



## Meet the 2019 Chapter Board



### Heidi Hahn, President—

My bio is on the Chapter website in the 2019 Board entry under the About tab, for those of you who don't know me. Here I'll just say I am an Expert Systems Engineering Professional (ESEP) as well as a certified Project Management Professional (PMP). This is my second stint as Chapter President.

**Looking ahead to 2019:** Before I start looking ahead, I need to look back over these past few years and give thanks to Rick Dove for all he has done for the Enchantment Chapter. As you may know, Rick is leaving New Mexico (by the time you are reading this he will already have left). We wish him success in his future endeavors and hope that he will continue his association with the chapter (albeit at a reduced level of effort) not only this year but in the coming years, too.

2019 will be a year of deliberate change for the Enchantment Chapter. We have restructured to have a smaller Board of Directors and will be organizing ourselves around several standing and *ad hoc* committees that align with our chapter strategic plan. In October, the Board voted to establish the standing Operations Committee (OpsCom), led by Bob Pierson, and a Socorro Summit Committee (SSumCom), led by Rick Dove. The latter will wax and wane as Summit activity gears up and slows down on its roughly biennial cycle.

This committee structure affords the opportunity for greater engagement of chapter members in chapter activities. Have a great network and a passion for organizing speakers? Join the Professional Development Committee (PDCom), which will be responsible for monthly chapter meetings and tutorials. Social butterfly who likes to throw parties? Join the Social Committee (SocCom). Other opportunities include Outreach (OutCom, in which the chapter reaches out to other organizations) and Engagement (EngageCom, which looks for collaborations both between chapter members and outside of the chapter). And the good news is that you don't have to be a Board of Directors member to have a leadership role in any of these.

Your Board had a strategic planning retreat on December 14 to begin making decisions about how the Board will operate in the future. Although we decided to continue to meet monthly, these meetings will be very short – they are an opportunity for the Board to receive the reports of the four standing committees (Ops, PD, Outreach, Engagement) and vote on committee proposals where needed. The rest of the time will be allocated to committee work.

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### Why fix what isn't broken?

Bob Pierson, ATA

We do it all the time, of course, when we take up a new sport, move to a new town, expand our business, add on to our home, or just rearrange the furniture. When we've built up enough strength and insight, sometimes we can see what could be better.

Our Enchantment Chapter is far from broken. We have repeatedly won INCOSE's Platinum award—the highest award for chapter excellence. Yet our Board of Directors is taking steps to change the structure that brought us this far. Are they crazy?

Probably not. I've been privileged to serve on the board since the beginnings of this Chapter, and, if we are crazy, it's the methodical craziness at the heart of systems engineering. We take chances, but not randomly, when opportunity outweighs the risks.

So what may be changing? Rather than one large Board that tries to do everything, the new organization focuses a smaller board on its management and goal-setting duties. That smaller

board relies on committees to do the work of the chapter—Outreach, Professional Development, Collaborative Engagement, Effective Operations—while hopefully having fun in the process.

Unlike a formal board, you can join a committee any time and contribute just the way you want. Want to help plan upcoming tutorials? Or invite speakers that matter to you or your organization? Interested in collaborative chapter projects like the upcoming Socorro Systems Summit? Want to reach out to share what INCOSE offers? Like planning socials? Or are you a master of the web, a media guru, a person who would enjoy editing and posting our speaker videos? In the new structure, there's a place for you to enjoy time with your fellow systems engineers. Watch for more info. Or, why wait? Contact any board member listed on the back page and join the team that IS our chapter.

I've left the board this year, but I expect to be as engaged as ever in the Chapter. Should be fun. Maybe one of the reasons we fix what's not broken is to make room for what's never been. ∞

## 2019 Board Members

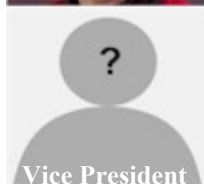
All Bios at [www.incose.org/enchantment](http://www.incose.org/enchantment)  
Under the About This Chapter Tab



Heidi Hahn  
Los Alamos Lab



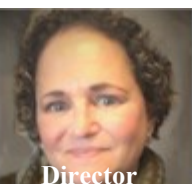
Rick Dove  
PSI Inc



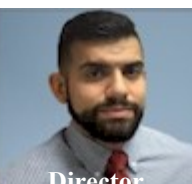
Ann Hodges  
Sandia Labs



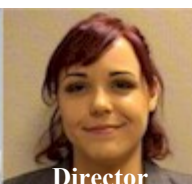
Mary Compton  
Sandia Labs



Cheryl Bolstad  
Sandia Labs



Anthony Matta  
Sandia Labs



Laura Salguero  
Sandia Labs



Eric Smith  
UTX, El Paso

To Be Appointed  
Unknown



## Winter Social at Gruet Winery—February 8

Mary Compton, Sandia National Labs

Mingle with fellow chapter members and friends with wine and some food in the Barrel Room at the Gruet Winery.

Admission: \$10 per person, payable via cash or check at the event—includes appetizer buffet and wine tasting. Event is limited to 35 people, must be 21 or over to consume wine. Guests are welcome.

