

WELCOME

It's a pleasure to welcome you to the 2019 Software and IT-CAST Symposium! It comes as no surprise that innovation in software and information technology — whether it be new products, processes or services — marches along. The United States Government, long past the time of dictating and leading innovation, faces a crossroads; how does it keep pace to this new reality?

Adding to the troubles is that cost has the dubious problem of being an unrecognized stakeholder. Resource allocation, financial information, and performance-based tracking is imperative for success and is a tenuous balancing act in acquisition, cost, and program management activities. Luckily, through this symposium and other venues we are tackling these inequities and searching for solutions that are aligned with the more traditional stakeholders.

Over the next two days, you will find a program that explores how cost is addressing some of our most significant challenges. And through the plenary sessions and discussions that follow, we will explore how our tradecraft should evolve and where we can improve our profession.

We encourage you to take advantage of the opportunities available at the IT-CAST Symposium to connect with others and let new partnerships grow. You will find that many attendees share similar challenges, and others who have found viable solutions are here to share what they did. We will have one happy hour event and numerous breaks and we hope you will be able to make the most of these sessions and meet with many of those in attendance.

Thank you for joining us this year! And a very special thank you to all of our speakers! We hope the next few days are a unique and rewarding experience that helps you meet all of your business, educational and networking objectives.

Sincerely,

Vjosa Dreshaj and Lyle Patashnick
The Software and IT-CAST Executive Team

AGENDA

TUESDAY, AUGUST 20, 2019

8:30-8:35 a.m. Announcements
Gregory Niemann

8:35-8:45 a.m. Introduction
Mr. John Scali

8:45-9:15 a.m. KEYNOTE: Tradecraft Evolution for Emerging Needs
Ms. Jen Rose

9:20-9:50 a.m. Living in the Clouds

Walking through the Department of Justice (DOJ) United States Trustees Program (USTP) Cloud journey over the last three years, I will delve into Cloud cost optimization techniques that can be applied in your agencies. Cloud cost optimization requires a solid understanding of a Cloud's offerings combined with meaningful data analysis and visualization that is continually providing value in the Cloud and impacting your agency's mission. This requires a solid understanding and knowledge of the Cloud services offerings, licensing, discounts, automation options and proper configuration of their services. I will break down specific case studies to show how the migrating to the Cloud can not only save money, but provide better value to users and enhance the mission, enabling IT resources to focus on higher-value work. The goal of this talk is to provide specific and detailed examples of cost optimization strategies for Cloud services that can be applied in each of your organizations.

Key Presenter

Michael Cassidy

*Chief Technology Officer, Department of Justice
United States Trustees Program*

9:55-10:10 a.m. | Break

10:10-10:40 a.m. Forecasting Future Amazon Web Services Pricing

The National Reconnaissance Office (NRO) Cost and Acquisition Assessment Group (CAAG) produces independent cost estimates to support decision making, budgeting, and trade studies. Cloud service costs procured from Amazon Web Services (AWS) are becoming increasingly scrutinized. We conducted a thorough analysis to collect historical AWS prices and modeled the downward trend. Autoregressive time series models were fit to storage and compute service prices, resulting in annual price reduction rates to be applied in future estimates.

Authors

James Smirnoff and Hassan Souiri

National Reconnaissance Office

10:45-11:15 a.m. Causality and Uncertainty: A New Wave for Cost Estimation

SEI research in the past seven years has progressed methods and tooling for early life cycle software cost estimation. The early life cycle cost estimation method and tooling known as QUELCE (Quantifying Early Lifecycle Cost Estimation) combines scenario planning workshops with Bayesian Belief probabilistic models and Monte Carlo simulation to model uncertainty as front-end inputs to existing cost estimation machinery. To enable the QUELCE framework to guide stakeholders in interventions for cost containment, reduction, and price negotiation, recent SEI research into causal modeling of observational data is being used to distinguish correlated factors from causal factors of program performance that affect

software cost. This talk describes the practical aspects of QUELCE and the ability, using open-source tooling from Carnegie Mellon University, to supplement QUELCE with causal search. The newly added causal search step better controls the exploding probabilistic model derived from expert opinion by reducing the number of factors included into the software cost model. Participants will take away job aids including process flowcharts for the complete methodology of QUELCE and conducting causal search. Participants will be encouraged to use QUELCE and conduct their own research using the causal learning tools and methods.

Authors

Bob Stoddard and Dr. Mike Konrad
Software Engineering Institute (SEI)

11:55 a.m.-1:00 p.m. | Lunch

1:00-1:30 p.m. Better Data Communication

A first step to improving the way you communicate data and analysis is to have some basic understanding of best practices and strategies. In this talk, I lay out three principles for better data visualization: Show the Data, Reduce the Clutter, and Integrate Graphics and Text. I also lay out three principles for better presentations: Visualize, Unify and Focus. Together, with the help of examples, both good and bad, I demonstrate how anyone can more effectively communicate their data and elicit insight.

