The Enchanted View

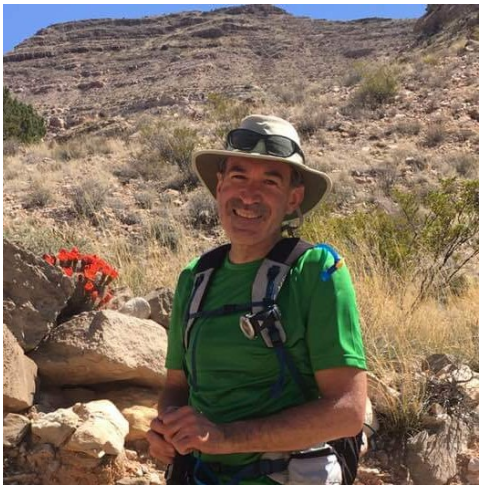
Thinking about Systems

2021 Quarter #1

In This Edition

President's Letter

Arno Granados



Dear INCOSE Enchantment Chapter,

My name is Arno Granados, and I am the new President of the INCOSE Enchantment Chapter. For those who don't know me, I moved to New Mexico from the Pacific Northwest in 2017 to join Sandia National Labs specifically to grow an MBSE approach for Center 5400. I have worn the mantle of "Systems Engineer" since 2002 when I began working on the Future Combat Systems program for The Boeing Company C4ISR team. My experience prior to that was in software engineering and research astronomy. My systems experience includes programs for academia, commercial products, research and development, NASA, small business, and very large-scale DoD programs of record. I have worked in a management role the last 10 years of my career. Over the past year I have been actively involved in the INCOSE/NDIA Digital Engineering Information Exchange Working Group (DEIX-WG), which won an INCOSE working group award. I have been a strong advocate for MBSE and systems thinking since before MBSE was a buzzword, having learned object modeling (and later UML) as a software engineer from a mentor who grew up under Booch, Jacobson and Rumbaugh. The evolution to SysML and transition from software to (model based) systems engineering felt very natural to me.

The BOD recently completed an annual Strategic Planning Session. As an INCOSE chapter, we operate under rules and guidelines set down by INCOSE. The annual strategic planning session included aligning our chapter goals to INCOSE, as well as looking at chapter specific goals. This year during strategic planning the BOD also spent a bit of time conducting a SWOT analysis: Strengths, Weaknesses, Opportunities, and Threats. Some of the identified SWOT items are associated with the larger INCOSE, while some are chapter specific. As the incoming president, a few areas of strategic planning that resonate with me, and which I see as a target to focus my activities for 2021 include:

- Survey and listen to our members so we can represent your needs and interests
- Grow outreach and advocacy
- Recruit and establish new members to the Board of Directors
- Leverage existing formal committees to better engage membership

- Reprise SEP and other training and mentoring opportunities
- Be a voice for the transformation from MBSE to Digital Engineering Ecosystems

- As Covid-19 moves into the rear-view mirror, continue Enchantment Chapter social activities

The Enchantment Chapter has a wonderful and active history as an INCOSE Chapter, and I am committed to working with the Board and chapter membership to continue the growth and impact of the organization. I am excited by the opportunity to shape the direction of systems engineering and advocacy in the Enchantment Chapter region. However, the goals and drive of the organization cannot be accomplished only through the efforts of the President or the Board of Directors (BoD). It takes the effort of the members of the organization. If there's something that you want out of INCOSE, I encourage you to work me, with your chapter members, and with the BOD to make it happen. What can you do? Get involved! A couple of easy ways for you to be involved are:

- Join a committee and put your talents to work.
- Pay your dues and encourage others to join.

We have some exciting plans in the works for 2021, and I look forward to working with all of you.

Thanks,
Arno

Enchantment 2021 Election Results

Ann Hodges

I am excited to introduce the Enchantment Chapter's Board of Directors. As you can see by the legend, a number of the Board members have been involved for one or more years, serving the systems engineering community. There's an opportunity for you if you want to become more involved in the Chapter operations – either as a voting member (President Elect, Director-at-Large) or a non-voting member. Why should you consider volunteering? Working on a Board provides professional development, networking opportunities, increased visibility within and external to your organization, and shows commitment to advancing the field of systems engineering (enhancing your resume!). Another benefit is that when you help plan events, you get to guide things in the direction that you're interested

in and enjoy (such as talks, venue/food/drink for social events).