**Where:** Gruet Winery, 8400 Pan American Freeway N.E., Albuquerque, NM.

**When:** Friday, February 8, 2019, 5:00–7:00 PM.

**Registration:** via [EventBrite](#) by February 1, 2019 at 12 noon. **Printable Flyer:** [Here](#). ∞



## 2018 Enchantment Chapter SEPs New Certs in Blue—Congratulations

Adams, Jason	SAIC	CSEP 06/10/2018
Aguilar, Virginia	Honeywell International	CSEP 05/29/2014
Byrnes, Bartley	SAIC	CSEP 07/30/2018
Compton, Mary	Sandia National Laboratories	ASEP 10/05/2017
DeVilbiss, Nathan	ATA-Aerospace	CSEP 10/07/2016
Durán, Felicia	Sandia National Laboratories	ASEP 09/26/2018
Gruet, Michael	Oasis Systems	CSEP 09/28/2013
Hahn, Heidi	Los Alamos National Laboratory	ESEP 05/23/2016
Hodges, Ann	Sandia National Laboratories	CSEP 08/10/2008
Kustra, Todd	Sandia National Laboratories	CSEP 04/27/2017
Matta, Anthony	Stevens Institute of Technology	CSEP 07/27/2016
McGoey, Paul	Retired Boeing	CSEP 03/29/2010
McLaughlin, Christopher	Not Listed	ASEP 08/30/2016
Mondragon, Oscar	University of Texas El Paso	ASEP 10/05/2017
Phillips, Timothy	L3 Technologies	CSEP 01/05/2011
Sayer, Robert	Sandia National Laboratories	ASEP 02/27/2018
Smith, Eric	University of Texas El Paso	ASEP 05/21/2010
Turner, Rob	Stellar Solutions	CSEP 04/29/2016
Young, Sharissa	Retired Sandia	CSEP 12/19/2007

## SEP Training Nearby

by Certification Training International:

Course details (more dates/locations)

Courses Nearby (somewhat):

2019 Feb 11-Feb 15 | San Francisco, CA  
2019 Aug 12-Aug 16 | Austin, TX

Chapter-arranged on-line course starts Jan 10  
Flyer is [Here](#). Register [Here](#). See below.

Chapter SEP Mentors:  
Ann Hodges [alhodge@sandia.gov](mailto:alhodge@sandia.gov),  
Heidi Hahn [hahn@lanl.gov](mailto:hahn@lanl.gov)

## Free SEP Exams—Local

**Free Exam** Jan 16, 2019, at University of Texas El Paso. Register [Here](#).

**Free Exam** April 4, 2019 at Socorro Summit  
Registration: TBD, watch for Announcement.

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## NEW: Enchantment Chapter's Self-Paced On-Line SEP Prep Course

Ann Hodges, Sandia National Labs

The INCOSE Enchantment Chapter is excited to offer a webinar-based SEP certification exam preparation training course through a special deal made with Paul Martin's **SE Scholar**. The timing of this offering is conveniently planned for students to take a free SEP exam offered at NM Tech on April 4, 2019 in conjunction with the 2019 Socorro Systems Summit.

### Webinar details:

- This self paced **class** has 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.

### Time line

- January 10, 2019, 5pm MST: Before-class live webinar explaining the INCOSE SEP certification process, allowing members to ask the instructor questions in real-time. A link to the webinar portal will be sent. Attendees will have temporary free access to the Canvas web portal that supports the webinar, so you can get a feel for what it's like to take the course.
- January 10 – April 3, 2019: Buy access to SE Scholar's online Canvas class portal. Note: You'll have access to the class as long as it takes for you to pass the SEP exam. No time limit – take as long as you need.
- April 4, 2019: Take free SEP exam offered at NM Tech.

**Registration** (The Chapter got a special \$500 deal on the course cost, \$150 off. Discount good until March 31, 2019)

- Navigate [here](#) and use the discount code ENCHANTED19 at checkout. This discount code will expire March 31, 2019.

**Questions:** contact [Heidi Hahn](#) or [Ann Hodges](#).

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## 2019 Socorro Systems Summit—April 5-6 with NRAO Tour on 4<sup>th</sup>

Co-sponsors: INCOSE Enchantment Chapter and New Mexico Tech Electrical Engineering Department

### Chapter Board

**Event:** Practitioners teaming for knowledge exchange and development on issues of interest and professional development.

**Location:** New Mexico Tech (NMT), Socorro, New Mexico – a charming small-community location 60 minutes south of the Albuquerque airport.

**Attendance fee:** \$100, with UTEP and NMT students admitted free with faculty-advisor registration and workshop topic research completed before attendance, per faculty advisor guidance.

**Registration:** Will open soon, watch for announcement.

**Full Event Detail:** in [Chapter website](#) Library tab.

### Workshop Topics:

Eight topics of current interest have been selected by survey and interviews from an initial candidate list of 16 topics.

**Objectives:** Engaged professional development. Expanded work-relevant network. New knowledge to take home. A stimulating time-out from deadline-driven work that leaves little time for thinking.

**Intent:** Understand problem and solution spaces of the topic area better—barriers to solution, cultural incompatibility and push back, systemic inertia, misaligned forces, and solution objectives and requirements.

### Topics:

- What impedes and would facilitate full life-cycle consideration by system developers?
- What impedes and would enable agile systems engineering in mixed-discipline projects?
- What impedes and would establish effective problem space attention over a solution focus rush?
- What impedes and would encourage mixed discipline systems engineering training?
- What impedes and would facilitate women as leaders in systems engineering?
- What impedes and would encourage and facilitate student involvement in Chapter and WG activities?
- What impedes and would facilitate dealing with complexity, emergence, and assessment in autonomous systems?
- What impedes and would encourage verification and validation of SE models?



**Keynote Speaker:** In process, she'll be good.

**Day 1: Speed dating.** First day will have two parallel tracks of four workshop topics each. These will each be 1.5 hours in duration. Participants can attend four intros in the time allowed. The session will conclude with setting objectives for the 2nd day workshop.

**Day 2: Two dance dates.** Participants will choose the two 3-hour workshops they will participate in, one in the morning and one in the afternoon, which

don't have to be among the four intros attended on Day 1. The objective of Day 2 is to develop a teamwork environment, expose each participant to the thinking, practices, and knowledge of the others, and provide new contacts that can become longer term collaborative relationships. An equal objective is to have the workshop identify a clearer understanding of the problem, concepts, and knowledge that surfaces in the workshop.

**Meet-and-Greet reception** at end of Day 1 provides an opportunity to socialize with new contacts and old friends.

**Optional dinner gathering** at end of Day 2, to be announced.

### Value Proposition for Personal and Organizational Participation

The knowledge base is exploding. The duration of value for any given piece of knowledge is shrinking as new knowledge makes old knowledge obsolete faster. This puts pressure on the speed of knowledge diffusion and a focus on the anticipation of new knowledge needs. When an organization needs to learn quicker it must shorten the time of knowledge acquisition.