Key Presenter

Jon Schwabish
The Urban Institute

1:35-2:05 p.m. Data Exploitation — More Value, Less Time

Cost analysts have historically operated on small, manageable datasets. Preparing data for a task may be tedious and time consuming but overall achievable. Those days are over. More and more data is being collected, yet that collection and storage is being handled under the same strategies as yesteryear. The unfortunate result is datasets and databases which are difficult, if not impossible, to work with at scale.

This presentation discusses an approach to normalize, categorize and analyze data as applied to a larger dataset. The resulting product is a compact, usable database that can answer any question the data itself is capable of answering, without additional prep work. Such a solution would take an order of magnitude more time to develop using lesser methods and tools.

The methodologies presented are consistent with data science best practices — formalized by the popular “grammar of data manipulation” implemented in R statistical software and the related “tidyverse” packages. The goal is to communicate a flexible, scalable thought process which can be applied to any dataset.

Author

Adam James
Technomics

2:10-2:30 p.m. Calibrating COCOMO® II for Functional Size Metrics

While COCOMO® II provides generalizable effort estimates, the accuracy of the estimates depends on the accuracy of the input parameters — namely, size in Source Lines of Code (SLOC), personnel, product and environmental attributes. Since SLOC is nearly impossible to estimate accurately until the project is nearly completed, it would be desirable to have a generalizable effort estimation model that allows size to be represented by functional size metrics, such as IFPUG (FPs) and COSMIC (CFPs) Function Points.

Since SLOC represents software size at a much lower level of granularity compared to functional size metrics, the effects various effort factors have on effort may need to be adjusted — particularly the 5 Scale Factors (Precedentedness, Development Flexibility, Team Cohesion, Risk and Architecture Resolution, and Process Maturity), which affect the rate at which effort grows with respect to size, and product characteristics, such as Product Complexity. We invite expert input on how the COCOMO® II ratings should be adjusted via a Wideband Delphi being held at the 20th Practical Software and Systems Measurement (PSM) User's Group Workshop September 16–20. Additionally, we will have handouts to get initial parameter ratings during the breaks and lunch. The insights gained may eventually be included in COCOMO® III.

Author

Anandi Hira

University of Southern California

2:30-2:45 p.m. | Break

2:45-3:15 p.m. Cost of Software Obsolescence Resolution of Real-Time Software

Software obsolescence happens when the original developer and authorized third party cease to provide support with regular updates, upgrades, and fixes or due to changes in the target environment, systems, and hardware, which makes software unusable (S. Rajagopal et al, 2014). It has been identified by the means of literature reviews and various interviews with the project teams in Ministry of Defence and Defence Industries that there is a requirement for developing a systematic framework that allows the forecasting and estimation of software obsolescence at a very early stage of the projects. It is even more important to develop a framework for identification, resolution and mitigation of Software Obsolescence issues that may arise during the lifetime of the software.

Author

Rajagopal Sanathanan

QinetiQ

3:20-3:50 p.m. New Army Software Sustainment Cost Estimating Results

The Army has conducted a study over the past six years to improve the estimation accuracy of software sustainment systems cost. Based on an extensive data call of 192 Army systems, data analysis revealed several types of cost estimating relationships based on release type, release rhythm and three categories of data. Analysis of a sustainment cost risk model was also conducted. This presentation will show the study results, including what worked and did not work. A paper providing additional detail on this presentation is available.

Authors

Cheryl Jones and James Doswell

United States Army

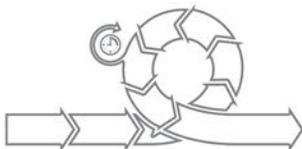
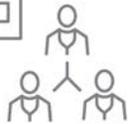
3:55-4:30 p.m. Agile Projects and GAO Best Practices

This presentation will provide an overview of the GAO Agile Assessment Guide (currently being developed). It will focus on Chapter 9 (program controls), which ties the best practices established in previous GAO guides to Agile development efforts. Additionally, the presentation will provide a more detailed look into areas of consideration currently discussed in the draft guide related to cost estimating, scheduling and earned value management.

Author

Jennifer V Leotta

Government Accountability Office



AGENDA

WEDNESDAY, AUGUST 21, 2019

8:30-8:35 a.m. Announcements
Gregory Niemann

8:40-9:10 a.m. KEYNOTE — Software is Never Done: Refactoring the Acquisition Code for Competitive Advantage

U.S. national security increasingly relies on software to execute missions, integrate and collaborate with allies, and manage the defense enterprise. The ability to develop, procure, assure, deploy and continuously improve software is thus central to national defense. At the same time, the threats that the United States faces are changing at an ever-increasing pace, and the Department of Defense's (DoD's) ability to adapt and respond is now determined by its ability to rapidly develop and deploy software to the field. The current approach to software development is broken and is a leading source of risk to DoD: it takes too long, is too expensive, and exposes warfighters to unacceptable risk by delaying their access to tools they need to ensure mission success. Instead, software should enable a more effective joint force, strengthen our ability to work with allies, and improve the business processes of the DoD enterprise.