Contact anyone on the Board for more information on how to get involved; contact information and employer for each Board member is listed at the end of this newsletter.

Role	Board Member
President	Arno Granados
Past President	Robin Reynolds (#)
Vice President	TBD
Treasurer	Mary Compton
Secretary	Ann Hodges (#)
Director-at-Large	Dr. Cheryl Bolstad
Director-at-Large	Dr. Heidi Hahn (#)
Director-at-Large	Kyle Spisak
Director-at-Large	Raymond Wolfgang
Non-voting Board Member	Jim Larkin
Non-voting Board Member	Dr. Eric Smith

# indicates Past President of Board

Photo by Element5 Digital on Unsplash

INCOSE International Workshop 2021

Mary Compton

INCOSE's International Workshop (IW) 2021 is a Virtual Event!

The Annual INCOSE IW is just around the corner. This year, for the first time, IW is a totally virtual event. As in past years, the IW will include the annual Model Based

Systems Engineering Workshop Friday through Saturday, January 29 – 30, 2021.

When is IW2021? IW2021 is January 29 –31, 2021. However, several Working Groups (WGS) are holding working or outreach sessions Monday, January through Thursday, February 4th. Check the IW2021 website for the complete event schedule. Because IW2021 was originally scheduled to be held in Sevilla, Spain, meeting times must be adjusted for the Mountain time zone. See "*What time is that meeting?"* below.

What are the fees for IW2021? Registration is open! Students and Senior Members: $65. Full INCOSE Members and CAB Representatives: $175. Associate Members and Non-INCOSE Members: $225. Currently Associate Member? Convert to full INCOSE membership here. Currently a Non-Member? Join INCOSE here.

Why should I attend IW? This event allows systems engineers at all levels and from all backgrounds to contribute to the state of the art of systems engineering. Systems Engineers are encouraged to engage in working sessions and contribute their knowledge and experience to take the discipline forward. Click here to learn more about the purpose of IW.

What happens at IW?: (1) Working group sessions that tackle INCOSE's major projects and in international standards development, (2) workshops to explore the Systems Engineering challenges in new sectors, (3) opportunities for chapter leaders to meet and share best practice, and (4) support sessions to help you get the most out of INCOSE's shared working environment, as well as a broad range of other technical meetings. WGs offer two kinds sessions at IW:

(1) Working meetings that focus on improving and completing working group products. These are ideal for contributing with and learning from the real experts in the field.
(2) Outreach sessions focus on disseminating the current state of the art to attendees with no of little previous exposure to the working groups.

What time is that meeting? Meeting times in the IW2021 agenda are based on Central European Time (CET), the time zone in which Sevilla resides. CET is Greenwich Mean Time (GMT) + 1 hour. Meeting times in the IW schedule are listed using the 24-hour clock. Adjust a CET meeting time to Mountain Standard Time (MST), by subtracting 8 hours. For example:

1. Meeting at 15:00 (aka 3:00 PM) CET on January 29th is at 7:00 AM MST on January 29th
2. Meeting at 0:00 (aka 12:00 AM) CET on January 29th is at 4:00 PM MST on January 28th

Not for Women Only

Dr. Heidi Hahn

Advancing Knowledge, Not Imposing Diversity, Should Be the Goal of Federal Research Funding

The title of this quarter's NFWO is the tag line from a commentary titled 'Woke Science is an Experiment Certain to Fail' written by Heather MacDonald in the *Wall Street Journal* in September 2020. MacDonald notes that identity politics have insinuated themselves into federal agencies. The National Science Foundation (NSF), the National Institutes of Health (NIH) and several other federal agencies that fund STEM research have embraced the idea that there is systemic bias against women and minorities in STEM and have taken it upon themselves to right the inequities.

Sounds about right so far, right? But think about how they're doing it. In addition to the usual preferences for females and minorities, the NIH plans to fund student researchers from disadvantaged backgrounds including those "who were or had been homeless, who were or had been in foster care, who had been eligible for free school lunches, or who had received WIC payments…as a child or a mother." Research institutes would also qualify for additional supplements to their funding for hiring a diverse work force, particularly if the candidates are "victims" of intersectionality.

