

Final Program

(Revised 23 October 2017)

AlaSim International 2017

Organized by [The Alabama Modeling and Simulation Council](#)

October 25, 2017, Huntsville, Alabama, USA
Holiday Inn Research Park
5903 University Dr, Huntsville, Alabama 35806, USA

Invited Keynote Speaker: Mr. Tom Barnett
Cyber Technology Principal Investigator
[U.S. Army Aviation and Missile Research,](#)
[Development, and Engineering Center](#)
Missile Science and Technology Program

Invited Luncheon Speaker: Dr. John Thomas Giannini, Jr.
Director, Simulation Laboratory
[Alabama College of Osteopathic Medicine](#)

Conference General Chairman: Joseph S. Gauthier
[Raytheon](#)

CONFERENCE PROGRAM

A final conference proceedings DVD will be produced and sold after the conference, based on information presented at the conference.

CONFERENCE REGISTRATION

Conference pre-registration is conducted through the AlaSim International web site at <http://www.almsc.org/alasim-international.shtml>. Select the Registration link. Pre-registration closes on October 14, 2017. After that, registration is at the on-site rate, at the Holiday Inn Research Park from 8:00am to 3:00pm on October 25, 2017.

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CONFERENCE COMMITTEE

The [Alabama Modeling and Simulation Council \(AMSC\)](#) wishes to thank and acknowledge the following individuals and their respective organizations for their contributions to the success of this conference:

Paul Agarwal, COLSA Corporation
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CERTIFIED MODELING AND SIMULATION PROFESSIONAL RECERTIFICATION UNITS

This conference qualifies for Recertification Units (RU's) for the Certified Modeling and Simulation Professional (CMSP) as administered by the Modeling and Simulation Professional Certification Commission (MSPCC – www.SimProfessional.org).

***Cyber Modeling and Simulation:
Bridging the Gap between Cyber Effects and Mission Impact***

Keynote Speaker: Mr. Tom Barnett

Cyber Technology Principal Investigator

[U.S. Army Aviation and Missile Research,](#)

[Development, and Engineering Center](#)

Missile Science and Technology Program

Wednesday, October 25, 2017, 8:30a.m.

Madison Avenue

Cybersecurity is one of the newest and fastest growing technical fields. So why can't anyone tell you definitively what it is or, for that matter, how to measure it? Without a common understanding of what it is and where it fits, how does the M&S practitioner model it? This presentation will explore how to represent cyber as part of a larger system context in order to address the most fundamental question about a cyber attack... "So what?"

Thomas C. (Tom) Barnett is a Cyber Technology Principal Investigator and subject matter expert for the AMRDEC Missile Science and Technology (S&T) Program. In this role, he is utilizing his extensive weapon system knowledge to develop innovative technologies and processes to secure Army systems from the threat of cyber compromise, and to ensure trigger pull confidence and resiliency in a contested cyber environment. He is also a primary member of the RDECOM Cyber Community of Practice (CCoP) and is a member of the Team Redstone Executive Steering Group (ESG) Cyber Working Group.

Mr. Barnett was the recipient of the Cyber Huntsville Excellence in Cyber Management Award at the 2017 National Cyber Summit. He was also a finalist for the Association of the United States Army (AUSA) Redstone-Huntsville Chapter's Department of the Army Civilian of the Year Award in 2016.

Over the last two years Mr. Barnett served as AMRDEC's first Cyber Technology Area Lead (TAL) where he established the Cyber Technology Area within the overall Missile Science and Technology (S&T) Program. As the AMRDEC Cyber TAL, he was responsible for integrating all aspects of technologies related to hardware and software cyber security and supply chain risk management (SCRM) into a cohesive program designed to weave cyber security into the DNA of Army weapon systems. Mr. Barnett has collaborated with industry, academia, other Army RD&E Laboratories, FFRDC/UARC/National Labs, other DoD services and PEOs, DARPA, military academies, and even the Energy and Biotech industries to build a solid foundation for his scientific and engineering efforts.

During this period, Mr. Barnett also performed the duties of the System Engineering and Integration (SE&I) Lead and Program Manager for AMRDEC-led Cyber Programs for the Program Executive Office for Missiles and Space (PEO MS). By working closely with current programs of record, the office of the Army Acquisition Executive, the TRADOC Centers of Excellence, OSD T&E, and the intelligence community, Mr. Barnett is working to re-engineer weapon systems for cyber resilience without sacrificing mission effectiveness.