The Defense Innovation Board (DIB) recently presented a report to Congress and DoD arguing that DoD and industry must change the practice of how software is procured and developed by adopting modern software development approaches, prioritizing speed as the critical metric, ensuring cybersecurity is an integrated element of the entire software life cycle, and purchasing existing commercial software whenever possible. In this talk, I will briefly survey the recommendations from this report, focusing on those aspects of the report related to cost assessment and performance estimation of software programs (and software-intensive components of larger systems). This includes the use of modern metrics for tracking performance for software programs and driving improvement in cost, schedule and performance.

Keynote Speaker

Dr. Richard M. Murray
California Institute of Technology

9:15-9:45 a.m. Estimating and Tracking Agile Software Development Projects

Generating accurate cost estimates for software development efforts has always been problematic, and no universal solution exists. What are the primary factors that make software cost estimation challenging, and what can be done to improve our cost estimates and accurately track the progress of agile software development? This discussion will focus on one approach to develop software cost estimates to better align with agile software development methodologies and accurately track software development programs throughout their life cycle.

Key Presenter

Matt Kennedy
United States Treasury

9:50-10:10 a.m. | Break

10:10-10:40 a.m. KEYNOTE — Software Acquisition: Pathway, Appropriation, and Value of Enterprise Infrastructure

Keynote Speaker

Dr. Jeff Boleng

Special Assistant for Software Acquisition to the Under Secretary of Defense for Acquisition and Sustainment

10:45-11:15 a.m. A Foundation for Software Acquisition Decisions

Electricity and the telephone took over 30 years to be adopted by more than 25 percent of U.S. households, while the smartphone was adopted in less than five. The advent of cloud computing has provided the ability to access computer services over the internet and significantly changed the initial costs of companies. Currently, the Fortune 500 list is overturning 20–50 companies annually. As George W. Bush stated: “You can’t do today’s job with yesterday’s methods and be in business tomorrow.” The challenge that industry and the government is facing is how to stay relevant in this environment. Our foundational business practices and decision-making processes will determine our ability to compete. Today, the projected cost of the weapon system or modernization effort is one of the primary facts that makes it all the way to Congress. When software is malleable and continuously delivered, how do we provide foundations for decisions?

Author

Tory Cuff

Tested Tech Solutions

11:20-11:50 a.m. Living in a World Without SLOC

With the recent publications from the Defense Science Board and Defense Innovation Board (DIB), department and federal agency leaders are pushing us away from using Source Lines of Code (SLOC) as a primary software size or estimates and actuals. This presentation will review some of the alternative software sizes. We will review the alternate sizing available in the more popular software parametric tools. This presentation will also include an overview introduction to Simple Function Points as an alternative to SLOC.

Author

John Sautter

Northrop Grumman

11:55 a.m.–1:00 p.m. | Lunch

1:00-1:30 p.m. Tracking Software Development: An Example of Feature-Based Estimating

AFCAA is working to develop a feature-based software cost and schedule estimating approach that can be used to track the execution of software development for DoD acquisition programs already underway. The goal is to develop metrics that will measure the progress of software development as it advances through three phases — code development, software integration, and test — and use those metrics to estimate the remaining cost and schedule of the effort.

Our preliminary approach consists of two stages: 1) map system or subsystem features to a program WBS at the control account level and 2) gather labor hour data spent on code development, software integration, and test for each of the system or subsystem features. In addition to estimating the remaining effort, this methodology will be useful in identifying both the features and software development phases that are the most effort intensive,

helping to develop an understanding of how each phase scales with content to allow for more effective cost and schedule estimates. As data is collected, productivity metrics can be developed using labor hours and the progression of features through each phase. As this effort continues, this methodology should identify which existing metrics data will be most useful to the cost community.

Author

John Rosson, Capt.

United States Air Force

1:35-1:50 p.m. **A Path Toward Consensus Measures for Iterative Software Development**

Traditional measures used to plan and manage software programs based largely on waterfall development and software lines of code-based estimates are not keeping pace with trends in the defense industry toward methods based in a software factory environment, including automated testing, continuous integration, and rapid iterative development and deployment of new capabilities. The Defense Science Board (DSB) and Defense Innovation Board (DIB) recommended measures for continuous iterative development and agile programs. A joint NDIA, INCOSE and PSM working group surveyed the community for feedback on the usefulness and effectiveness of these measures and has been developing a framework based on information needs to help reach industry consensus on candidate measures. This presentation will summarize current recommendations, feedback from the community, and a path forward on a consensus measurement framework.