The NSF is also on the intersectionality bandwagon, providing $29M for projects that "'use intersectional approaches in the design of systematic change strategies' to combat bias in the STEM fields."

MacDonald (2020) cites research that contradicts the idea that unequal representation in STEM hiring is the result of discrimination. She points to the academic skills gap as the reason that science organizations aren't proportionally diverse:

- Blacks make up only 1% of SAT test-takers scoring 700-800 on the math SAT, but 24% of test takers with scores of 300-390
- The average black math score is more than one standard deviation (SD) below the average Asian math score and nearly one SD below the average white math score
- The proportion of males achieving perfect or near-perfect SAT math scores is twice as large as the proportion for females

Yes, these disparities are probably the result of inequities in the educational system and other disadvantaging circumstances, but employers can't be blamed for wanting to hire the most qualified candidates. If we really want to solve the problem of inequities in STEM fields (and I do believe it is real), we need to start at the K-12 level.

A more appropriate problem for organizations to tackle in the near-term is that of retention in STEM, which is a particular problem with women. Silbey (2016) notes that women leave the engineering profession at a higher rate than men. She states "Women make up 20% of engineering graduates, but it's been estimated that nearly 40% of women who earn engineering degrees either quit or never enter the profession." As a result, in 2013 women made up only 12% of the US engineering workforce (Corbett and Hill, 2015). Fouad, Singh, Fitzpatrick, and Liu (2012) surveyed more than 5,500 women with engineering degrees. They found that more than half of the respondents were working as engineers; however, about a quarter had worked as engineers at one time but had left the field and the rest had never entered the workforce as engineers.

The government diversity initiatives are based on the theory that scientific advancement depends on having a diverse scientific workforce. The literature supports the idea that social diversity in teams – gender, ethnic, racial – is a good thing, but it's not because of the identity-based diversity *per se* but because it introduces informational diversity or diversity of perspectives and experiences (Phillips, 2014). MacDonald (2020) urges that federal science funding return to making color- and sex-blind basis. She closes with the title of this article, saying also that "America's scientific competitiveness depends on supporting our most talented scientists, regardless of their race and sex."

References

Corbett, C. and Hill, C. 2015. *Solving the Equation – The Variables for Women's Success in Engineering and Computing*. Washington, DC (US): AAUW.

Fouad, N. A., Singh, R., Fitzpatrick, M. E., and Liu, J. P. 2012. *Stemming the Tide: Why Women Leave Engineering*. Milwaukee, WI (US): University of Wisconsin.

MacDonald, H. 2020. 'Woke science is an experiment certain to fail', *Wall Street Journal*, September 24.

Phillips, K. W. 2014. 'How diversity works', *Scientific American*, 311 (4), 42-47.

Silbey, S. S. 2016. 'Why do so many women who study engineering leave the field?' Accessed 17 September 2017.

Recent Chapter Meetings

Ann Hodges

October 2020

Dr. Jakob Axelsson, a full Professor of Computer Science at Mälardalen University, Sweden and a senior research leader in systems-of-systems at RISE Research Institutes of Sweden, presented "Achieving System-of-Systems Interoperability Levels". Interoperability is a key concern in systems-of-systems (SoS). Numerous frameworks have been proposed to deal with this, but they are generally on a high level and do not provide specific guidance for technical implementation. However, in the context of simulation, the Levels of Conceptual Interoperability Model (LCIM) has been proposed. Also, the semantic web initiative has been introduced to provide description logic information to web pages. This presentation discussed how these two concepts can be combined into a general approach for SoS interoperability. It also expanded on the LCIM model by providing more details about the world models of a system and its content on the higher levels of interoperability, and discussed experiences from applications.

