THE WINTER SIMULATION CONFERENCE: MODERN PERIOD (2008–2017)

Christos Alexopoulos

H. Milton Stewart School of Industrial
and Systems Engineering
Georgia Institute of Technology
765 Ferst Drive NW
Atlanta, GA 30332–0205, USA

Jeffrey A. Joines

Department of Textile Engineering, Chemistry
and Science
North Carolina State University
1000 Main Campus Drive
Raleigh, NC 27695, USA

Michael E. Kuhl

Industrial & Systems Engineering Department
Rochester Institute of Technology
81 Lomb Memorial Drive
Rochester, NY 14623-5603, USA

ABSTRACT

In this paper we review the history of the Winter Simulation Conference (WSC) during 2008–2017, a period characterized by financial stability, continued growth, and inroads into the new age of simulation. In particular, we trace the modernization of the Conference as well as its expansion outside of the United States for the first time.

1   INTRODUCTION

This paper provides an historical overview of the Winter Simulation Conference (WSC) during the period 2008–2017, which we are calling the "modern period." It does so from three main perspectives: the program, technological advancements, and the administration of the Conference. This period was characterized by international growth, financial consolidation, and technological innovations. The Conference Program also matured and expanded. Technological advancements literally changed the way the Conference operates with regard to paper and program management, publications, publicity, and engaging conference participants. Behind the scenes, the Conference experienced significant changes in its governance structure and financial arrangements with the Sponsoring Societies, in particular the four Financial Sponsors. The latter changes improved short-term financing of each conference and long-term risk management for WSC. Fostered by novel collaborations, the WSC Board of Directors (BoD) decided to select an international venue for WSC 2012 for the first time in Conference's history.

The rest of the paper is organized as follows. Section 2 covers the development of the WSC Program over the ten years that reflect the themes that span this period. In Section 3, we discuss technological advancements including the change of the Paper Management system and the development of the mobile App. Section 4 contains the major developments in the WSC administration over this time frame, while Section 5 contains concluding remarks.

2   DEVELOPMENTS IN THE WSC PROGRAM

Barton, Joines, and Morrice (2017) documented a strong growth of the Conference in terms of papers, tracks, mini-tracks, etc. over the period 1993–2007. During the next ten years, WSC did not expand

significantly in terms of size, but did not experience the financial pitfalls of 2002. Figure 1 displays the number of total papers and the attendance of WSC over this modern period. During the previous period of 1993–2007 the number of papers rose by almost 50% from just about 200 to near 300, the number of concurrent sessions increased from 10 to 17, while attendance jumped to the upper 600s. During the modern area, hotel space limitations kept the number of concurrent sessions basically the same (from 16 to 18) while the number of papers rose about 15% to an average of 340.

Table 1 lists the WSC locations and themes from 2008 through 2020. WSC plans five years out as the General Chair (GC) for 2021 has been selected but the location will be determined during the meeting of the BoD in the Summer of 2017, along with the GC of the 2022 Conference. Clearly, the modern area represented a new direction for WSC in terms of unique locations with only a few previous locations (Phoenix, AZ and Washington, DC area) being revisited. It should be pointed that WSC has always returned every third year back to the Washington, DC area because of the large government and military presence. As we discuss later, this pattern may be broken due to the prohibitive hotel and food and beverage costs in the area surrounding the U.S. capital city. The themes also reflect the changing state of technology and the world with many dealing with big data, social behavior, and focus on the environment.
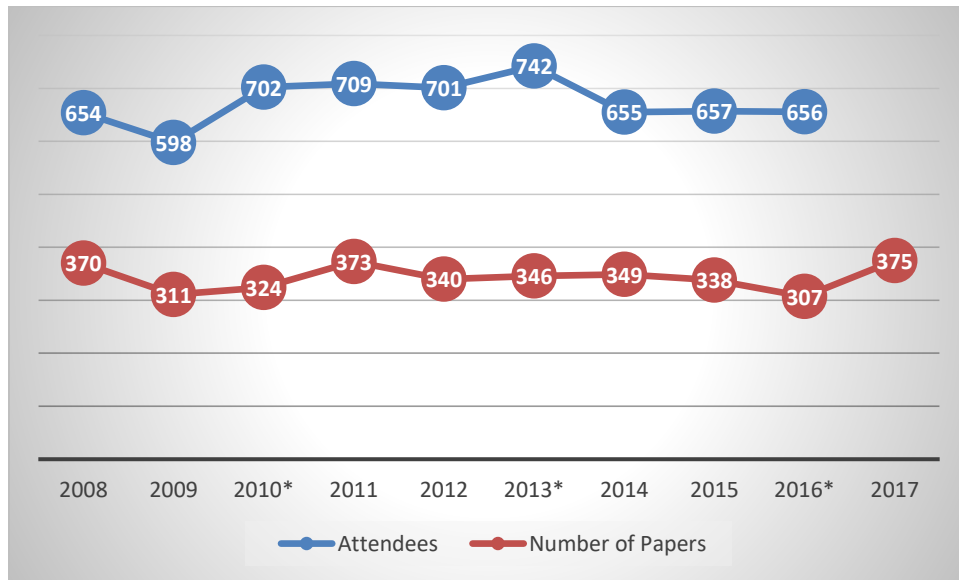

Figure 1: Number of Papers and Attendance from 2008 to 2017 (the Figure for WSC 2017 is a Preliminary Estimate); Asterisks Indicate that WSC was Held in the Washington, DC Area.