Mr. Barnett has 30 years of systems engineering experience in the areas of cybersecurity, system of systems hardware in the loop (HWIL), all-digital constructive simulations, radar and infrared sensors, integrated air and missile defense and short-range air defense. He has a Bachelor of Science in Electrical Engineering from Christian Brothers College in Memphis, Tennessee.

Medical Simulation: Building Critical Thinking Skills
Invited Luncheon Speaker: Dr. John Thomas Giannini, Jr.
Director, Simulation Laboratory
[Alabama College of Osteopathic Medicine](#)
Wednesday, October 25, 2017, 12:00p.m.
5th Avenue

This presentation will describe the simulation experience for first and second year medical students at the Alabama College of Osteopathic Medicine (ACOM) leading to the successful medical simulation competition at the national and international level. The preparation and each process of the simulation experience will be described. This educational process enhances clinical skills, critical reasoning, assimilation of information, generating a differential diagnosis, and potential treatment, all of which prepare the students for the clinical years.

John (Buz) Giannini, M.D., is Director of the Simulation Center and Associate Professor of Internal Medicine at the Alabama College of Osteopathic Medicine in Dothan, Alabama. Dr. “G”, referred to by patients, students and faculty, has been with ACOM for 3 years. As Director of the Simulation Center, he assumes the key role of case development and implementation of encounters and its integration into the curriculum. Dr. G teaches and supervises clinical skills sessions as part of pre-clinical training such as blood drawing, IV insertion, lumbar puncture, ultrasound, suturing, cast & splinting, with an assortment of task trainers. In addition, he gives lectures on Internal Medicine topics such as Cardiology, Pulmonary, Renal, GI and Musculoskeletal topics along with teaching the clinical skills of taking a history and physical exam.

Dr. G played a key role in the development and design of a new, free-standing, 4 bay state-of-the-art simulation center which opened in March of 2017. This new Center of Excellence now provides a simulation experience for every student, each week. With Dr. G’s leadership over the last 3 years, the simulation center has grown to conduct its own in-house simulation competition consisting of teams of 4 students performing in a high-risk medical environment. The winning teams have gone on to successfully compete at both the national and international levels of competition.

Dr. G received his MD from the University of Louisville, Louisville, Kentucky. He completed 3 years post-graduate training in General/Trauma Surgery at Shands Jacksonville in Jacksonville, Florida. This was followed by a 3 year Internal Medicine Residency at the same institution. He then completed a post-residency year acting as Chief Resident with administrative and teaching responsibilities. Prior to medical school, Dr. G completed a Physician Assistant (PA) program at Duke University and practiced as a surgical PA for 3 years, initially fueled by being a hospital corpsman in the Navy for 4 years.

11:00 to 12:00

**TUTORIAL: BIOSAFETY AWARENESS: WHY IT MATTERS
AND WHAT YOU NEED TO PROTECT YOUR STAFF**

*Andres Viles, Lisa McCormick, Dawn Taylor Peterson, Elena Kidd, Joseph Castongia, Marjorie Lee White
University of Alabama at Birmingham*

The purpose of this course is to bring awareness of the need for continued vigilance of emerging and re-emerging infectious diseases and the consequences of failing to do so. This presentation will highlight key elements used in the University of Alabama at Birmingham (UAB) Office of Interprofessional Simulation for Innovative Clinical Practice's biosafety and infectious disease response awareness and operations level training. Various infectious disease resources will be introduced and demonstrations of the recommended process for donning and doffing Personal Protective Equipment (PPE) for a suspected Ebola Virus Disease (EVD) patient will be provided. Other resources will be made available to participants including rubrics and checklists used in evaluating donning/doffing procedures and the donning/doffing observer. After the demonstration, participants will be encouraged to ask questions and review the PPE kits used in the demonstration. Additional kits will be available for viewing.

The intended audience for this training includes those working in direct and in-direct patient care roles in the healthcare environment, infection control managers at hospitals and health care facilities, as well as those responsible for education and training staff at their institution.

