

**Adding New Dimensions to a  
Blasé Financial Metric**

**How Overconfident  
is the Expert?**

# ICEAAWorld

**The magazine for the International Cost Estimating & Analysis Association**



**Reflecting on the  
2018 Professional Development & Training Workshop**



# *Finishing School*

*The International Cost Estimating & Analysis Association and Technomics, Inc.  
invite those candidates preparing for our Certification Exam to join us for  
two days of intensive preparation intended to put the finishing touches on your studies.*

November 1-2, 2018 • Crystal City, Virginia

Registration Deadline: **September 30, 2018**

*All participants will be required to:*

- ◆ Own a CEBoK license and have reviewed its contents for a minimum of two months
- ◆ Be familiar with basic concepts in CEBoK Modules 1-6
- ◆ Have completed an application for and been approved to take either the PCEA or CCEA exams

Class size is limited to 25 attendees to maintain an interactive environment where candidates for the PCEA and CCEA certifications can ask questions, solve problems, and finalize their preparation for the exam(s).

Instructors will assume understanding of and will not stop to re-explain definitions or basic concepts that are assumed to be understood from study of Modules 1-6.

Registration and Details at: [www.iceaaonline.com/finishing](http://www.iceaaonline.com/finishing)

## *Pricing:*

ICEAA members: \$395

Non-members: \$495

*For those who already own a copy of CEBoK and have applied for, been approved, and paid for the exam(s).  
Course fee includes 16 hours of training, breakfast, lunch, and breaks for two days.*

Sign up for the finishing school and receive special discounts on CEBoK and Exam Fees:

<i>Add CEBoK:</i>	\$195 Members/\$295 Non-Members	<i>(vs. usual \$235/\$335)</i>
<i>Add PCEA Exam Fee (Exam Pt. 1):</i>	\$100 Members/\$225 Non-Members	<i>(vs. usual \$150/\$275)</i>
<i>Add CCEA Exam Fee (Exam Pt. 2):</i>	\$100 Members/\$225 Non-Members	<i>(vs. usual \$150/\$275)</i>
<i>Add Both Exams (Pts. 1&amp;2):</i>	\$200 Members/\$450 Non-Members	<i>(vs. usual \$300/\$475)</i>

Attending or completing the CCEA Finishing School offers no guarantee of passing either the PCEA or CCEA exam. This course is intended to provide those certification candidates who have been studying for a minimum of two months additional assistance with their preparation and in no way assures a passing grade. The CCEA Finishing School will not provide enough preparation for the exams alone, and attendees that have not prepared for the exam sufficiently prior to the workshop are unlikely to benefit from it or pass the exam.





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The Magazine for the International Cost Estimating & Analysis Association

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The International Cost Estimating and Analysis Association is a 501(c)(6) international non-profit organization dedicated to advancing, encouraging, promoting and enhancing the profession of cost estimating and analysis, through the use of parametrics and other data-driven techniques.

ICEAA World is a publication of the International Cost Estimating and Analysis Association. Members of the association receive copies as a benefit of membership. Subscriptions for non-members are available on a yearly basis for \$30.00 per year.

Publication of materials is at the discretion of the editor and officers of the association. Opinions expressed by contributors are not necessarily those of the International Cost Estimating and Analysis Association. The association endorses no product or service, does not engage in any form of lobbying, and does not offer for sale any commercial product or service for a profit. All revenue received from the activities of the association are used solely for the professional benefit of its members.



# Letter from the Editor

*Joe Wagner, ICEAA World Editor*

While I thoroughly enjoy each year's version of the ICEAA Professional Development & Training Workshop, this year in Phoenix was just a little more special for me personally. That was due to the honor of receiving the 2018 ICEAA Association Service Award, presented by our President **Paul Marston** and Executive Vice President **Mike Thompson**. I am extremely grateful and appreciative for the efforts of the award selection committee and our Executive Director **Megan Jones** for the honor of being this year's recipient. I have been with ICEAA, and our predecessor SCEA, for a lot of years and in various roles, but this is the best experience ever. Thanks again to everyone involved. The workshop itself was also a very successful outing, with attendance at the highest level in the last 6 years. See the workshop section in this issue and on the ICEAA website for complete coverage and photo highlights of all the activities.

And speaking of being honored by recognition, ICEAA was internationally recognized earlier this year as a professional standard-bearer for cost. In a paper published for the Canadian Global Affairs Institute in February of this year, retired Canadian Navy Rear-Admiral Ian Mack cites ICEAA as a source of information and accreditation for naval systems cost estimating and analysis. See the excerpt

from his paper titled *A Basic Primer on Naval Shipbuilding*, provided to *ICEAA World* by the ICEAA Canada chapter.

Two important dates coming up shortly are among those noted in the *Upcoming Events* list in this issue. On September 20, 2018 the annual all-member virtual meeting will be held. By registering at the ICEAA website by September 17<sup>th</sup>, you will have access to a comprehensive briefing, provided live, on the state of the Association, coming activities, and plans for the future. Looking ahead to the 2019 Workshop in Tampa next May, those planning to present a paper need to have their initial presentation summary submitted for review by November 5, 2018.

Those of you who presented a paper at the Phoenix workshop put in a lot of work and preparation for that opportunity. We can offer you another payoff for your efforts. Why not submit your paper, in a shortened version, for publication in *ICEAA World*? Hundreds more ICEAA members will have the opportunity to see your presentation and gain the professional development benefits that your work represents. If you will create a 1,200 to 1,500-word version of the paper and send it to me, we will be glad to publish it. Plus, if you're certified, you will earn points towards your recertification.



## Upcoming Events

### SCAF Annual Conference

September 11, 2018  
Royal United Services Institute, London  
[scaf.org.uk/events](http://scaf.org.uk/events)

### 2018 All-Member Virtual Meeting

September 20, 2018  
RSVP by September 17  
[www.iceaaonline.com/townhall](http://www.iceaaonline.com/townhall)

### ICEAA Southern California Chapter Workshop

September 26, 2018  
Redondo Beach CA, and online  
[www.iceaaonline.com/socal](http://www.iceaaonline.com/socal)

### CCEA Finishing School

November 1-2, 2018  
Crystal City, VA  
Register by September 30, 2018  
[www.iceaaonline.com/finishing](http://www.iceaaonline.com/finishing)

### 2019 ICEAA Professional Development & Training Workshop

Tampa Marriott Waterside Hotel & Marina - Tampa, Florida  
May 14-17, 2019

Call for papers summary due Nov. 5, 2018  
[www.iceaaonline.com/cfp2019](http://www.iceaaonline.com/cfp2019)

# President's Address

*Paul Marston, ICEAA International President*




I suspect that for most of our ICEAA members, you think of yourselves as consumers of our products and services. In fact, the ICEAA Board, our Chapter leaders, and our International Business Office spend most of our time trying to find ways to enhance our value proposition to our members and constituent organizations. Ensuring that our Professional Development & Training Workshop (which you will see was a fantastic success in Phoenix!), other events (hope to see you at the September Finishing School!), certifications, CEBoK, Journal, annual awards, website (iceaaonline.com), chapter luncheons and other events, and even this edition of *ICEAA World* are relevant, timely, valuable, and often entertaining. In short, we work very hard so that ICEAA continues to serve the broader interest of enhancing the cost analysis profession around the world.

Yet, there's another aspect of the association that is easy to forget. We are and always have been a volunteer organization. We were created way back in 1960 when a handful of cost estimating pioneers formed the Industrial Estimating Society of San Diego. Since then, dedicated volunteers have contributed countless hours of their time to the growth of the profession. Some of you who've been around a while will remember the likes of **Baseman, Book, White-Olsen, Freiman, and Flett**. You will certainly have heard of people like **Wagner, Andrejev, Valenti, and Albert**. These names are just a tiny sample of the many, many people who are responsible for incredible growth of ICEAA over the years. In fact, with a little time and research, I think we could credit every one of our valuable services to a volunteer member who made it happen.

The interesting thing is that if you asked anyone of the giants of ICEAA's continuing story, they would tell you the same thing: "I received way more from ICEAA than I contributed." When I talk to our leaders and contributors, the stories are amazingly similar. They all started by joining a chapter, volunteering help coordinate an event, being asked to

run for a chapter board position, presenting at a conference, serving as a workshop track chair, taking on a task of a committee, and finally running for the ICEAA Board or officer position.

When I joined the profession in what seems like a lifetime ago back in 1986, I would have never dreamed that I'd be the ICEAA President. But looking back, I stepped on the path when I went to my very first luncheon in Dayton, Ohio. I don't remember the speaker or the food, but I can tell you that I have received way, way more from ICEAA than I have ever contributed.

Take that first step and volunteer for something. I promise you won't regret it. 

**Subscribe to our YouTube Channel!**

Enter "international cost estimating" in the search bar at youtube.com to find us.

**ICEAA is**   
**Follow us**  
**on LinkedIn!**

**follow**   
**ICEAA**  
**on Facebook**





# Business Office Update

*Megan Jones, ICEAA Executive Director*

**T**hanks to everyone for another outstanding Professional Development & Training Workshop! Phoenix was as hot as promised, not just because it hit 110° on Wednesday, but we hit record highs all week with sizzling sessions, raging receptions, and blazing local bars. I hope all the attendees had as great a time as I did and enjoy this year's special Workshop section.

Thanks to our photographer, **Carrie Evans**, who captured the essence of the event so artistically; Workshop Chair **Mike Thompson**'s Planning Committee for all of their time, effort, and energy into making Phoenix a huge success; and most especially to **Sharon Burger**, **Chelsea Torres**, and **Joe Wagner** for just about everything else.



*Team ICEAA in Phoenix*

Normally we at the International Business Office get a few moments to cool off after the big event, but with all the plans cooking for the fall, we've barely dropped the fever pace!

First up: the 2018 All-Member Meeting on **September 20**, presented again in a townhall format where ICEAA President **Paul Marston** will give an update on the state of the association, provide a forecast of initiatives for the coming years, and field your questions and concerns. When you RSVP online (by **September 17**) you can send us questions or topics you'd like to see covered in advance, or you can ask at the end of the presentation – we're going to try out taking live questions this year!

The next big thing is hopefully going to be just that: the next big thing. For years, members have been emailing us asking for some in-person training to help them with their CCEA preparation, and for years, the answer has been "pretty much only at the Workshop." This fall, that changes.

We're delighted to introduce the first (of what we hope will be many) **CCEA Finishing School**: a two-day course designed to provide interactive review

and in-depth clarification for certification candidates that have been preparing for the exam but either need a little extra help, or are otherwise struggling with the self-study-only aspect of the usual exam prep.

Our instructors will expect you to be familiar with the introductory basics of CEBoK Modules 1-6, and won't stop the training train for stragglers. Don't

expect to show up for these two days and then pass the exam on the 3<sup>rd</sup>. CCEA remains a certification that requires months of study to pass, and the Finishing School is intended to do just that: to put a fine polish on your preparation.

All that talk about the pre-study requirements explains the **September 30** registration deadline.

Even though the course isn't until **November 1-2**, that extra time is to ensure you've put in the minimum of two months' study to benefit from the course.

Another change looms large on the horizon: the 2019 Professional Development & Training Workshop is a month earlier than usual. We discovered that early June was a busy time for everyone, between vacations, graduations, and other industry events all vying for your attention at that time of year, and figured why compete when we can just go first? And so, the 2019 Workshop will be **May 14-17, 2019**.

Someone wise once said if change is easy, it's not really a change, and what's going to make this change difficult is that with an earlier Workshop comes earlier deadlines – everything is going to be due a month earlier, most critically the deadline for your 75-word topic summaries for the Papers Presentations, which need to be in to us by **November 1, 2018**.

Or if it helps ya sniveling yellabellies to remember: the voyage takes just as long no matter when ye set sail. Anchors aweigh for Tampa, **MAY**teys!



# Certification Corner

*Peter Andrejev, CCEA®, PMP®  
ICEAA Director of Certification*




## Seeking the Next Generation of Leadership

Technically I am not a member of the Board of Directors. My official position is Chair of the Certification Committee, a standing committee to which the Chair is nominated by the President, and approved by the Board of Directors with each “new administration.” At any point in time, the Certification Committee consists of **Sharon Burger**, the Certification Program Manager in the International Business Office, and myself.

We dutifully maintain the certification program, with Sharon handling all of the administrative and management actions (reviewing applications, establishing testing schedule and sites, assembling examination packages, collecting and scoring test results, notifying applicants of their results, and awarding appropriate designations). I am responsible for ensuring the professional standing of our suite of certifications (reviewing, revising and adjudicating

questions for relevance, suitability and fairness of testing, or retaining recertification standards), and for envisioning, proposing and implementing new certification “product lines” (such as the PCEA® designation, specialty certifications, or international translations). In these cases, I doggedly seek help from you to serve on the committee to define testable topical areas, determine application standards, and create new examinations and questions.

I cannot thank those who have helped in the past enough. However, we need to move from reliance on herculean effort to an environment of sustained support and retained corporate memory. I ask anyone interested in helping maintain the integrity of our certification program to please contact the International Business Office or me directly. Let’s have a conversation on how you might help the association and enrich your own professional growth at the same time. 

## WANTED

### CCEA® and Specialty Exam Test Questions

**For enhancing the portfolio of questions in ICEAA exams,  
study guides and training materials**

#### 1. Topic Category

Parametric Estimating:

#### 2. Topic

CER

**3. Question** If a CER for Site Development was developed giving the relationship,  $y$  (in \$K) =  $31.765x + 145.32$  (where  $x$  is the number of workstations) for a data set cost driver that had a range minimum of 2 workstations to 52 workstations, and the independent variable has tested positively for significance, the predicted cost for a site that had 33 workstations would be:

#### 4. Five multiple choice answers

- a. \$ 1,193.57
- b. \$1,193,565.00
- c. \$ 1,797.10
- d. \$1,797,100.00
- e. \$ 208,850.00

#### 5. Answer B

#### 6. Solution:

$y = 31.765 * 33$   
 $+ 145.32 = 1,193.57$   
but must convert  
from \$K; value is  
 $1,193.57 * \$1000 =$   
 $\$1,193,565$

#### 7. Reference CEBoK Module 3

## REWARD: RECERTIFICATION POINTS

**Contact the ICEAA Office or Director of Certification for details**





# Certification Congratulations

ICEAA Certification has had a busy first half of the year and it seems many in the cost field have also been busy preparing to take the Certification Exam. Sixty-one individuals earned certification between February and June! As always, this would not have been possible without the CCEA's who volunteered their time to proctor the exam. If you are CCEA® certified and would like to give back to the cost community by proctoring an exam in your area in exchange for points toward recertification, please contact the ICEAA International Business office.

Thanks go out to following individuals for volunteering their time to proctor the certification exam between February and June 2018:

**Jason Aiken, Mark Bachand, Erin Barkel, Joe Bauer, Jason Blancet, Eric Cohen, Daniel Garcia, Dan Germony, Jeremy Goucher, Jason Hayes, Anna Irvine, Joseph Javier, Jennifer Lampe, Matthew McGovern, Patrick Myers, Jennifer Scheel, Debra Walter**

Congratulations are extended to the following individuals for passing either the CCEA® or PCEA® exam between February and June 2018.

## **PCEA® Achievers/CCEA® Eligible:**

**Amy Ankney**, Technomics, Inc.  
**Brandon Bryant**, Technomics, Inc.  
**Daniel Bui**, Tecolote Research, Inc.  
**Joseph Carino**, Cobec Consulting, Inc.  
**Margaret Dozier**, Technomics, Inc.  
**Robin Hackett**, Engility Corporation  
**Chase Houser**, U.S. Air Force  
**Mary Johnson**, Booz Allen Hamilton  
**Andrew Kicinski**, Integrity Applications Incorporated

**Alexander Krencicki**, Booz Allen Hamilton  
**Kyle Larsen**, Treasury Board Secretariat,  
Government of Canada  
**Meghna Marathe**, Booz Allen Hamilton  
**James Okamoto**, DFAS-JFLL/IN  
**Ayodeji Oladipupo**, Technomics, Inc.  
**David Sangillo**, Technomics, Inc.  
**David Todd**, Kalman & Company, Inc.

## **PCEA® Achievers:**

**Aimal Ahmadzai**, Deloitte Consulting, LLP  
**Garrett Cano**, U.S. Air Force  
**James Dalton**, Booz Allen Hamilton  
**Justin Doi**, Tecolote Research Inc  
**Megan Gadreault**, Herren Associates  
**Henry Hargrove**, The RAND Corporation  
**Faye Kim**, Herren Associates  
**Kurtis Kurata**, Tecolote Research, Inc.