Table 1: Conference Themes and Venues

WSC	Location	Conference Theme
2008	Miami, FL	Global Gateway to Discovery
2009	Austin, TX	Energy Alternatives
2010	Baltimore, MD	Integration and collaboration
2011	Phoenix, AZ	Simulation for a Sustainable World.
2012	Berlin, Germany	WSC Goes Europe!
2013	Washington, DC	Simulation: Making Decisions in a Complex World
2014	Savannah, GA	Exploring Big Data through Simulation
2015	Huntington Beach, CA	Social and Behavioral Simulation
2016	Arlington, VA	Simulating Complex Service Systems
2017	Las Vegas, NV	WSC Turns 50: Simulation Everywhere!
2018	Gothenburg, Sweden	Simulation for a Noble Cause
2019	National Harbor, MD	Simulation for Risk Management
2020	Orlando, FL	N/A

Table 2 highlights program changes during the modern period, with rows corresponding to features, tracks or mini-tracks and columns for each year. An 'x' indicates that the theme was present in that year. The General and Program Chairs develop the theme of their conference. Often the theme is based on the areas of interest of these two individuals; naturally, these interests will lead to mini-tracks that align with the theme of the Conference. In some situations, the location of the Conference may lead to mini-tracks aimed at drawing local attendees. Unfortunately, many of these mini-tracks were "one-hit wonders" and did not permeate into future Conferences. For example, in 2012, many of the mini-tracks were not carried on for a variety of reasons and the Petri Net track was designed to celebrated the 50th anniversary of Petri Nets. In another instance, the Big Data and Decision Making mini-tracks were related to the theme of WSC 2014, but they only lasted a couple of years. These mini-tracks are often small (e.g., two to five sessions). So when they drop to the lower end, Program Chairs (PCs) typically fold them under another track. In the 1990s, a track consisted of about 27 papers that would make up nine three-paper sessions. The track was assigned to a particular room for scheduling purposes. The idea behind the creation of the mini-tracks was an attempt to market WSC to a wider audience by appealing to a niche (e.g., simulation optimization). Some tracks including the Modeling Methodology, Analysis Methodology, Case Studies, and Vendor tracks are often large and involve 18 sessions, with two sessions running concurrently. It was necessary to take some liberty in identifying the row labels, particularly for the non-traditional categories that appear in the lower portion of the table. In a few cases, an 'x' indicates at least two sessions, without formal recognition as a mini-track. A single session on a topic often occurred in a year preceding the first 'x' in the table. Table 2 shows both innovation, as well as periods of consolidation, when the Conference refocused on its traditional core set of tracks.

Table 2: WSC Program Features During 2008–2017

Track/MiniTrack	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Advanced Tutorials	x	x	x	x	x	x	x	x	x	x
Introductory Tutorials	x	x	x	x	x	x	x	x	x	x
Vendor Tracks	x	x	x	x	x	x	x	x	x	x
Titan Talks	x	x	x	x	x	x	x	x	x	x
MASM	x	x	x	x	x	x	x	x	x	x
Poster Session (Madness, Briefings)	x	x	x	x	Mad	Mad	Brief	Brief	Brief	Brief
Health Care	x	x	x	x	x	x	x	x	x	x
Manufacturing Applications, New Modeling in Manufacturing Systems (NMMS)	x	x	x	x	NMMS	x	x	x	x	x
Logistics, Transportation and Distribution (LTD), Logistics and Supply Chain Management (LS), Logistics, Supply Chain and Transportation (LST), Logistics and Production (LP)	LTD	LTD	LS	LS	LP	LST	LST	LST	LST	LST
Modeling Methodology	x	x	x	x	x	x	x	x	x	x
Agent-Based Simulation				x		x	x	x	x	x
Analysis Methodology	x	x	x	x	x	x	x	x	x	x
Simulation Optimization			x			x	x	x	x	x
Quality, Statistics, Reliability				x						
Risk Analysis	x	x	x							
Construction Engineering and Project Management, Applications of Construction (AC), Construction and Arhicture (CA)	x	x	x	x	AC	x	x	X	x	CA
Project Management					x					x
Case Studies	x	x	x	x		x	x	x	x	x
Simulation Education	x	x	x	x		x	x	x	1s	1s
Military Applications	x	x	x	x	x	x	x			
Homeland Security	x		x							
Homeland Security and Emergency Response		x		x		x	x			
Homeland Security and Military Applications				x						
Military, Homeland Security, & Emergency Response								x	x	x
Business Process Modeling	x	x		x			x	x		
Environmental and Sutainability Applications				x	x	x	x	x	x	x
Scheduling Applications			x			x				
Simulation Around the World	x									
Simulation Interoperability	x	x								
Networks (and Connectivity (NC))			x	x	x	NC	NC	NC	NC	
Social Science and Organization Applications, Social and Behavioral Simulation (SBS)					x	x		SBS	SBS	SBS
Embedded Simulation					x					
Petri nets, simulation and Applications					x					
Simulation Methods and Tools					x					
Performance Issues of Simulation Software					x					
General Applications (G), Scientific Applications (S), General & Scientific (GS)	x	x				x	S	GS	GS	
Railroad Applications				x						
Hybrid Simulation						x	x	x	x	x
Simulation of Decision Making, Big Data and Decision Making (BDDM)						x	BDDM	BDDM		
Serious Games and Simulation							x	x		x
Cross-Fertilization									x	
Aviation Modeling and Analysis										x
Future of Simulation										x
History of Simulation		1s						1s		x
Modeling and Simulation of Intelligent, Adaptive and Autonomous Systems										x

