Fusion 2015

Washington, D.C.

18th International Conference on Information Fusion

Grand Hyatt Washington
Washington, DC 20001

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Schedule of Events

Fusion 2015
Washington, D.C.

Monday, July 6			Wednesday, July 8	
07:00-19:00	Registration		06:30	5K Fun Run
08 :00-12:00	Tutorials		07:00-17:00	Registration
12:00-1300	Lunch		08:30-09:30	Plenary Session
13:00-17:00	Tutorials		09:30-10:00	Coffee Break
17:30	Ice Breaker Reception		10:00-12:00	Technical Session
			12:00-13:00	Lunch
Tuesday, July 7			13:00-15:00	Technical Session
07:00-17:00	Registration		15:00-15:30	Coffee Break
08:30-09:30	Plenary Session		15:30-17:10	Technical Session
09:30-10:00	Coffee Break		19:00-22:00	Gala Dinner
10:00-12:00	Technical Session			
12:00-13:00	Lunch		**Thursday, July 9**	
13:00-15:00	Technical Session		07:00-12:00	Registration
15:00-15:30	Coffee Break		08:30-09:30	Plenary Session
15:30-17:10	Technical Session		09:30-10:00	Coffee Break
18:30-21:00	Welcome Reception		10:00-12:00	Technical Session
			12:00-13:00	Lunch
			13:00-15:00	Technical Session
			15:00-15:30	Coffee Break
			15:30-17:10	Technical Session

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Welcome to Fusion 2015

Welcome to FUSION 2015 and Washington D. C., one of the most exciting cities in America. We hope you have a technically rewarding time at the conference and enjoy all that Washington D. C. has to offer. Our social activities will highlight a few parts of the city, but there are many other sites that should be visited.

The International Conference on Information Fusion is a premier forum for interchange of the latest research in information fusion and discussion of its impacts on our society. The conference brings together researchers and practitioners from industry, government, and academia to report on the latest scientific and technical advances. Authors are always invited to submit papers describing advances and applications in information fusion.

The 18th Fusion conference will be held at the Grand Hyatt Washington Hotel in Washington, D. C., USA. It is a flagship hotel centrally located, near all key sites and attractions. Washington is home to many national monuments and museums, which are primarily situated on or around the National Mall within walking distance of the conference venue. The greater D. C. area provides a variety of tourist attractions that can satisfy even the most demanding visitor. By hosting 176 foreign embassies as well as headquarters of many international organizations, D. C. offers a culturally rich environment ripe for exploration. The conference will be held the week following the US Independence Day, July 4th. This creates an opportunity for those coming to the conference to arrive a bit earlier and enjoy the best the city can offer at this special time.

We chose the Grand Hyatt Hotel, because of its location and ability to serve our conference well. While this flagship Hyatt is huge in many ways, regarding the facilities, all Fusion 2015 technical activities will be held at the Independence level, which will be exclusively devoted to the Fusion conference.

The Grand Hyatt Washington is located at easy walking distance from the National Mall and with a convenient internal access to the Metro Center subway station, the hotel is an ideal choice for Fusion 2015 attendees. Local attendees will have easy access via the metro subway system and visitors will enjoy privileged access to the city's major attractions. The facility includes top-notch room and suites, five restaurant and bars, an indoor swimming pool, and a host of world-class services and amenities.

Among the attractions that are within walking distance from the hotel are the White House, the U.S. Capitol Building, the Eastern Market, Georgetown, various historic monuments (*e.g.* Lincoln memorial, Washington monument, FDR memorial), the International Spy Museum, the Newseum, the Museum of Crime & Punishment, and the Smithsonian Institution museums at the Washington Mall (*e.g.* Museum of Natural History, Airspace Museum, and many others). The hotel is also close to the Verizon Center, the Nationals Park, and the FedEx Field.

In addition to the internal access to Metro Station, the hotel is in an area where there are plenty of transportation alternatives, such as taxis, buses and limos.

The social events schedule includes an "Ice-Breaker" reception at the conference venue on Monday at 1730, the Opening Reception at the *Mansion on O Street* on Tuesday at 1830, and the Gala Banquet at the *Donald W. Reynolds Center for American Art and Portraiture* on Wednesday at 1900. There will be shuttle service available for the Opening Reception.

Welcome to Fusion 2015

Acknowledgements

We believe we have an extraordinary technical program, thanks to the Technical Program Committee chaired by Stefano Coraluppi, Roy Streit, Allen Waxman and their volunteer reviewers, and to Program Chairs Erik Blasch and Shiloh Dockstader for all time scheduling assignments. Some numbers: there were 259 members of the Technical Program Committee (TPC); 357 papers were submitted and 285 (80%) of these were accepted for publication in the conference proceedings. All papers submitted received at least two technical reviews—many had more than that.