Author

Cheryl Jones

United States Army

1:55-2:25 p.m. **Why and How to Use COSMIC FP Effectively on Agile Development Contracts**

In this presentation, Colin and Lonnie will be presenting the use of automated analysis of software requirements for both functional sizing and early requirements quality improvement. The presentation is based in part on the effectiveness of ScopeMaster, the world's first automated software requirements analyzer. ScopeMaster estimates functional size (both COSMIC and IFPUG) and identifies potential errors in software requirements at very high speed, directly from the language of user stories. It helps the user remove around 50 percent of requirements defects in a fraction of the time it would take to do manually. With over 75 years of software project management between them and substantial experience in both IFPUG and COSMIC, they will highlight the merits of using COSMIC Function Points and its particular suitability to Agile and embedded systems work. They will show the importance of knowing the functional size early and how it lets you manage cost, velocity and quality throughout an Agile project. They will also show how this can contain technical debt and reduce project risk, especially on larger software projects.

Authors

Colin Hammond and Lonnie Franks

ScopeMaster

2:30-2:45 p.m. | Break

2:45-3:15 p.m. **Automatic Objective Function Points**

Searching for better methods to take advantage of latest technologies, we investigated how to automatically capture Function Points from actual SW code. We proposed using Cyclomatic Complexity to calculate Function Points by selecting the appropriate Function

Point standard tables. This method enables the ability to capture “Objective” Function Points directly from SW code. While investigating this process and latest technologies, we experimented with the Natural Language Toolkit (NLTK) to parse through textual definitions to determine if it is possible to estimate “Objective” Function Points directly from a SW document such as Agile “Features.”

Author

Paul Cymerman
Quaternion Consulting

3:20-3:40 p.m. JASI Cost IPT – Join the Band!

The Joint Agile Software Innovation (JASI) Cost IPT was established in 2018 as a cross-government agency team with the purpose of exchanging cost data and information related to Agile software development. The goal of this Cost IPT is to improve the cost community's ability to estimate the cost of software development in an Agile software development environment and track progress to successful completion using Simplified Function Points. This presentation will discuss the origins of JASI, what we do as an IPT, a brief introduction to Simplified Function Points, and how you can join this innovative and dynamic team!

Author

Katharine “Kammy” Mann
Department of Homeland Security

3:45-4:30 p.m. Agile Centers Panel Discussion

Come pop the “Agile Bubble” as we explore topics on: agile measures, which data is most useful for answering RFPs, how far we should go in standardization of agile, which data is best used for performance tracking, and others that may come to pass. This panel is meant to be interactive; arrive prepared to ask questions of this very knowledgeable group.

Panel

Sarah Nichols
Northrup Grumman
(Representative)
Boeing

Robin Yeman
Lockheed Martin

Facilitator

Lyle Patashnick
National Geospatial-Intelligence Agency

KEYNOTE BIOGRAPHIES



Dr. Jeff Boleng

Special Assistant for Software Acquisition to the Under Secretary of Defense for Acquisition and Sustainment

Dr. Jeff Boleng is the Special Assistant for Software Acquisition to the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)) where he serves as a key member of the Under Secretary's executive leadership team, providing strategic focus and overall policy guidance on all matters of defense software acquisition. In this role, he leads the formulation of the Department's software acquisition strategy, advises Department leadership on latest best practices in commercial software development, supports the enterprise to build a team of top-tier software engineers, and works to develop modern software skills in the acquisition workforce. Jeff has a breadth of experience across the Department of Defense (DOD) and

the private sector. Prior to joining DOD, he served as the chief technology officer (acting) and deputy chief technology officer at Carnegie Mellon University Software Engineering Institute. Prior to that, he served more than 21 years in the United States Air Force as a cyberspace operations officer and software engineer. In his final assignment with the Air Force, Jeff served as the deputy department head, Department of Computer Science, at the United States Air Force Academy.

Jeff is a senior member of both the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE), and he holds PhD and MS degrees in Mathematical and Computer Sciences from the Colorado School of Mines and a BS in Computer Science from the U.S. Air Force Academy.



Dr. Richard M. Murray

California Institute of Technology

Dr. Richard M. Murray is the Thomas E. and Doris Everhart Professor of Control & Dynamical Systems and Bioengineering at the California Institute of Technology (Caltech). He received the B.S. degree in Electrical Engineering from California Institute of Technology in 1985 and the M.S. and Ph.D. degrees in Electrical Engineering and Computer Sciences from the University of California, Berkeley, in 1988 and 1991, respectively. Murray served on the Air Force Scientific Advisory Board from 2002-2006 and has served on advisory committees for the Jet Propulsion Laboratory (JPL), the Pacific Northwest National Laboratory (PNNL) and the Defense Advanced Research Projects Agency (DARPA). Murray is an elected member of the National Academy of Engineering (2013) and the recipient of the 2017 IEEE Control Systems Award. He is a current member of the Defense

Innovation Board, where he co-chairs the Science and Technology Subcommittee, and served as co-chair of the Software Acquisition and Practices (SWAP) report.