2.1   2008: MASM Integration

In the mid to late 2000s the WSC BoD attempted to appeal to a wider audience in order to increase participation from both industrial and academic sectors.   MASM (Modeling and Analysis for Semiconductor Manufacturing) is the leading modeling and analysis conference for global semiconductor manufacturing and supply chain operations. John Fowler, Program Chair for WSC 2008 made a formal proposal to have MASM as part of WSC. The goal was to give WSC participants access to MASM applications while offering to MASM participants access to a wider range of simulation topics, tutorials, and applications. As a result, WSC 2008 incorporated, for the first time, the MASM 4th Conference as a self-contained conference inside of WSC. It should be mentioned that MASM covers a much wider range of techniques and approaches than simulation (e.g., discrete optimization, queueing theory, process control, and data analysis). MASM has been fully integrated into conference since 2008 and will be having the 13th MASM as part of WSC 2017. The partnership has been great as MASM is two full tracks (i.e., 18 sessions) with a Keynote address similar to the military applications.

2.2   2009-2011: Exploration in the U.S.A.

Ann Dunkin (GC) brought WSC 2009 to Texas for the first time. The Program Chair, Ricki Ingalls, put all the tracks into three super categories: Education, Methodology, and Applications. For example, the Advanced and Introductory tutorials, the Vendor track, a new Training track, and Simulation Education fell under the Education category. Owing to the theme, Ricki added a track on Energy and Material Stream Simulation. The most profound change was the switch to a single-column format for the Conference Proceedings in an attempt to improve online readability (it took four years of no printed proceedings to reach this milestone). Ann and Ricki's most memorable contribution to WSC was the introduction of the WSC Best Paper awards, one for a research/theoretical paper and one for an applied paper. Joe Hugan, the General Chair of WSC 2010 along with Enver Yücesan (PC) brought a new rendition on the DC site by having WSC in Baltimore, MD. WSC 2010 also marked the introduction of a new Paper Management system, which will be discussed in Section 3.3. In November of 2009, Gerald Mackulak abruptly retired from academia and resigned from the General Chairmanship of WSC 2011. To fill this void, Preston White stepped down from the BoD and undertook the leadership role of WSC 2011. The 2011 Conference will be partially remembered for the heavy rainfall in the Phoenix, AZ area that lasted approximately three days. Given the theme of WSC 2011 "Simulation in a Sustainable World," Michael Fu (PC) introduced the mini-tracks Environment and Sustainability Applications which have retained their viability. Also, the WSC golf tournament returned and was won by the team of Jeffrey Joines, Steve Roberts, and friends.

2.3   2012: WSC Going Abroad

Even though WSC is the premier international conference on simulation, since its inception it was always held in the U.S.A. until 2011. The possibility of holding the Conference abroad had intensified in the first decade of the 21st century. The typical mix of participants in WSC had been 60−65% from the U.S.A. and 35−50% outside the U.S.A. A group of German academicians led by Drs. Markus Rabe, Oliver Rose, and Adelinde Uhrmacher worked very hard to bring forward a very attractive proposal for holding the 2012 Conference in the German capital of Berlin. The BoD approved the proposal during the December 2007 meeting in part due to the large simulation community in Germany. The scheduling of the first international WSC meeting encountered a plethora of challenges ranging from lower participation from the U.S.A. to taxation issues. To increase participation from Europe, the German simulation society Arbeitsgemeinschaft Simulation (ASIM) agreed to host its conference jointly with WSC, Berlin, thus ensuring strong attendance from ASIM members (ASIM 2017). The meeting was housed at the InterContinental Berlin hotel and was an unprecedented success due to the tireless efforts of the organizing committee, with an attendance of 701 where the mix of participants flipped to about 65% from outside of U.S.A. Because of the success and the

tremendous European simulation community, ASIM became a technical co-sponsor to further strengthen the relationship (WSC Archive/Info 2017).

   The tremendous success of the 2012 Conference, encouraged the BoD to consider other non-U.S. sites for future meetings. During the executive session of the December 2012 meeting of the BoD, Gothenburg, Sweden was chosen as an exploratory site for the 2018 WSC. The site was approved in 2013, and the Conference will be housed at the The Swedish Exhibition & Congress Center on December 9–12, 2018. Again, ASIM pledged its support and Oliver Rose was given permission to be the Business Chair despite his membership on the BoD—his experience in this role for WSC 2012 will serve as a shield for financial pitfalls. As this article is written, the BoD is considering proposals from groups from outside the U.S.A. for the 2022 Conference. Many members of the BoD believed a rotation of every four years outside of the U.S.A. followed by a return to the DC area would be a great direction for WSC.

   One of Adelinde (Lin) Uhrmacher (PC) most impactful changes in WSC 2012 was the introduction of a more rigorous peer review process, aiming at improving the overall quality of the papers in future WSCs, as well as the introduction of several new mini-tracks (e.g., Embedded Simulations, Petri Nets, Simulation Methods and Tools, and Performance Issues of Simulation Software; see Table 2 for details). Unfortunately, these mini-tracks did not survive or were absorbed into more traditional tracks such as Modeling and Analysis Methodologies. One of the most unique features Lin introduced was the Poster Madness along with longer abstracts (i.e., two pages) which has lasted through WSC 2017. To elevate the Poster sessions of the conference and make them more interesting for presenters and the audience, Poster Madness allowed each poster presenter to give a two-minute oral presentation before the Poster session started. The excitement of the presenters to give essentially a brief sales pitch of why you should visit their poster was very well received. As can be seen in Table 2, the named changed to "Poster Briefings" for the period 2015–2017.

