

**2018 Andrew P. Sage
Senior Design Capstone Competition
Monday May 7th, 2018**

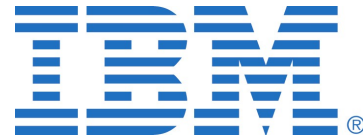
**Hosted by:
Department of Systems Engineering and Operations Research
Volgenau School of Engineering
George Mason University
Fairfax, Virginia**

CONFERENCE PROGRAM

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GMU Mason Innovation Exchange (MIX)

Andrew P. Sage
George Mason University, Founding Dean Emeritus
University Professor and First American Bank Professor
Professor, Systems Engineering and Operations Research



Dr. Sage Received the BSEE degree from the Citadel, the SMEE degree from MIT and the Ph.D. from Purdue, the latter in 1960. He received honorary Doctor of Engineering degrees from the University of Waterloo in 1987 and from Dalhousie University in 1997. He was a faculty member at several universities including holding a named professorship and being the first chair of the Systems Engineering Department at the University of Virginia. In 1984 he became First American Bank Professor of Information Technology and Engineering at George Mason University and the first Dean of the School of Information Technology and Engineering. In May 1996, he was elected as *Founding Dean Emeritus* of the School and also was appointed a University Professor. He was an elected Fellow of the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, and the International Council on Systems Engineering. He was editor of the John Wiley textbook series on *Systems Engineering and Management*, the INCOSE Wiley journal *Systems Engineering* and was coeditor of *Information, Knowledge, and Systems Management*. He edited the *IEEE Transactions on Systems, Man, and Cybernetics* from January 1972 through December 1998, and also served a two year period as President of the IEEE SMC Society. In 1994 he received the Donald G. Fink Prize from the IEEE, and a Superior Public Service Award for his service on the CNA Corporation Board of Trustees from the US Secretary of the Navy. In 2000, he received the Simon Ramo Medal from the IEEE in recognition of his contributions to systems engineering and an IEEE Third Millennium Medal. In 2002, he received an *Eta Kappa Nu* Eminent Membership Award and the INCOSE Pioneer Award. He was elected to the National Academy of Engineering in 2004 for contributions to the theory and practice of systems engineering and systems management. He retired in Spring of 2014 and passed away on 10/31/2014.

Plenary Talk

Using Analytics to Predict and to Change the Future

Dr. Kirk Borne
Principal Data Scientist
Booz Allen Hamilton

Short Abstract: The talk will focus on applications of data science and machine learning in the areas of predictive, prescriptive, and cognitive analytics. We will look at those applications within the context of “new ways to see around corners with data.”

Biography: Dr. Kirk Borne is a data scientist and astrophysicist who has used his talents at global technology and consulting firm Booz Allen Hamilton as an Executive Advisor and as the firm's Principal Data Scientist since 2015. In those roles, he focuses on applications of data science, data management, data mining, machine learning, and machine intelligence across a wide variety of disciplines. He also provides leadership and mentoring to multi-disciplinary teams of data scientists. Before coming to Booz Allen, Kirk was professor of astrophysics and computational science at George Mason University for 12 years, where he did research and taught students in the undergraduate data science and graduate computational informatics programs. Prior to that, Kirk spent nearly 20 years supporting data systems activities for NASA space science missions, including a role as NASA's Archive Project Scientist for the Hubble Space Telescope. Dr. Borne has a B.S. degree in Physics from LSU, and a Ph.D. in Astronomy from Caltech. He is an elected Fellow of the International Astrostatistics Association for his lifelong contributions to big data research in astronomy. Since 2013 he has been listed consistently each year as a top worldwide influencer in Big Data and Data Science on social media.



Time	CONFERENCE PROGRAM																	
8	Registration																	
8:30																		
9	Plenary (Rm 163)																	
9:30																		
10	Coffee Break																	
10:30	Quantitative Model for Cyber Security Products with General Dynamics Information Technology	GMU	Cybersecurity (Rm 163)	The Modern Political Virus: A System Dynamics Approach to Analyzing the Spread of Fake News	GMU	Simulation (Rm 162)	Implementation of mHealth in Nicaragua	GMU	Healthcare (Rm 301)									
11	Cyber Security Automation through Machine Learning	GMU		Designing System-Level Models to Holistically Capture Soldier Lethality	West Point		Design of a System to Prevent Posterior Tibial Tendon Dysfunction	GMU										
11:30	Improvement of a System for Modelling and Analysing Attrition at the IRS	GMU		Design of a Ski Lift Inspection and Maintenance System	GMU		Modeling Insights to Food Security: A System Dynamics Approach	West Point										
12	Cross Domain Solution (CDS)	GMU		Cost Per Flight Hour and Mission Capability Rate Model	VT		Ulnar Collateral Ligament Rehabilitation Robotics Capstone	USNA										
12:30	Lunch																	
1	Scheduling (Rm 301)																	
1:30											Tradeoff Analysis for Soldier Equipment	West Point	Decision Support Systems (Rm 163)	Masun Solar: A Template for Designing a Solar Power System	GMU	Energy (Rm 162)	Design of a Data Collection System for Devils Backbone Brewery	VT
2											AI Academic Advisor	GMU		Northern Virginia Solar Proposal	GMU		Regatta Rules Adjudication System	GMU
2:30											Design and implementation of a centralized system for autonomous unmanned aerial vehicle trajectory conflict resolution	U. Penn		Design Peer to Peer Energy Trading System	GMU		MTA Asset Management	Stevens
3	Coffee Break																	
3:30	Custom Android ROM	GMU	Design (Rm 163)	Vulnerability Assessment of a Smart Grid IoT Environment	GMU	Environment (Rm 162)	Cybersecurity, Decision Support Systems, Simulation, Energy, Health, and Scheduling											
4	Future Conceptual Designs of the Tactical Assault Light Operator Suit	West Point		Design of a Decision Support System for the Scheduling of Workflow Process for a Water Utility Company	GMU													
4:30	Design of a Synthetic Voice Real Time Reporting System	GMU		LM StarGazer - Design of a Decision Support Tool and Data Science to Predict Illegal Fishing	GMU													
5	The Rough Map System	GMU																
5:30							Design and Environment											
6																		
6:30	Social Hour (Johnson Center - Dewberry Hall)																	
7																		
7:30	Shark Tank (Johnson Center - Dewberry Hall)																	
8	Banquet and Awards (Johnson Center - Dewberry Hall)																	
8:30																		
9																		