Ms. Jennifer Rose

Director, Cost and Acquisition Assessment Group, National Reconnaissance Office (NRO)

Ms. Jennifer Rose was selected as the Director, Cost and Acquisition Assessment Group (CAAG), within the National Reconnaissance Office (NRO) Business Plans and Operations (BPO) Directorate in November 2017. With this selection, Ms. Rose joined the Defense Intelligence Senior Leader (DISL) ranks. As the Director, CAAG, Ms. Rose manages cost analysis and integrated performance management (IPM) functions for the agency.

Prior to joining the NRO, Ms. Rose led the National Geospatial-Intelligence Agency (NGA) Cost Assessment Division within the Corporate Assessment and Program Evaluation (CAPE) Office beginning in January 2015. Her group conducted unbiased, independent cost and resource analysis in support of NGA planning and programming activities, acquisitions, and CAPE studies.

Ms. Rose worked for defense contractor TASC from 1996 – 2015, holding numerous positions reflecting growth in technical knowledge and responsibility over the 19-year period. Her technical expertise ranges across cost analysis; data analysis; budget planning, programming, budgeting, and execution (PPBE); portfolio management; earned value management and analysis; program justification and advocacy; systems engineering; and acquisition support. She applied these skills as a direct support analyst for NGA, NRO, Defense Finance and Accounting Service, Army, Navy and Air Force. Ms. Rose concurrently held corporate leadership positions while providing direct support. In her last formal leadership role at TASC, Ms. Rose served as the Cost and Risk Analysis Division Director within TASC's Financial Business Analytics Center of Excellence. She was responsible for over 50 analysts and approximately \$12M of revenue based on cost analysis services across various customers in the Intelligence Community, Department of Defense and Civilian Agencies.

Ms. Rose began her career as a cost analysis intern with the Naval Center for Cost Analysis in 1994. Ms. Rose graduated with a Bachelor of Arts degree with a double major in Mathematics and English from Washington College, Chestertown, MD. She earned a Master of Science degree in Operations Research from the College of William and Mary, Williamsburg, VA. She is a Certified Cost Estimator/Analyst (CCE/A) with the International Cost Estimating and Analysis Association (ICEAA) and a Level III certified DAU Business Cost Estimator.

KEY PRESENTER BIOGRAPHIES



Michael Cassidy
Chief Technology Officer, Department of Justice, United States Trustees Program

Mike Cassidy is the Chief Technology Officer at the Department of Justice United States Trustees Program (USTP) focusing on modernizing the USTP IT services using Agile and DevOps practices on modern Cloud services platforms (e.g., IaaS, PaaS and SaaS). Over the past three years Mike has focused within USTP performing a “lift and shift” migration to the Cloud. During this three-year journey, Mike has lead the effort to capture detailed cost analysis on this migration identifying cost savings, cost avoidance and enhanced opportunity costs that have been realized. USTP was recognized by GAO as one of the leaders in the Cloud Cost savings in their report “Agencies Have Increased Usage and Realized Benefits, but Cost and Savings Data Need to Be Better Tracked” (Refer to: <https://www.gao.gov/products/GAO-19-58>).

Mike has a B.S. in Consumer Economics from University of Maryland College Park and a M.S. in Information Technology from University of Maryland University College. Mike also holds a number of Cloud professional certifications including CompTIA Cloud+, CompTIA's Cloud Essentials, ISC's Cloud Certified Security Professional (CCSP) and Microsoft's Azure Architect.



Matt Kennedy
United States Treasury

Matthew R. Kennedy is a Senior IT Program Manager and Contracting Officer Representative (COR) at the Office of the Comptroller of the Currency (OCC). Formerly, Matt was a Program Manager at the Army's Program Executive Office - Enterprise Information Systems (PEO-EIS) and was a Professor of Software Engineering at Defense Acquisition University (DAU) where he specialized in agile acquisition. Matt served as the Associate Director of Engineering at the National Cancer Institute's Center for Biomedical Informatics and Information Technology and served in the U.S. Air Force as a network intelligence analyst. He has worked both inside and outside of the government on various IT projects over the last 18 years. Matthew holds a Bachelors in Computer Science and a masters and Ph.D. in Computer Science and Software Engineering from

Auburn University. He is Defense Acquisition Workforce Improvement Act (DAWIA) Level III certified in Program Management, Systems Engineering, and Information Technology (IT) and a SAFe® 4.5 Program Consultant and Certified Scrum Professional (CSP).