1:30 to 3:00

**WORKSHOP: UNDERSTANDING CHALLENGES AND SOLUTIONS FOR THE DEVELOPMENT OF
MODELING & SIMULATION SOFTWARE IN DEFENSE AND MEDICINE**

Jeffrey C. Carver, Nasir U. Eisty, University of Alabama

The increasing use of modeling and simulation software in defense and medicine and the increasing importance that software plays in solving critical problems motivates the need to identify and understand software development challenges related to its development. Because of the variety and complexity of the underlying domains, existing software engineering tools and techniques, developed initially for the business/IT community, may not be efficient or effective. The goal of this workshop is to assemble members of the modeling and simulation community working on defense and medical applications to discuss issues related to software development. Specifically, participants will identify challenges faced by developers of this software and solutions that developers have tried to address those challenges.

3:30 to 5:00

**TUTORIAL: CATAPULTING THROUGH SIMULATION UNCERTAINTY
WITH MODEL CALIBRATION AND VALIDATION**

Mark Andrews, SmartUQ LLC

As simulation models increase in complexity, the importance of understanding the uncertainty in both the simulations and physical experiments goes up significantly. However, using model calibration and validation, it is possible to quantify how close simulations are to reality. Building on the overview presented at an earlier session, this tutorial will use a live case study of a catapult to sequentially walk through the processes used to quantify uncertainties for simulations and physical experiments using model calibration and validation.

The session will start with the development of two designs of experiments (DOEs); one for the simulation model and other for the physical test. The simulation model will then be used to run its DOE prescribed points and the results of those used to develop a surrogate model. The surrogate model will be used to perform parameter sensitivity analysis and determine the projectile distance uncertainty of the surrogate model. For the physical testing, members of the audience will use the physical DOE and collect data live by catapulting foam balls and measuring the distance covered. Finally, the projectile model will be calibrated and validated with the physical data.

The audience for this briefing would be engineers and managers involved in or overseeing simulation design and analyses and experimental analyses. Attendees should leave with an understanding of how to apply statistical calibration to their combined simulation and testing environment and to be able to understand the fundamental value that statistical calibration brings.

THE GROWING COMPLEXITY OF CYBERSECURITY

Session Chair: Peter Kiss, Sentar, Incorporated

9:30: Defending Space and Missile Defense Command Simulation Center Borders-

Lisa Vann, Space and Missile Defense Command

Matthew Robbins, DigiFlight

Kim Holl, Sentar, Incorporated

10:00: Integrating Software Assurance into the Simulation System Development Environment

Dale Brown, Sentar, Incorporated

11:00: Cyber and Electronic Warfare “The Future is Now”

Bryant D. Glando, Athena Technology Group, Inc.

CYBERSPACE AND SECURITY

Session Chair: Dietmar Moeller, TU Clausthal

11:30: Cybersecurity Issues in the Automotive Industry

Dietmar P. F. Moeller, Clausthal University of Technology

Roland E. Haas, QSO Technologies

Bernard Schroer, University of Alabama in Huntsville

1:30: Modeling Cyberattacks with Petri Nets: Research Program Overview and Status Report

Mikel D. Petty, Tymaine S. Whitaker, John A. Bland, University of Alabama in Huntsville

Katia P. Mayfield, Athens State University

2:00: An Overview of Modeling Cyberattacks with Petri Nets

Katia P. Mayfield, Athens State University

Mikel D. Petty, Tymaine S. Whitaker, John A. Bland, University of Alabama in Huntsville

2:30: Modeling Cyberattack Patterns in Fault Trees

Tymaine S. Whitaker, John A. Bland, University of Alabama in Huntsville

Katia P. Mayfield, Athens State University

Mikel D. Petty, University of Alabama in Huntsville

3:00: BREAK

3:30: Validating Petri Net Models of Common Attack Pattern Enumeration and Classification

John A. Bland, University of Alabama in Huntsville

Katia P. Mayfield, Athens State University

Mikel D. Petty, Tymaine S. Whitaker, University of Alabama in Huntsville

MARITIME CONTAINER SHIPPING

Session Chair: Ralph Weber, Alabama Modeling and Simulation Council

4:00 Maritime Vessel Dynamics Modeling

Dillon Malone, Jamie Burns, Torch Technologies Inc.

HIGH PERFORMANCE COMPUTING

Session Chair: Ralph Weber, Alabama Modeling and Simulation Council

4:30: Beyond the Browser: Can Web Technologies Play Viable Roles in Edge-Computing?