**John Morley**, Yulista Aviation Inc.  
**Thao Liz Nguyen**, The RAND Corporation  
**Garrett O'Hanlon**, DFAS-JFLL/IN  
**Joseph Rieger**  
**Mark Stalczynski**, The RAND Corporation  
**Michael Vasseur**, The RAND Corporation  
**Shauna Young**, U.S. Air Force

*continued*



## **CCEA® Achievers:**

**Teresa Bright**, The Boeing Company  
**Thomas Brooks**, Kalman & Company, Inc.  
**Travis Chapman**, Engility Corporation  
**Curtis Chase**, Kalman & Company, Inc.  
**Jason Comfort**, BCF Solutions  
**Bradley Dahlin**, PRICE Systems, L.L.C  
**Salem Engler**, Tecolote Research, Inc.  
**Teresita Frisch**, Engility Corporation  
**Rick Garcia**, MCR Federal  
**Betsy Gibson**, Technomics, Inc.  
**Paul Gromek**, U.S. Department of Defense  
**Jose Guzman**, Tecolote Research, Inc.  
**Sarah Harrop**, Center for Army Analysis  
**Conrad Hertzler**, Booz Allen Hamilton  
**Shaun Irvin**, MCR, LLC

**Roy Jordan**, Engility Corporation  
**Zachary Kleff**, Kalman & Company, Inc.  
**Karen Kunkler**, U.S. Army TACOM  
**William Labbe**, Tecolote Research, Inc.  
**Adam Offenberg**, Tecolote Research Inc.  
**Alexia Pappas**, Technomics, Inc.  
**Anna Pastuszak**, Booz Allen Hamilton  
**Elizabeth Persons**, Engility Corporation  
**Michael Pfeifer**, Tecolote Research, Inc.  
**Richard Renie**, MCR, LLC  
**Vincent Tassery**, The Boeing Company  
**Jacob Walzer**, Kalman & Company, Inc.  
**Wesley Wells**, Defense Contract Management Agency  
**Tagud Wilfred**, Cobec Consulting, Inc.  
**Brittany Yantis**, Tecolote Research, Inc.

The following are those who have recertified between February and June 2018

<b>Michael Allen</b>	<b>Joseph Frisbie</b>	<b>Jonathan Joo</b>	<b>Jennifer Rose</b>
<b>Evangeline Baluch</b>	<b>Joy Fritz</b>	<b>Walter Kuo</b>	<b>Jennifer Scheel</b>
<b>Sandy Burney</b>	<b>John Gardner</b>	<b>Nicole Leighton</b>	<b>Richard Shea</b>
<b>Charles Casserly</b>	<b>James Hamilton</b>	<b>James MacCubbin</b>	<b>Krista Stroh</b>
<b>Courtney Chiazza</b>	<b>Scott Hardy</b>	<b>Daniel Mezzera</b>	<b>Harlan Swyers</b>
<b>Robert Cisneros</b>	<b>Jeffrey Herrera</b>	<b>Nicholas Morales</b>	<b>Angelica Torres</b>
<b>Adriana Contreras</b>	<b>Zachary Hunt</b>	<b>Justin Moulton</b>	<b>Nicole Tucker</b>
<b>Aileen Donohue</b>	<b>Shaun Irvin</b>	<b>Joseph Parisi</b>	<b>Ian Walker</b>
<b>Klara Emelianova</b>	<b>Ed Jankowski</b>	<b>Andrew Pitman</b>	<b>Travis Winstead</b>
<b>Jeffrey Feuring</b>	<b>Christopher Jarvis</b>	<b>Cynthia Prince</b>	<b>Pamela Wood</b>

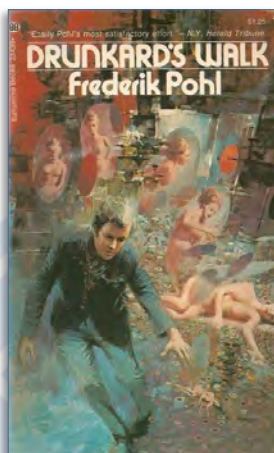
# The Drunkard's Walk: How Randomness Rules Our Lives

*Book review by Col David Peeler*

## Book Review

We had a bit of fun – I hope – with the **guesstimation** read highlighted in the last issue. Now from the lightheartedness of that book to something a bit different. To history we turn; but an interesting look at the people and developments that discovered and revealed a lot of what we cost estimators and analysts use in our occupation. This read is still a less than rigorous journey, but one involving development of the vital tools of our craft. An informative book that engages both the human and mathematics aspects of probability and statistics.

Not to be confused with famed science fiction author Frederik Pohl's novel **Drunkard's Walk**,



this edition's book selection is informative and useful to the practice of cost estimation.

**Drunkard's Walk** (1960), is an excellent yet quite underrated novel. One you might well enjoy, if sci-fi is among your reading preferences.

Unlike Pohl's story, which is placed in the

overpopulated world of 2200, Mlodinow's **The Drunkard's Walk** is a history of the discovery and development of probability and statistics. Pohl tells the fictional story of a young and popular teacher unsuccessfully trying to commit suicide. Mlodinow tells the actual story of a myriad of famous and some not so well known mathematical founders and forerunners that made modern probability and statistics possible. Both books are creatively, humorously, and socially revealing. Neither read is about drunk people walking.

Across ten chapters, split between the early study of probability and the rise of statistics, Mlodinow blends mathematician history with contemporary examples to highlight the thread between modern

### The Drunkard's Walk: How Randomness Rules Our Lives

Leonard Mlodinow  
Pantheon Books: New York, N.Y.2008

and ancient discovery and application of the subject. He begins in chapter one by "Peering through the Eyepiece of Randomness," where he highlights randomness and its underestimation. Of particular interest here are the use of movies and sport; making points with "Lara Croft" and "Jerry McGuire" as well as Ruth and Marris.

Chapter two deals with Truth. Here the reader will see the work of Kahneman and Tvesky, who have appeared in the last couple of reviews, as well as a discussion of the Greeks – beauty in arithmetic – and Gödel – the choice between inconsistency or the improbability of truth. Then, on to the Romans, who's "culture it was comfort and war, not truth and beauty, that occupied center stage. And yet precisely because they focused on the practical, the Romans saw value in understanding probability."

Gerolamo Cardano is introduced in chapter three. His story and his dealings with the Black Death show a way through a space of possibilities – to include the Monte Hall problem. All a big deal. Keeping in mind that "to a mathematician a blunder is an issue of embarrassment, but to a gambler it is an issue of livelihood." Thus, the importance of memory in estimating the frequency of past occurrences – something at which the human mind is notoriously poor.

Next comes "Tracking the Pathways of Success," where a young Galileo takes up the gambling question and writes a paper – "Thoughts about

*continued*

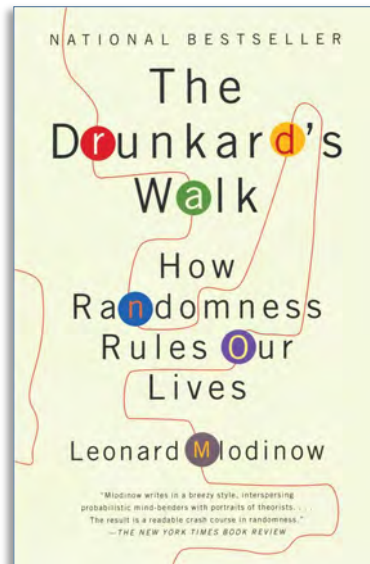


Dice Games” – for the Grand Duke. Then came Pascal’s wager and his triangle as a computational method.

“The Dueling Laws of Large and Small Numbers’ is the subject of chapter five. Enter Zeno, Bernoulli, Newton, Leibniz, Newcomb, Benford, Hill. The invention of Calculus; a logarithmic tease for the appearance of digits; and calculation of the appearance of a comet. Then Jagger and his practicable observations to win the roulette tables.

The creatively titled chapter six – “False Positives and Positive Fallacies” – brings in Bayes theory of conditional probability; and joins probability, statistics, and the normal distribution. What would a costers job be without these? Mlodinow manages to work in the unification of these ideas and provide evidence in modern track and field, crime data, and genetics – naturally!

Chapter seven starts with a story about helping kids with their school work and illustrates “Measurement and the Law of Errors.” Here we are introduced to LaPlace and his analysis of the measurement, i.e. standard deviation. We also see De Moivre’s work applied to polling data. Additionally, in a tacit nod to costing estimating social science side, the author mentioned William James’ *The Principles of Psychology* in regards to the brains ability to concede to opinion and group-think.



“The Order in Chaos” is the theme of chapter eight. Herein we see Kant, Darwin, Galton, Einstein, and Quételet, as well as the founders of statistics – Graunt and Petty. With the latter two we return to Black Plague data before moving on to their foreshadowing of classical economics from their statistics work. The chapter also gives great perspective on the derivation of other concepts: regression to the mean, average man theory, forensic

economics, heredity, coefficients of correlation, and random jiggle.

Chapter nine deals with Illusion, asserting that perception requires imagination. Could this impact a cost estimate? “It is human nature to look for patterns and to assign them meaning when we find them.” These recognized patterns can be called shortcuts, or heuristics, and lead to bias and systemic error. Sometimes events appear to have definite causes but are the result of randomness.

“The Drunkard’s Walk” then is a randomness influence journey from one place to another that appears to be purposeful and exact. Here we see the conclusion of several stories

told throughout the book and Perrow’s doctrine of normal accident theory. In many ways the reader can see estimate bias therein. I recommend this book to cost analysts, sci-fi readers, and the general public; give it a read for the history that spawned today’s statistical methods. Reflection will unveil specific application to our occupation beyond the general treatment of everyday life.



*Colonel Peeler is the retiring Deputy Director of Financial Management and Comptroller for the Air Force Life Cycle Management Center. He is a certified cost estimator/analyst and a DoD certified acquisition professional in financial, program, and test management. He is a member of both the American Society of Military Comptrollers and the International Cost Estimating and Analysis Association.*

## ICEAA All-Member Virtual Meeting

### September 20, 2018 12:00 noon Eastern

Join us online for our annual meeting where members can get an update on the state of the association and a forecast of initiatives for the coming years

Sign up and send us your questions and agenda topics by **September 17** at:  
[www.iceaaonline.com/townhall](http://www.iceaaonline.com/townhall)

*Excerpts from*

## **A Basic Primer on Naval Shipbuilding**

**Ian Mack, Rear Admiral, Canadian Navy (Ret.)**

*In February of this year, a paper was published by the Canadian Global Affairs Institute as written by Rear Admiral Ian Mack, recently retired as the Canadian Department of National Defence Director-General with responsibilities for the National Shipbuilding Strategy program over almost a decade.*

*This excerpt from his paper, provided by the ICEAA Canada chapter, relates the effect of costing issues on overall program management. The complete paper is available at [www.cgai.ca/a\\_basic\\_primer\\_on\\_naval\\_shipbuilding](http://www.cgai.ca/a_basic_primer_on_naval_shipbuilding)*

### **Introduction**

The National Shipbuilding Strategy (NSS) is consistent with the “Build in Canada” shipbuilding policy, which when fully implemented will deliver ships for the Royal Canadian Navy and the Canadian Coast Guard, employing two shipyards competitively selected in 2011. Many NATO nations long ago rationalized their shipbuilding activity to one or two shipyards focused on delivering types of ships for their navies, and routinely as prime contractor, just as Canada is now doing.

### **Oversight**

From the earliest days of 2010 as the competition was launched to select two shipyards, a multi-tiered governance structure was in place to oversee the work. The overseers were drawn from all stakeholder departments and central agencies, at the directors-general, assistant deputy minister and deputy minister levels. This internal governance hired many companies to independently review various aspects of the execution. Good governance is always a challenge. Too much and you lose agility, with burdensome reporting. Frequent changes in those governing mean that both continuity and expertise suffer. Add attributes such as competence/insight into the business at hand, availability of time invested, behaviours and transparency, and one understands why creating and sustaining good governance is a perpetual challenge everywhere.

### **Cost Estimation**

Those in Canada well-schooled in this area point out that there are two issues at play: the ability to estimate costs, and the communication of cost estimates to the public.

The Cost Estimate – Many primers and standard methodologies are in use to generate cost estimates

today. The **International Cost Estimating and Analysis Association** is one useful source of such information and accreditation. Suffice to say that one starts out with many assumption-based unknowns such that early cost estimates can be expected, with a selected confidence factor, to fall somewhere in a range. As work is done and decisions taken, the level of uncertainty is reduced so that there is convergence on a more realistic cost estimate.

It should be no surprise then that estimating costs to set budgets for complex projects is no easy task anywhere. Our allies have not perfected this either, as is evident from the media if one scans naval shipbuilding articles. Budget overruns of 10 per cent have been common (and in the hundreds of millions of dollars), with some well north of 20 per cent, and delays are also the norm.

There are many reasons for this. It starts with changing requirements – an emerging offensive threat not foreseen (something more common since the Berlin Wall came down) or an in-service fleet calamity leading to the loss of sailors’ lives. Regarding inflation, our allies track tailored indices for different types of ships over decades. But in the uncertain, ambiguous and interconnected global marketplace of modern times, volatility can play a huge role. As well, every budget is based on a schedule, which is based on a plethora of informed assumptions over more than a decade as a minimum. Only in a scenario where ships will be identical to those coming off an existing “hot” production line will the schedule be relatively reliable.

In the case of all the naval shipbuilding projects in train under NSS, every budget was set prior to the conception of NSS – the NSS essentially delaying all shipbuilding projects by at least 3.5 years but more realistically by five to six years. As well, the

*continued*



procurement strategies changed, with the introduction of pre-selected shipbuilders under NSS. The additional time required to launch NSS enabled emerging threats to affect requirements. Inflation allowances were also impacted. But perhaps the largest contributor to the weaknesses in initial budgets was the deterioration of the capability to generate high-end cost estimates for defence platforms. This was a capability that was somewhat sacrificed in the 1990s as part of the 23 per cent reductions in all government departments to address the national institutional deficit created in the 1970s and 1980s. Fortunately, the Department of National Defence has reestablished this skill set and now has an enhanced cost-estimating capability.

Communication of the Cost Estimate – No organization starts an expensive project based on the proverbial blank cheque. In democracies, there is an added responsibility to communicate with the public. And as many international experts have determined, the first number communicated on an expensive defence project is the one that everyone remembers and measures the government's performance against.

It is not surprising that governments struggle with what to communicate at the launch of any complex procurement, especially a shipbuilding project. One can understand the tendency to shy away from ranges because of the perception that they do not know and are gambling with taxpayers' money ("It will cost between x and 3x"). As a result, a single number is preferable, but at what confidence factor? The 100 per cent confidence factor could be 4x-5x but is a worst-case estimate that risks the very launch of the project due to sticker shock. So, do they choose the 50 per cent or 80 per cent confidence estimate? In many instances due to competing priorities, decision-makers cannot invest the time required to truly understand the complicated set of nuanced options offered.

There is also the question of what to include, and nations differ. Does one include all personnel costs or just the cost of the incremental human resources? What about ammunition (missiles are not cheap) and how much is required up front? Should the forecast of the through-life cost be provided, and based on what assumption set (inflation, period of service, usage/maintenance profile) for an asset not yet even designed? In some cases the announced cost estimate

... perhaps the largest contributor to the weaknesses in initial budgets was the deterioration of the capability to generate high-end cost estimates for defence platforms.

is for the ships alone, which could be only 50 percent of the all-up cost if all cost contributors are included as is the practice in Canada.

In Summary - All budgets are based on a myriad of assumptions that are typically time-sensitive. Hence, announcing any cost estimate is politically risky, that

risk significantly influenced by the importance of defence to the citizens – if you live in daily fear of attack by enemies, the cost of insurance does not matter as much. And the viability of any cost estimate is directly proportional to the timely execution to the assumed schedule. Staying on schedule is a critical factor in mitigating a degree of the risk.

### So What

In the end, this is all about the future of the National Shipbuilding Strategy, an enterprise-wide change initiative of national proportions. It is truly a complex initiative that can be expected to take decades to mature, as was typically required when national naval shipyards went into place in other nations in the previous century. And as stated in the opening paragraphs of this paper, challenges will continue to emerge – challenges that will need continual and candid explanation.