November 2020

Dr. Heidi Hahn, recently retired from Los Alamos National Laboratory as Senior Executive Advisor to the Associate Laboratory Director for Weapons Engineering Sciences,

currently an Adjunct Faculty Member in Engineering Management Department at New Mexico Tech, Enchantment Chapter Past President, and holder of ESEP and PMP certifications, presented "Empowering Women Leaders in Systems Engineering". The INCOSE Empowering Women Leaders in Systems Engineering effort (EWLSE) is focused on creating an open systems engineering environment welcoming to all; promoting the demonstrated value of women as systems engineers and leaders; engaging women in engineering and systems engineering at all levels of education around the world; and enabling increased participation and retention of women in systems engineering leadership. This presentation discussed EWLSE, current status and initiatives.

December 2020

Dr. Paul Clements, Vice President of Customer Success with BigLever Software, and David Hartley, Senior Advanced Software Engineer and Product Owner for the General Dynamics Missions Systems Product Line Engineering Center of Excellence, presented "Patterns for Success in the Adoption and Execution of Feature-Based Product Line Engineering". Systems and Software Product Line Engineering (PLE) is a general approach to engineer a portfolio of related products in an efficient manner, taking advantage of the products' similarities while respecting and managing their differences. The approach manages a product portfolio as a single entity, as opposed to a multitude of separate products. Numerous resources describe the organizational benefits associated with incorporating PLE techniques and tools. Feature-based System and Software Product Line Engineering is a specific form of PLE that is powered by commercial off-the-shelf automation, fully defined processes, and a formal language of variation based on features. Many case studies show the efficacy of Feature-based PLE and the improvements in cost, schedule, and quality that can come with it. This talk summarized a paper from INCOSE's 2020 International Symposium, in which practitioners from four of world's six largest defense companies highlight their experience with the practices that enable and inhibit success with this powerful engineering discipline.

Upcoming Events

January 13, 2021: David Long, founder and President of Vitech, INCOSE Fellow and ESEP, and Past President of INCOSE, will present "Schema and Metamodels and Ontologies, Oh My!".

February 10, 2021: Dr. Gan Wang, BAE Systems, BAE Global Engineering Fellow and Chief Engineer for BAE's Integrated Defense Solutions, will present "Implementing a Model-Based Digital Engineering Enterprise for a Defense System Integrator".

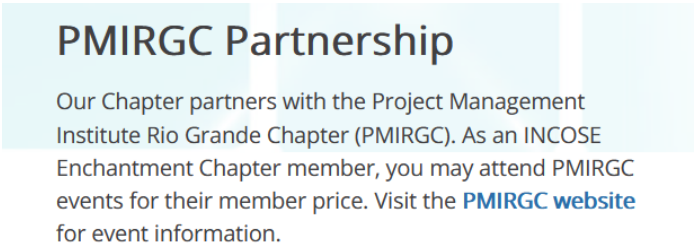
March 10, 2021: Dr. Ron Carson, retired Technical Fellow in Systems Engineering from Boeing, an Adjunct Professor of Engineering at Seattle Pacific University, an Affiliate Assistant Professor in Industrial and Systems Engineering at the University of Washington, an INCOSE Fellow and a certified ESEP, will present "Perspectives on the Boeing 737MAX Maneuvering Characteristics Augmentation System (MCAS)".

Enchantment / PMIRGC Partnership

Ann Hodges

The Project Management Institute Rio Grande Chapter (PMIRGC) event lineup is now available from our Enchantment Chapter website!

In 2020, representatives from the Enchantment Chapter and PMIRGC Boards agreed to more closely collaborate, sharing event information and speaker opportunities. The PMIRGC has offered member prices to their events for Enchantment Chapter members. The PMIRGC's events are available from our Chapter's home page or by clicking the image below. See you there!



Systems Engineering Professional Training

Ann Hodges

The INCOSE Enchantment Chapter is in the process of arranging another webinar-based Systems Engineering

Professional (SEP) certification preparation training sometime during Q1 2021. SE Scholar, the firm we worked with in the past for this training, offered the Chapter a discounted rate. This webinar serves as an overview of systems engineering even for those not interested in getting certified.

Here are some details from our past training opportunity:

- The class is self-paced consisting of 7 modules and over 16 hours of instructional videos covering the entire INCOSE SE Handbook v4.0.
- The price includes study guides, a comprehensive process flow diagram, practice quizzes and exams.
- The material will be provided as PDF with the students making hard copies as desired.
- There will be a discussion board so that students can collaborate and ask the instructor questions.