Blake J. Anderton, Sarah B. Graham, Penny J. Hauke, Kiel M. Pease, Raytheon

AVIATION, MISSILES AND SPACE

Session Chair: Harold “Hal” Aycock, U.S. Army Aviation and Missile Research, Development, and Engineering Center

9:30: Aviation System of System Analysis Toolkit

John V. Smith, Julian C. Olander, US Army Aviation and Missile Research, Development, and Engineering Center

SCENE GENERATION

Session Chair: Harold “Hal” Aycock, U.S. Army Aviation and Missile Research, Development, and Engineering Center

10:00: Dynamic Thermal Material Property Modeling Based on Weather Conditions and Terrain Composition

Paul Etheredge, Matthew Rigney, U.S. Army Aviation and Missile Research, Development, and Engineering Center
Jamie Burns, Bradley Seal, Maisey Morgan, Torch Technologies

TRAINING

Session Chair: Harold “Hal” Aycock, U.S. Army Aviation and Missile Research, Development, and Engineering Center

11:00: Transition of Military Unmanned Air Systems Training and Simulation to the Commercial Drone Community

Tony Dickson, UG Wilson, Aegis Technologies Group

ELECTRONICS

Session Chair: Harold “Hal” Aycock, U.S. Army Aviation and Missile Research, Development, and Engineering Center

11:30: The Development of a Single-Phase Inverter for Photovoltaic Systems

Insu Kim, Shanquila Carter, Asiana McKinney, Keonte Williams, Alabama A&M University

SIMULATION IN EDUCATION

Session Chair: Mark Andrews, SmartUQ LLC

1:30: Simulation of Two Novel Defected Ground Structures with Sonnet Suite Software

Shujun Yang, Alabama A&M University

TEST AND EVALUATION

Session Chair: Ralph Weber, Alabama Modeling and Simulation Council

2:00: Simulation Slowdowns: Three Common Problems and How to Overcome Them with Statistical Methods

Mark Andrews, SmartUQ LLC

VERIFICATION, VALIDATION AND ACCREDITATION

Session Chair: Alleen Bray, Aegis Technologies Group

2:30: Quantifying the Uncertainty in Simulation Models with Statistical Calibration and Validation

Mark Andrews, SmartUQ LLC

3:00: BREAK

MEDICAL MODELING AND SIMULATION

Session Chair: Charles Prince, University of Alabama at Birmingham

3:30: Modeling and Simulation for Education and Training in Medicine

Dietmar P. F. Moeller, Clausthal University of Technology

Hamid Vakilzadian, University of Nebraska-Lincoln

Bernard Schroer, University of Alabama in Huntsville

4:00: Integration of Telepresence Technology into Simulation Training Scenarios: The Next Step in a Successful Simulation Based Experience for Training Nursing Students

Lori Lioce, University of Alabama in Huntsville

Dietmar P.F. Moeller, Clausthal University of Technology

Bernard J. Schroer, University of Alabama in Huntsville

Sidney E. Gunter, Huntsville High School

4:30: A Comprehensive System for Mass Casualty Education, Training, Triage, Telemetry, and Tracking

Jeremy White, Fred Rawlins, Harold “Skip” Garner, Darlene Myles, Joseph Bauer, Bruno Moraes

Edward Via College of Osteopathic Medicine

HUMAN BEHAVIORAL MODELING

Session Chair: Joseph Gauthier, Raytheon

10:00: Towards a Feasibility Study to Identify Key Factors in Public Perception of Boko Haram Activities in Nigeria

Fortune Mhlanga, Lipscomb University

E.L. Perry, Faulkner University

Elizabeth K. Noonan, University of Mississippi

W. Alan Cantrell, Kyle Killian, Lipscomb University

Ifeyinwa Ajah, Emeka Agwu, Joseph Igwe, Ebonyi State University

Robert Kirchner

TUTORIAL

11:00: Biosafety Awareness: Why It Matters and What You Need To Protect Your Staff

Andres Viles, Lisa McCormick, Dawn Taylor Peterson, Elena Kidd, Joseph Castongia, Marjorie Lee White

University of Alabama at Birmingham

WORKSHOP

1:30: Understanding Challenges and Solutions for the Development of Modeling & Simulation Software in Defense and Medicine

Jeffrey C. Carver, Nasir U. Eisty, University of Alabama

3:00: BREAK

TUTORIAL

3:30: Catapulting Through Simulation Uncertainty with Model Calibration and Validation

Mark Andrews, SmartUQ LLC