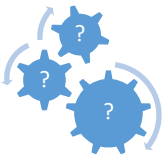
INCOSE ENCHANTMENT CHAPTER

The Enchanted View

Thinking about Systems

2020 Quarter #1



President's Message:

Happy New Year 2020!

Robin Reynolds
Chapter President

Happy New Year! I love new beginnings because they hold so much potential and possibility. There are many wonderful new things in my life this year and my role on the Board of Directors is one of them. The board is filled by talented and committed people who spend time each week working to build a stronger professional organization in our local area and to further the discipline of Systems Engineering (SE). I'm honored to be here and work with this team. If you have ever considered getting involved in the INCOSE Enchantment Chapter, please reach out to myself or to another board member to learn more about this rewarding work.

As we move into a new decade, I'm excited to see what the future holds. This is an interesting time for the discipline of SE because evolving technology and tools are allowing us to stay grounded in foundational SE methodologies while increasing effectiveness. The broad SE community is working to advance Digital Engineering and I will seek opportunities for the Enchantment Chapter to add to the momentum.

I would love to hear from members (or potential members) regarding how the chapter could better support you in your profession. Please reach out to me. Cheers to 2020 and I hope to see you soon at a chapter meeting!

Looking Back on 2019

by Heidi Hahn (Past President)

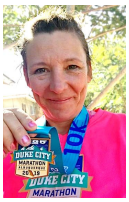
It has been a year of transitions, both for me personally and for the Enchantment Chapter. This past summer, I retired from Los Alamos National Laboratory after a 29 year career, having served in myriad roles -- Senior Executive Advisor to two Laboratory Directors, Project Director for an Enterprise Resource Planning System project, Human Resources Director, and most recently, keeper of the Lab's systems engineering management processes as Senior Executive Advisor to the Associate Lab Director for Weapons Engineering. Two weeks after retiring, I joined New Mexico Tech as an adjunct faculty member in the Engineering Management Department. In the fall semester, I taught a graduate project management course and in spring I will teach a graduate systems engineering class (see related blurb below). Consistent with my long-held belief that PM and SE exist in parallel universes, the PM class had a little SE thrown in and the SE will, likewise, have a little PM incorporated.

At our annual strategic planning meeting, Chapter leadership decided to streamline our processes, relying more on offline committee work and reserving Board of Directors meetings for receiving reports from those committees -- Operations, Professional Development, Regional Interaction, and Engagement -- and dealing with items requiring a vote of the Board. We also have opened up committee membership to Chapter members who are not Board members, even having a non-Board member (Bob Pierson) chair the Operations committee. If you want to get more involved with the chapter but are not ready to take on a Board position, committee membership may be for you. Feel free to contact me or our new president, Robin Reynolds, for more info. I can't claim that our implementation of these changes was perfect this year, but I am looking forward to continuing to make progress in the New Year!

INSIDE THIS EDITION

Meet the Board

Here is your new board of directors, elected at the end of last year and serving January 1 – December 31, 2020. We asked each to share two sentences - one summarizing who they are as an SE/board presence plus a fun fact.



President: **Robin Reynolds** is a Systems Engineer at Sandia National Laboratories working to carry out model based system engineering (MBSE) within the Nuclear Deterrence Portfolio. She is also a new runner and ran her first 10K in October.

President-Elect: *vacant*. No candidate was elected, so the board will fill this position. Are you interested?

Secretary: **Ann Hodges** has practiced systems engineering for over 30 years (even before she knew what it was called) at Sandia National Laboratories. Her education is in Business and Computer Science, and she became interested in CS after playing a video game at lunch (Lunar Lander, before Pong and Pacman).

Treasurer: As a Systems Engineer at Sandia National Laboratories **Mary Compton** performs model-based systems engineering for weapon development programs. While traveling in the Peruvian Amazon, Mary got to hug a little girl's pet sloth, named Rosarita.

Past President: **Heidi Hahn** recently retired from Los Alamos National Laboratory after a 29 year career there and has joined New Mexico Tech as an adjunct faculty member in the Engineering Management Department. While in graduate school, Heidi jumped out of a perfectly good airplane.

Cheryl Bolstad is starting her second year on the board. She is a human factors engineer at Sandia National Laboratories with over 30 years of experience. Cheryl loves to travel and years ago went on an elephant safari in Nepal to see Bengal Tigers in the wild.

James Larkin is a Sr. Systems Engineer at MEI Technologies, Inc. working as a Mission Engagement Lead at the Space and Missile Systems Center at KAFB. He plays the practice chanter and is in training to play bagpipes with Mac-Tire of Skye.