2.4   2013-2014: Return from Europe

One of the concerns associated with WSC 2012 was the loss of U.S. participants. In an effort to ensure strong attendance, the next WSC was in Washington, DC. The 2013 Conference was a great success due to the efforts of the Conference Committee, with 742 participants, as seen from Figure 1. Ray Hill (GC) and Michael Kuhl (PC) introduced two very successful mini-tracks that have survived, "Hybrid Simulation" and "Simulation and Decision Making," whose names matched the Conference theme. Staying with the discovery of new locations, Steve Buckley (GC) selected Savannah, GA for WSC 2014 with the hotel right on the Savannah River. Based on the theme of "Big Data,", John Miller (PC) morphed the previous mini-track into "Big Data and Decision Making" along with the introducing of the new mini-track "Serious Games and Simulation." WSC 2014 also witnessed the introduction of the WSC mobile App (for details, see Section 3.4). The WSC golf tournament was held at the hotel's golf course and was won by the team of Jeff Joines, Steve Roberts, Jeff Smith, and Leon McGinnis.

2.5   2015-2017: Retaining Momentum during Changing Times

The next three years marked a dramatic change in the military presence at WSC. The military sector had been a large component of WSC, with their own track and Keynote Speaker, and the primary reason WSC returns to the DC area every three years. However, the last five years we have seen a decline, in particular when the U.S. Government placed substantial restrictions to travel. For example, the General Chair for WSC 2013 attended the WSC 2012 BoD meeting in Berlin, but was not able to attend the Conference because that would have been a violation of the travel restrictions. In 2013, during a Federal budget sequestration, the WSC Foundation provided a grant for U.S. military personnel. A perusal of Table 2 reveals the various forms of the "Homeland Security" mini-track that started in 2006 to include Emergency Response as well as military applications. During the latest three-year period, the "Military Applications" track has been completely combined with "Military, Homeland Security and Emergency Response."

In the final two years leading up to the 50th anniversary WSC stayed with the course of choosing new locations. Charles Macal (GC) and Manuel Rossetti (PC) selected Huntington Beach, CA for WSC 2015, and their theme "Social and Behavioral Simulation" illustrates an increasing awareness of the explosion in simulations that incorporate models of behavioral and social decision making. The return to the Washington, DC area in 2016, as part of the normal rotation in 2016, did not result in the usual attendance "bump". In fact, the attendance of the Conference has been flat for the past three years (near 650). However, Todd Huschka (GC of 2016) and Stephen Chick (PC) had a great program and reintroduced the "Cross-Fertilization" track from WSC 2007 with the help of Russell Barton to help spawn discussions across areas not currently at WSC. World-renowned scientists Oliver Gusche from the Fermi National Accelerator Laboratory and Edward Kaplan form Yale University gave Keynote addresses regarding large data simulation of particle collisions and the design of HIV epidemic control strategies through simulation, respectively. The WSC Foundation generously provided a travel grant for these two prominent presenters.

Ernie Page (GC of WSC 2017) was one of the ACM representatives on the WSC BoD for eight years (2004–2012) and always wanted WSC to visit Las Vegas. For over 25 years, people feared that Las Vegas would prevent companies and academics from attending WSC. Once he was appointed as General Chair for the 50th Anniversary of WSC in the 2017, the venue location was already set (Vegas Baby!). Gabriel Wainer (PC) has introduced some new mini-tracks (i.e., Aviation Modeling and Analysis, Modeling and Simulation of Intelligent, Adaptive and Autonomous Systems, and the History and Future of Simulation).

3 TECHNOLOGICAL ADVANCEMENTS

Being the preeminent computer simulation conference, WSC also paved the way for many other conferences and organizations in using the world wide web to access and manage the conference and its content. In many cases, the WSC volunteers created the opportunities through their dedicated service.

3.1 The Conference Web Site

The WSC web site www.wintersim.org was developed and maintained by Peter Welch and Josephine (Winky) van der Hoeven, both retirees from IBM, between 1995 and 2011. The site went through several upgrades during those 17 years, including customized Google Search capabilities. In December of 2011, Jeffrey Smith from Auburn University volunteered to take over the site and maintain it with the help of a student; this activity lasted for two years. In 2012, the maintenance of the site became part of the Conference Management contracts signed with INFORMS for the period of 2014–2019.

3.2 Program Archive

In 2010, WSC started to transition from CDs to USB memory sticks for publishing its Proceedings. Currently only a handful of CDs are created mostly for military and government participants who are not allowed to use USB keys. At this juncture, we would like to point out that the Program Archive at www.informs-sim.org is housed on the web server of the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech and offers an archival access to the WSC Programs since 1968. Subsets of the Programs are also accessible by IEEE Exploris and the ACM Digital Library. In 2010, the WSC Foundation authorized the digitization of all the WSC Programs before 1997, which was the first conference to have a CD proceedings (Barton, Joines, and Morrice, 2017). Figure 2 displays a screen shot of the Program Archive showing links to all past Conferences. Notice that the site includes a Customized Google Search capability, a feature added by Peter Welch and Winky van der Hoeven.