For many years, our government has stated they would pursue a list of solutions to the current ills: enhanced oversight, greater shipbuilding expertise and capacity within the government, improved budgeting based on better cost estimates, and four key measures of outcome performance (timeliness of project execution, delivery of vessels within approved budgets, shipyard productivity and economic benefits).

These are not easily achieved. Internationally, nations are struggling to recruit shipbuilding expertise in sufficient quantities to manage more than one or two major naval procurements continuously over a decade and the knowledgeable people to provide mature governance. International associations engaged in complex project management research have said that in truly complex endeavours, the iron triangle of matched requirements and schedule with cost are high on impossible to predict with much confidence until actual deliveries occur in a sorted fashion, so an enhanced record on cost estimation is inherently unlikely.



# How Overconfident is the Expert?

## Accounting for Bias in Cost Estimates

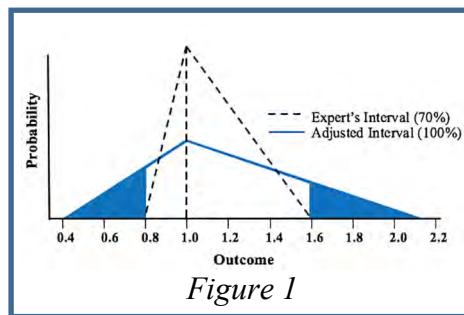
Captain Gregory E. Brown, USAF

In the absence of historical data, it is commonplace for the cost estimator to rely on a subject matter expert, often an engineer, to make forecasts via expert opinion. When done correctly, expert opinion is a credible cost estimating methodology, having been shown to be as accurate as parametric cost models in generating point estimates<sup>1</sup>.

Cost estimating, however, is about more than just generating a single point estimate for the decision process. Today's decision makers demand a range of possible outcomes, so that they can better understand the uncertainties they face. In a tight fiscal environment, for example, the decision maker might ask, "What is the probability that our project will breach the approved budget?", or "Can my R&D portfolio absorb Project X's worst-case overrun?" A realistic risk and uncertainty analysis is thus paramount for informing a high-quality cost estimate.

Unfortunately for the cost estimator, integrating expert opinion into a risk and uncertainty analysis can be a challenge, as the expert is generally overconfident in assessing the accuracy of his or her point estimate, providing too small of an uncertainty interval around the point estimate. If an expert is asked to estimate a 90 percent uncertainty interval for the hours required to develop a prototype, for instance, the expert's minimum and maximum estimate will capture the true requirement much less than 90 percent of the time. Simply put, an expert's range of outcomes will almost always be too narrow, and won't contain the truth nearly as often as he or she thinks it does.

To help correct for expert overconfidence, some governmental cost agencies recommend considering the expert's minimum and maximum as encompassing only 70 percent of the true uncertainty, and applying the remaining 30 percent uncertainty by manually adjusting the expert's interval outward, as shown notionally in Figure 1. Where is the 70 percent heuristic derived from? The



*Joint Agency Cost Schedule Risk and Uncertainty Handbook*<sup>2</sup> credits the heuristic to Capen, who finds that experts never identify more than 70 percent of the possible uncertainty range. Capen arrives at his conclusion through conference surveys of 1,000 petroleum engineers who were challenged with ten generic, encyclopedia-type questions, such

as "What is the area of Canada in square miles?", and asked to produce uncertainty intervals<sup>3</sup>.

Which brings us to the purpose of this article. In order to successfully apply a heuristic in a cost estimate, the cost estimator must be able to confidently and competently defend the heuristic's origin when briefing the decision maker. However, some may find fault with citing Capen's research. As a minor issue, Capen's publication is now over 40 years old. One might ask if more contemporary research is available to reference. As a more significant issue, Capen's research asks experts for uncertainty intervals that are not directly related to the experts' field of expertise. If the petroleum engineers had instead been asked to generate uncertainty intervals specific to petroleum engineering, would they be more or less overconfident than they were for generic, encyclopedia-type questions?

To address these issues, this author searches for additional research to support or refute Capen's finding. A query is thus conducted for studies in which business and engineering experts are asked to provide uncertainty intervals related to their working field or industry. In deciding which studies

<sup>1</sup>Jorgensen, M. (2007). Forecasting of software development work effort: Evidence on expert judgement and formal models. *International Journal of Forecasting*, 23(3), 449-462.

<sup>2</sup>U.S. Government (2014). *Joint Agency Cost Schedule Risk Uncertainty Analysis Handbook*. Washington, DC.

<sup>3</sup>Capen, E. (1976). The Difficulty of Assessing Uncertainty. *Journal of Petroleum Technology*, 28(08), 843-850.

*continued*



to include, a definition for ‘expert’ is necessary. For simplicity, experts are described as professionals with experience in a given field or industry. Studies involving undergraduate students are therefore excluded. However, studies involving graduate students are included, if it is documented that the graduate students have prior working experience in the field or industry.

After applying these search criteria, five studies with a combined total of 17 surveys are identified. The studies are summarized below in order of publication date:

- Russo and Schoemaker (1992) ask corporate business managers to provide uncertainty intervals for technical questions related to the managers’ own firm and industry<sup>4</sup>
- McKenzie et al. (2008) ask information technology (IT) professionals to provide uncertainty intervals for IT industry questions<sup>5</sup>
- Ben-David et al. (2013) ask Chief Financial Officers of major companies to provide uncertainty intervals for S&P 500 market returns for the following year over a nine-year period<sup>6</sup>
- Goldenson and Stoddard (2013) ask graduate students with industry experience to provide uncertainty intervals for lines of code (LOC) and effort in person-years for previously completed software projects based on a description of the software and programming language<sup>7</sup>
- Bar-Yosef and Venezia (2014) ask experienced brokerage analysts to use accounting data for a company to provide uncertainty intervals for net income, earnings per-share, and share price<sup>8</sup>

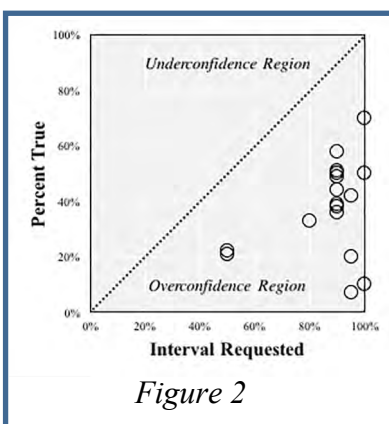


Figure 2

The surveys are combined in Figure 2. For each survey, the *Interval Requested* represents the percentage of experts whose uncertainty intervals should contain the true response, while the *Percent True* represents the percentage of experts whose uncertainty intervals actually contain the true response. The dotted line is the calibration line, which signifies where well-calibrated uncertainty intervals should fall.

After viewing Figure 2, it is evident that the experts’ uncertainty intervals are not well calibrated, as none of the surveys are plotted close to the calibration line. Instead, the experts consistently underestimate uncertainty: 70 percent or less of the experts have the true response within their provided interval, even when asked to provide a 95 or 100-percent uncertainty interval (as in Goldenson and Stoddard’s study). It is therefore appropriate to conclude that experts are overconfident, even when providing estimates within their areas of expertise. This conclusion validates Capen’s previous finding.

So what is the take-away for the cost estimator? Research finds that expert opinion is a relatively accurate methodology for generating point values for cost estimates<sup>1</sup>. However, research also shows that experts are prone to overconfidence, providing uncertainty intervals that are overly narrow with regard to their actual expert knowledge<sup>3-8</sup>. A manual adjustment of the expert’s lower and upper estimate—by considering them as the 15<sup>th</sup> and 85<sup>th</sup> percentiles, encompassing only 70 percent of uncertainty—is therefore warranted and recommended. In the event that the 70 percent heuristic is challenged by the decision maker, this article provides the cost estimator with five contemporary studies encompassing over 21,000 predictions to reference in addition to Capen. Although it may offend some experts that we don’t accept their answers at face value, adjusting the expert’s uncertainty interval is crucial to counteracting cognitive biases and providing the decision maker with a more realistic risk and uncertainty analysis.



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<sup>4</sup>Russo, J.E. & Schoemaker, P. (1992), Managing Overconfidence, *Sloan Management Review*, 33(2), 7-17.

<sup>5</sup>McKenzie, C.R.M., Liersch, M.J. & Yaniv, I. (2008). Overconfidence in interval estimates: what does expertise buy you? *Organizational Behavior and Human Decision Process*, 107, 179-191.

<sup>6</sup>Ben-David, I., Graham, J., & Harvey, C. (2013). Managerial Miscalibration. *Quarterly Journal of Economics*, Forthcoming.

<sup>7</sup>Goldenson, D.R. & Stoddard R.W. (2013). *Quantifying Uncertainty in Expert Judgment: Initial Results*. Carnegie Mellon Software Engineering Institute.

<sup>8</sup>Bar-Yosef, S. & Venezia, I. (2014). An Experimental Study of Overconfidence in Accounting Numbers Predictions. *International Journal of Economic Sciences*, 3(1), 78-89.



# Ask an Analyst

*Edited by*

*Joseph W. Hamaker PhD, CPP®, CCEA®*

## An anonymous reader submitted the following question:

**Q:**

I understand that conducting a risk analysis is a best practice when developing a cost estimate. However, for many of my estimates, including risk is a challenge. I often must do quick-turn drills, and do not have time to incorporate uncertainty into my WBS elements, determine a correlation matrix, and then aggregate the risk using a Monte Carlo simulation. Also for many of my estimates, such as analogy-based estimates, I do not have any historical data to use in conducting a cost risk analysis, so anything I do would be subjective. Is there an objective way to incorporate risk in my estimates when I have limited time and information?

For an answer, I turned to Dr. **Christian Smart**, Chief Scientist of Galorath Inc., a noted expert in this subject. His answer is:

Yes, there is a way to do this. You can calibrate a point estimate and incorporate risk using historical cost growth data. Cost risk is the probability that cost will exceed a specific value, such as a point estimate. Cost growth is when cost risk is realized. By considering the cost growth experienced in historical programs, we can assign a cost risk distribution that is based on objective information and that is realistic.

Calibration involves assessing risk to the outputs of a cost analysis. This can be done at the WBS level and then aggregated; or done at the total system level. To conduct the calibration, you need to determine what point on the distribution your point estimate best represents, you need a measure of variation of your estimate, and you need a distribution.

A point estimate is one value on a probability distribution. It can be set to a specified percentile, to the mode, or to the mean of the distribution. For example, if you have developed a system point estimate by summing point estimates established at the WBS level, then your estimate is likely a low percentile of the distribution, especially if it is an estimate developed at or near the beginning of a development program. Historical cost growth studies indicate that 80-90% of development programs experience some cost growth, so your point estimate is likely between the 10<sup>th</sup> and 20<sup>th</sup> percentiles. If you are assessing risk for a single analogy and believe that your analogy is close to the system you have estimated, then the mode is an appropriate choice.

You also need a measure of variation. A good, unitless measure of variation for this purpose is the coefficient of variation (CV). It is defined as the ratio of the standard deviation to the mean, i.e.,

$$CV = \frac{\text{Standard Deviation}}{\text{Mean}}$$

As a percentage, for a given value the CV measures the same amount of relative risk regardless of the size of the estimate. Historical cost growth data indicates CVs in the range 10%-50%, depending on the program phase. For a program at the beginning of development, a CV equal to 50% is recommended. If the program is at the beginning of production, 30% is recommended. If it is at the beginning of operations, 10% is recommended. Note that these guidelines also provide a sanity check for all risk estimates – if the program has not yet started development, and your CV is equal to 5%, you need to revisit your estimate as your range of variation is too narrow.

We also need a distribution. Recent cost growth studies indicate that a three-parameter lognormal is the best choice for modeling cost risk. A three-parameter lognormal is like the standard two-parameter version, but it includes an additional parameter for the lower bound. An estimate is not likely to underrun by much, if at all, since there is a tendency for program managers to spend all available funds, i.e., money allocated is money spent. Cost

*continued*



growth studies show that programs occasionally underrun, but this is no more than a 30% decrease in cost.

Letting  $\lambda$  denote the location parameter, the coefficient of variation for a three-parameter lognormal is:

$$CV[X] = \frac{\sqrt{Var[X]}}{E[X] - \lambda}$$

the mean is:  $E[X] = \lambda + e^{\mu + \frac{\sigma^2}{2}}$

and the variance is the same as for a two-parameter lognormal.

As an example, consider an analogy estimate equal to \$100 million that is for a development program. Then we assume that the point estimate is equal to the mode. We assume that the CV is equal to 50% and that the location parameter is 30% less than the point estimate, that is,  $l = (1-0.3)*\$100 \text{ million} = \$70 \text{ million}$ . In this case, the three-parameter mode is equal to

$$PE = Mode = \lambda + e^{\mu - \sigma^2}$$

where  $\mu$  and  $\sigma$  denote the log-space mean and standard deviation, respectively. The log-space standard deviation is given by

$$\sigma = \sqrt{\ln\left(1 + \left(\frac{Standard\ Deviation}{Mean - \lambda}\right)^2\right)}$$

and the log-space mean is  $\mu = \ln(Mode - \lambda) + \sigma^2$ . equal to

Cost growth studies indicate that the mode is 5% higher than the point estimate for development programs, and that the mean is 50% higher on average. Thus, the ratio of the point estimate to the mean is approximately  $1.5/1.05 \approx 1.4$ . That means that the three-parameter CV is equal to:


$$\frac{0.5 * E(X)}{E(X) - \lambda} = \frac{0.5 * 1.4 * PE}{1.4 * PE - 0.7 * PE} \approx 1.0$$

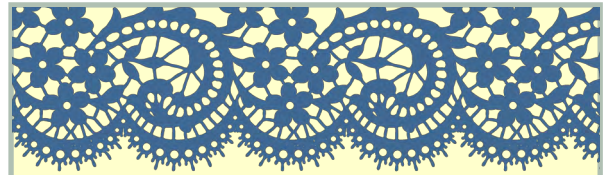
$$\sigma = \sqrt{\ln(1 + 1^2)} \approx 0.8326$$

$$\mu = \ln(Mode - \lambda) + \sigma^2 = \ln(30) + 0.8326^2 \approx 4.0944$$

$$Mean = \lambda + e^{\mu + 0.5\sigma^2} \approx \$154.9 \text{ million}$$

$$Standard\ Deviation = (\$154.9 - \$70) * 1 \approx \$84.9 \text{ million}$$

Note that the three-parameter lognormal can be implemented in Excel by using the following form  
 “=LOGNORM.DIST(x-λ, μ, σ, true)”. 



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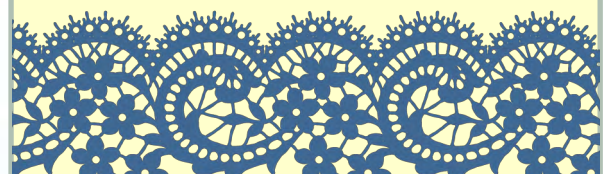
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# Retention Issues:

## Air Force Military Financial Managers

Lt Shauna Young, Col David Peeler, and Lt Col Brandon Lucas

Officers in the Financial Management (FM) career field help the Air Force mission by providing analysis and decision support to senior Air Force leaders and are responsible for effectively utilizing our nation's resources. Even though FM officers have an essential role within the Air Force, the FM career field has a shortage of field grade officers (FGOs) due to personnel separations. Not having enough senior FM officers to fulfill required duties places the mission at risk and also hinders mentorship to junior officers. Two recent studies conducted at the Air Force Institute of Technology (AFIT) analyzed separation and turnover intentions and realities within the FM career field. In these two studies, the researchers analyzed burnout levels of FM officers related to: job duties; potential impact of the major command assignment; effects of being prior enlisted; impact from particular commissioning sources; and whether separation is more likely among AFIT graduates or non-AFIT graduates.