Effective learning is amplified when conducted as a team sport, among people driven by curiosity and a deep-felt need to know something more – a specific something. Collaborative-learning workshops chose topics screened for real appeal to real practitioners – who have a real application for the results. Participants self-select, bring passionate questions and diverse perspectives, and never fall asleep. Collaborative learning is aided when topics do not have a clear established knowledge base, and when participants cannot claim dominant expertise.

Collaborative learning is an effective mechanism for knowledge agenda fulfillment, knowledge diffusion, collaborative culture initiation, and community of practice formation. Communities of practice are an effective mechanism for nurturing a collaborative culture and increasing the velocity and richness of knowledge diffusion. ∞



## Special Tour of NRAO Very Large Array

The National Radio Astronomy Observatory's (NRAO) Very Large Array, one of the world's premier astronomical radio observatories, consists of 27 radio antennas in a Y-shaped configuration on the Plains of San Agustin fifty miles west of Socorro, New Mexico.

New Mexico Tech's Aly El Obery has arranged an awesome special tour for us on April 4th, starting at 10:00am. Free registration will be required to establish head count, and some rules will need to be observed relative to cell phones and clothing. These details will be announced and also posted on the Chapter's 2019 Summit webpage soon. ∞





## IW19 INCOSE International Workshop, Los Angeles — 26-29 Jan

Workshops	Sat 26 Jan	Sunday	Monday	Tuesday
Academic Council			0900-1500	
Agile Systems & SE			1300-1800	
<b>Americas Chapter Leaders</b>			1530-1700	
Architecture			0800-1700	
Automotive	1100-1200	1000-1200		1300-1400
<b>Certification Exam</b>		0800-1100		
Competency		1300-1500	0900-1700	0900-1200
Configuration Management			0900-11:30	
Critical Infrastructure Protection/Recovery		1300-1700	1000-1700	1300-1500
Decision Analysis		1500-1700		
Digital Engineering Information Exchange		1300-1500	0900-1200	1300-1500
Empowering Women as Leaders in SE				0800-1200
Enterprise Systems				1300-1500
Human/Systems Integration			0900-1200	
Independent Verification & Validation			0800-1200	
Integration, Verification, & Validation		0800-1200		
Knowledge Management			1500-1700	1000-1400
Lean Systems Engineering			1300-1500	
MBSE	1030-1800	0900-1800	0800-1700	0800-1500
MBSE Challenge Team -			1300-1600	
MBSE Patterns		1300-1700	1000-1700	
Model-Based Conceptual Design	1300-1500	1300-1500	1300-1500	
NAFEMS-INCOSE Systems Modeling &			0900-1200	
Natural Systems	1030-1700	1030-1700		1000-1500
Object-Oriented SE Method	1300-1600			
Oil & Gas				0800-1200
PM-SE Integration		1030-1200		
Product Line Engineering		1000-1700		
Requirements	1000-1700	0800-1700	0800-1700	0800-1200
Resilient Systems	1300-1500			
SEBOK				0800-1500
SE for Early Stage R&D (WG Formation)			1500-1700	
SE Quality Management	1330-1530	1300-1600		1000-1130
SE Tools Database	1030-1700	0900-1700	1030-1700	1030-1500
Space System		1000-1100		
Systems & Software Interface		1500-1600		
Systems of Systems		1300-1700	0900-1700	0800-1200
System Safety	1030-1200	0900-1500		0930-1130
Systems Science	1000-1700	0800-1700	0800-1700	0800-1500
Systems Security Engineering	1039-1700			
Systems Thinking RoundTable	0700-0800	0700-0800	0700-0800	0700-0800
Telecommunications		1500-1700		1300-1500
Training		1530-1630		1100-1200
Transportation	1300-1600		1500-1700	1030-1200

Take the INCOSE Certification exam at IW19 **FOR FREE** (normally \$80). [Sign up on IW19 registration form.](#)

For updates to this 27 December schedule go to the INCOSE IW19 site.

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### Recent Meetings

Ann Hodges, Sandia National Labs

Presentations and recordings are in the Library at [www.incose.org/enchantment](http://www.incose.org/enchantment).

#### October 2018

Laura Salguero, Systems Engineer at Sandia National Laboratories, presented *An SE Approach for Analysis of a Complex Adaptive Organization's Risk Inducing Characteristics*. In order to support safe operations, Sandia has a large Environment, Safety, and Health (ES&H) organization that provides expertise to support engineers and scientists in performing work safely. One of the methods being investigated is using enterprise architecture analysis to mitigate risk inducing characteristics such as normalization of deviance,

organizational drift, and problems in information flow.

This talk presented a case study for how a Department of Defense Architecture Framework (DoDAF) model of the ES&H enterprise can be analyzed to understand the level of risk associated with these characteristics.

#### October 2018

Dr. Tyson Browning, Texas Christian University, gave a tutorial on *Design Structure Matrix Methods and Applications* on October 26 at the CNM Workforce Training Center. The design structure matrix (DSM) is a powerful tool for visualizing, analyzing, innovating, and improving systems—including product designs, organizational structures, and process flows. See page 9 for what you missed.