We are especially grateful to our plenary speakers: Moshe Kam, Colleen Keller, and Edward Cope who made our technical program even stronger.

As with all FUSION conferences, we have been helped by the many who have organized special sessions. These papers were subject to the same strict review process that all the papers receive as Fusion conferences. We must thank Special Sessions Chairs Michael Vaccaro and Simon Maskell for their hard work in bringing these special sessions together.

We are indebted to the many people who have helped with this conference. Local Arrangements Chairs Lance Kaplan and David Crouse were in charge for arranging all fantastic local activities. Finance Chair James Ferry has dealt with the budgeting issues and all payments. Tutorials Chair Mitch Kokar has put together a strong program of tutorials. Stefano Coraluppi, Roy Streit, Allen Waxman have had the unenviable task of coordinating the reviews to all the 357 submitted papers. Our Publications Chairs Ken Hintz and Ivan Kadar have worked on putting together a well organized Proceedings and Program. Many people who attend conferences are not fully aware of how much time-consuming work is involved for that slot, and we have been pleased that they accepted that responsibility. Our Awards Chairs Ramona Georgescu and Tien Pham established criteria for various awards. Publicity Chair Mark Silbert and International Chairs Anne-Laure Jousselme and Joni Amorim helped to advertise the conference as well as by networking.

We have been fortunate to receive financial support from a number of sources, mostly thanks to the coordination of our Industry Chair Angela Pawlowski. We must begin, of course, with our prime co-sponsors ***ISIF***, the ***AESS*** society from ***IEEE***, the George Mason University's C4I Center, and ***Random Sets LLC*** (at Platinum Level). In addition, we are extremely grateful to ***Metron*** (at Silver Level), ***Systems and Technology Research***, and ***Lockheed Martin*** (at Bronze Level) for their generous support.

Most members of our organizing committee have participated in many of the past FUSION conferences. We have always found these conferences technically exciting. The FUSION conferences have developed a hard-earned reputation for its combination of technical excellence, networking opportunities, and a vibrant social program. We hope that we, in Washington, D. C., will be able to claim that we have given you all three.

Conference General Co-Chairs: Kathryn Laskey and Paulo Costa

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Plenary Talks

The impact of Sensor and Data Fusion thought on Engineering Practice and Engineering Education, 1975-2015, Moshe Kam, New Jersey Institute of Technology

Abstract:
Motivated by challenges in detection and estimation, data and sensor fusion studies burst into the scene in the mid 1970s. Many data integration architectures can be traced to earlier times, but the renewed interest in the 1970s was the definitive birth (or perhaps re-birth) of the discipline. This presentation follows the development and expansion of the field since its early introduction, focusing on two areas of impact: (1) utilization in engineering applications; and (2) integration of data fusion and sensor fusion in engineering curricula. Both subjects are related to questions about assumptions, realism of modeling, computational complexity, interplay of complexity and performance, and mathematical sophistication. We follow the main themes and emphases in the data and sensor fusion literature as they evolved over the last four decades, identify the principal trends, and assess the degree of proliferation of ideas from the developing literature into disciplinary graduate and undergraduate education programs in engineering. We further discuss what an academic course-of-study that includes sensor and data fusion would look like, who can benefit from such curriculum, and how might it be of interest to groups interested in developing new engineering education programs.
Biography:
Moshe Kam is an Israeli American engineering educator presently serving as the Dean of the Newark College of Engineering at the New Jersey Institute of Technology. Until August 2014 he served as the Robert G. Quinn Professor and Department Head of Electrical and Computer Engineering at Drexel University. In 2011, he served concurrently as the 49th President and CEO of IEEE. Earlier he was IEEE's Vice President for Educational Activities (2005–2007) and IEEE's Representative Director to the accreditation body ABET. Dr. Kam's research interests include detection and estimation; data, decision and sensor fusion; robotics and navigation; and engineering education. He has published extensively in these areas in periodicals that include the *Proceedings of IEEE*, the *IEEE Trans. on AES*, *Automatica*, and *Information Fusion*. He served as General Chair and Program Chair of several technical conferences, including the *Int'l Summit on Meeting the Growing Demand for Engineers and Their Educators 2010-2020*; the *First IEEE International Symposium on Cost-Effective Museum Exhibits in Engineering and Applied Science*; and the *IEEE Secure Agents Workshop*.