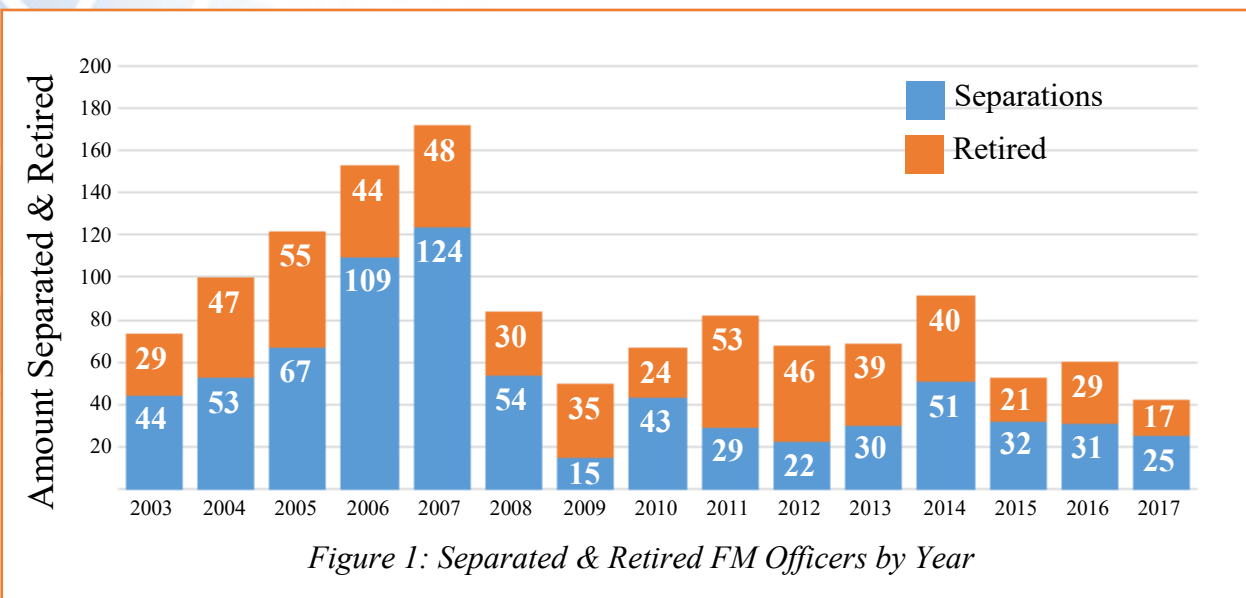
The data collected came from a 74-item online survey, approved by SAF/FM and the Air Force Survey Office for distribution to the entire 65Fx (budget) and 65Wx (cost) officer workforce in December 2016. Of the 618 officers in the career field, 235 respondents completed the survey for a response rate of 38%. Additional data came from the

Air Force Personnel Center (AFPC), which provided demographics on FM officers who either retired or separated from the Air Force during the years of 2003 through 2017. Demographic information included how many total years the officer served, prior-enlisted and commissioned time, last rank held, age, sex, marital status, last assigned major command, source of commission, academic institutions attended, previous duty stations, and date of exit – separation or retirement – from military duty.

### Demographics

Figure 1 outlines all of the officers in the AFPC demographic dataset by year, categorizing whether an officer separated or retired from the Air Force. Aside from years 2004 – 2007, there is a fairly steady state of losses from the FM career field, either due to separation or retirement. For the years of 2003 through 2007, an increase in officer separations occurred. During that time, the U.S. economy was demonstrating an economic boom and better financial opportunities were available outside of the military. In 2007, the U.S. economy experienced a financial crisis, which incentivized officers to remain in the military to maintain a secure income.

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### Burn-out

In testing burnout levels, the researchers found that officers serving in comptroller squadrons reported higher levels of exhaustion as opposed to officers serving in all other FM roles – acquisition, MAJCOM, and Air Staff jobs. The job type with the lowest exhaustion level was cost analysis. Officers serving in acquisition budget roles reported being the most disengaged, while officers serving in MAJCOM/Air Staff roles reported being the most engaged. To obtain a better understanding of why officers in acquisition budget roles reported being the most disengaged from their work, respondents provided open-ended comments in the survey. Some common themes appear to exist regarding why the officers are disengaged. A few representative comments reported included:

“As a captain, I felt completely underutilized, unchallenged, and lost in the fray, despite my best efforts to get involved in the organization and take on extra duties. Our program manager counterparts hold all responsibility and our civil servant FMers are not very good at bring[ing] young CGO [company grade officer] FM officers into the fold.”

“It feels like FM is never included and the PM [program management] role is the glorified poster child of the Acquisition workforce. I have been working incredibly hard to turn around the programs I am working for... [but] in the Acquisition world, I am reminded daily that I am just a functional.”

“The FM acquisition career field seems geared toward civilians – officers sometimes seem like an afterthought... Sometimes they are not given programs to work as Financial Managers because programs are given to civilians for fear of deployments or lack of a backfill, so CGOs are left with non-FM work (i.e. exec) or multiple additional duties.”

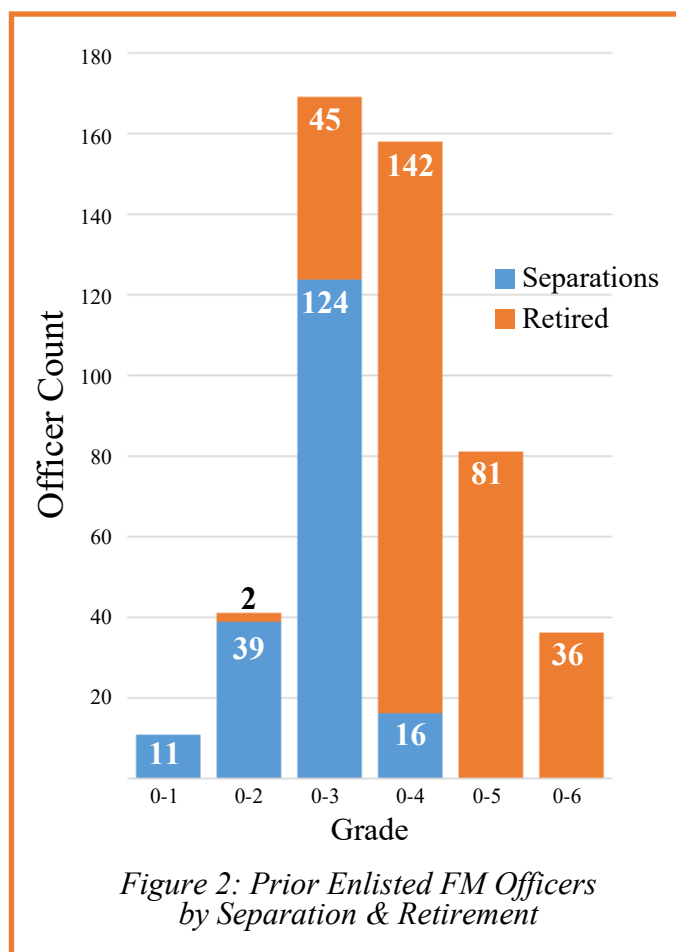


Figure 2: Prior Enlisted FM Officers by Separation & Retirement

### Prior Enlisted

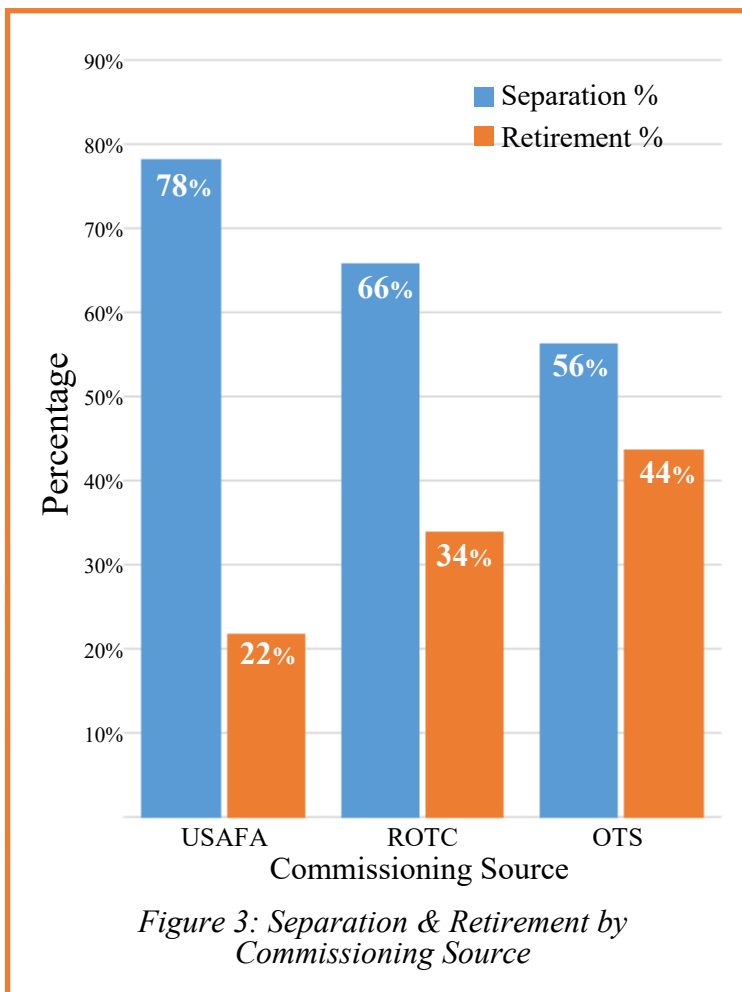
Prior enlisted service was analyzed to determine its impact on separation from the Air Force. The AFPC dataset contained 1,286 records; from that, 39% (496 officers) were prior enlisted. Of the prior enlisted officers, a majority left the Air Force at the rank of captain, reaffirming the problem that a large portion of FM company grade officers (CGOs) are separating from the Air Force, causing a shortage of field grade officers (FGOs) in the career field. Figure 2 displays that there were more separations than retirements from the prior enlisted captains, although retirements are beginning at the grade of captain for prior enlisted officers. This situation is possible because many were commissioned with a significant enlisted service time. At the grade of O-4 (major), the graph shows a majority of prior enlisted majors retiring after completing around 20 years of service. Even though majors are part of the field grade officer category, it is the first rank as an FGO and effectively reduces the number of senior field grade officers available to the career field.

continued



### Commissioning Source

Commissioning source proved to be a significant factor in evaluating separation influences. The United States Air Force Academy (USAFA), Reserve Officer Training Corps (ROTC), and Officer Training School (OTS) were the three commissioning sources upon which the researchers focused. Figure 3 depicts the breakout of separation and retirement percentages by commissioning source. To compare across an even scale, the chart excludes officers who had prior enlisted service, because OTS commissioning of prior-service skewed the OTS result far toward retirement. Figure 3 illustrates that FM officers commissioned via the Air Force Academy are more likely to separate from the Air Force, and less likely to make the Air Force a career by staying to retirement, than officers commissioned from ROTC and OTS.



However, taking prior enlisted service into account, the separation and retirement percentages for OTS graduates were vastly different. Prior to normalizing the data, the retirement percentage for OTS graduates was higher than its separation percentage. Instead of the 56/44 separation to retirement ratio, there was a 36/64 separation to retirement ratio. Due to the retirement percentage being higher before normalization, the researchers infer that officers with significant prior service time are more likely to retire than separate; however, retirement tends to be before obtaining senior FGO tenure of duties. When the prior enlisted officers were excluded from the analysis, the retirement percentage for both OTS and ROTC graduates decreased.

### Air Force Institute of Technology (AFIT) Cost Program

The two studies both looked at whether AFIT cost analysis graduates separate from the Air Force more than non-AFIT personnel. This comparison was of interest as legend within the FM career field is that AFIT graduates separate at a higher rate than non-AFIT FMers. Neither study indicated that AFIT cost graduates separate from the Air Force more frequently. In fact, the first study found that there is no difference between retirement intentions of AFIT and non-AFIT graduates in FM. Further analysis concluded that AFIT cost graduates are more likely to remain in the Air Force than non-AFIT FMers. There is a 40.7% historical retention rate of AFIT cost graduates (FY04 - FY12), compared to the 38.0% historical retention rate of total Air Force officers. Additionally, the survey results revealed that 60.6% of AFIT CGOs plan on staying in the Air Force for 20 years, whereas only 50.0% of non-AFIT CGOs plan on staying in the Air Force for 20 years. The survey responses were confirmed by the AFPC data on actual Air Force departures from the FM career field. Analyzing the data showed that an AFIT cost analysis degree reduced the likelihood of separation. AFIT graduates are less likely to separate from the Air Force than non-AFIT graduates. The majority staying to retirement while non-AFIT graduates are much less likely to make a career of the Air Force. This trend is more pronounced when

*continued*

adjusted for prior-enlisted time, resulting in 54% retention to retirement of AFIT graduates and a 29% rate for non-AFIT graduates. These numbers are significant and worthy of attention by senior FM decision-makers.

## Recommendations

After identifying some of the issues related to why large numbers of FM CGOs separate from the Air Force, the researchers have a few recommendations for senior leaders that may combat this problem. First, the Air Force should focus retention efforts on first lieutenants and captains, since this is the rank where most personnel separate according to the two studies. Also, supervisors need to ensure these officers are engaged in their work and that they are adequately utilized in their positions.

When planning for future officer positions, Air Force leaders should take into account officers who have prior enlisted service. Title 10, U.S. Code, Section 3911 mandates that officers with prior enlisted service must serve a minimum of 10 commissioned years in order for them to retire with the officer rank. From the time-period of the data, research shows that at the 10-year point, prior enlisted officers will most likely be at the rank of captain; thus, qualifying them for retirement. One recommendation is increasing the required amount of time to serve as a commissioned officer from 10 to 15 years before eligible to retire as an officer. This recommendation would require statutory changes, but has positive impacts for career fields across the Air Force, as many are suffering the same retention issues as FM. The result would be extension of Air Force careers and consequently filling more lieutenant colonel and colonel FM officer positions.

Knowing that Air Force Academy graduates are more likely to separate than ROTC and OTS graduates, the Air Force could select more FM

personnel from the ROTC and OTS programs because personnel from these commissioning programs are more likely to make FM and the Air Force a long-term career choice.

In regards to AFIT graduates, we recommend increasing the number of FM officers sent to AFIT because both studies show that AFIT cost analysis graduates are more likely to remain in the Air Force than non-AFIT personnel. Plus, graduates obtain an analytical skill set valuable across the totality of FM roles and responsibilities. Gaining the analytical skills, critical thinking, and problem-solving capabilities that AFIT provides, graduates will enhance the Air Force's decision analysis and support capabilities.

By implementing these recommendations, the FM career field will have more officers – especially, more senior FM officers, which has been a long-standing issue for the FM community. In addition to decreasing the FGO shortage issue, more officers would mean more personnel to share the workload, and perhaps reduce exhaustion and burnout levels as well.



*First Lieutenant Shauna Young is originally from North Charleston, SC. She currently serves as a Space Systems Cost Analyst at the Air Force Cost Analysis Agency. Lt Young obtained a BS in Management from Clemson University and a MS in Cost Analysis from the Air Force Institute of Technology.*

*Colonel Peeler is the retiring Deputy Director of Financial Management and Comptroller for the Air Force Life Cycle Management Center. He is an AFIT, Air Command & Staff College, and Army War College graduate; a three-time comptroller squadron commander; and was a DoD Corporate Executive Fellow. He is a certified cost estimator/analyst and a DoD certified acquisition professional in financial, program, and test management. He is a member of both the American Society of Military Comptrollers and the International Cost Estimating and Analysis Association.*

*Lieutenant Colonel Brandon Lucas is the Director of the Graduate Cost Analysis Program and an Assistant Professor at the Air Force Institute of Technology, Wright-Patterson AFB Ohio. He received his MS in Cost Analysis from AFIT and a PhD in Economics from George Mason University. He has served in the budget, cost, and finance communities at base, center, and Air Staff levels. His research interests include profit, incentives, and decision making. E-mail at Brandon.Lucas@us.af.mil*

# Solving for X: an Assessment of Female Involvement in ICEAA

Christina N. Snyder, CCEA

I distinctly remember learning multiplication tables in my 3<sup>rd</sup> grade class and the thrill of being the fastest at flashcard multiplication races. It was the first time I realized I was good at math and developed a love for the relationships between numbers. That love only deepened when I met algebra and calculus, setting me up for a future in a field like cost estimating. But according to new research from the University of Nebraska-Lincoln, my story is the exception and not the rule. The stereotype that science, technology, engineering, or math (STEM) careers are only for boys is still introduced to and accepted by girls as early as adolescence.