Hotels in the Area:

<http://www.gmu.edu/resources/welcome/hotel>

Campus Map:

<http://www.gmu.edu/resources/welcome/FairfaxMap2017.pdf>

Parking:

Shenandoah Parking Lot (Building #42). See instructions on next page.

Conference Venues:**Research Hall (Building #49):**

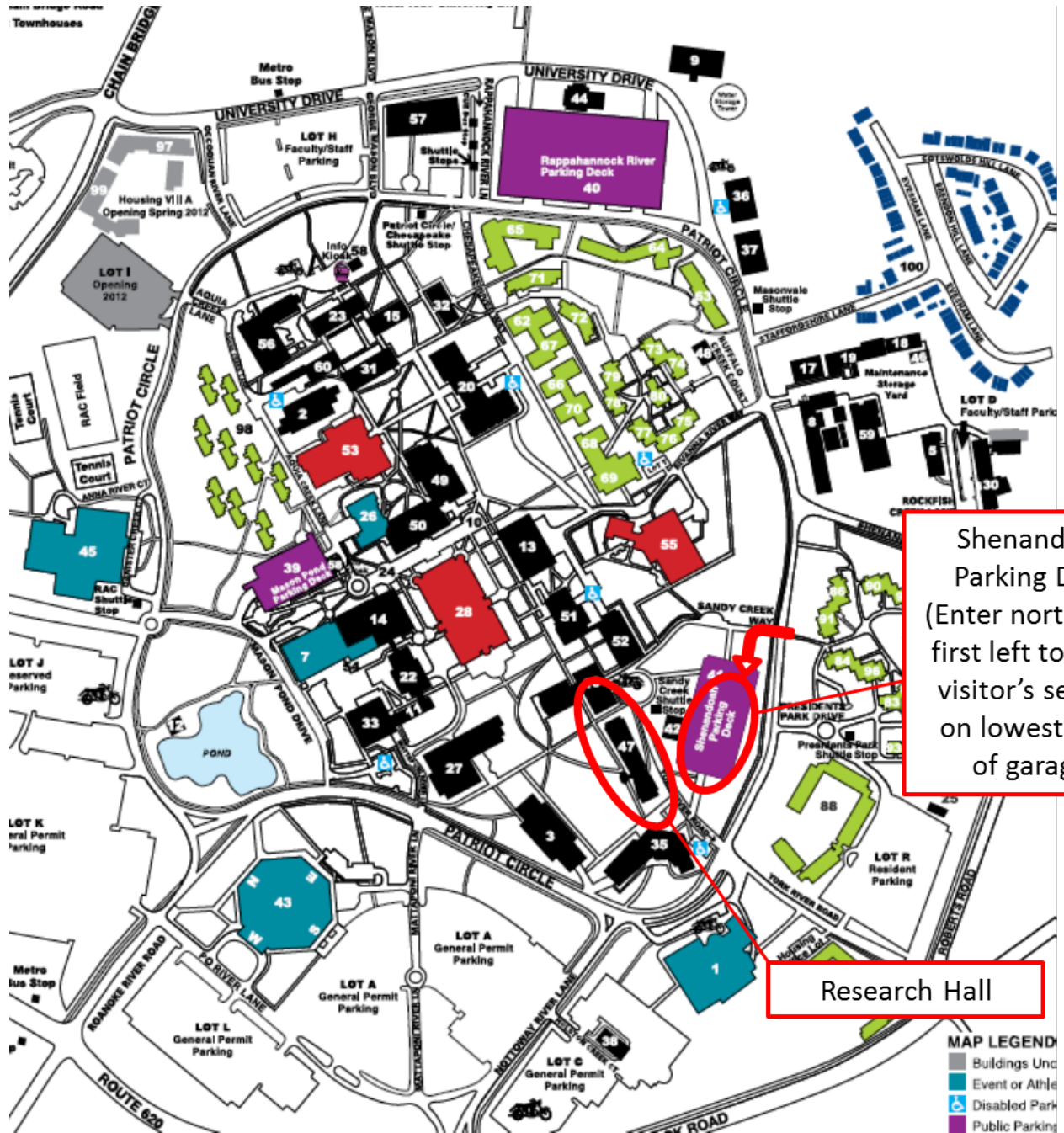
Rm 163 lobby: Registration and Coffee Breaks
Showcase Rm: Judges and Conf. HQ
Rm 163: Plenary
Rm 163: Cybersecurity Track
Decision Support track
Design Track
Rm. 162: Simulation Track
Energy Track
Environment Track
Rm 301: Healthcare Track
Scheduling Track

Johnson Center (Building #30):

Dewberry Hall: Social Hour
Shark Tank
Banquet and Awards

Lunch Venues:

- Johnson Center (Building #30)
- Ikes Cafeteria (Next to building #83)
- South Side Cafeteria (Building #68)
- Also, you can check the GMU dining map:
<https://dining.gmu.edu/dining-map/>



Shenandoah
Parking Deck
(Enter north side,
first left to enter
visitor's section
on lowest level
of garage)

Research Hall