Be on the lookout for the SEP prep training flyer when the details are available. If you have any questions, please contact the Chapter's SEP mentors (Heidi Hahn or Ann Hodges, see contact information at the end of this newsletter).

Photo by Roberto Nickson on Unsplash

End of Year Survey

Cheryl Bolstad

The end of the year survey was sent to members by email in October, 2020. The annual survey (along with surveys offered at the conclusion of each monthly chapter meeting) is an opportunity for the board to learn how the members feel about the organization – what is working, and what could be improved or implemented to make the Enchantment Chapter a valuable support and resource for Systems Engineers. This year's survey focused on how COVID-19 had affected members.

Overall response rate was lower when compared to last year. Over 66% of the respondents believe that their ability to perform systems engineering has been impacted by COVID-19. The majority of the respondents indicated that they were most impacted by working from home and not being able to collaborate in person with others. Other impacts include a loss of travel and the fact that things seem to take longer now to accomplish than they did before COVID-9. Of the respondents 2/3 (67%) told us they attend the monthly meetings and they read the quarterly newsletter. 60% of the respondents said they are totally satisfied with the local chapter activities during this COVID-19 time, while 13% were somewhat dissatisfied with the activities. Additionally 47% felt totally connected to the chapter during this time, 20% somewhat connected, 13% were neutral and another 20% felt somewhat disconnected from the chapter during the COVID crisis. Several participants offered to help the local chapter by giving talks or helping with the newsletter.

Surveys aren't the only avenue to provide input, suggestions, or to get involved – you are always welcome to contact any member of the Board of Directors by email or to attend a Chapter or Board meeting and initiate a discussion. We welcome your ideas and want the Chapter to serve and support our members in the best way possible.

Membership

Robin Reynolds

Please welcome the following new members to our Chapter!

Miguel Sama	University of Texas at El Paso
Ray Velazquez	University of Texas at El Paso
Sergio Luna	University of Texas at El Paso
Mark McConnelee	Embry-Riddle Aeronautical University
Susan Caskey	Sandia National Laboratories
Carlos Rodriguez	University of Texas at El Paso
Todd Embree	Sandia National Laboratories
Michael Cutter	Booz Allen Hamilton Inc.

The Enchantment Chapter currently has 106 members – 96 regular members and 10 student members. INCOSE has over 18,000 members in 70 countries worldwide.

WARMEST WISHES FOR A HAPPY NEW YEAR!

Note that a large number of memberships have recently expired or are expiring in the first quarter of 2021 so please take a moment to login in and check your status then renew if needed.

Board of Directors

President	Arno Granados, SNL	agranad@sandia.gov
VP/President Elect	TBD	NA
Secretary	Ann Hodges. SNL	alhodge@sandia.gov
Treasurer	Mary Compton, SNL	mlcompt@sandia.gov
Past President	Robin Reynolds, SNL	rmreyno@sandia.gov
Director at Large	Dr. Cheryl Bolstad, SNL	cbolsta@sandia.gov
Director at Large	Dr. Heidi Hahn, LANL	drsquirt@outlook.com
Director at Large	Kyle Spisak, SNL	kspisak22@sandia.gov
Director at Large	Raymond Wolfgang, SNL	rwolfga@sandia.gov
Student Division Advisor	Dr. Eric Smith, UTEP	esmith2@utep.edu
Non-Voting	Jim Larkin, NG	jelarkin3@gmail.com
Non-Voting	Phil Bennett, SNL	pcbenne@sandia.gov
Non-Voting	Dr. Eric Smith, UTEP	esmith2@utep.edu

Committee Leads

Collaborative Engagement	Dr. Cheryl Bolstad
Effective Operations	Arno Granados
Professional Development	Ann Hodges
Technical	Dr. Heidi Hahn

Are you passionate about SE? Do you want to give back to the community and affect the future direction of the Chapter? Consider participating on the Board of Directors.

The Enchanted View
is published quarterly by the INCOSE Enchantment Chapter (New Mexico & El Paso). Published material does not necessarily reflect the views or opinions of INCOSE, the Enchantment Chapter Board of Directors, or the Editor, Robin Reynolds.

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