Brussels, Santiago, Chicago, and Shanghai. They meet with city representatives and look at values such as reputation, reducing congestion, carbon emissions, and the value of data itself. They then pick 3 areas to work on and do separate models of costs for different approaches and then integrate them. See www.thecrystal.org for the Siemens building in London. It is billed as one of the most sustainable buildings in the world. Siemens sees software as a service, computation as a utility, and data as a resource. Also check out the video on the Crystal Future Life concepts (low resolution) at www.youtube.com/watch?v=zuPIyqUc9oA.

Product line engineering, variant engineering, and agile development were frequent topics. One paper that covered these was “The Best of Both Worlds: Agile Development Meets Product Line Engineering at Lockheed Martin” by Paul Clements from BigLever Software, Inc. He described how the U.S. Navy AEGIS weapon system evolved. It had multiple products that were being maintained independently, and the Navy didn’t want to pay multiple times to fix the same problem. Now they have 100+ ships managed using product line engineering. The Littoral Combat System Ship was added in 2011, and recently the Coast Guard was invited by the Navy to join AEGIS. The program does a 1-5-9 build and release rhythm, and a 3-7-11 requirements review cycle. (The numbers refer to the months of the year.) They have governance boards to adjudicate priorities from stakeholders. Mr. Clements also stated that in 2014, Lockheed-Martin made a corporate decision to implement agile processes on Orion, AEGIS, and others. Agile is usually on small products, organization, and team, and short cycles, which does not describe AEGIS. So they have a three year transition plan. They broke big teams into small teams, and divided the work into packages. Eight sprints of 2 weeks each

is a release, to maintain the cadence above. There are 12 major configurations in 9 major product lines. So coordination of the 100 small teams is a major work effort. They use Scaled Agile Framework (SAFe) and Atlassian's Jira tool. So far, it seems to be working.

An overview of the SE Body of Knowledge (SEBoK) was given by Richard Adcock of Cranfield University. The U.S. Government funded Stevens Institute of Technology and the Naval Postgraduate School for 3 years, ending in 2012, to do the first SEBoK. It was to include technical content, curriculum, and workforce development. Since then, INCOSE, IEEE, and the SERC have run it with a BKCASE Editorial Board. It is free to everyone. SEBoK has information relevant and important to SE. It has a quarterly newsletter. The website is www.sebokwiki.org. The SEBoK has 7 parts and is fairly flat. The articles look a lot like Wikipedia as it is built on the same software platform. Each article is a maximum of 2000 words. The complex knowledge is in the reference links to the literature, which have to be publicly available but not necessarily free. The SEBoK implementation has 3 aspects: housing a system of ideas, allow people to use it to get information, and allow human activity to sustain it. It is updated 2 times a year, March and September.

The banquet was at Prestonfield House, complete with bagpipers and drummers, dancers, and a stirring rendition of "Address to a Haggis."

The next INCOSE International Workshop will be January 28 to 31, 2017 in Torrance, CA. The INCOSE 27th International Symposium will be July 15 to 20, 2017 in Adelaide, Australia. Paper submissions are due by November 7, 2016.

Karen Weiland



Figure 1 Karen Weiland accepts the C-NO Chapter's 2015 Silver Circle Award

C-NO Chapter Receives Silver Circle Award

During INCOSE's 2016 International Symposium in Edinburgh, Scotland, the Cleveland-Northern Ohio Chapter received a Silver Circle Award for 2015.

Congratulations to the C-NO Board of Directors and everyone else who worked so hard last year, for the continuing success of the Chapter.

INCOSE Presents Outstanding Service Award to C-NO Chapter Member

In Edinburgh, on July 19, 2016, INCOSE recognized Bill Klinger "for outstanding leadership and service at both the local chapter level and nationally to promote Systems Engineering, including chapter president, support to the Great Lakes Regional Conference, and work with national entities, such as the Library of Congress."

Nominees for the Outstanding Service Award must have demonstrated significant and arduous volunteer effort on behalf of INCOSE.

Congratulations

Member and past-President of the INCOSE C-NO chapter Joel Knapp was notified at the end of May that he has attained CSEP. Congratulations to Joel for this achievement!

Systems Engineering Makes Appearance at the First Annual Biomimicry Summit and Education Forum for Aerospace

Over 170 attendees from all over the U.S. converged on the Ohio Aerospace Institute in Cleveland, Ohio for the first annual Biomimicry Summit and Education Forum for Aerospace, August 2 – 4, 2016. The conference was organized by NASA's Glenn Research Center, Ohio Aerospace Institute and Great Lakes Biomimicry (GLBio). Great Lakes Biomimicry is a non-profit organization with a mission to create conditions for innovation by integrating biomimicry into the educational and business system.

A dynamic group of speakers represented industry experts, a distinguished team of NASA researchers and more than 20 universities from across North America, including Harvard, Yale, Princeton and Stanford. The conference brought together educators, artists, designers, naturalists, paleontologists, biomimicry/bionics/biophysics practitioners, systems engineers and related communities to help achieve NASA's missions. The summit was co-sponsored by NASA's Aeronautics Research Mission Directorate. Summit participants will collaborate and stay connected through NASA's Virtual Institute for Bio-inspired Exploration (VIBE).