#### November 2018

Marlene Brown, Sandia National Laboratories, presented *An SE Approach to Providing Photovoltaics in Ghana*. The presentation portrayed the evolution of the Boko Bed Net System for a Malaria ridden area in Ghana. It is the result of analyzing a serious problem, understanding the environment and limited local resources, and then finding the right technologies and partners to design and implement a simple and elegant solution. The system is simple enough, but the project was created out of need derived from personal stories of Malaria, cultural communication issues and taboos, and compassion for combating the devastation of Malaria. A Systems Engineering approach was used throughout this project and described in this talk. ∞

### Next Meetings Ann Hodges, Sandia National Labs

#### Jan 9: Risk and Opportunity Management & V&V Using SysML

Brian Selvy, CEO, CTO, and Co-founder of Nymbysys LLC

**Abstract:** Today's well known and utilized SysML tools and platforms that deliver exceptional capability in systems engineering typically do not offer an intuitive and effective means for capturing and modeling risks and opportunities. Modeling these elements, their properties, and interactions/traceability to other Systems Engineering artifacts is yet another pillar of a holistic Systems Engineering methodology that can make or break the success of any program. While it may be easy to modify existing elements to provide a static identification of risk and opportunity attributes within any given model, much more thought and care needs to be employed to generate a methodology that includes analysis of the time-phased, evolving aspects of R/O management. Only then can the attribute data related to potential risks and opportunities be analyzed sufficiently to make technical and programmatic decisions, and a full model-based system-level understanding of a project is incomplete without it. This presentation will fully define the problem of ignoring risks and opportunities in a complete MBSE employment and will describe a set of custom SysML extensions and a methodology that meets typical project needs. A few examples for how to create static and dynamic model elements for identifying, analyzing, and predicting the probabilistic impact of these potential events will be presented, as well as means of tailoring the rigor and scope of a model-based risk & opportunity program to the needs of an organization based on project size, complexity, and stakeholder demands.

#### Jan 10: Chapter-Arranged On-Line SEP Training Course

Paul Martin, CEO, SE Scholar; Adjunct Professor, UMBC College of Engineering and Information Technology

**Abstract:** Starts January 10 with free try-before-you-buy session at 5:00pm MST, with discount price until March 3, and stays opened for registered participants as long as necessary. The timing of this offering is conveniently planned for students to take a free SEP exam offered at NM Tech on April 4, 2019 in conjunction with the 2019 Socorro Systems Summit. Flyer [Here](#), Register [Here](#).

#### Jan 16: Chapter Co-Sponsored Free SEP Exam at University of Texas, El Paso

Dr. Oscar Mondragon, Associate Professor, University of Texas El Paso, Industrial, Manufacturing, and Systems Engineering

**Abstract:** The Industrial Manufacturing and Systems Engineering (IMSE) department at UTEP is hosting this exam. This exam will be held in CRBL (Classroom Building) room 205 at UTEP, at 6:00pm. The SEP exam is open to all professionals or students. You must pre-register to take the exam [here](#).

#### Feb 8: Chapter Winter Social, Gruet Winery, 5:00pm-7:00pm.

Mary Compton, Event Producer

**Abstract:** Mingle with fellow chapter members and friends with wine and some food in the Barrel Room at Gruet Winery. \$10 per person, payable via cash or check at the event—includes appetizer buffet. Flyer [Here](#), Register [Here](#) by 12 noon Feb 1.

#### Mar 13: Evidence-Based Approach to Implementing the New INCOSE Systems Engineering Competency Framework

Dr. Don Gelosh, Director, Systems Engineering Programs, Worcester Polytechnic Institute

**Abstract:** The much-anticipated new INCOSE Systems Engineering Competency Framework was released in July 2018. In this presentation, Dr. Don Gelosh, Chair of the Competency Working Group, will discuss how individuals and organizations can use a practical evidence-based approach with the new framework to enhance their systems engineering expertise. The framework consists of 36 competencies across five groups: Core, Technical, Management, Professional, and Integrating. In addition to a description and explanation of why it is important, each competency includes a set of evidence-based indicators of knowledge and experience for five levels of competence: Awareness, Supervised Practitioner, Practitioner, Lead Practitioner and Expert. Dr. Gelosh will explain how individuals and organizations can use these evidence-based indicators to help identify and acquire the necessary knowledge, skills, abilities, behaviors and experiences at the appropriate levels of proficiency to enhance their own Systems Engineering effectiveness across their careers and the workforce. ∞



## Not For Women Only

Heidi Hahn, Los Alamos National Lab

Here I'll share some recent readings with you that I found interesting.

**Read: Women Scientists of the Secret City.** (Open access.) Nearly 640 women contributed to the Manhattan Project at Los Alamos, but their stories are rarely told. The history of Los Alamos is a great tale: world-renowned scientists are recruited to a secret location in the remote southwest (known only by its P.O. box address) to build a weapon to put an end to World War II. This story has been told dozens of times but is often focused only on the most famous of the scientists involved. Yet the Manhattan Project was truly the work of many, and although it was a time when relatively few women were educated in science, it has become clear that many women contributed scientifically to the success of this historic endeavor.

**Read: Carbon Queen.** (Access may require IEEE membership.) Mildred Dresselhouse died in 2017. In 2015 IEEE

Spectrum magazine featured an article about her called "The Queen of Carbon," noting: "After a half century of quiet work, she is accumulating accolades. This past November, in a ceremony at the White House, President Obama awarded her the Presidential Medal of Freedom, the U.S. government's highest civilian honor. 'Her influence is all around us, in the cars we drive, the energy we generate, the electronic devices that power our lives,' Obama said."

In 2015 the IEEE conferred its highest accolade upon Dresselhaus, the IEEE Medal of Honor. She was the first female Medal of Honor recipient in the award's nearly century-long history ... and still the only, to this date.

Interesting bit of trivia: Dresselhaus says of her Radcliffe College days in the '50s: "Women didn't take their exams with the men. I had to take my exams by myself in a different room. It was a very complex situation and not a very comfortable one." Now why that would be?

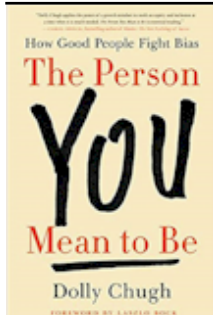
**Read: Women's Work.** (Access may require PMI membership.) The Project

Management Institute has an article on women in project management, identifying gender-based opportunity and pay gaps, offering advice, and making the observation that: "The demands for gender equality are rising to a roar heard around the world. This isn't some fleeting moment. Women—including those in project management—are rising up, refusing to let the issue continue to be swept under the rug."