Eric Smith is the advisor for the Student Division at UTEP. He was surprised into experiencing complex systems as a substitute teacher.

Kyle Spisak is a recent Purdue graduate and R&D systems engineer at Sandia National Laboratories who brings his engineering, manufacturing, management, IT, and human behavior research background to bear on software applications. He is also president of the Sandia Soccer Association.

Your Opinion Matters!

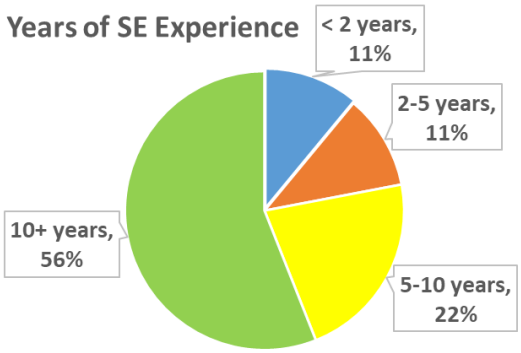
Chapter Survey Results

by Cheryl Bolstad (SNL)
and Rob Pierson (ATA)

I want to personally thank those of you that completed the 2019 local chapter member survey. We received 28 responses and would still like to receive more. If you have not completed the survey, there is still time to get your voice heard. Just follow the link at the bottom of this newsletter item.

I would like to share a little bit about the responses:

- 93% are current INCOSE members.
  (Hope the other 7% decide to renew or join!)
- 82% live in the Albuquerque metro area.
- 70% are employed at a national laboratory.



- 56% have 10 or more years of SE experience, 22% have 5-10 years 22% have 0-5 years
- 67% attend chapter meetings with the top reasons being: (1) relevance of presentations to their work, (2) professional development, and (3) networking with other SEs.

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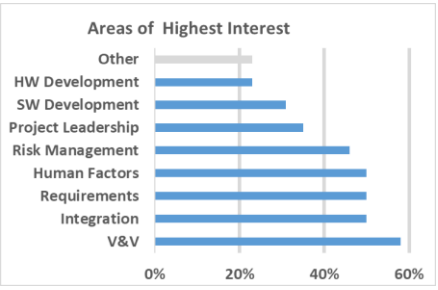
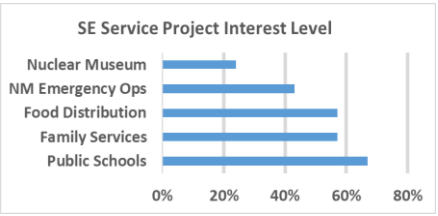
Chapter Survey Results (continued)

- The most common areas of expertise were: Requirements 92%, Project Leadership 77%, Integration 65%, V&V 62%, Risk Management 54%, Software Development 50%, Human Factors 42%, and Hardware Development 38%. Come network if you want to meet people with expertise in these areas!
- Other named areas of expertise included: Concept Development, Architecting, Test & Evaluation, Modeling (of several types), Cyber, IT, System of Systems, Telecom, and Safety



- The highest level of common interest were V&V, Integration, Requirements, Human Factors, and Risk Management, but there are a wide range of other interests within our ranks.
- The most commonly suggested tutorial topics were MBSE/modeling languages, V&V, and Requirements



- 84% are interested in collaborating on a service project! The top three choices for projects where we could apply SE practices were: (1) Public School Systems, (2) Improving Family Services, and (3) Food Distribution (Food Banks). More than half were interested in these areas. Stay tuned!
- And, finally, 93% read this newsletter… at least sometimes… so hello, and keep making this your chapter newsletter! See the back page if you want to contribute an article!

If you have not completed the survey and want to add your voice, it can be found here:
https://www.surveymonkey.com/r/EnchantmentChapter2019

Not For Women Only:

A Woman Driver on Mars

by Nina Lanza

Note: This op-ed appeared in the Santa Fe New Mexican newspaper. Planetary scientist Nina Lanza was a guest speaker at the Institute of Meteoritics' 75th anniversary at UNM on Oct. 25, 2019. Her story is one that I could have told as well, having been warned by my Ph.D. advisor (an older white, male Baptist minister) that I would never marry if I pursued the degree. Boy, was he wrong – though it took me a long time to find the right guy! – Heidi Hahn

Three years ago, I was a keynote speaker at a conference, talking about my job at Los Alamos National Laboratory as a planetary scientist who shoots rocks on Mars with a laser. Part of my job involves helping to guide the Curiosity rover to the appropriate targets. After my talk, I was socializing with a small group of other conference attendees when one of them said, "Oh, so we've got a woman driver on Mars!" The joke was made by a man and the others assembled—also men—laughed.