Jon Schwabish
The Urban Institute

Jon is currently a Senior Fellow in The Urban Institute's Income and Benefits Policy Center. He is also a member of the Institute's Communication team where he specializes in data visualization and presentation design. Prior to the time at Urban, Jon spent the previous 9 years at the Congressional Budget Office conducting research in such areas as earnings and income inequality, immigration, disability insurance, retirement security, data measurement, the Supplemental Nutrition Assistance Program (SNAP), and other aspects of public policy.

Jon created a number of policy-relevant data visualization products; wrote widely on data visualization and presentation techniques; and offer public workshops on those areas. Jon is generally known for calling for clarity and accessibility in research and wrote on various aspects of how to best visualize data including technical aspects of creation, design best practices, and how to communicate social science research in more accessible ways. Jon was named a “visualization thought leader” by AllAnalytics in 2013. Jon's book, *Better Presentations: A Guide for Scholars, Researchers, and Wonks* is designed to help presenters of scholarly or data-intensive content develop clear, sophisticated, and visually captivating presentations.

In addition to his efforts to improve how researchers communicate their findings to a wider audience, Jon continues to pursue his existing research portfolio. Ongoing and future work includes investigation of child nutrition programs; long-term earnings patterns among SNAP recipients; the relationship between state-level SNAP policies and individual participation decisions; coincident retirement-disability Social Security benefit claiming behavior; and patterns in earnings inequality and volatility within and across groups of workers.

Jon earned an M.A. and Ph.D. in Economics from Syracuse University and an undergraduate degree in Economics from the University of Wisconsin at Madison.

BIOGRAPHIES

Tory Cuff **Tested Tech Solutions**

Victoria ‘Tory’ Cuff is the CEO and founder of Tested Tech Solutions, a consultancy for the DoD on software delivery. Tested Tech was founded to empower the government to deliver—based on the belief that potential solutions for current and emerging capability gaps are a combination of technological advancements, key partnerships, and investments in the current workforce. As a previous AF civilian, she began as a cost estimator that had worked on various weapon systems, including: aircraft, tactical data links, satellites, sensors and then turned her focus to software cost estimating. She became the Chief of the Agile Acquisitions branch supporting Kessel Run as it morphed from the modernization of the Air Operations Center (AOC) system modernization to the entirety of the HBB division plus the addition F-35 ALIS program. That role expanded her responsibility to include overseeing program management, contracting, financial management and cost estimating. Since her AF departure, she is now supporting the Joint Artificial Intelligence Center (JAIC) to support the acceleration and adoption of AI across the DoD.

Paul Cymerman **Quaternion Consulting**

Paul Cymerman works for Quaternion Consulting Inc. (QCI) supporting the Office of Director of National Intelligence (ODNI). He has over 32 years of experience as a software cost analyst, aerospace engineer, and computer programmer. He is currently supporting the ODNI in developing independent cost estimates and researching new estimating methods. Back in 2001, Paul proposed code counting standards using the University of Southern California (USC) code counter. In 2004, he proposed and developed the original “Diff” capability to USC tool to help analyze SW development process. This was a first in the SW cost community to be able to extract the actual changes in the SW development.

James Doswell **United States Army**

James Doswell is a Senior Operations Research Analyst in the Networks, Information, Software & Electronics Costing (NISEC) Division of the Office of the Deputy Assistant Secretary of the Army for Cost and Economics (ODASA-CE). James is a technical advisor and is responsible for software and electronics estimating for major Army programs. He has also been an instrumental part of the Army software maintenance data collection initiative for the last 5 years.

Lonnie Franks **ScopeMaster**

Lonnie is a Senior Executive Consultant with extensive knowledge and experience in the delivery of large-scale IT projects over the last 35 years, for financial institutions, leading blue chip companies and the US government, involving both on-shore and off-shore development. His key skills include sizing, estimating, planning, organizing and controlling large-scale IT development projects using proven metrics; ensuring that projects have the expected and required functionality; that projects are done within a reasonable (and predictable) schedule; that projects meet cost targets and benchmarks; and that projects are delivered with exemplary quality. In the area of quality management, Lonnie’s skills include setting quality targets and measuring the actual quality achieved for all work products; analyzing quality variances between expected and actual quality; doing root cause analysis and providing closed loop corrective actions for quality issues; ensuring that the right product is developed in the right way with outstanding quality the first time; and minimizing rework because of quality issues. Lonnie has used IFPUG function point analysis and, more recently, COSMIC FSM.