The definition of 'women's work' is now broad enough to include almost any job imaginable. And project management is no exception." Many of the discussed issues faced by female project managers are faced by female systems engineers.

This is all the more poignant given the interests of both INCOSE and PMI in integrating the two disciplines.

**Read: 'Enough Is Enough': Science, Too, Has a Problem with Harassment.** (Open access.) From the New York Times: "Many women in science thought that meritocracy was the antidote to sexism. Now some have decided on a more direct approach." You could replace 'scientist' with 'engineer' in this article and it would be equally applicable. ∞



## The Good Person's Unconscious Assumption of Privilege

Excerpted from *Amazon review*:

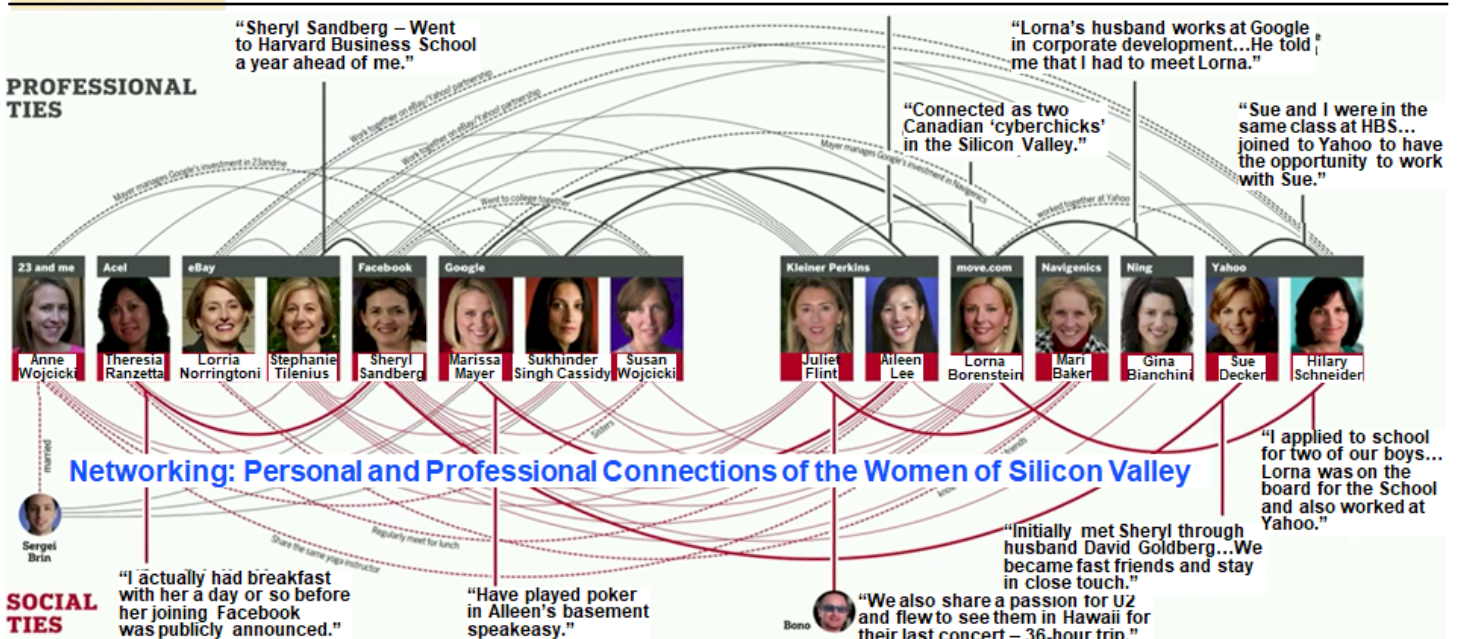
From her unconscious bias research findings, Dolly offers practical tools to avoid being a well-intentioned barrier to equality.

Most of us think we're good people, and that is the root of the problem. She helps you find your "ordinary privilege"—the part of

your everyday identity you take for granted, such as race for a white person, sexual orientation for a straight person, or gender for a man.

Dolly introduces the psychological reasons that make it hard for us to see the bias in and around us. She leads you from willful ignorance to willful awareness.

Her science-based approach is a method any of us can put to use in all parts of our life. ∞







## Transportation Working Group

*Dale Brown, MARTA and Co-Chair of TWG*

Over the past year we have been re-organizing the TWG to better utilize scarce volunteer resources. We recognize that volunteer time is very hard to find and are trying to spread the load amongst members so that they can focus a few hours each month on tasks that they enjoy. We have reorganized along functional lines and are currently revising our Charter and Operating Plan to reflect the changes in organization. As you can see from the version below, there are still volunteer opportunities available, and we have an International constituency.

### Collaboration

One of the TWG themes for 2018 was to actively collaborate and support our three partner Application Domain working groups: Automotive, Infrastructure, and Critical Infrastructure). This resulted in good attendance at IS and IW working group speaking events. We are working with these three groups to provide an exciting series of collaborative webinars on a monthly basis.

### Case Studies Sub-group

The TWG Case Studies sub-group has Joshua Crain, Kenneth Diemunsch, Bruce Elliott and Bob Gave as full members and benefits from the support of Kevin Fehon, and Jonathan Hulse as associates. Together, we work to extend the TWG library of case studies. You can find the case studies

on the TWG web site ([www.incose.org/incose-member-resources/working-groups/Application/transportation](http://www.incose.org/incose-member-resources/working-groups/Application/transportation)). The current version has 16 Transportation case studies and, for comparison, 1 case study from another domain. A typical case study is 2 or 3 pages in length, describes a project on which SE (or some part of SE) was applied and explains how this application made the project turn out better.

The library is designed to help you explain the benefits of SE to audiences – perhaps work colleagues or managers – who, while interested in SE, find it difficult to see its benefits clearly. Do, please, make use of this resource.

The TWG sub-group assembles each case study by carrying out a structured overview with senior members of the project over the phone and then writing this up, for checking by the interviewees. This makes the process painless for the project staff and provides some objectivity and consistency in the case studies.