The study of more than 400 middle school students found that even though girls and boys have similar comprehension and grades up until middle school, girls were more likely to consider boys more fit for science. If girls see that most of their female mentors aren't going into STEM, they are less likely to go into those fields themselves. Part of the reason behind this phenomenon is the stereotype threat<sup>1</sup>, which states that if we are aware of a stereotype, we are more likely to accept and act in accordance with it. The researchers speculate that a lack of representative modeling likely plays a key role in girls' opinions on the subject; girls and young women don't have role models in STEM careers to emulate and are further discouraged from pursuing these fields by the presumption that girls don't belong in "men's fields."

<sup>1</sup>Claude Steele, Joshua Aronson, *Stereotype Threat* [www.learning-theories.com/stereotype-threat-steele-aronson](http://www.learning-theories.com/stereotype-threat-steele-aronson)

<sup>2</sup>Bureau of Labor Statistics, *Household Data Annual Averages 11. Employed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity* [www.bls.gov/cps/cpsaat11.pdf](http://www.bls.gov/cps/cpsaat11.pdf)

<sup>3</sup>National Science Foundation, *Science and Engineering Indicators 2016* [nsf.gov/statistics/2016/nsb20161](http://nsf.gov/statistics/2016/nsb20161)



Christina Snyder instructs CEBoK Module #4, Data Collection at the 2018 ICEAA Workshop

According to the Bureau of Labor statistics, women accounted for only 12.9% of cost estimators in 2017<sup>2</sup>. While over the past 100 years barriers for women have diminished, our field remains unbalanced. This isn't just a cost-estimating problem, the National Science Foundation found that "women remain underrepresented in the science and engineering workforce, although to a lesser degree than in the past, with the greatest disparities occurring in engineering, computer science, and the physical sciences<sup>3</sup>."

From the statistics above we know the cost estimating field is male-dominated, but does ICEAA reflect that bias? I'm happy to report that in a STEM field where you would expect women to remain underrepresented, this year at the ICEAA workshop of the over 400 attendees, **more than 30% were female!** Think about that for a minute: in a profession made up of less than 13% women, more

*continued*



than double the women the data would indicate were attendees at the biggest opportunity for training, networking, and engagement in cost analysis!

I then reflected on how serendipitous it was that of all people, **Carol Hibbard**, the Vice President of Finance and Chief Financial Officer of Boeing Defense, Space & Security (BDS) was one of the keynote speakers at the workshop. The data shows that women need more role models in STEM, and ICEAA was lucky enough to have a woman that oversees a \$30 billion business specializing in defense, government, space, intelligence and security customers worldwide. In her engaging remarks she even said “One thing we know about the current business environment is that what it took to drive the business for the last 100 years won’t sustain us for the next 100 years... my call to action for all of you is to spend some time thinking about how you will drive change, and *who you will help develop* to create that long term success and get your organization where you want to go at an accelerated pace.”

100 years ago, there wouldn’t be a Carol Hibbard in front of a podium or a message from a woman like me published in our professional journal as a call to action – but here we are. I consider myself fortunate to be of a generation where the glass ceiling has not been an impediment in my career, thanks both to the women who have been working for decades to shatter it, and the men who have cooperated with and supported us along the way. Though I too have noticed the relative lack of female role models in STEM careers, some of the biggest proponents of my professional success have been men who saw potential in me as an estimator first and a woman second. They are men that pushed me out of my comfort zones and believed in me when I myself had doubts. They took chances on me, trained me, and were the ones that encouraged me to be more active in ICEAA. The stereotype that girls are bad at math

**women accounted for only 12.9% of cost estimators in 2017 ... this year at the ICEAA workshop of the over 400 attendees, more than 30% were female!**

won’t be erased just by women rallying against it, but by facing it along with men who choose to disregard it.

I’m also fortunate to be a part of an association that is bucking the stereotype. To take a line from Carol, my challenge to ICEAA members is to ask yourselves, what are you doing to attract the best and brightest to the field, regardless of diversity delineation; how can we make ICEAA an even stronger example of broken stereotypes; and what can we do to help create the mentors that 13-year-old girls are missing?

ICEAA’s new Membership Outreach Committee has begun thinking of innovative ways not only to attract new members to ICEAA, but to promote our profession as a whole, including a series of videos to share at colleges (though the study above makes me think we may need to show it to audiences even younger). Coincidentally, nominations for the next ICEAA International Board of Directors are due this fall. Ladies of ICEAA, are you willing to be the role model you never had? Gentlemen, will you encourage the future mentors in your areas of influence to step up and get involved?

As Ms. Hibbard put it – “...one thing I have noticed over my career and in the progression of others is that you have to be comfortable being uncomfortable. *We must take chances on ourselves and also on others...So I challenge each of you - get out of your comfort zones.*”



# Adding New Dimensions to a Blasé Financial Metric

Joe Huelsman, Robert Blakey, and Jeremy Brogdon

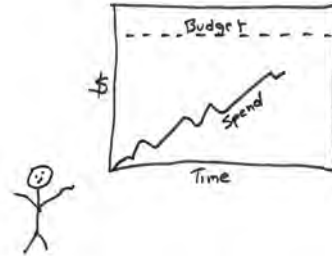
## Introduction

The federal government has been making acquisition decisions based on socioeconomic development priorities as early as Roosevelt's "New Deal" in the 1930's, and more formally instituted in the Small Business Act of 1953. This bias has continued to grow beyond small businesses to: women owned, veteran owned and many others. Today, federal acquisitions have a host of "set-asides" and legislative considerations that influence procurement of goods and services. The federal socioeconomic expansion has been deliberate over decades and is embedded in the fabric of federal acquisitions. While it is common for federal organizations to track expenditures to small business goals, this can be viewed as merely an added level of bureaucracy. Rarely is the larger question of socioeconomic spending relative to other commitments explored. In addition, measuring those objectives in conjunction with market viability may not have been captured.

The search for an alternate metric arose from frustration with the traditional assessment of fiscal obligations over time. This single dimensional view tends to repeat year after year and provides limited insight to organization spending.

## Thesis

The thesis for this project is first, to leverage two of the three aspects of the Triple Bottom Line in development of an enhanced financial metric. Triple bottom line is an accounting framework with three parts: social, environmental and financial. The concept is credited to John Elkington circa 1994<sup>1</sup>. While the environmental stewardship element of TBL was not explored, data that supports both economic development and social responsibility is readily available for analysis. Next, socioeconomic indicators are coupled with the number of offers per solicitation to assess the relative health of the marketplace. An evaluation of the socioeconomic



spending and market viability relative to total obligations as a strategic financial metric is assessed in the following paragraphs.

## Data

Source data for the prototype metric came from the Federal Procurement Data System – Next Generation ([www.fpds.gov](http://www.fpds.gov)). Data contained in FDPS provided visibility of the

following information used in this analysis:

- ◇ Individual contract actions
- ◇ The number of offers received for each contract action
- ◇ Which contract actions supported social or economic development programs
- ◇ The hierarchical business structure as it related to each contract action
- ◇ The amount of money obligated for each transaction

For this analysis, FDPS data was narrowed to contract information specific to the Air Force Installation Contracting Agency (AFICA).

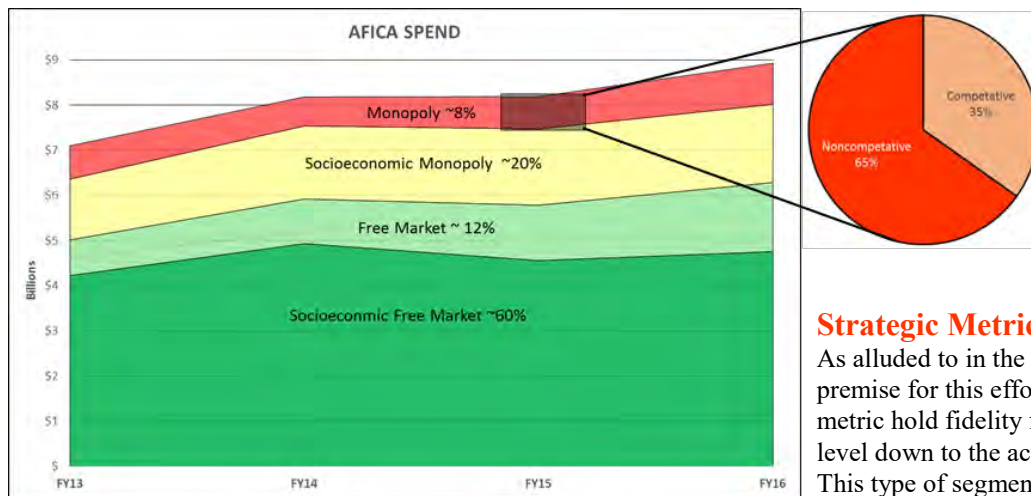
## Markets

To address the topic of market viability, the traditional view of spending over time was retained, and two other dimensions were added. One was socioeconomic commitments. The second was identification of the type of market; competitive or non-competitive. Specifically, was the acquisition executed in a free market (competitive) environment, or was the acquisition monopolistic (non-competitive)? In this analysis, a monopolistic action is defined as a solicitation that only receives a *single offer*. The free market is defined as *2 or more offers*.

The competitive market is broken into two segments. First, the *socioeconomic free market* which is defined as contract actions with multiple offers that

<sup>1</sup> John Elkington, "Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development," California Management Review 36, no. 2 (1994): 90–100

*continued*



also have a socioeconomic indicator (often referred to as a “set aside”). Second is *free market*; defined as contract actions with multiple offers without a socioeconomic indicator.

The *monopolistic market* is segmented similarly. First, the *Socioeconomic Monopoly* is defined as contract actions with one offer with a socioeconomic indicator. Next, the *monopoly* is defined as contract actions with a single offer without a socioeconomic indicator.

### Strategic Metric

The graphic above shows the enterprise level measure. This aggregate view is intended to provide a strategic perspective for senior leaders. The horizontal axis shows time and the vertical axis shows summarized fiscal obligations. Building from the bottom are the types of markets defined in the previous paragraph. This observation shows four years of data, but other time measures (E.g. quarterly) could be delineated. Also, a spending target (budget) could be easily added.

This analysis focused on the monopolistic markets as potential areas for action. The rationale being the government may not be getting as good of a price as it might in a competitive market place. As defined above, a monopoly is a procurement action that received a single offer. However, there are two different types of single offer solicitations. The first is a competitive solicitation (commonly referred to as “full and open competition”) that while open to the entire marketplace, only receives a single bid. The second is a monopolistic acquisition that is deliberately awarded to a single vendor, commonly known as “sole source.” The breakout of the ratio of each is shown above in the pie graphic for monopoly acquisitions for fiscal year 2015. Each of these monopoly types provide the possibility for expanding the marketplace to achieve pricing improvements.

### Strategic Metric; Drill Down

As alluded to in the data section above, a premise for this effort was that the metric hold fidelity from the enterprise level down to the action officer level.

This type of segmentation was tested successfully and provided a few observations. First, ratios may change dramatically at the lower levels. Depending on the nature of the requirement being procured, the space of the free markets relative to the monopolies changes. Generally, the more specialized functions like research and development tend more toward monopolies. More common needs like building maintenance tend toward free market. There are exceptions to these tendencies and this is where the power of the metric is shown. An unusual example was vocational training; slanting toward monopolies. Further exploration of this area was left to the functional managers to determine if this was indeed strange, or merely necessary due to the nature of the requirements and the market environment.

### Leadership Assessment Opportunities

There are several areas for performance evaluation embedded in the new metric. First, the largest segment “socioeconomic free market” presents not only an open market environment, but also one which enhances social or economic value. An expectation here would be to retain or possibly grow this segment. The same can be said for the free market segment. It shouldn’t be ignored that in the data set nearly three quarters of the actions fall into these categories. This certainly appears to be a job well done for the tax payer.

Next is the socioeconomic monopoly. This segment of around 20% poses interesting questions:

- ◇ Are we being overzealous with set asides?
- ◇ Can we build new competition into the areas heavy in socioeconomic monopolies?
- ◇ Is this 20% merely an artifact of the embedded policies driving socioeconomic spending?


*continued*



Monopoly, the last segment, presents further areas to explore:

- ◇ Is there room to maneuver on sole source contract actions?
- ◇ Do solicitations receiving a single offer require market analysis or other research?
- ◇ How much can the monopoly segment be squeezed without disproportionate effort on the government to open up the marketplace?

### Final Thoughts / Summary

The vast majority of federal spending in this study is: a) socially responsible and b) subject to a competitive free market. This is a good news story that may not be told. Since FDPS-NG contains acquisition information for the entire federal spectrum, other federal entities can generate the same metric for exploration into their socioeconomic commitments and market types. 

*This analysis does not reflect the views of the Air Force Materiel Command nor the United States Air Force.*

**Robert Blakey** is a Senior Advisor in HQ Air Force Materiel Command. He holds a B.A. in Political Science and M.S. in Logistics. He has over 30 years' experience working for the Air Force in Program Management, Logistics and Analysis roles.

**Jeremy Brogdon** is an Operations Research Analyst with 15 years of experience working in HQ Air Force Materiel Command. He has conducted studies related to Acquisition, Sustainment, Test and other processes enabling AF Lifecycle Management. He earned a B.S. and M.S. in Industrial and Systems Engineering, with a focus in Operations Research, from The Ohio State University

**Joe Huelsman** is an Operations Research Analyst with 18 years of experience working in HQ Air Force Materiel Command. He has specialized in conducting studies related to cost, efficiency and return on investment. He earned a B.S. in Mathematics and an MBA from the University of Dayton, with a concentration in Finance.

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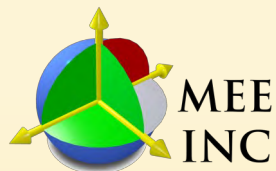
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## Sponsors & Exhibitors



# 2018 Workshop Review

Megan Jones

The 2018 Professional Development & Training Workshop was full of exciting and unusual moments that made it an event to remember! Just shy of 450 professionals from around the country - and around the world - braved Phoenix's dry heat for 3<sup>1/2</sup> days this June. Those of you who were there should enjoy some reminiscing with our special Workshop section, and those of you who missed it can spy what lies on the horizon next year in Tampa!



*Best Paper Chair Andrew Drennon*

Best Paper Chair Andrew Drennon kicked off the Workshop with the 2018 Best Paper Awards. These awards are announced first thing

Tuesday morning to give attendees a glimpse of what lies ahead for the week and allow them to adjust their schedule plans to catch one of the best of the over 75 paper presentations planned for the week. The winners are listed on the following pages and their full papers and presentations are available on the ICEAA website for download.

Immediately after Best Paper Awards, we were joined by keynote speaker David Kriegman, author of *Zero to a Billion: 61 Rules Entrepreneurs Need to Know to Grow a Government Contracting Business*. David's message on innovation centered on the idea that in order to be truly innovative, individuals must constantly question authority; and for companies to create a culture in which the best idea *really* wins, challenging the status quo can't just be tolerated but must be actively rewarded.

Tuesday was a full day of breakout sessions and training workshops capped off with the welcome reception in the exhibit hall that



*Tuesday Morning Keynote Speaker David Kriegman*

evening – an awesome opportunity to meet with our sponsors and exhibitors, as well as a chance to get to know fellow attendees in a fun and relaxed environment.

Wednesday morning began with the presentation of the 2018 ICEAA Association Awards, emceed by Awards Chair Rich Harwin. Nominators joined the winners onstage to tell us a little more about why and for what accomplishments they sent in their nominations, and some of our nominees took the mic as well to say their thanks. Most notably was 2018 Frank Freiman Lifetime Achievement Award winner Peter Andrejev, who brought the audience to their feet with his encouraging and poignant remarks. Read more about what **made all of this year's winners worthy of a standing ovation** later in the issue.

What came next on Wednesday morning? We'll get to that.

Wednesday evening, our attendees and sponsors met up again for our second networking reception of the week, this time with a ballpark theme - a nod to the over 100 attendees who took advantage of the ICEAA group tickets for Thursday's Diamondbacks vs.



*Freiman Award Winner Peter Andrejev*







*Chelsea Torres and Sharon Burger ready to check you in!*

Mets game. The jumbo soft pretzels, pigs-in-a-blanket, popcorn, and nachos were a grand slam hit - we destroyed 20 dozen mini wieners in 20 minutes! Apparently I've been getting the Workshop menu all wrong for years and may have to put PB&Js and mac & cheese into the rotation (ok not really). What could have been a disaster quickly turned into a moment of camaraderie with everyone getting an impressed laugh out of how fast we crushed the food with their colleagues.