Several INCOSE members attended the event, including Eric Bobinsky, a former NASA Glenn researcher who participated in the agency's biomimetics program in the early 1990s, Randy Anway, George Studor, and Curt McNamara. George, retired from NASA JSC, founded the INCOSE Natural Systems Working Group (NSWG) in 2013. Now Curt chairs the group and its monthly recorded webinars with the support of Larry Pohmann, one of INCOSE's original founders and several "regulars" like Randy. The NSWG grew out of George's human spaceflight experience at NASA to encourage the systematic consideration of living and non-living natural systems in the system engineering process.

George gave an overview of both NASA's and INCOSE's motivations and activities in how to move "Natural Systems Inspired Design" (NSID) into traditional systems engineering and technology practices. NSWG wants to help engineers realize the significant benefits of asking "how can Nature help me?" as they work in any part of the project life-cycle. The support for the initiation of the INCOSE NSWG comes from the NASA Engineering and Safety Center's Robotic Spacecraft Technical Discipline Team, led by Daniel Winterhalter at JPL. Besides education through webinars, publications and interacting with other communities, one of the INCOSE NSWG's goals is to incorporate NSID into both the INCOSE SE Body of Knowledge (SEBoK) and the Systems Engineering Handbook itself. George hopes to start a counterpart to the INCOSE NSWG within the NASA systems engineering community.

The relationship between biomimicry and systems engineering—an active area of research—is both complementary and bi-directional. Biomimicry studies and imitates nature's design principles and processes to solve human problems, reduce the use of energy and raw materials and to minimizing waste. It has already inspired researchers at NASA to create turbine blades that mimic harbor seal whiskers, look to penguin feathers to solve the sonic boom problem and to create bug-eye sensors and is being widely applied by industry to problems in coatings, materials science, product engineering and system design.

Biomimicry, sometimes referred to a biomimetics and bio-inspired engineering, can benefit from the application of both traditional and emerging systems engineering principles, while systems engineering can benefit from understanding and incorporating what biomimicry can tell us about the evolution and behavior of natural systems, both living and non-living. As Dr. Shyam, founder of VIBE and a summit organizer, points out, "we are not just focusing on life but on all natural systems—and at using them systematically. INCOSE is working to improve systems engineering in its present form while the Virtual Institute—VIBE—is trying to redefine how we do systems thinking, so there is a very nice symbiosis there."

GLBio, NASA Glenn and the participants and sponsors of the summit form a solid foundation for building our region's future in biomimicry science and bio-inspired engineering. INCOSE members can play a key part in bringing SE tools and techniques to bear on this exciting, complex and evolving discipline.

Additional information about the NSWG is available to INCOSE members at www.incose.org/ChaptersGroups/WorkingGroups/analytic/natural-systems, and to others through the group's public website sites.google.com/site/incosenswg/.

Great Lakes Biomimicry has an excellent website at glbiomimicry.org/ for systems engineers interested in a better understanding of what biomimicry is all about.

Proceedings of the summit including pictures, presentations and summit objectives can be found at www.grc.nasa.gov/vibe. Requests for collaboration with NASA on biomimicry can be directed to www.grc.nasa.gov/vibe/contact/.

Eric Bobinsky

Tour of ASM International World Headquarters

For the July 29 C-NO Chapter Meeting, INCOSE Members and their guests met at the breathtaking and historical Materials Park—a 45-acre campus, located 20 miles east of Cleveland in Geauga County.

There, we experienced the largest open-latticework geodesic dome in the world, designed by inventor R. Buckminster Fuller and Cleveland architect John Terence Kelly, in the 1950s. The spectacular structure “stands 103 feet high and 250 feet in diameter, weighs 80 tons, and consists of more than 65,000 parts.”



Figure 2 Geodesic dome, over ASM Headquarters

Photo by Anna-Maria Manuel

Beneath the dome, the Eisenman Garden features “more than 60 specimens of raw mineral ores and more than 70 varieties of perennials, shrub, and flowering trees.” This strikingly beautiful setting brings “nature and technology together in a celebration of materials.”



Figure 3 Eisenman Garden

Photo by Anna-Maria Manuel

Thanks to the kindness of ASM Lab Manager John Pepler, our group enjoyed a rare opportunity to tour the interior of ASM's World Headquarters, which is not normally open to the public. The futuristic office building, nestled under Fuller's dome, is listed on the National Register of Historic Places, and designated an Historic Landmark by the state of Ohio. Many elements of the original 1959 architectural design and furnishings were expertly restored, between 2009 and 2011.



Figure 4 C-NO Chapter Tour Group

Photo by John Pepler



Figure 5 Restored furnishings and brushed-aluminum murals by artist Bel-Jon

Photo by Bill Klinger



Figure 6 Circular-arc interface of exterior and interior

Photo by Anna-Maria Manuel



Figure 7 John Pepler, describing ASM's Scanning Electron Microscope System

Photo by Bill Klinger

Following the ASM Tour, most of our group drove to nearby Punderson Manor State Park Lodge. The August C-NO Board Meeting was held over dinner in the Cherry Dining Room of the Punderson Manor.

Bill Klinger
C-NO Chapter President (2014)

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