We do have further projects to talk to but we are always looking for more. If you are aware of any transportation projects that might provide a basis for future case studies, Bruce Elliott would be pleased to hear from you. It does not matter if the contributing project did not carry out a comprehensive program of SE activities; if the experience illustrates the value of a single aspect, such as sound requirements management, then it will advance the

cause. To suggest a case study, to ask questions or to discuss joining the sub-group, please contact Bruce at [bruce.elliott@altran.com](mailto:bruce.elliott@altran.com).

### IS18 Featured Session

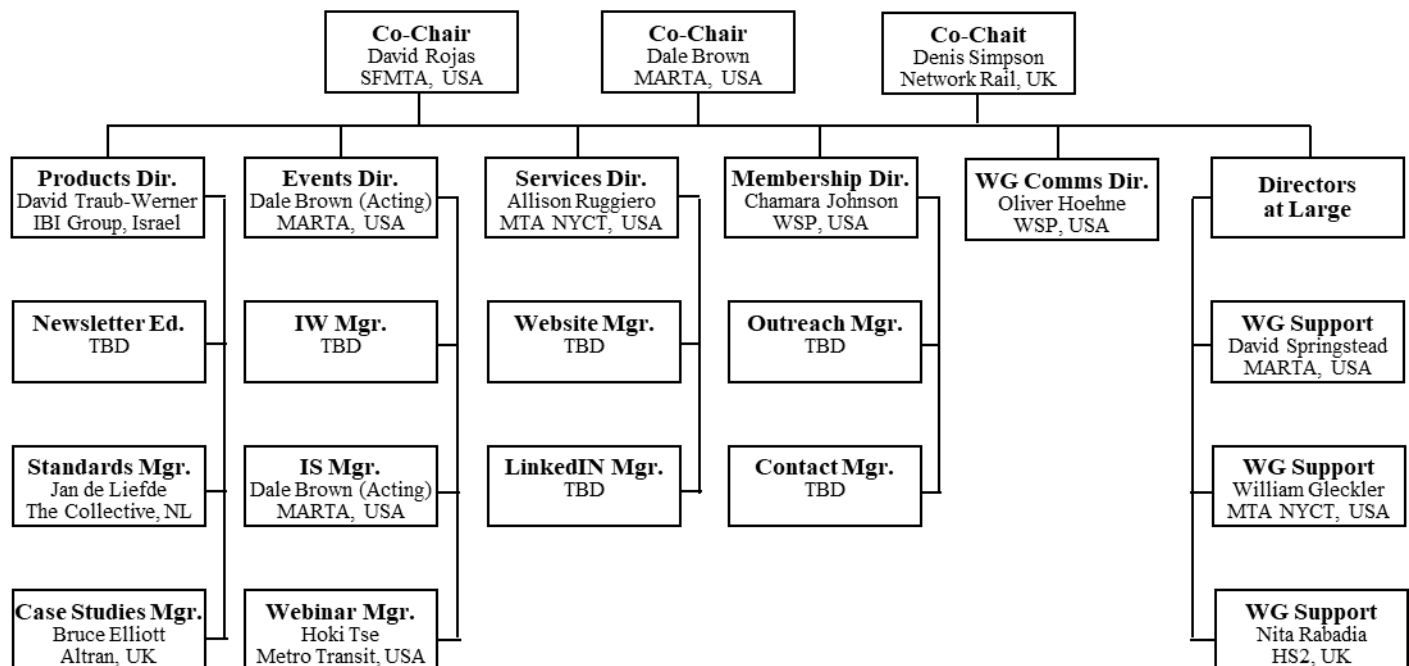
The Federal Highway Administration (FHWA) provides stewardship over the construction, maintenance and preservation of the Nation's highways, bridges and tunnels. FHWA has a major initiative focused on Intelligent Transportation Systems (ITS). At IS18 the TWG facilitated a 2 hour session with the FHWA Department of Transportation (DOT) called "Using Agile in Intelligent Transportation Systems" The session included a facilitated discussion presented by Jesse Glazer (FHWA) and Barbara Staples (Noblis). They discussed the FHWA project that developed the report "Applying Scrum Methods to ITS Projects" and this was followed by a lively discussion centered around the relative maturity levels amongst various industry sectors (e.g., aerospace vs. infrastructure/civil engineering).

### Leadership Contacts

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Denis Simpson,  
[denis.simpson@networkrail.co.uk](mailto:denis.simpson@networkrail.co.uk) ∞





## News From the UTEP Student Division

Dr. Eric Smith, UTEP Student Division Advisor

Lockheed Martin funded a project in the Department of Industrial, Manufacturing, and Systems Engineering (IMSE) at the University of Texas at El Paso for a method to remotely inspect difficult-to-reach areas with high levels of quality requirements.

Currently, inspections are performed by individual persons acquiring access to very tight areas of interest with potentially hazardous materials present. These personnel evaluate areas of interest and have cameras to document and relay information to people that need to see the inspection taking place. The new Crawler inspection system integrates machine vision system capable of automatically identifying and qualifying certain features and attributes with an autonomous or remotely controlled vehicle that is capable of accessing hard-to-reach areas of interest. The system's status and controls are displayed on user interfaces for the person overseeing the inspection as well as by personnel observing the inspection. Objects not passing the inspection criteria are identified and a record of the inspection is generated. The video of the inspection is archived for future reference.

The project funded four undergraduate students from the Departments of Computer Science, Mechanical Engineering, and the Industrial, Manufacturing & Systems Engineering (IMSE) department, as well as a graduate student from IMSE.

The learning objectives of the project included using requirements solicitation and generation methods, as well as Integration, Verification and Validation (IV&V) techniques to ensure that the right products are made, and are made to meet requirements provided by the customer. Students were exposed to technologies and disciplines outside of their field of study, and learned how to collaborate effectively to develop a complex system. This first phase of the project effectively proved the concept of an



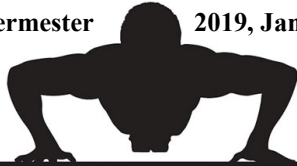
The new Crawler is capable of moving along inverted surfaces as it inspects, because of a suction fan sub-system.

inspection crawler, and may be further refined in future phases.