I didn't. I just stood there, speechless. I couldn't believe that he had just made such a tired, outdated (and unfunny) joke.

But it stuck with me. As a planetary scientist who holds a Ph.D. in geology, I'm no stranger to being a minority in professional settings. I'm often the only woman, or one of only a handful. But still, this joke surprised me. It was 2016, after all, not 1956. I had just delivered a keynote address that I was invited to give based on my academic and professional credentials. (Incidentally, the man who made the joke was not a speaker, invited or otherwise.)

It brought to mind my undergraduate college advisor who discouraged my pursuit of an astronomy degree. The only

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What You Missed…

Recent Chapter Meetings

by Ann Hodges,
Sandia National Labs

Recordings of past chapter meetings are stored in the chapter's website library at: https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/enchantment/library-and-resources

❖**OCTOBER 2019: Randy Anway**, AIA, is a Registered Architect in New York and Connecticut specializing in interdisciplinary architectural design research inspired by natural patterns and systems. Randy presented ***Bioinspiration for Future Systems Engineering and Architecture***. "Bioinspired" refers to a range of novel approaches (biomimetics, bionics, biodesign, etc.) to design that make use of disciplined studies of natural systems. Recent and emerging developments in such design methods are enhancing the capacity of engineers and architects to move beyond conventional design set-points and identify effective strategies to address novel problem spaces. This presentation provided an overview of the practice of bioinspired design as it may be applied toward future systems engineering and architecture project work. Additionally, practical approaches to near and long-term implementation were discussed.

❖**NOVEMBER 2019: David Long** is founder and president of Vitech, INCOSE Fellow and ESEP, and 2014-2015 President of INCOSE . David spoke on ***The Future of Model-based Systems Engineering (MBSE)***. MBSE is a term that has become "loaded" with meanings – many not intended in the original concept of MBSE, some of them even contradictory with it and with each other. As originally conceived, MBSE was the practice of basing the systems engineering (be that design, redesign or improvement) on a common, shared model of the system design. But the loading down of the term has resulted in confusion in engineering enterprises about what MBSE is and how it is practiced. There is a path forward – to an MBSE 2.0 where the hurdles and missteps are behind us. In plotting this path, we don't reject the journey and the progress that has brought us to this point in time. Instead, we embrace them in all their richness – the strengths and successes to reinforce, the challenges to address and resolve. This involves understanding that a broad vocabulary consisting of representations that will communicate to a wide audience of customers and not just to a narrow segment accustomed to one way of representing systems. It requires connecting to a variety of analytical models (e.g.- physics-based performance models) without thinking of them as the systems architecture model that makes systems engineering truly "model-based." The path forward is a return to sound systems engineering principles and practices while incorporating and embracing the enrichment derived from the contributions of the sister disciplines of traditional engineering, software development and the advancing world of artificial intelligence. This is a practical reflection with pragmatic guidance to help us deliver against today's challenges while plotting a path to the greater digital engineering future. Moving towards MBSE 2.0 today allows us to mine the best of systems engineering's fundamentals and the learning of its future.

❖**DECEMBER 2019: Becky Reed** and **Ian Pressland** presented a 2-hour tutorial on ***Why the SEMP (SE Management Plan) is not Shelfware***. Becky is President and CEO of Reed Integration, Inc. and an INCOSE ESEP. Ian Pressland, Charterhouse Systems, is a Fellow of the Institution of Engineering and Technology (FIET) and an INCOSE ESEP.

Coming Up Next

Next Chapter Meetings / Events

by Ann Hodges,
Sandia National Labs

❖ **JANUARY 8, 2020: Anne O'Neil** will speak on ***Leading Cultural Change and Transformation***. Anne counsels the increasingly diverse range of infrastructure industries facing complexity and integration challenges. From 2005-2013 as the founding Chief Systems Engineer for MTA New York City Transit, Anne established and integrated SE capability to improve the agency's capital project delivery. This required developing systems engineering discipline expertise and modifying the agency's business process and program development approach. It also necessitated effecting change and building systems awareness at an industry level – among peer transit properties, consultants, contractors and systems suppliers. Anne is a former board member for INCOSE and serves as INCOSE Industry Outreach Ambassador. In recognition of Anne's extensive outreach efforts within both the SE community and transportation industry, she was awarded the 2011 INCOSE Founders Award.

❖ **FEBRUARY 12, 2020: Dr. Ali Raz**, Purdue Technology Center, will speak on **A Definition Abstraction and Implementation Process for SoS Engineering**. Dr. Raz studies complex systems, system-of-systems, systems engineering and information fusion. He teaches graduate and undergraduate courses in design theory, design methods, and systems engineering for aerospace systems.