Moments like those are what really make the difference between going to an event and simply tuning in or clicking like. The outstanding educational and professional development draw people in, but the networking is what makes them come back over and over. As usual, networking was cited most frequently as the best and most valuable aspect of the event, saying it's "a great way to build lasting relationships with your peers and leaders of the community," "an absolute must for anyone who is serious about being a leader in the field of cost estimating and analysis," and my favorite, "the ICEAA Workshop is the best and funnest opportunity to learn new stuff and to meet peers in our profession."

Thursday Morning we were back at it bright and early with a keynote presentation from Carol Hibbard, vice president of Finance and chief financial officer of Boeing Defense, Space & Security, who challenged our ICEAA membership to embrace uncertainty in grasping for new opportunities. Through her own example, she demonstrated that a career in cost analysis endows our analysts with a unique set of systematic problem-solving skills which provide the tools necessary to



*Thursday Morning's Keynote Speaker  
Carol Hibbard*

create versatile and enthralling careers... we need only to reach for it.

The last big event of the week was the Best Paper Overall presentation on Thursday right before lunch. A while back we decided to feature the year's best paper as a general session for all to enjoy. What was different this year was which author won...

## 2018 Workshop Committee

### Workshop Co-Chairs:

Mike Thompson  
Christina Snyder

### Training Chair:

Remmie Arnold

### Papers Co-Chairs:

Chad Lucas  
Britt Staley  
Karen Mourikas

### Association Awards Chair:

Rich Harwin

### Best Paper Chair:

Andrew Drennon



# 2018 Best Papers



*Andy Prince presents Being Certain about Uncertainty, Part 2 to the attendees of the 2018 Professional Development & Training Workshop*

..because it was a tie!

In an unprecedented scoring result, Andy Prince and **Christian Smart**'s paper, *Being Certain about Uncertainty, Part 2* ended up with the exact same score from the 2018 Best Paper Judges as Eric Lofgren's *Cost and Competition in U.S. Defense Acquisition*. Unsure of how to break the tie without extensive re-judging, Best Paper Chair Andrew Drennon decided, why not award two?

And so two it was. Andy presented his paper, which was also named Best Paper in the Comprehensive Perspectives Category on Wednesday morning, and Eric presented his on Thursday just before lunch.

Neither are strangers to the Best Paper Awards: Andy has won Best Overall for three out of the past four years, and though Eric has a four out of five-year record for Best Paper in his category, this is first Best Overall Win. Congratulations to Eric and Andy!

Our thanks go out to all of the authors of **this year's papers**. ICEAA is proud to offer the highest caliber content in the industry, and we owe it all to the time and hard work our authors put in to give us the best content.

Thanks also to all of the best paper judges for taking the time out of their busy **schedules to read and rate this year's papers**. The judges are broken out into teams, one for each of the five categories, and rate the papers based on technical content, creativity, usefulness in the field, and overall quality and style. The paper with the highest score is named the best in that track. All of the judges from all tracks then review the best papers in each track to determine the overall winner.

We are always on the lookout for more judges willing to read these outstanding papers and provide their thoughts. And **what's more, serving as a Best Paper judge** earns valuable CCEA recertification points for those getting ready to renew!

## 2018 Best Paper Judges

Guenever Aldrich	Stuart Dornfeld	Tae Lee
Richard Aldrich	Tom DuPre	Arlene Minkiewicz
Timothy Anderson	Robert Fairbairn	David Peeler
Bill Barfield	Cynthia Foster	Joshua Pepper
Walter Bednarski	David Holm	Paolo Ponzio
Douglas Brown	Bob Hunt	Tom Sanders
Michael Brozyna	Arthur Kaczynski	Barbara Stone-Towns
Raymond Covert	Jukka Kayhko	John D. Sullivan
Charles Dobbs	William Laing	William Taylor
Aileen Donohue		Robyn Wiley



# 2018 Best Paper Winners

Download all of the 2018 Papers and Presentations at  
[www.iceaaonline.com/phx18papers](http://www.iceaaonline.com/phx18papers)

Comprehensive Perspectives Category Winner  
- and - Best Paper Overall:

## *Being Certain About Uncertainty, Part 2*



Andy Prince,  
Christian B. Smart

This paper addresses the difficult and pervasive challenge of identifying extreme cost growth early in a project's life cycle and preventing it before it happens. The paper examines how DoD and NASA have implemented policies and practices to minimize or eliminate extreme cost growth and why those policies can sometimes fail. Finally, we propose some remedies that could help and identify some warning signs that a project may be headed for trouble.

Acquisition & Operations Category  
- and - Best Paper Overall:

## *Cost and Competition in U.S. Defense Acquisition*



Eric M. Lofgren

The cost estimator has a major role in determining the price, and therefore value, of major systems acquisition in the Department of Defense. Two primary costing methodologies include "should cost" and "will cost" analysis, and are affected by "must cost" realities. This paper explores the history of these costing methods and places them in a theoretical context, first with respect to the meaning of competition, and second with respect to the nature of cost.

Risk, Modeling & Management  
Category Winner:

## *Enhancing Risk Calibration Methods*



Christian B. Smart

Calibration methods such as the Enhanced Scenario-Based Method allow analysts to establish cost risk analyses that are based on objective data. Some methods currently in use rely on the normal and two-parameter lognormal. Empirical data, however, indicates that a three-parameter lognormal is more appropriate for modeling cost risk. We discuss three-parameter lognormals and how to calibrate cost risk using this distribution. We compare the results with traditional calibration to two-parameter normal and lognormal distributions.

Analysis & Innovation Category Winner:

## *Demand, Recurring Costs, and Profitability*



Douglas K. Howarth

Customers in all markets collectively abide by their self-imposed demand curves, which dictate their responsiveness to changes in price and the maximum quantities of products they can absorb. Concurrently, producers in all markets face recurring costs, which typically fall over time due to a variety of factors. Producers can effectively model demand and recurring costs before product launch. Understanding how demand curves relate to recurring costs is key to enhancing profitability, which this paper examines.

Software & Agile Category Winner:

## *A Probabilistic Method for Predicting Software Code Growth: 2018 Update*

Eric M. Sommer, Bopha Seng, David LaPorte, Michael Ross

Software estimating is challenging. SMC's approach has evolved over time to tackle this challenge. Originally based on Mike Ross's 2011 DSLOC Estimate Growth Model, we've updated our model to include more recent SRDR data and an improved methodology (Orthogonal Distance Regression). Discussions will focus on non-linear relationships between size and growth, unique growth for new, modified, and unmodified DSLOC, as well as correlation between DSLOC types and future efforts to include space flight software data.







# ICEAA ASSOCIATION AWARDS

ICEAA thanks everyone who nominated one or more of their colleagues for a 2018 Association Award. The stories shared gave us unique glimpses into what makes our members the best of the best in the cost professions. As you read the summaries of their achievements below, give thought to the dedicated and inspiring members you interact with regularly and consider submitting a nomination for next year at:

[www.iceaaonline.com/awards](http://www.iceaaonline.com/awards)

## Junior Analyst of the Year:

**Marc Stephenson**

Since starting his cost analysis career with Technomics in August 2015 upon graduating from Penn State University, Marc Stephenson has consistently demonstrated that he has what it takes to be a future leader in the field.

Technomics prides itself on doing important, impactful work for visible, influential government clients. Marc has **been at the forefront of Technomics' work** for the Office of the Secretary of Defense (OSD), Cost Assessment and Program Evaluation (CAPE), the department's most powerful cost analysis organization. By taking on progressively challenging and visible assignments, Marc has become a **key contributor to CAPE's Cost Assessment Data Enterprise (CADE) program.**

As the Deputy Lead for the Defense Cost and Resource Center, Marc facilitates the planning and collection of Cost and Software Data Reports (CSDRs), a deliverable requirement for all Acquisition Category I and IAM program contracts (and major subcontracts) that makes invaluable return cost data available to DoD cost analysts. In this role, he provides guidance and support to a team of 17 analysts responsible for ensuring program offices and their industry



*Marc Stephenson (L) with Rick Collins (R)*

partners follow CSDR policies and processes while delivering valid and complete cost data.

Marc also serves as the CADE lead for the FlexFile data initiative, a program intended to revolutionize the way cost data is collected by the DoD without creating undue burden on the contractors. In this role, Marc has been integral to all aspects of FlexFile development. He has been a driving force behind policy and software requirements, training, implementation guidance, and coordination with a diverse community of over 50 stakeholders that includes Industry partners, cost accounting system and earned value management system vendors, and government analysts.

While Marc's accomplishments are impressive, they're only part of the reason he is deserving of recognition. What's more important for this particular award is *why*



## 2018 Association Award Winners

he has achieved significant success early in his career. In addition to the analytical and quantitative skills essential to our profession, he has mastered the critical soft skills for effective collaboration, developing healthy, mutually-respectful working relationships with Technomics colleagues of all experience levels, as well as stakeholders from government and major defense contractor organizations. The fact that he has established a such a strong reputation with senior government and industry representatives so early in his career is a testament to his success on this front.

In the interest of exploring and creating new opportunities for himself and his government clients, Marc is consistently **willing to leave his comfort zone. It's one thing to express ambition and motivation; it's quite another to back it up with diligent, thoughtful, selfless action.** Marc's expanding role in the CADE project is a direct result of his hard work and a testament to the reality that the best career growth opportunities are earned not entitlements.

Finally, Marc has been mature enough to understand that you have to take the good with the not-so-good. Every project has its frustrations, whether mundane tasks, unresponsive data providers, or tight deadlines, but Marc has learned to overcome those frustrations in order to deliver quality and always learn from the experience.

Marc is well deserving of the 2018 *Junior Analyst of the Year Award*. However, based on the aforementioned reasons for his early career success, I think *Future Leader Award* may be more appropriate!

❖ Nominator AI Leung  
Technomics, Inc.



### Technical Achievement of the Year: Karen Mourikas

Karen is an Associate Technical Fellow at the Boeing Company focusing on Systems Optimization and Affordability Analysis. Currently, as the Analysis Chief Engineer of the Product Analysis & Teardown **organization within Boeing's Research and Technology division**, she performs modeling & analysis on parts, products, and programs, throughout their life cycle, leading to more affordable, more reliable and easier to produce solutions.

Throughout her career, Karen has developed a reputation for promoting new and innovative cost analysis methods and tools as well as integrating cost analyses with engineering functions. For instance, she integrated life-cycle cost models into Multi-disciplinary Design Analysis & Optimization (MDAO) frameworks encompassing performance models, reliability data, design options, and sizing models, providing engineers insight into cost impacts of design decisions within the larger trade space. More recently, Karen worked on a Model-based Systems Engineering (MBSE) effort, integrating cost analyses to support system requirements, design analysis, manufacturability, and verification & validation activities within a fully integrated, model-centric cloud environment to optimize life cycle costs.

Most notably, Karen is a pioneer in the use of a machine learning approach called Random Forest Prediction to predict specific program costs across the life-cycle. Although Random Forest Prediction, and machine learning in general, has been widely used in other fields, its application within the cost analysis community has

## 2018 Association Award Winners

been slow to catch on. However, Karen has been able to bridge the gap between cost analyses and machine learning techniques, in particular Random Forest Prediction and Natural Language Processing, developing innovative methods to analyze and predict cost in multiple domains, such as logistics, manufacturing operations, and product design.

Over the past few years, Karen has been leading and growing the Boeing Enterprise Affordability Community of Practice, including rolling out a new company website that provides information, training, and resources on Affordability analyses. She ardently promotes the use of many standard industry cost analysis tools such as **PRICE Systems' True Planning**, **Galorath's SEER tools**, **ACEIT suite of products** by Tecolote Research, and **@Risk** by Palisade Corporation, not just in the usual cost areas, but across the entire company, **connecting with many "non-traditional"** users such as design and manufacturing engineers to promote the awareness of cost impacts of design decisions in all life cycle phases.

Karen is a life-time member of ICEAA, having joined ISPA and SCEA in 2005. She has presented more than 10 papers on many aspects of cost analyses at ICEAA, ISPA, SCEA, MORS, and ACEIT Users Workshop. She has been involved in ICEAA, or its predecessors, in multiple capacities: as presenter, co-chair of



*Karen Mourikas (L) with Denise Nelson (R)*

Southern California Workshops at Boeing, Southern California election committee, track chairs, and conference papers co-chair. And if you attended any of the presentations at the 2018 ICEAA workshop on Machine Learning, it was **Karen's idea to devote a track entirely to "newer"**

technologies. She hopes that next year there will be even more papers to fill two full days of the Innovation and Technology Track.

Recently, Karen was awarded with selection to the Boeing Technical Fellowship, a highly competitive program of technical experts, limited to the top echelon of engineers within specific domains of expertise. Karen is currently one of only a handful of engineers who perform cost, affordability, and optimization analyses and her fellowship provides opportunities to promote the innovative technical aspects of cost and affordability analyses, including, but not limited to, machine learning.

For these reasons described above, for her years of service to the association, her passion for innovation, and her dedication to expand, promote, and share her expertise to the cost analysis community, ICEAA is honored to award Karen Mourikas with the 2018 Technical Achievement of the Year.

❖ Nominator Denise Nelson  
The Boeing Company





## 2018 Association Award Winners

### Management Achievement of the Year:

#### **Capt. Keith O'Donnell**

Captain Keith O'Donnell provided outstanding management and leadership as the Cost Chief of the Intelligence, Surveillance and Reconnaissance / Special Operations Forces Program Office within the Air Force Life Cycle Management Center (AFLCMC) at Wright-Patterson Air Force Base in Ohio.

Captain O'Donnell supported the Air Force Cost Analysis Agency and the Office of the Secretary of Defense Cost Assessment and Program Evaluation with their multi-year procurement cost estimate resulting in approval of a 40-aircraft program with a projected savings of \$457.9M. Working through multiple budget drills and analysis of alternatives for the President's FY17 budget totaling \$14B, his efforts led to securing funding for 5 additional aircraft, providing more capability to the warfighter.

Keith facilitated Program Objective Memorandum cost estimates with solid execution plans for 3 major commands totaling \$3.2B across the Future Years Defense Program securing new technology for Special Operations Forces. More specifically, he led four program office estimates through AFLCMC approval and oversaw their associated earned value analysis. In total, Keith oversaw 24 estimates for the Battlefield Airmen and Guardian Angel programs totaling over \$85B.

Captain O'Donnell led a nine-person team to develop a flexible military career progression system that will be implemented throughout the Air Force, an effort with direct visibility by the Air Force Chief of Staff. Captain



*Capt. Keith O'Donnell*

O'Donnell's tactics cut acquisition time by 30%, resulting in a reallocation of 1,000 government hours, equating to \$330K.

From the program office up to the highest government acquisition levels, Keith has demonstrated excellent management and performance every step of the way. His leadership will certainly continue to inspire others for years to come.

❖ Nominator Joe Bauer  
PRICE Systems, LLC

### Educator of the Year:

#### **Donald Remer**

Dr. Donald S. Remer has dedicated his professional career to the cost estimating profession making significant and ongoing educational contributions to our profession not only during the last year but for over 40 years.

Don, until very recently, was the Oliver C. Field Professor of Engineering Economics in the Engineering Department at Harvey Mudd College (HMC). He is also the



## 2018 Association Award Winners

President of the Claremont Consulting Group. He is a registered Professional Engineer in the state of California with a BS in engineering from the University of Michigan and an MS and PhD from Caltech in Chemical Engineering and Business Economics.

Don developed and presented courses at HMC in cost and schedule estimation, engineering economics and project management especially for undergraduates who typically were not exposed to this type of training until after graduation. During the last 40 years, over 1,300 engineering and STEM students at HMC have taken his courses.

In 1979, he cofounded the Claremont Consulting Group to consult and deliver two- to five-day short courses on cost and schedule estimation. He has trained over 14,000 professionals from small entrepreneurs to Fortune 500 companies, government agencies, national R & D laboratories, and universities. Organizations have included, but are not limited to Amgen, Beckman-Coulter, Boeing, Booz-Allen & Hamilton, DIRECTV, Disney, Hewlett-Packard, Northrop Grumman, QAD, Raytheon, St. Jude Medical, TRW, 20th Century Fox; and in the public sector, FAA, the NASA Jet Propulsion Laboratory, Lawrence Berkeley National Laboratory, Lawrence Livermore, Los Alamos, and Sandia National Laboratories, County of San Bernardino, City of Tucson, U.S. Coast Guard, U.S. Air Force; and in the educational arena, UCLA, Caltech,



Donald Remer

and the University of Wisconsin at Madison. His most recent 5-day cost estimating course for practicing professionals was presented in the UCLA Technical Management Program in March of 2018 and will be presented again in September.