Dr. Bill Tseng, Chair of the IMSE Dept., stated that "This is a project that brings together many different backgrounds and exposes students to expertise outside of their own, much like what engineers will encounter when working in industry."

The opportunity for multidisciplinary collaboration coupled with the improved working conditions of inspection personnel makes the impact of this project significant in adding quality and consistency to a company that has been influential in progressing technology.

Wintermester 2019, Jan 7–19



## BOOTCAMP

The Systems Engineering Boot Camp provides engineers with a no-nonsense, back to basics experience by immersing

them in a workshop of unique and highly interactive training. During Boot Camp engineers learn about and participate in the extensive breadth/depth of System Engineering activities and products.

One fundamental goal is to train engineers in the concept of Adaptive Systems Engineering—the application of SE principles and practices to projects of varying length and type without the need for re-writing processes. Project-based learning develops skills for effective team work.

Topics include Basics of Systems Engineering, Mission Analysis, Requirements Engineering, Architecture/Design, Product Lifecycle, System Integration, Cost of Quality, Reviews, Verification, and Quality Analysis.

The Boot Camp is the result of a collaboration between Lockheed Martin Aeronautics - System Engineering and The University of Texas at El Paso - Department of Industrial, Manufacturing and Systems Engineering (IMSE).

At UTEP there are several individuals, in addition to myself as Student Division Advisor, with ongoing interest for the success of the INCOSE Student Division:

- Dr. Oscar Mondragon, Clinical Associate Professor.
- Dr. Bill Tseng, Chair of the IMSE Department.
- Dr. Oscar Salcedo, Head of Strategic Initiatives.
- Dr. Rene Contreras, long-term advisor of the IMSE chapter.

Graduate Students have led the INCOSE Student Division well over the years. In the last 2 years, however, Undergraduates (President Pepe Martinez, and now Gustavo Marquez) have interfaced INCOSE with the more numerous undergraduates. IMSE has 80 graduate students and 250 undergraduates. The result has been a more open, resilient, adaptable, self-organizing, and creative culture.







## Past President's Swan Song

*Rick Dove, Past President*

I am now the Chapter's Past President—neither an elected position nor one that can be resigned. One occupies the position as a historical fact. INCOSE recognizes Chapter Past President as a Board Officer position; but apparently confuses it as an honorary position since they remove you from the officer distribution list if not otherwise instructed. Presumably the Past President brings value in lessons learned wisdom, knowledge behind operational evolution, and perhaps as a tempering force against changes at odds with past learning.

As some of you know, I have left New Mexico for a new home in the Phoenix area, and am winding down my Enchantment Chapter activities. This means new people need to step up now to the tasks of quarterly newsletter editor, timely webmastering, monthly speaker arrangements and pre-meeting prep, and video editing of monthly speaker recordings.

I will now share how I have viewed and dispatched these tasks. Perhaps most importantly, I have never viewed these as tasks; but rather as art projects that give me joy in creation, satisfaction in learning how to solve the puzzles they present, and a sense of respected accomplishment in displaying something valued by the membership. In short, I have done these for selfish personal reward—producing something I've been proud of as each new piece of art is completed.

Public-facing evidence of Chapter effectiveness in attending to membership needs and professional development is primarily achieved with newsletter and

website content. These are what prospective Chapter and INCOSE members see as long term reflections of value, and are useful resources for existing members.

The newsletter editor and the webmaster, working to deadlines for material, also serve as instigators of timely Chapter contribution activity, a value not to be taken lightly.

The newsletter editor's activity is helped with regular contributions from others, such as the regular appearance of the president's message, a working group feature article provided by a working group chair or co-chair (committed 2 months in advance and usually edited heavily), the Not For Women Only page led off by Heidi Hahn, the UTEP student page with material from Eric Smith, the past and next meetings page provided by Ann Hodges, and both the upcoming and What You Missed event and tutorial material provided usually by Mary Compton and Ann Hodges. The final page is half boiler plate, augmented by interesting resources the Editor finds and a new member list, of considerable importance, gleaned from the INCOSE membership directory.

It is important to add the new members to the newsletter distribution list just before the newsletter is published.

It is recommended that future editors seek additional regular column writers.

As newsletter editor, I made it a point to include material in the newsletter that could later be used in Circle Award submissions. It makes the Circle Award end-of-year evidence accumulation much easier.



I use Microsoft Publisher for newsletter production, as it comes bundled in my MS Office Professional subscription.

The webmaster is best as an obsessive-compulsive personality. One who is diligent about timeliness in postings: three month rolling future event notices, meeting presentation slides posted before the meeting occurs and recordings posted within a very few days, board election candidates and subsequent installed members posted as required by Chapter by laws. And above all, a thorough quality verification that newly posted material is fully checked for correctness as intended, working links, and consistent formatting.

I use NCH VideoPad for video editing, about \$75. My editing attempts to provide an enjoyable experience for anyone who later views the recording—free of Chapter news, start-up and ending garbage, and gaffs that occur during the presentation.

As to monthly speaker line ups, commitments need made a minimum of 3 months in advance to satisfy website rolling three month notices, a Circle award requirement valuable to the membership.

Adiós, muchachos! ∞

## Tyson Browning Tutorial—What You Missed

*Ann Hodges, Sandia National Labs*

A tutorial on *Design Structure Matrix Methods and Applications* was presented by Dr. Tyson Browning, Texas Christian University, on October 26, 2018 at the CNM Workforce Training Center.

The design structure matrix (DSM) is a powerful tool for visualizing, analyzing, innovating, and improving systems—including product designs, organizational structures, and process flows. The DSM is a square matrix showing relationships between system elements, which can be product components, software code packages, teams, activities, etc.