Bayesian Search for Missing Aircraft, Colleen Keller, Metron

Abstract:
Bayesian search theory provides a disciplined method for planning searches for lost objects. The Bayesian approach was successfully applied in the 2009 search for the wreckage of Air France flight 447, which was discovered at the bottom of the Atlantic Ocean in 2011. This talk will describe the Bayesian approach and previous applications to searches, leading up to the analysis that solved the mystery of AF447. The talk finishes with a discussion of the current search for Malaysian Air flight MH370 in the Indian Ocean, describing what is known and how the Bayesian approach could be used to guide search efforts.
Biography:
Colleen Keller is an Operations Research Analyst at Metron, Inc., a small DoD consulting firm specializing in mathematical software applications to real-world problems. Colleen was part of the Metron team that performed Bayesian probability mapping for the French Government in the 2009 search for Air France 447. More recently she has served as Metron's spokesperson for questions raised by the media on the search for Malaysian Air flight MH370. Colleen also applied Bayesian principles to the search for Steve Fossett in 2006 and is a founding member of the all-volunteer Missing Aircraft Search Team (MAST) which tackles cold cases of missing aircraft. She is a 3,000-hour instrument- and commercial- rated private pilot and FAA-certified A&P mechanic, and a Civilian Volunteer to the San Diego Sheriff Department's Aero Unit and Search and Rescue team. Colleen holds a B.A. in Physics from Dartmouth College (1985) and a M.S. degree in Applied Physics from The Johns Hopkins University Whiting School of Engineering (1990). She has been with Metron since 1995.

Integrative GEOINT Foresight: Fusion of Transdisciplinary Expertise via Visual Analytics, Models, and Collaborative Computing, Edward Cope, NGA

Abstract:
In this talk, we introduce and explore the transdisciplinary fusion challenges associated with a new GEOINT research partnership called the *Foresight Initiative*. This research effort examines the integrative nature of geospatial, temporal, contextual, and visual reasoning data. The goal of the project is to create a suite of decision-making modules and interactive, anticipatory analytic processes that policy makers can use to understand, anticipate, and mitigate national security risks associated with climate change, with a focus on water-energy-food nexus. The capabilities we develop will include processing modules for advanced data analysis, simulation, and visualization. "Foresight represents a new way of thinking," says Nadya Bliss, the initiative's Principal Investigator. "It's about a new way of thinking about problems, new ways of engaging multiple disciplines, and new ways of engaging multiple agencies."
Biography:
Mr. Edward T. Cope, DISL-01, is the Director, Basic and Applied Research at NGA. In this leadership role since Jan. 2011, he is responsible for conceptualizing, communicating, and implementing innovative strategies to perform basic and applied research for GEOINT that exploits future science and technologies in core multidisciplinary areas such as geodesy and geophysics, sensors, image science, information technology, computational science, and cognitive science. The fundamental challenge is to explore new GEOINT value propositions by conducting peer review quality science in the context of mission relevant future technology opportunities and customer challenges. Additionally, he actively directs GEOINT R&D initiatives to exploit the spatiotemporal aspects of open source data and elements of digital humanities to apply spatial thinking in the context of the social sciences to develop human geography applications.

Tutorials

Location	Morning Tutorial (08:00-12:00)	Afternoon Tutorial (13:00-17:00)
Independence B	T4 - Erik Blasch *Overview of High-Level Information Fusion Theory, Models, and Representations*	T1 - Audun Jøsang *Fusion and Belief Reasoning with Subjective Logic*
Independence C	T5 - Subrata Das *Big Data Fusion and Analytics*	T8 - Eric Little *Applications of Scalable Semantic Technologies and Ontologies for Enhanced Higher Level Fusion*
Independence D	T10 - Thia Kirubarajan *Multisensor-Multitarget Tracker Development and Performance Evaluation for Realistic Scenarios*	T11 - Yaakov Bar-Shalom *Multitarget Tracking and Multisensor Information Fusion*
Independence E	T6 - Ronald Mahler *Advances in Statistical Multisource-Multitarget Information Fusion*	T12 - Ba-Tuong Vo *Implementations of random-finite-set-based multi-target filters*
Independence F	T2 - Larry Stone, Roy Streit, Kristine Bell *Bayesian Multiple Target Tracking*	T9 - Mahendra Mallick *Space Surveillance and Space Object Tracking*
Independence G	T7 - Galina Rogova *Information Quality in Human-Machine Integrated Environment*	T3 - Felix Govaers *An Introduction to the Distributed Kalman Filter and Track-to-Track Fusion*

Technical Program—Overview

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Tuesday, July 7

Room	Independence B	Independence C	Independence D	Independence E
8:30-9:30	Plenary Session (Independence Ballroom): **Moshe Kam**			
09:30-1000	Coffee Break			
10:00-12:00	Large Scale Value-Centered Data Fusion	ETURWG – Part 1	Sequential Monte Carlo Methods for Complex Systems	Real-World Problems with Network Abstractions
12:00-13:00	Lunch			
13:00-15:00	Applications of data fusion	Uncertainty management and reasoning	Sequential Monte Carlo Methods for Complex Systems	Real-World Problems with Network Abstractions
15:00-15:30	Coffee Break			
15:30-17:10		ETUR Working Group meeting	Big Data fusion	Real world problems for Networking Panel