Don has contributed widely to the field of cost estimating by publishing, consulting, and doing research on cost estimating with a large number of companies and government agencies. He has over 90 publications with 70

focusing on cost and parametric estimating. Coauthoring with over 90 undergraduate and graduate students has helped train and mentor many future cost estimators. His paper entitled, "Long Range Planning Cost Model for Support of Future Space Missions by Using Major Cost Drivers," was selected as the outstanding paper of the year in the *Journal of Parametrics*.

His 20 years of consulting and research at the NASA Jet Propulsion Laboratory resulted in 13 NASA/JPL publications. For one of these publications on life cycle cost analysis, he and his coauthors received a NASA outstanding research award. Three of his cost estimating parametric papers were selected to be reprinted and included in the *Encyclopedia of Chemical Processing and Design*, and he also received the Outstanding Speaker of the Year Award from the Occidental Research Corporation Seminar Program for his cost estimating presentation on his oil shale recovery research.

Don has been a very strong advocate for enhancing cost estimating performance



## 2018 Association Award Winners

by publishing papers on the certifications available in the field of cost estimating. The first one was entitled, "Certifications Offered by Cost Estimating Organizations," in the *National Estimator*, the second one was entitled, "Cost Estimating Certifications Offered by Professional Societies in the US and Abroad," in the *Proceedings of the American Association for Engineering Education* and the most recent one was entitled, "Cost Estimation Certification for Managers and Engineers," in the *Journal of Leadership and Management in Engineering*.

He has been a prolific researcher in the area of parametric cost scale-up factors, having published research that has included everything from airport construction, to conventional and micro-scale tools, to commercial jet planes, to air pollution control to chemical process plants. Two of his most recent contributions to the ICEAA's *Journal of Cost Analysis and Parametrics* were, "Parametric Scale-Up Factors for Conventional and Micro-Scale Tools," and "Economic Survey of the Monetary Value Placed on Human Life by Governmental Agencies in the US."

Don has been on editorial boards and a referee for many costing journals, including: *The Engineering Economist*, *Engineering and Process Economics*, *Engineering Costs and Production Economics*, *International Journal of Production Economics*, and the *Engineering Economics and Engineering Management Divisions' Publications in the Proceedings of the American Society for Engineering Education*.

Don's years of effort have enhanced thousands of undergraduate and graduate students' educations and furthered

the training of numerous practicing professionals; while his vast body of research, canon of publications, and contributions as an editor and referee for other works have supported the cost estimation field on the whole. While we are honored to name Don Remer as ICEAA's 2018 Educator of the Year, he's been working diligently to earn the title for a lifetime.

❖ Nominator Dr. Dan Nussbaum  
Naval Postgraduate School

### Team Achievement of the Year:

#### Air Force Research Laboratory Cost Team

This year is the first fully operational year for the cost team in the Air Force Research Laboratory (AFRL). The team members, Helen Barfield, Tamie Bertke, Katie Kuhns, Zac Newman, Jack Snyder, Debra Walter, and Emily Duke, made enormous improvements to the overarching program management of the Air Force's Science and Technology programs by providing data driven analysis and cost estimates for the center. The cost team spearheaded estimates for multiple directorates, which were critical to planning and programming efforts, led Cost Benefit Analyses (CBA), and built analytical tools to enable analysis across the laboratory.

The team's support during the Program Office Memorandum (POM) process informed budgeting decisions across the Air Force. Within the laboratory, the team provided estimates for over \$1B of development and demonstration programs. They led two CBAs used by the



*continued*



## 2018 Association Award Winners

Air Mobility Command during POM planning choices that identified more than \$130M of savings and documented the benefits of transitioning new technologies from the laboratory to the field. These analysts also supported the Strategic Development Planning and Experimentation office to estimate rapid experimentation efforts and to provide analysis of operational costs for commercial off-the-shelf light attack aircraft.

To support strategic-level planning decisions, our AFRL team lead the cost analysis for the Multi-Domain Command and Control Enterprise Collaboration Capability team and partnered with thought leaders from multiple emerging

technology areas to ensure all planning decisions evaluated life cycle cost. The resulting campaign plan was submitted to General David L. Goldfein!

At the program level, the team matrixed analysts to science and technology programs to provide ongoing cost expertise, enabling the evaluation of investment and O&S costs with changes to system design, manufacturing methods, and materials at the earliest stage in the development program. For the Low Cost Attritable Aircraft Technologies program, the team estimated an air vehicle that beat the cost-per-flyaway target, quantified a 54% decrease to airframe dollars per pound, and identified significant part reductions when utilizing novel manufacturing methods.

The team formed cross-service partnerships with Army and Navy, international partnerships with analysts in the United Kingdom, and reached out to representatives from the industry to increase collaboration and data sharing. The team demonstrated their research findings at Air Vehicles Technology Symposium, several industry days, and the ICEAA Professional Development & Training Workshop.



*Joe Bauer (L) with team member Debra Walter (R)*

Building a core cost capability from the ground up required the team to create new tools for estimates and analyses as well as establish strong partnerships across science and technology organizations. They engineered an earned value management tool

for Hydrocarbon Boost Program within the Aerospace Systems Technology Directorate, enabling monthly cost and schedule analyses; initiated a Laboratory Cost Working Group to improve communication within the lab; developed a cost repository that created higher fidelity estimates while and saving time; and developed a process for estimating low Technology Readiness Level efforts by leveraging commercially available tools.

Organizations within the Laboratory sought out this team's expertise for projects beyond science and technology. The AFRL Enterprise Business Modernization team **relied on the cost team's expertise** to estimate five alternatives and more than \$800M IT requirements to support a new software acquisition. The Air Force 711<sup>th</sup> Human Performance Wing partnered with the cost team to analyze impacts of



## 2018 Association Award Winners

having the Air Force Epidemiology Lab perform several million tests currently outsourced to commercial testing facilities. The team was able to build a strong case to recapture the test volume, save \$12M, and provide better patient care across the DOD!

The outstanding cost estimating, analysis, and expertise of each of the members of this team contributed to building a strong cost capability in the Research Laboratory over a very short period of time. The progress made over the last year will posture the team for success in the future, and enable science and technology programs to incorporate cost into programmatic and strategic decisions.

❖ Nominator Joe Bauer  
PRICE Systems, LLC

### Association Service Award:

Joe Wagner

It's hard to think of anyone who has done more for ICEAA than Joe Wagner. A long-time volunteer leader for the Society for Cost Analysis (SCEA) Washington Capital Area Chapter, Joe joined the SCEA National Board in 1999 and served continuously through 2013 as Region 2 Director, Vice President, and Treasurer. In 2010, Joe joined the staff of the then-joint office for SCEA and ISPA, the International Society of Parametric Analysts as the editor of ICEAA World's

predecessor publication, National Estimator.

Joe was an integral participant in the creation of ICEAA through the merger of SCEA and ISPA, contributing to the drafting and finalizing of the plans and documents that brought the groups together. He has **been the steward of ICEAA's finances from day one**; maintaining our accounts, budgets, and forecasts. He has even created a predictive model to forecast the success of ICEAA Workshops based on year-to-date registrations and revenue. When **ICEAA's Executive Director stepped down** in 2013, Joe stepped up to serve as Interim Executive Director for several months to ensure member services continued uninterrupted and the transition of leadership was flawless.

For those who may not be able to conjure a mental image of Joe Wagner: he's the guy who has been busily snapping photos of our sponsors and attendees at the ICEAA Workshops for years. His wife Deb has helped out at many of our events, bringing a warm smile and burst of sunshine along with her.

An Air Force Lieutenant Colonel, Joe spent most of his cost career as an employee of MCR. He started in the field in 1976, which is to say in the before-Excel time of hand-drawn and hand-calculated spreadsheets,

formulas, estimates, and all the other things our computers do for us that we take for granted. He has seen the path of cost estimating grow and change for forty years and



Mike Thompson (L), Joe Wagner (C), and Paul Marston (R)



*continued*

## 2018 Association Award Winners

provides the ICEAA International Business Office with invaluable input and perspective on the industry.

ICEAA isn't the only thing that takes up Joe's time. He's actively involved with his local homeowners' association, the National Rifle Association, and most especially, the First Virginia Regiment of the Continental Line, a group of Revolutionary War Reenactors. Joe performs reenactments in full 1700's regalia throughout the year (which means wool and leather in the summer) at events around the Northern Virginia area, most frequently at Mt. Vernon, George Washington's historic home. He and his group provide interactive educational presentations to schoolchildren in their Revolutionary personae about the life of the soldier and civilians accompanying the army during the American Revolution, and even appeared in the 2000 film *The Patriot*, starring Mel Gibson.

Joe's passion for military history may be either the cause or the result of his extensive antique gun collection, spanning weapons used from the Revolutionary to Vietnam wars, complete with documentation and history of each piece. But that doesn't mean he's stuck in the past: he regularly bowls a 300 on the Nintendo Wii, with or without a beer in his other hand.

ICEAA has Joe Wagner to thank for so much: for his time, for his hard work, and for his unwavering dedication. Granting Joe the Association Service Award will go a long way to show all of our thanks.

- ❖ Nominators Paul Marston, MCR Federal; Mike Thompson, Galorath Federal; and Megan Jones, ICEAA

Frank Freiman

Lifetime Achievement Award:

Peter Andrejev

Peter is worthy of Lifetime Achievement recognition for several reasons: the leadership roles he's held, the client assignments he's performed, the articles and presentations he's composed, the many professionals he's influenced, and the innovations he's introduced to the cost community that we now take for granted.

As a leader, Peter served as a board member for SCEA from 2000 through 2008, and since 2009 has served as the Director of Certification. For the Washington Capital Area Chapter he has held the offices of President, Vice-President, Membership Chair, and Professional Development Chair.

Peter's technical body of work is impressive. He generated several dozen significant deliverables over his career (numbering well over 50 cost-related estimates or analyses). He received commendation from the program manager of an MDAP classified program stating that his work "should be the model used in the government" for developing life cycle cost estimates, cost-benefit analyses, risk management plans, and analysis of alternatives. He conducted the IV&V of the 2000 Decennial Census Cost Model for the Dept. of Commerce that earned Peter the 2000 National Cost Estimator/Analyst of the Year Award in Management from SCEA.

Peter's ability to communicate complex issues in an engaging manner that is meaningful and relevant to his audience shines in the numerous articles and presentations he has authored or co-





## 2018 Association Award Winners

authored for various publications and events. Paired with his effective communication methods, Peter is known for “speaking truth to authority.” For example, he publicly characterized “cost overruns” as instances of “chronic budget underfunding” as the guest speaker on Federal News Radio’s “Off the Shelf” program (sponsored by the Coalition for Government Procurement).

While broadcasts and accolades are important, Peter’s greatest contribution in advancing the cost profession resides in how he made cost analysis a viable and important professional trade to the many staff in Booz Allen Hamilton. As an advocate for professional certification, Peter drove Booz Allen to become the first organization to exceed over 100 CCEA®s. He’s a true “Johnny Appleseed” for the cost analysis profession, making cost a prevalent topic in venues outside of the cost community.

At the international level, Peter was a fierce advocate for CEBoK® and its predecessor product CostPROF, having served as a technical reviewer of both products. As a key member of the ISPA/SCEA Joint Committee, he crafted the agreement that created the SCEA/ISPA Joint National Office, which eventually led to the merger of SCEA and ISPA into ICEAA (for which he was awarded the 2013 National Cost Estimator/Analyst of the Year team award for Service to the Association).

Peter played a critical role in the reengineering of the certification program in 2009, leading to his current position as Director of Certification. As the certification

czar, Peter Co-chaired the re-write of the Certified Cost Estimator/Analyst (CCEA®) examination, established the Professional Cost Estimator/Analyst (PCEA®) certification for junior practitioners; participated heavily in creating the Parametric Methods specialty certification, and continues to work diligently to promote and enhance ICEAA’s certification program.

In summary, Peter has dedicated a lifetime of service to the cost estimating profession through outstanding commitment, technical excellence, leadership, educational development and more. But Peter’s real gift to the profession is in his ability to *edu-tain*: any encounter with Peter results in two things: I learned something, and I was entertained while doing it. He always knows how to toss in a few of his Andrejev-isms such as “some of my best work is other people’s...” and “there’s a world of difference between doing things right and doing the right thing...” I personally think of Peter has a respected colleague, tremendous mentor, *edu-tainer*, and a great friend.

❖ Nominator Jeffrey Moore  
Herren Associates



*Jeffrey Moore (L) with Peter Andrejev (R)*





Photos by Carrie Evans: [carrieevansphoto.com](http://carrieevansphoto.com)





More photos at [www.iceaaonline.com/phx18photos](http://www.iceaaonline.com/phx18photos)



International Cost Estimating & Analysis Association  
**Professional Development & Training Workshop**



**May 14~17, 2019**

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	<b>Before April 1:</b>	<b>After April 1:</b>
ICEAA Members	<b>\$ 960</b>	\$ 1,060
Non-Members	<b>\$ 1,065</b>	\$ 1,165
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Member Group Registrant	<b>\$ 905</b>	\$ 1,005
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Book your room at the **Tampa Marriott Harborside Hotel & Marina** by **April 17, 2019** to take advantage of the ICEAA block rate of \$209 per night

Register online and book your hotel at:

**[www.iceaaonline.com/tampa2019](http://www.iceaaonline.com/tampa2019)**

Upload your abstract summary by **November 1, 2018** at:

**[www.iceaaonline.com/cfp2019](http://www.iceaaonline.com/cfp2019)**

## Central Virginia Chapter Report

*Britt Staley, ICEAA Central Virginia Chapter President*

The ICEAA Central Virginia Chapter continues to actively engage in the local, regional, and national arenas. Locally, we hosted our second and third quarterly meetings on April 4th and June 27th, respectively. Our second quarterly meeting boasted a fun and engaging presentation, *The Collinearity Kill Chain: Detect, Classify, Localize, Neutralize* by Dr. **Brian Flynn** of Technomics, Inc. This interactive presentation (complete with props) delved into challenging and robust material in a relatable and easily digestible manner.



Nicole Robertson (L) and Britt Staley (R) represent CVA in Phoenix

For our third quarterly meeting, we heard from our in-house cost growth gurus, Dr. **Jon Brown** and Ms. **Gail Flynn** from the Naval Surface Warfare Center Dahlgren Division (NSWCDD), who briefed our membership on *The Impact of Scope Changes on Software Growth*. This proved a great opportunity for attendees to learn about the distinction between scope growth and pure cost growth in software cost estimation and the necessity of vigilance when using historic software code data as a basis of estimate. A big thanks goes out to our presenters for facilitating these exceptional learning opportunities!

In the regional arena, we hosted our second ICEAA Central Virginia Chapter Social on May 17th! This event proved to be a great success (and a great time!). Hosted at Highmark Brewing in Fredericksburg, Virginia. Chapter members, colleagues, and friends enjoyed good food, good brews, and good company. It was great to see

representation from across the region, government and contractors alike. Sincere thanks to **Megan Jones** (ICEAA Executive Director) and **Rick Collins** (ICEAA Region 2 Director) for joining us as our special guests!

Several Central VA members supported our sister chapter in D.C. by attending the ICEAA Washington Capital Area Chapter's Workshop, *Operating and Support Cost Management: Are We Practicing What We Preach?* on April 11. Kudos to the D.C. chapter for a great event and an outstanding learning opportunity!

We also had a phenomenal showing at the 2018 ICEAA Professional Development & Training Workshop in Phoenix! Our membership contributed to the success of this year's Workshop as leaders, presenters, and trainers. Check out our team:

**Courtney Collins**, Tecolote Research, Inc.  
Track Chair


**Britt Staley**, Technomics, Inc.  
Papers Program Co-Chair; Track Chair

**Britt Staley and Nicole Robertson**, Technomics, Inc.  
*Robust Non-Design, Code, Test, and Integration Cost Estimating Ratios*

**Nicole Robertson**, Technomics, Inc.  
*CEBoK Training: Inflation*

**Ben Unruh**, NSWCDD  
*CEBoK Training: Schedule Estimating and Analysis and CEBoK Training: Joint Cost and Schedule Risk*

... And we're not done yet! Mark your calendars for the fourth quarterly membership meeting for fiscal year 2018. If you are a Central Virginia member please plan on joining us for a little lunch and knowledge sharing on September 19, 2018 at NSWCDD. Great opportunity to rack up those CCEA Recertification points!