By analyzing a DSM, one can prescribe a better (e.g., more modular) system architecture or organization. Adding a time-basis to the model enables one to prescribe a faster, lower-risk process.

Because the DSM highlights process feedback, it helps identi-

fy iterations, cycles, and rework loops (key drivers of cost and schedule risk).

The DSM is concise, visually appealing, and used in many organizations across diverse industries. Users have found it extremely useful for fostering architectural innovation and enabling the situation awareness and empowerment that motivates the people executing complex processes.

This tutorial introduced DSM and applications for product developers, systems engineers, and project and program managers. Real-life examples were presented from the aerospace, automotive, semiconductor, and other industries. Participants engaged in hands-on exercises (building DSM models) and came away with a clearer understanding of the drivers of critical, emergent behaviors in systems. The methods can be applied immediately to systems for quick results and insights. ∞



### Resources

**From Stanford, watch:** *Tesla founders Marc Tarpennin and Martin Eberhard* give a remarkably informative talk on the engineering mindset behind the Tesla product concept. Excerpted from a brief synopsis [here](#): This long and meaty talk with Tesla founders Tarpennin and Eberhard is well worth watching from start to finish. "My interest was simply using less energy," says Eberhard. "I spent some time doing a real careful well-to-wheels energy analysis for every kind of technology I could find. To our surprise, the electric car pathway was not just better than the other choices that were out there—that included hydro-

gen, every form of petroleum, natural gas and so on—it was dramatically better. It was so much better that it was stunning to us that nobody else was doing it."

**From TED, watch:** *Three lessons on decision-making from a poker champion.* Liv Boeree investigates how we make better decisions in an uncertain world. Is it better to be lucky or good? Should we trust our gut feelings or rely on probabilities and careful analysis when making important decisions? In this quick talk, professional poker player Liv Boeree shares three strategies she's learned from the game and how we can apply them to real life.

**From TED, watch:** *How to Get Better at the Things You Care About.* Working hard but not improving? You're not alone. Eduardo Briceño reveals a simple way to think about getting better at the things you do, whether that's work, parenting or creative hobbies. And he shares some useful techniques so you can keep learning and always feel like you're moving forward

**From TED, watch:** *What if your attachment to being a "good" person is holding you back from actually becoming a better person?* In this accessible talk, social psychologist Dolly Chugh explains the puzzling psychology of ethical behavior—like why it's hard to spot your biases and acknowledge mistakes. "In every other part of our lives, we give ourselves room to grow—except in this one, where it matters most," Chugh says.

Her book, *The Person You Mean to Be: How Good People Fight Bias*, was selected by Malcolm Gladwell, Adam Grant, Susan Cain and Dan Pink as one of "six books to have on your bookshelf" in fall 2018.

[Editor: speaks to conflicts between what we think should be vs. what we practice. This speaks to the person who thinks they are gender neutral. ∞

### Chapter Membership

Jeni Turgeon, Sandia National Labs

Enchantment Chapter now has 95 full members and 38 student members.

We welcome the following new full members:

Phil Bennett	Sandia National Laboratories
Dana Grisham	Sandia National Laboratories
Timothy Gustafson	(declined to list)
Marcey Hoover	Sandia National Laboratories

We welcome the following new student members:

Alex Kingsley	Embry Riddle Aeronautical University
Josue Neri	University of Texas El Paso

∞

## Connect to Your Community of Practice

Chapter meetings with a focus on systems engineering are held monthly on the second Wednesday, except when social events occur, with mingling, dinner, and often a speaker chosen for enjoyment by systems engineers and guests alike.

Monthly meetings feature speakers from out-of-town as well as local subject matter experts on topics of relevance.

On occasion, special facility tours are arranged, sometimes as the monthly meeting, and other times on a separate schedule.

Chapter meetings begin at 4:45 pm.

After chapter news, announcements and introductions, the presentation and discussion lasts until 6:00 pm; and are carried and recorded as a web meeting for anybody to access who can't attend in person.

Tutorials with coverage on topics of interest are arranged approximately twice a year. Delivered by experts in the field, tutorials range from 1/2 day to day+ durations, and generally involve a tuition.

Mix with people who have the same professional interests as you do, but with a diversity of perspective beyond daily

workmates. It comes in handy when you need help or answers to questions outside your accumulated experience, need a connection at another organization, or simply want some mind stretching thought.

Meeting announcements, event notices, and web-meeting links routinely go to all INCOSE members within the Chapter's geographic territory; as well as to names on a special *information* list open to one and all. Sign up for the *information* list with a request to the Chapter secretary listed below. ∞

### Chapter Board and Goal-Committee Leads

Heidi Hahn	President	505-665-4606	<a href="mailto:hahn@lanl.gov">hahn@lanl.gov</a>
Rick Dove	Past President	575-586-1536	<a href="mailto:dove@parshift.com">dove@parshift.com</a>
(TBD)	VP/President Elect	(TBD)	(TBD)
Ann Hodges	Secretary	505-844-6284	<a href="mailto:alhodge@sandia.gov">alhodge@sandia.gov</a>
Mary Compton	Treasurer	505-845-9268	<a href="mailto:mlcompt@sandia.gov">mlcompt@sandia.gov</a>
Cheryl Bolstad	Director	505-844-3775	<a href="mailto:cbolsta@sandia.gov">cbolsta@sandia.gov</a>
Anthony Matta	Director	575-915-6800	<a href="mailto:armatta@sandia.gov">armatta@sandia.gov</a>
Laura Salguero	Director	575-496-3154	<a href="mailto:lsalgue@sandia.gov">lsalgue@sandia.gov</a>
Eric Smith	Director	915-747-5205	<a href="mailto:esmith2@UTEP.edu">esmith2@UTEP.edu</a>
(TBD)	Operations	(TBD)	(TBD)
(TBD)	Professional Dev	(TBD)	(TBD)
(TBD)	Outreach	(TBD)	(TBD)
(TBD)	Engagement	(TBD)	(TBD)

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