Colin Hammond **ScopeMaster**

Colin Hammond is a software project leader, innovator and entrepreneur. He is the inventor of ScopeMaster, the world’s first requirements analyzer that simultaneously performs both automated functional sizing and quality assurance by interpreting the functional intent of written software requirements. Colin is a certified IFPUG and certified COSMIC Function Point specialist. For 30 years he worked as a software project, program and portfolio manager at numerous large organizations in the UK. An engineer by training he combines technical skills with management skills to bringing certainty to software projects using effective metrics and techniques. Colin now works full time at ScopeMaster helping software project leaders achieve greater certainty and faster success through early sizing and improved requirements quality work.

Anandi Hira **University of Southern California**

Anandi Hira is currently a PhD student under Dr. Barry Boehm at University of Southern California’s (USC’s) Computer Science Department. Her research interests lie in cost estimation and models. She has been a part of the Unified Code Count (UCC) development effort at USC CSSE for the past 6 years and has been collecting and analyzing the data to improve the development processes and the product’s quality. Anandi has also joined the effort within USC CSSE to develop COCOMO® III (CONstructive COSt MOdel) as an update from COCOMO® II.

Adam James

Technomics

Adam James is a Senior Analyst at Technomics, Inc., where he serves as a strategic leader and data scientist for the newly established Technomics Innovation Lab (TIL). In this role, Adam provides his expertise to develop modern, innovative solutions to address new – and old – cost analysis problems. Adam's current focus is helping clients extract value from datasets of varying complexity. Recently, he helped the Army analyze traditional cost estimating data sources such as the Cost and Software Data Reports (CSDRs) and Contracts/Mods using modern tools and data science techniques. Prior work includes serving as a lead author of the Joint Agency Cost Estimating Relationship (CER) Development Handbook.

Adam earned a M.S. in Statistics from Virginia Tech in 2012. He also has a B.S. from Virginia Tech with a double major in Mathematics and Statistics. He received the International Cost Estimating and Analysis Association (ICEAA) Technical Achievement Award in 2016. Adam also has been active in contributing to the community knowledge base, winning best paper in both the "Analysis & Modeling, Machine Learning" and "Methods, Data Collection & Management" categories at ICEAA in 2019.

Cheryl Jones

United States Army

Cheryl Jones works in the Strategic Quality initiatives Group at FCDD-ACE-QSA at Picatinny Arsenal, New Jersey. Ms. Jones is a technical lead for the Army Software Sustainment Cost Estimation initiative. The objective of this project is to provide the Department of the Army with the ability to accurately estimate, budget, allocate, and justify the software maintenance resources required to meet evolving mission and service affordability requirements across the system life-cycle.

Ms. Jones is the technical lead and project manager of Practical Software and Systems Measurement and a primary author of Practical Software Measurement: Objective Information for Decision Makers. Ms. Jones is the DoD representative to the US Technical Advisory Group to International Standards Organization SC7, System and Software Engineering.

Dr. Mike Konrad

Software Engineering Institute (SEI)

Michael Konrad is a principal researcher at the Software Engineering Institute (SEI), currently using causal and machine learning and simulation to help achieve improved analytic capabilities in: software estimation, engine health, and video understanding. From 1998 to 2013, he contributed to CMMI in many technical roles. From 1988 to 1998, Konrad was a member of the teams that developed the original Software CMM and ISO 15504. He is coauthor of the CMMI for Development (CMMI-DEV) books. Konrad received his PhD in mathematics from Ohio University in 1978; and is a Senior Member of the IEEE.

Jennifer V Leotta

Government Accountability Office

Jennie Leotta is an Assistant Director for the Government Accountability Office (GAO). She is responsible for performing cost, schedule, and Earned Value Management analyses to support audits on a wide range of government programs. Before joining the GAO, Jennie worked for the Department of Homeland Security and the Navy, developing and analyzing cost estimates. Jennie holds a B.S. in Quantitative Finance from James Madison University and an M.A. in Economics from George Mason University.

Katharine "Kammy" Mann

Department of Homeland Security

Ms. Kammy Mann is an Operations Research Analyst for the Department of Homeland Security (DHS), Cost Analysis Division (CAD). She has supported numerous projects and programs in the DoD and DHS and for the NATO Communication and Information Agency (NCIA) in Brussels, Belgium. Ms. Mann is a member of the Agile IT Software Development commodity team at DHS CAD responsible for approving all Software Major Acquisition Programs' Life Cycle Cost Estimates. She is the current Secretary for the Joint Agile Software Innovation (JASI) Cost IPT and Membership Chair for the Washington Chapter of ICEAA. She holds B.S. and M.S. degrees in Industrial and Systems Engineering from Virginia Tech, is a Certified Cost Estimator/Analyst (CCEA®), and is a member of the International Function Point Users Group (IFPUG).

Sarah Nichols

Northrup Grumman

Sarah Nichols has 25 years of experience in the government consulting and banking industries in the management and training fields. She is currently a Lead Enterprise Agile and DevOps Coach and trainer. She received a Master's in Adult Education for Wayland Baptist University, a BS in Finance from Oklahoma Christian University, and an Associates in Journalism and Math from York College. She holds certifications with the American Society of Quality Certified Quality Manager/Organizational Excellence (CQM/OE) and is a PMI Project Management Professional (PMP), as well as a certified CMMI associate.