Figure 2: WSC Program Archive from 1968–2016

3.3   Paper Management System

By 2008, the Paper Management System built and maintained by Jeffrey Joines since 2000 was reaching the end of its life; one can say that it was running on steroids. During the December 2007 meeting of the WSC Board of Directors (BoD), a committee was appointed to identify a viable, long term alternative system. The original committee was composed of Christos Alexopoulos (chair), Ricki Ingalls, Jeffrey Joines, Manuel Rossetti, and Andrew Seila. Douglas Morrice joined the committee after the June 2008 meeting of the BoD. During the same meeting, the BoD reviewed the list of specifications and a variety of potential systems, both open-source and commercial. The request for proposals (RFP) was placed in early October 2008. While open-source systems were financially attractive, they exhibited limited capabilities in particular with regard to the ability to yield the XML feed required by OmniPress to convert the final program to a form suitable for the HTML-based product to be stored on a CD or uploaded to the Conference web site in order to maintain the cost savings from the previous system. On the other hand, commercial systems incurred large setup and annual maintenance costs because the vendors wanted to manage the entire conference (i.e., proceedings production and conference management).

Following a recommendation from James Wilson, Christos Alexopoulos contacted John Konkle from Linklings, LLC, who served as Managing Editor for *ACM Transactions on Modeling and Computer Simulation (TOMACS)*. Linklings created a mockup web site and put forward an attractive proposal with low setup and annual maintenance costs. The formal bid was submitted by Linklings on December 3, 2008, and was approved unanimously by the WSC BoD during the executive session of the December 2008 meeting. The setup costs were paid from the current share of the Retained Working Capital belonging to the American Statistical Association (ASA), which transitioned from a Full Sponsor to a Technical Co-sponsor during the same meeting. To smooth the transition, the new system was developed and tested during 2009, in parallel with the existing system with the help of Jeffrey Joines and Enver Yücesan who

was the Program Chair for 2010. The new system at ssl.linklings.net/conferences/wsc has been a cornerstone of WSC since 2010, and has undergone several enhancements, in particular prior to WSC 2012.

3.4   WSC Mobile App

As mobile technology advanced with many people carrying smart phones or other mobile devices, the WSC introduced a mobile application (app) for WSC 2014. The objective of the app is to provide Conference attendees with an interactive tool allowing dynamic access to Conference information including real-time changes and announcements to attendees before, during, and after the Conference.

In his role of Program Chair for WSC 2013, Michael Kuhl proposed the idea of having a mobile app for future WSCs at the December 2013 WSC BoD meeting. He was given approval to proceed with the app on a trial basis for WSC 2014. Omnipress, Inc. was contracted to produce the app (in conjunction with the WSC Proceeding Editors and Program Chair. Graphic artists from INFORMS produced the WSC app logo and "splash" screen graphics for the app. The primary sources of information for the app content included the WSC Paper Management System (by Linklings, LLC), the INFORMS conference management group, and the WSC Program Committee. The app was developed to run on both Apple iOS and Google Android operating systems and was made available through the iTunes App Store and Google Play, respectively. At WSC 2014 in Savannah, GA the debut of the app received very positive feedback from attendees, and has been continued each year, including this Conference.

The content of the WSC app is designed to provide attendees information about the Conference in a live interactive platform, adding another dimension to the information previously available only in static format in the WSC Program and the WSC Proceedings. Screen shots of selected WSC app features are shown in Figures 3 and 4. The main menu in Figure 3 gives access to the app features as follows:

Activity Stream. The Activity Stream (Figure 3) enables app users to establish a user profile in the app that is accessible by other app users. In addition, users can post items such as announcements, pictures, comments, etc. for other app users to view.

People. This feature allow users to exchange messages.

Favorites & Notes. Favorites provides a single location to create lists of items of interest for quick reference. For example, a user can create an personal itinerary of sessions and events. Notes provides a location to write down and save information.

Schedule. The Schedule (Figure 3) is a chronological listing of events and technical sessions for each day of the Conference. The listing of the technical sessions provides the title, authors, abstract, and a link to the WSC conference paper for each talk in the session. The star (*) icon is used to save items into the user's Favorites list/personal itinerary.

Sponsors. The Sponsors screen (Figure 4) lists the Conference Sponsors at various sponsorship levels. The information and web link for each Sponsor are included.

Exhibitors. The Exhibitors screen list all of the vendors and sponsoring organizations that have display booths in the exhibit hall. Vendor information and a website link are also included. Figure 4 gives an example of a vendor listing.

Venue Maps. The Venue Maps feature provides the floor layout and room locations of the technical sessions and events in the WSC venue.

City Maps. The City Maps feature (Figure 4) provides an interactive map to aid users in locating restaurants and other attractions within the vicinity of the WSC venue.

WSC Information. This screen provides information about WSC including a "Welcome to WSC" message from the General Chair, a list of WSC Sponsoring Societies, a list of the WSC Board of Directors, a list of the Conference Committee, a list of future WSCs, a call for papers for WSC for the following year, and information about the WSC Foundation.

About Us. This screen provides general information about WSC and the mobile app.