❖ **MARCH 11, 2020: Chapter Social!** Save the date for our Chapter Social! Look for upcoming details on our chapter website:

https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/enchantment/chapter-home.

2020 INCOSE International Workshop

by Robin Reynolds,
Sandia National Labs

The International Workshop (IW) is just around the corner! It will take place January 25 – 28, 2020 in Torrance, California. The program theme, ***Transformation of Systems Engineering***, has an integrated Model Based Systems Engineering (MBSE) initiative woven throughout the workshop.

The agenda includes a wide variety of expert speakers from across commercial, governmental, and non-profit sectors and offers incredible opportunities for networking, collaboration, and workshop attendance. You can find the event schedule at: https://www.incose.org/iw2020/program/event-schedule.

The INCOSE Certification Knowledge Exam will be offered twice during the workshop for only a $30 fee (on 1/26/20 and 1/28/20), is open to all conference attendees, and can be used by INCOSE members to apply for certification. https://www.incose.org/iw2020/program/certification-knowledge-exam.

More general information about the IW can be found at: https://www.incose.org/iw2020/home.

Hope to see you there!

No doubt as years go by people forget which engineer did it, even if they ever knew. Or some politician puts his name on it. Or they credit it to some promoter who used other peoples money with which to finance it. But the engineer himself looks back at the unending stream of goodness that flows from his successes with satisfactions that few professions may know. And the verdict of his fellow professionals is all the accolade he wants. – Herbert Hoover

A Woman Driver On Mars

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time he could muster any enthusiasm for my course selection was when I enrolled in a modern dance class.

I could go on with similar experiences—and I have innumerable female colleagues who have their own collection of stories. But it can be hard to see the demoralizing effect statements such as these have when looking from the outside. Taken as single events, each of these stories might be a simple misunderstanding, or a dumb joke. It's only when viewed over the course of a lifetime does the pattern begin to emerge.

The fact is, despite the great strides women have made in the sciences, stereotypes persist. In the 1960s and 70s, a social scientist asked 4,807 elementary-school children to draw a scientist. Of those, only 0.6 percent depicted a woman. The good news is, today, about 28 percent of children draw female scientists, a significant improvement, but we still have a long way to go—especially when you consider that women earn roughly 34 percent of all doctoral degrees in science, technology, math, and engineering.

To continue this upward trend, we need to approach diversity not as the feel-good, check-the-box requirement it's often perceived to be, but as a critical foundation on which successful teams are built. Because it is.

I see it every day in my work. Science is all about solving problems. The more diverse a team is—not just in terms of gender and race, but also educational background, career experiences, socioeconomic background, and the list goes on—the better it is at solving those problems. That's because all of those experiences that shape us as human beings influence how we look at challenging questions and investigate possible answers.

Welcome New Members!

Please welcome the following new members to our Enchantment Chapter!

Nayelli Holguin - student
Andy Yu - Sandia National Labs

Enchantment now has 122 members. That includes 107 regular members and 15 student members.

INCOSE has ~17,000 members in 70 countries worldwide.

The research bears this out. For example, a 2018 study that looked at nearly 2,000 companies in 8 countries found that those companies with more diverse management teams had 19 percent higher revenue due to innovation.

I'm fortunate that I've worked with a lot of leaders—including many men—who have been firm believers in the benefits of diversity. When I was a graduate student at the University of New Mexico, my advisor was adamant about giving his female students the same opportunities as the men. Consequently, he fostered an atmosphere of creativity and can-do-ism that influences me to this day.

This week, I will be a guest speaker at the Institute of Meteoritics' 75th anniversary at UNM. Giving this talk feels in some ways like I'm coming full circle, making my way back to the place that helped empower me to pursue science passionately and without boundaries. And I bet no one will make a joke about me being a woman driver on Mars.

30th Annual INCOSE international symposium
Cape Town, South Africa
July 18 - 23, 2020

INCOSE Enchantment Chapter Board and Committee Leads

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	Past President	**Heidi Hahn**	hahn@lanl.gov
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The Enchanted View
is published quarterly by the INCOSE Enchantment Chapter (New Mexico & El Paso), www.incose.org/enchantment.

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Published material does not necessarily reflect the views or opinions of INCOSE, the Enchantment Chapter Board of Directors, or the Editor.

Call or email your news, reviews, announcements, or other contributions and suggestions to the chapter Secretary: Ann Hodges, alhodge@sandia.gov .