Lyle Patashnick
National Geospatial-Intelligence Agency

Lyle Patashnick has over 15 years' experience in the government cost tradecraft. A serial connector and collaborator, Lyle is passionate on pursuing joint ventures, whether it be as a founding member of the JASI CIPT or an integral member for the present and several of the past Software and IT-CAST Symposiums. Since 2017, Lyle has supported NGA's Corporate Assessment and Program Evaluation Division, working on Automatic Simplified Function Point Estimation and Automatic Traceability in programmatic and engineering artifacts. Prior to that, Lyle was a cost analyst for several DoD and non-DoD federal agencies. In addition to cost, Lyle has a Juris Doctor from Northwestern University School of Law and is licensed to practice in both Illinois and Washington, D.C.

John Rosson
Capt, United States Air Force

U.S. Air Force Captain John Rosson joined the Air Force Cost Analysis Agency (AFCAA) in April 2017, after completing his Masters of Cost Analysis degree at the Air Force Institute of Technology. During his time at AFCAA, he has worked on Joint Strike Fighter, Light Attack Aircraft, and the B-21 bomber.

Rajagopal Sanathanan
QinetiQ

Sanath is a highly capable and internationally recognized Cost Engineer/Cost Estimator specializing in Software Estimating, Software Obsolescence Management, Software Obsolescence Cost Estimating and Parametric Estimating. Sanath is an ISPA (International Society of Parametric Association) certified parametric estimator who worked in various high-profile Defence projects in ISS/ISTAR, Air, Maritime and Land domains, providing costing services at all stages of the procurement cycle in setting budgets, historic trends and Independent Cost Estimates assurances for government business cases. Currently, Sanath is working as a Cost Estimating Manager for Cyber, Information and Training in QinetiQ. Sanath is a Fellow of QinetiQ and Fellow of Defence Equipment and Support. Sanath served as a UK Director for ICEAA, and he is the current Chairman of SCAF (Society of Cost Analysis and Forecasting), UK.

John Sautter
Northrop Grumman

John Sautter is a Level 6 Software Estimator working in the Northrop Grumman Technology Services Global Services Division. Mr. Sautter serves as task lead in the collection and evaluation of project historical data and is often assigned to high-priority large new business acquisitions and also helps perform independent cost evaluations, non-advocate project reviews, and startup reviews. Mr. Sautter serves as the lead facilitator of the Northrop Grumman Cost Estimation Community of Practice. Mr. Sautter is a trained function point specialist and is the corporate liaison to the International Function Point Users Group (IFPUG). Mr. Sautter is a TS member of the software Center of Excellence and the Agile Center of Excellence with a focus on software metrics and estimation. Mr. Sautter has over 37 years of experience working in software engineering, project management, and organizational process improvement. Mr. Sautter holds a BS degree in Computer Science and an MS in Organizational Performance.

James Smirnoff
National Reconnaissance Office

Hassan Souiri
National Reconnaissance Office

Bob Stoddard
Software Engineering Institute (SEI)

Robert Stoddard is a principal researcher within the Software Engineering Institute focused on research and customer work involving causal and machine learning. Recent projects include jet engine predictive maintenance, test and simulation of weapon systems, and early lifecycle cost estimation. The SEI cost research transcends traditional cost estimation to actual causal modeling of program software costs, moving from prediction modeling to uncertainty modeling to prescriptive modeling. Robert Stoddard is a Fellow of the American Society for Quality and Senior Member of the IEEE with 24 years industrial experience and 14 years SEI research.

Robin Yeman
Lockheed Martin

Robin Yeman works for Lockheed Martin in Northern Virginia as a Lockheed Martin Fellow, Certified Enterprise Coach, and an Agile Champion. She has over 20 years of experience in software and IT, across multiple business areas building everything from Satellites to Submarines. She has been actively supporting and leading Agile programs at Scale both domestically and internationally for the last 13 years with multiple certifications including SPC, CSM, CSP, PSM, PMP, PMI-ACP, INCOSE CSEP, and ITIL Practitioner. Robin has been actively driving DevOps into Lockheed Programs for the last 3 years and recently collaborated across all lines of business to develop an integrated delivery pipeline toolset known as Sparta to give new programs a jumpstart. She actively coaches and trains teams through in person coaching, Agile workshops and virtual training classes. She leads the Lockheed Martin's Agile Community of Practice and Center of Excellence and speaks at multiple conference engagements each year. Robin received her Master's Degree in Software Engineering from Rensselaer Polytechnic Institute.



NGA
NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

Approved for public release, 19-949