Twitter. The Twitter feature enables app users to subscribe and tweet messages using Twitter and the hashtag *#wintersim*.
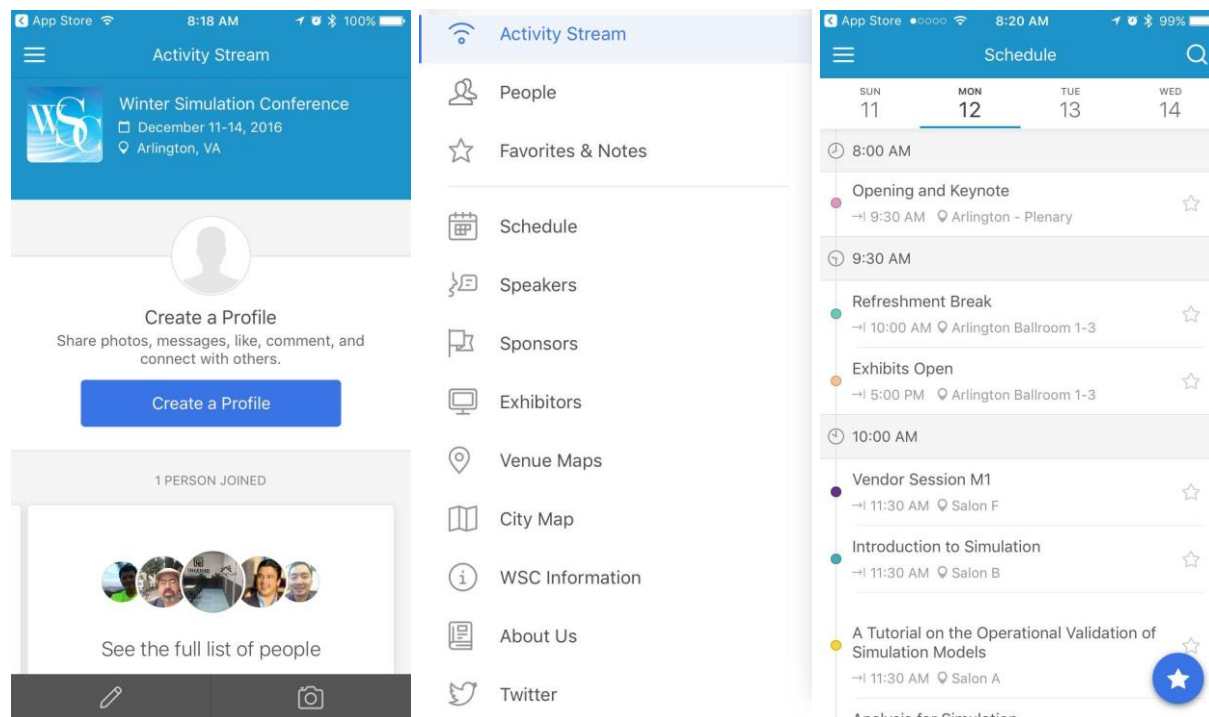
Figure 3: WSC App Activity Stream/Home Screen, App menu, and App Schedule Screen.

Since 2014, the functionality of the WSC app and its use by attendees have continued to expand. Some convenient and useful features of the app include the ability to make/change a personal itinerary prior to arriving at the Conference, the ability to download and view papers on a hand-held device, real-time Conference updates and announcements, and attendee interaction through Activity Stream messaging/pictures and social media (Twitter). As communications technology continues to develop, the WSC app will continue to evolve to provide WSC attendees with information to enhance their experience at the Conference.
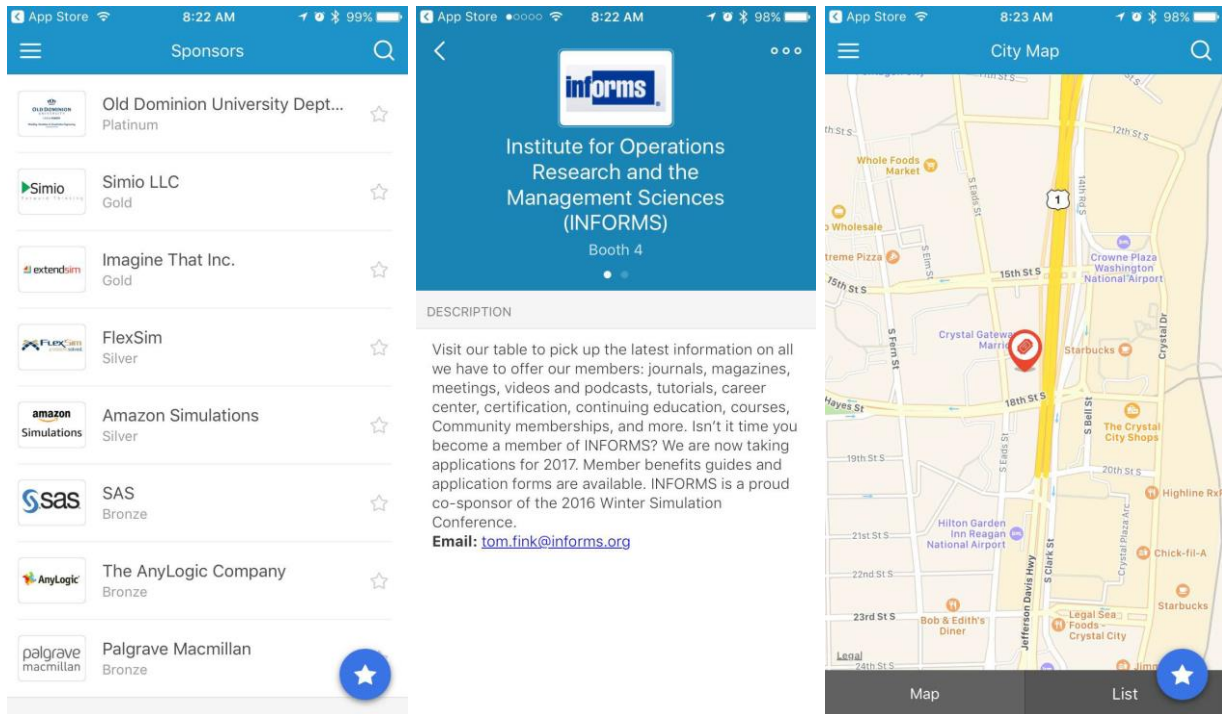
Figure 4: WSC App Sponsors Screen, Example of an App Exhibitor screen, and App City Map Screen.