If you're in the Central VA area (Quantico, Dahlgren, Pax River), and are not affiliated with a Chapter yet – or would like to change your affiliation – please don't hesitate to reach out to any of our board members with your inquiries! The more the merrier at the ICEAA Central VA Chapter! 

### The ICEAA Central VA Chapter 2018-2019 Board of Directors:

President:	<b>Britt Staley</b> <a href="mailto:bstaley@technomics.net">bstaley@technomics.net</a>
Vice President:	<b>Tommy Knoll</b> <a href="mailto:tknoll@tecolote.com">tknoll@tecolote.com</a>
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Membership:	<b>Erik Gyorgy</b> <a href="mailto:egyorgi@tecolote.com">egyorgi@tecolote.com</a>



## Washington Capital Area Chapter Report

*Meghan Kennedy, ICEAA Washington Capital Area Chapter President*

### Chapter Workshop

On April 11, 2018, the Washington Capital Area Chapter of the International Cost Estimating and Analysis Association sponsored an all-day workshop with the theme *Operating and Support Cost Management: Are We Practicing What We Preach?* at Boeing's Long Bridge facility in Crystal City, VA. The workshop featured eight speakers from across government and industry who gave varied perspectives on the state of operating and support (O&S) cost analysis, the resources required to operate and sustain weapon systems, and how the acquisition community can affect operating and support costs before and after a system is developed and procured.

Mr. **Tom Henry**, Director of the Weapon System Cost Analysis Division, OSD CAPE, provided a DoD-wide perspective with updates on Congressional direction, policy related to cost analysis, and efforts to collect sustainment cost data. He also offered examples of programs that have been affected by their O&S cost estimates and affordability.

Mr. **John Johnston**, NAVAIR Cost Department, O&S Cost Process Lead, delivered a Navy-focused viewpoint by demonstrating how the Navy O&S cost community aligns with overall Navy strategic guidance through the products they provide to program offices and senior leaders.

Mr. **Terry Emmert**, Deputy Assistant Secretary of Defense for Material Readiness, provided an interesting philosophical discussion from the advocacy perspective.

Mr. **Dave Holm**, Director, Army TACOM Life Cycle Management Command Cost and Systems Analysis Office, offered a case study on the acquisition of the Joint Light Tactical Vehicle (JLTV) program. He described how the JLTV used prototyping and competition, as well as traditional and non-traditional source selection criteria, to acquire an affordable product.



*Region 2 Director Rick Collins introduces the speakers*

Mr. **Scott Hite**, Principle Deputy Program Manager, V-22 Joint Program Office, spoke about O&S in the daily life of a fielded program. He highlighted how certain challenges can distract from longer term O&S focus and specific methods and projects the V-22 program is taking on today to improve its operational affordability.

Mr. **Frank Washburn**, Director, F-35 Hybrid Product Support Integrator Transition Operations, discussed decisions that were made about the KC-

46 supply chain based on projected O&S costs, including leveraging the commercial aviation sector.

Mr. **Chris Deegan**, President/CEO, Gibbs & Cox, Inc., presented options for making future naval surface combatants more affordable. He discussed reducing the time to design and build ships, how leveraging re-use can aid in that goal, and how re-use and smart, early design can lead to flexible, reconfigurable options.

Finally, Mr. **Kirk Kotthoff**, Senior Affordability Analyst, Boeing Research & Technology, discussed O&S cost estimating from the industry cost analyst's perspective.

The event was an excellent opportunity for analysts to hear from speakers representing a wide range of backgrounds within the DoD, from OSD to program-level, and different areas of industry. The chapter hopes to continue to hold this event on an annual basis, with a different theme each year.



*The first speaker of the morning, Mr. Tom Henry, from OSD CAPE*

*continued*

Photographs by **John Choe**



## Chapter Luncheons

The chapter continues to offer a popular monthly lunchtime speaker series. Some of our recent presentations include:

April 2018: *Update on the SURF Process*

Presenter: **Marc Russo**

Location: Tecolote Research, Crystal City, VA

May 2018: *Cost Estimating and Analysis, Not Just for Weapons Systems Anymore*

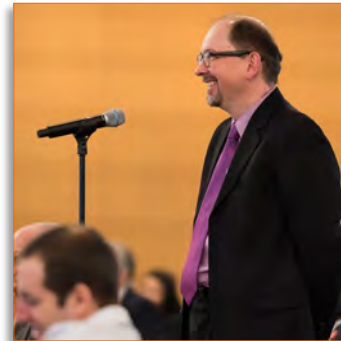
Presenter: **Michael Thompson**

Location: Tecolote Research, Crystal City, VA

July 2018: *The Total Cost of Ownership for Cybersecurity Management in the Cloud*

Presenter: **Richard Mabe**

Location: PRICE Systems, Arlington, VA



*Dave Stem asks a question*

Stay tuned and watch your inbox for more information on other upcoming events. If you've missed any of our past luncheon presentations, they are often available on our website [www.washingtoniceaa.com](http://www.washingtoniceaa.com).

If you're interested in presenting at one of our luncheons, please contact our program chair at [programchair@washingtoniceaa.com](mailto:programchair@washingtoniceaa.com).



*Attendees at the ICEAA Washington Capital Area Chapter Workshop*

## 2019-2021 International Board of Directors

### Nominations due November 15

- ◆ Develop leadership skills and network with driven individuals
- ◆ Impact the future of cost estimating and analysis
- ◆ Influence the direction of the association



We're looking for willing and qualified individuals to serve on people to serve on the 2019-2021 International Board of Directors.

All 19 positions are up for election for the upcoming term. Volunteers are encouraged to complete a nomination application online by **November 15, 2018**

For details and information, visit [www.iceaaonline.com/leadership](http://www.iceaaonline.com/leadership)

## Greater Alabama Chapter Report

*Brian Alford, ICEAA Greater Alabama Chapter President*

The Greater Alabama ICEAA Chapter, in partnership with local cost offices at the Missile Defense Agency (MDA) and NASA Marshall Space Flight Center (MSFC), conducted its annual cost estimating workshop on 7 March 2018 at the KBR Wyle office in Huntsville. Over 85 people attended the event, with representatives spanning the many different Federal Government, Support Contractor, and Prime Contractor organizations in the local Huntsville area. Speakers at the event covered a variety of topics; some gave a reprise of an award-winning talk, others tested out new ideas emanating from their current research, while others provided discussions of topics useful to the cost estimating field. We were fortunate to have the following speakers this year:

- Dr. Christian Smart** (Galarath Federal): *Enhancing Risk Calibration Methods*
- Mr. Tom Crowe** and **Mr. Skyler Embrey** (MDA): *Modeling with Fixed and Variable Cost*
- Mr. Dan Strickland** (MDA): *Software Acquisition 101*
- Dr. Brian Gillespie** (MDA): *The Art of Cost: Sun-Tzu's Strategic Insight in Cost Estimation*
- Ms. Susan Parlamento** (Defense Acquisition University) and **Ms. Lisa White** (U.S. Army Contracting Command): *The Civil False Claims Act – Recent Procurement Fraud Cases*
- Mr. Andy Prince** (NASA MSFC): *Being Certain about Uncertainty, Part 2*
- Mr. Eric Hawkes** (Qualis Corp): *Adventures in Data Visualization*



Photo LR: *Christian Smart, Andy Prince, Eric Hawkes, Susan Parlamento, Tom Crowe, and Dan Strickland.*

Co-hosting these workshops the past several years has been a very valuable way to further the mission of our chapter. They offer presenters a chance to practice and get feedback on their talks to be given later in the summer at the annual ICEAA Workshop. They offer attendees, in particular those unable to make it to the annual Workshop, an opportunity to learn directly from some of our local estimator/analysts who are leaders in the field. But for everyone, they provide a forum for valuable networking, helping develop and foster connections and collaborations that transcend our day-to-day jobs. A huge thanks goes out to Ms. **Robyn Kane** (MDA) for organizing this year's event (again!) and to KBR Wyle for hosting it for a second straight year.

In addition to the workshop, the Greater Alabama chapter conducted its annual series of free cost estimating training sessions this Spring. Meeting on Tuesday nights after work in February and March, instructors and attendees discussed topics ranging from inflation to learning curves to software cost estimating to EVM (a new addition for this year). Attendance was up significantly for each class this year compared to previous years, as we had over 20 attendees per class on average (36 in total) spend some of their Tuesday evenings with us. Thank you to all our amazing instructors for volunteering your time to help make these a success.



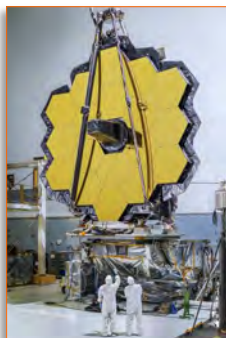
## Southern California Chapter Report

*Rich Harwin, Southern California (SoCal) Chapter President*

*Tom Bosmans, SoCal Chapter Vice President*



The Southern California (SoCal) Chapter of ICEAA Region 7 is holding our next 1-day workshop on September 26<sup>th</sup>. It will be hosted by Northrop Grumman, at their Space Park facility in Redondo Beach CA. RSVP and download the agenda at [iceaaonline.com/socal](http://iceaaonline.com/socal). Not in Southern California? The whole day will be broadcast via GoToMeeting, so when you RSVP, indicate you're attending virtually and we'll send you the login information. Don't forget: ICEAA SoCal Chapter Workshops qualify for CCEA recertification points!




Other future workshops will be in Dec 2018 and Mar 2019 and locations may include Tecolote in El Segundo, the Jet Propulsion Lab in Pasadena, and a joint SoCal-San Diego meeting at Leidos in La Jolla CA. Plans are still forming around these options.

The chapter will conduct elections this fall for officers and board members. Our

election chair this year is **Pam Ehrreich**. If you would like to nominate yourself or someone else, please forward the bio to Pam at [Pamela.f.ehrreich@boeing.com](mailto:Pamela.f.ehrreich@boeing.com).

As always, our workshops are free, and all available presentations are loaded on the web site following the meeting. If you have any questions about the presentations, please feel free to contact the ICEAA Southern California Board of Directors or the ICEAA office ([iceaa@iceaaonline.org](mailto:iceaa@iceaaonline.org)).

Please consider hosting or presenting at a workshop! It will be a rewarding experience. If you are interested in hosting or making a presentation at a workshop, please contact **Rich Harwin** at [Richard.a.harwin@boeing.com](mailto:Richard.a.harwin@boeing.com) or **Tom Bosmans** at [Tom.L.Bosmans@leidos.com](mailto:Tom.L.Bosmans@leidos.com). 

### ICEAA Southern California Chapter Board of Directors: January 1, 2017 - December 31, 2018

President **Rich Harwin**

Vice-President **Tom Bosmans**

Secretary **Melissa Winter**

Treasurer **Chris Hutchings**

Board Members:

**Dara Billah** **David Bloom**

**Danny Polidi**

**Steve Sterk** (Honorary)

**Kurt Brunner** (Emeritus)

View upcoming SoCal Chapter workshop agendas or download previous workshop briefings at:  
[www.iceaaonline.com/socal](http://www.iceaaonline.com/socal)





## Society for Cost Analysis & Forecasting (SCAF): Costing News from the UK

*Dale Shermon, SCAF Chairman*

In April, SCAF had our annual challenge, provided by **Sanathanan Rajagopal**, the Deputy Chairman, and the challenge was to cost the security arrangements for this year's world cup football (known in America as soccer) tournament in Russia. The SCAF committee try to make the topic neutral, rather than aerospace or defence related, to give all teams an equal chance and starting point. Our second criteria is to make the challenge an open question which enables the teams to make their own interpretation of the solution; whether they are a team of one or six, the boundaries can be adjusted to the resources and time available.

Again, SCAF had more than the allowed seven teams who applied. But Wood, Babcock, Atkins, AWE, CAAS, BAE System and QinetiQ were the successful participants drawn from a hat. The organisations provided very capable junior members to attempt the cost estimate and present it to a panel of experts. The MOD Cost Assurance and Analysis Service (CAAS) organised a mini-competition internally between two teams, as the interest to participate was significant. The winning CAAS team had the opportunity to present at the SCAF event. It was again a very stimulating and inspiring day.

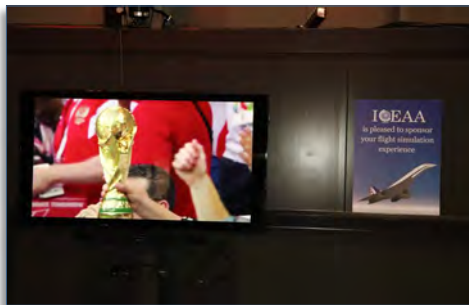
I was lucky enough to attend and present at the ICEAA Canadian Conference at Ottawa Shaw Centre on May 1st and 2nd of this year. With more than 140 attendees for two days the Canadian conference continues to be a success. I presented a paper at the plenary session on *Considering Cost at the Forefront of Decision Making* transferring many of our good



practices from the UK to Canada. As SCAF Chairman I took the opportunity to talk to many of the attendee about SCAF and invite speakers to come to the UK and talk to our SCAF audience.




*Attendees at the  
ICEAA Canada Workshop*



*ICEAA scores a great sponsorship for SCAF*

Our Summer Reception and Awards event, which was held under the wings of the Concord at Aerospace Bristol on 11th July was a great success. I would like to thank our sponsors this year: TechModal, QinetiQ and MCR as well as ICEAA, who sponsored the Concord simulator!

The next SCAF event will be our conference on the theme of *Cost Benefit Analysis: What is the Benefit?* at RUSI in London on the 11th September. Come and join us, you may learn something new or contribute to the learning of the less experienced by networking! 



*SCAF Summer Reception and Awards at  
Aerospace Bristol*

Get involved with ICEAA at the highest level:  
run for a position on the  
**2019-2021 International Board of Directors**



## Nominations due November 15



ICEAA's Board of Directors meets three times annually for approximately eight hours per meeting, and directors are expected to spend at least two hours reviewing materials in preparation for those meetings. Board members are encouraged to volunteer to participate in additional activities or complete tasks as needed by the association that require varying amounts of time and effort.

The Executive Committee consists of five elected positions, one legacy position, and the ICEAA Executive Director. These individuals are expected to attend all Board of Directors meetings, participate in additional meetings/calls of the Executive Committee, and perform specialized duties as listed below. Executive Committee members should be prepared to spend a minimum of **80 hours per year** in their role:

**President**

**Executive Vice President**

**Vice President for Professional Development**

**Secretary**

**Treasurer**

**Immediate Past President** (not an elected position; the last sitting President assumes this role at the end of their term)

The remaining members of ICEAA's Board of Directors are two **Elected Directors**, seven **U.S.-based Regional Directors**, a **U.S. Non-Aligned Region Director**, and **International Regional Directors** for our key areas abroad. All are expected to attend the three annual board meetings and additional duties as required or desired.

Any board member should be prepared to spend a minimum of **60-80 hours per year** in their role. An Officer or Director who misses two consecutive board meetings or three total over the two-year term may be removed from their position by a majority vote of Executive Committee.

In addition to the elected members of the ICEAA International Board of Directors, committees to address areas such as certification, marketing, member outreach, chapter development, government participation, finance/budget, and governance are formed to solve problems, research solutions, and figure out how ICEAA can best serve its members. Though neither the members of these committees nor their chairs can vote during a Board of Directors meeting, committee participation and involvement is always encouraged, and as a mostly-volunteer run association, vital to ICEAA's success. Nearly all of ICEAA's voting board members got their start by serving on a committee.

Additional details, position descriptions, and nomination forms at:

**[www.iceaaonline.com/leadership](http://www.iceaaonline.com/leadership)**

*Don't wait until an election to get involved on a committee; please email [iceaa@iceaaonline.org](mailto:iceaa@iceaaonline.org) to find out where and how you can participate!*





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International Cost Estimating & Analysis Association  
**Professional Development & Training Workshop**



**May 14~17, 2019**

Tampa Marriott Waterside Hotel & Marina  Tampa, Florida

**Upload your summary by November 1, 2018:**

[www.iceaaonline.com/cfp2019](http://www.iceaaonline.com/cfp2019)

*Ahoy, MAY-teys: the Workshop be a month earlier.  
All ye deadlines be a month earlier too!*