4 DEVELOPMENTS IN WSC ADMINISTRATION

During this time period, the WSC BoDs made significant changes to safeguard the financial health, longevity, and credibility of the Conference.

4.1 Safeguarding the Attendance of the Conference

The case of authors who submit papers to WSC without intent to attend the Conference has been a longstanding problem. Despite the best efforts of the Conference Committees to ensure that each paper that appears in the *Proceedings* will have its authors attending the Conference, inevitably there "no-shows" each year. The WSC BoD felt strongly that no-shows significantly undermine the Conference: they waste the time and efforts of the Conference Committee, they consume a spot in the program that could be allocated to other papers/authors, and they inconvenience Conference attendees who must deal with undesirable gaps within sessions.

To preserve the quality of the Conference experience and safeguard the credibility of WSC, the BoD worked in 2009 and 2010 to establish a policy anoints no-shows that remains in effect today; the policy is dated January 2011. The policy allows flexibility to the Conference Committee and the BoD on a case-by-case basis, and its skeleton is comprised of the following steps: (a) The liaison from the BoD collects the current list of authors who fail to attend the Conference; these names are added to the current list that spans a period of five years. The list is shared confidentially among the General Chair, the Program Chair and the Proceedings Editors. (b) The BoD uses the following guidelines for penalizing offending authors:

- *One no-show with advance notice (to Conference Committee) and plausible excuse*: These individuals stay on the list, but generally their submission privileges are not suspended.
- *Two no-shows with advance notice and plausible excuse <u>or</u> one no-show without advance notice and/or excuse*: The BoD generally suspends the submission privileges of an individual

for a period of three years, subject to careful considerations for the reason for the previous no-shows.

- *Three or more no-shows with advance notice and plausible excuse <u>or</u> two or more no-shows without advance notice and/or excuse*: These authors are suspended for a period of three years.

After the suspension period of an individual expires, the author can resubmit to WSC with a clean slate.

4.2   Financial Sponsorship, Joint Sponsorship Agreement (JSA), and By-laws

As detailed by Barton, Joines, and Morrice (2017), two (Full) Financial Sponsors of WSC, the ASA and the IEEE Systems, Man, and Cybernetics Society (IEEE/SMCS), chose to transition to Technical Co-sponsors. The entire 2008 year was consumed by intense negotiations between the four remaining (Full) Financial Sponsors and communications between Mark G. Doherty, Executive Director of INFORMS, and the WSC BoD. The transition of the ASA was approved by the WSC BoD during the December 2008 meeting, while the request of the IEEE/SMCS was approved during the December 2009 BoD meeting. Mark Doherty led the discussion on the JSA during the December 2008 meeting of the WSC BoD, and the Agreement was approved by the remaining four Financial Sponsors (referred to as "Parties"), namely INFORMS, ACM, IIE, and SCS soon afterwards. The date on the Agreement is September 24, 2008.

Article 1 of the JSA states

"<u>Financial Responsibilities</u>. Each of the Parties shall have a 1/4 interest in the finances of the Conference. Accordingly, each of the parties will receive1/4 of the net income of the Conference and shall be responsible for 1/4 of the liabilities liabilities and 1/4 of the expenses of the Conference. A separate account of Conference revenues shall be maintained in order to provide for the payment of Conference liabilities and expenses."

while Article 2 stipulates

"<u>Management</u>. The Conference Oversight Board (the 'Board') shall have full authority to manage the business and affairs of the Conference. *Each of the Parties shall appoint one representative to the Board, and each such representative shall have one vote on all matters coming before the Board*. A Party can replace its Board representative at any time by written notice to all other Parties. In addition to the four voting members of the Board, the American Statistical Association, the Institute of Electrical and Electronics Engineers/Systems, Man, and Cybernetics Society and the National Institutes of Standards and Technology shall each be entitled to appoint one non-voting technical representative to the Board. The Board shall be entitled to delegate certain authority over the Conference to volunteers (including the Management Agent), including authority for site selection and content development. Decisions carry a majority vote and are binding on all Parties."

The italicized sentence in Article 2 of the JSA created issues with the existing version of the By-laws because the BoD was composed of one representative of each sponsoring society and two members from the INFORMS Simulation Society (I-Sim), each with1/2 vote. This latter vote split was inherited from the merger of ORSA and TIMS into INFORMS in 1994. The By-laws went through several revisions between 2009 and 2014, with the current version dated January 12, 2014. The following items aim at closing the gap between the JSA and the version of the By-laws in effect since 2004:

Article II, Section 7: "Each *financial* sponsor shall have at most two (2) voting representatives on the Board of Directors. Each technical sponsor shall have one (1) voting representative on the Board. Each voting representative has one (1) vote. Representatives of technical sponsors shall not vote on any matter directly related to the financial aspects of WSC. The Board may invite others to participate in its meetings."

Article II, Section 8: "Each representative serves for a minimum of eight (8) years. Financial sponsors should appoint their representatives in a staggered fashion, i.e., the older representative should be replaced in the middle of the younger representative's term. This

strategy aims at representatives becoming officers of the Board during their last three years of service."

Article IV, Section 1: "… Starting with year 2016, only representatives of financial sponsors are eligible to become officers."

Soon after the JSA took effect, the remaining three Financial Sponsors, added a second representative on the BoD; IIE in 2010, and both ACM/SIGSIM and SCS in 2011. In June 2013 Arbeitsgemeinschaft Simulation (ASIM) became the third Technical Co-sponsor of WSC.

The aforementioned amendments and the enhanced membership of the BoD did not close the gap between the JSA and the By-laws entirely, but aims at increasing the diversity of the Board membership as well as to prevent representatives of the Financial Sponsors from becoming officers close to the onset of their tenure on the Board.

4.3 Policy on WSC BoD Membership

The purpose of WSC BoDs is to help maintain the continuity from year to year as well as oversight of the yearly conferences in selecting General Chairs and approving Program Chairs, Business Chairs, venues, rate changes, etc. As the financial and technical cosponsors have their own way of selecting their board representatives, the current BoDs felt they needed to be able to control who was selected to ensure the members possess the experience with the conference to be able to assist the yearly conference committees. Therefore, in December of 2013 the BoD approved the following motion:

"In order to maintain the integrity of the WSC board, representatives of sponsoring societies must have experience as WSC participants and leaders. Representatives of sponsoring societies must (1) have attended a minimum of five WSC conferences in the fifteen years immediately preceding their appointment to the board; (2) have prior experience serving on WSC committees for at least three conferences; and (3) have served in the at least one leadership role that may include General Chair, Program Chair, Business Chair or Proceedings Editor."

Another policy the BoD approved in 2011 prohibits its members from taking on the main roles of a conference (i.e., General Chair, Program Chair, or Business Chair). Since the BoD votes on financial issues including venues and changes in fees, joint membership on the BoD and a Conference Committee constitutes a clear conflict of interest. BoD members are allowed to take on lower-level roles that do not have financial implications (i.e., track chairs, session chairs, registration chair, etc.).

5 CONCLUDING REMARKS

The Winter Simulation Conference entered the modern era (2008–2017) with the momentum gained from the end of the previous period of growth, consolidation, and innovation (1993–2007). The first few years saw the settlement of financial stability and security with the establishment of the Joint Sponsorship Agreement between its four Financial Sponsors, the revision of the By-laws, and the true internationalization of the Conference with the first WSC outside the U.S.A. in the German capital of Berlin in December 2012. The Conference also visited several U.S. cities for the first time in order to diversify its geographical footprint. Despite the expansion of the Conference in terms of track diversity and size of the Proceedings and its alliance with other societies and conferences (ASIM and MASM) Program, the Conference has not realized a growth with regard to attendance. The sharp decline in the participation of the U.S. military appears to be the largest contributor to the "stagnation" in attendance. We are certain that the BoD is working diligently to address this issue; a potential solution is the expansion of the global footprint of WSC with Conferences in emerging economic markets.

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AUTHOR BIOGRAPHIES

CHRISTOS ALEXOPOULOS is a Professor in the H. Milton Stewart School of Industrial and Systems Engineering at the Georgia Institute of Technology. His research interests are in the areas of simulation, statistics, and optimization of stochastic systems. He is a member of INFORMS and an active participant in the Winter Simulation Conference, having been Proceedings Co-Editor in 1995, Associate Program Chair in 2006, and a member of the Board of Directors between 2008 and 2016. He is also an Associate Editor

of the ACM Transactions on Modeling and Computer Simulation. His e-mail address is christos@isye.gatech.edu and his Web page is http://www.isye.gatech.edu/~christos.

JEFFREY A. JOINES is a Professor and the Department Head in the Textile Engineering, Chemistry, and Science department at North Carolina State University. He received a B.S. in Electrical Engineering and B.S. in Industrial Engineering in 1990, a M.S in Industrial Engineering in 1993, and Ph.D. in Industrial Engineering in 1996 all from NC State University. He received the 1997 Pritsker Doctoral Dissertation Award for the best dissertation from the Institute of Industrial Engineers. His expertise is in supply chain optimization utilizing computer simulation where he has published numerous papers and given dozens of international conference presentations. He was the Co-Proceedings Editor for the 2000 Winter Simulation Conference, the Program Chair for the 2005 WSC and currently sits on the WSC Board representing IEEE-SMC. He teaches undergraduate and graduate classes in computer information systems, computer based modeling in Excel and VBA, simulation and Lean Six-Sigma. His passion lies with helping students reach their fullest potential and is heavily involved in utilizing technology in the classroom and how it impacts problem solving. He was awarded the 2006 Alumni NC State University Outstanding Teaching Award, the 2009 Gertrude Cox Teaching Award for Innovative Excellence in Teaching and Learning with Technology for Large Transformative Projects, the 2012 Alumni Distinguished Undergraduate Professor.

MICHAEL E. KUHL is a Professor in the Department of Industrial and Systems Engineering at Rochester Institute of Technology. He earned his Ph.D. in Industrial Engineering from North Carolina State University. His research interests include modeling and simulation of stochastic arrival processes, and the application is of simulation and simulation-based optimization to systems including healthcare, manufacturing, cyber security, and project management. He is a member of the WSC Board of Director representing the INFORMS Simulation Society. He has also served WSC as Proceedings Editor (2005), Program Chair (2013), and Mobile App Chair (2014-2017). His e-mail address is Michael.Kuhl@rit.edu.