Wednesday, July 8

Room	Independence B	Independence C	Independence D	Independence E
08:30-09:30	Plenary Session (Independence Ballroom): **Colleen Keller**			
09:30-1000	Coffee Break			
10:00-12:00	Directional Estimation	Data mining and machine learning in data fusion	Intelligent Information Fusion	Advances in Distributed Kalman Filtering
12:00-13:00	Lunch			
13:00-15:00	Directional Estimation	Data mining and machine learning in data fusion	Context-based Information Fusion	Distributed/decentralized fusion
15:00-15:30	Coffee Break			
15:30-17:10	Averaging Measures: Wasserstein Barycenters, MMOSPA	Change, Anomaly, and Trend (CAT) Detection in Challenging Environments	Context-based Information Fusion	Applications of data fusion (Automotive)

Thursday, July 9

Room	Independence B	Independence C	Independence D	Independence E
08:30-09:30	Plenary Session (Independence Ballroom): **Edward T. Cope**			
0930:1000	Coffee Break			
10:00-12:00	Registration	Estimation and filtering; Object tracking	Signal processing and computer vision	Homotopy Methods for Progressive Bayesian Estimation
12:00-13:00	Lunch			
13:00-15:00	Data association; Estimation	Estimation and filtering	Applications of Data Fusion and Predictive Analytics to Finance, Business, and Marketing	Dynamic Data Driven Application Systems for Sensor Data Problems
15:00-15:30	Coffee Break			
15:30-17:10	Data association; Object tracking	Estimation and filtering	Applications of Data Fusion and Predictive Analytics to Finance, Business, and Marketing	Dynamic Data Driven Application Systems for Sensor Data Problems: Belief

Note: highlighted sessions are special sessions, non-highlighted sessions are regular.

Technical Program—Overview

Tuesday, July 7

Independence F	Independence G	Independence H	Independence I
Plenary Session (Independence Ballroom): **Moshe Kam**			
Coffee Break			
Sensor, Resources and Process Management for Information Fusion Systems	Random sets and processes	Fusion Enabled Decision Support	Special Session: Multistatic Tracking Working Group (MSTWG) – Part 1
Lunch			
Sensor and fusion process management including performance evaluation	Target detection and localization; Estimation and filtering; Object tracking	Trust in Fused Information	MSTWG – Part 2
Coffee Break			
Sensor and fusion process management including performance evaluation	Target detection and localization	Trust in Fused Information	MSTWG – Part 3

Wednesday, July 8

Independence F	Independence G	Independence H	Independence I
Plenary Session (Independence Ballroom): **Colleen Keller**			
Coffee Break			
Ontologies, graphs, and semantic reasoning for high level fusion	Sensor management	Extended Object and Group Tracking	Data Fusion Methods for Indoor Localization of People and Objects
Lunch			
Situation representation and estimation	Space Object Detection, Tracking, Identification, and Classification	Extended Object and Group Tracking	Image fusion and video tracking
Coffee Break			
Situation and threat assessment	Space Object Detection, Tracking, identification, and Classification	Uncertainty management and reasoning: Estimation	

Thursday, July 9

Independence F	Independence G	Independence H	Independence I
Plenary Session (Independence Ballroom): **Edward T. Cope**			
Coffee Break			
Particle filters and Monte Carlo methods	Applications of data fusion (Nav)	Target Classification; Target detection and localization; Object tracking	
Lunch			
Multi---Level Fusion: bridging the gap between high and low level fusion	Target Classification		
Coffee Break			
Fusion in Multi-Biometric Systems	Multi---Level Fusion: bridging the gap between high and low level fusion	Probabilistic RGBD Data Fusion	

Technical Program—Tues. AM

Time	Independence B	Independence C	Independence D	Independence E
10:00-12:05	**Al Hero** ***Large Scale Value-Centered Data Fusion***	**Pieter De Villiers** ***ETURWG – Part 1***	**Lyudmila Mihaylova** ***Sequential Monte Carlo Methods for Complex Systems***	**James Ferry** ***Real-World Problems with Network Abstractions***
10:00	Efficient Information Planning in Gaussian MRFs *Georgios Papachristoudis, John W. Fisher III*	Dissecting Uncertainty-Based Fusion Techniques for Maritime Anomaly Detection *Anne-Laure Jousselme, Giuliana Pallotta*	Improvements in the Implementation of Log-Homotopy Based Particle Flow Filters *Muhammad Altamash Khan, Martin Ulmke*	A Bayesian Idealization of Entity Resolution *James P Ferry, Darren Lo, Thomas Seaquist*
10:25	Boosting Crowdsourcing with Expert Labels: Local Vs. Global Effects *Qiang Liu, Alexander Ihler, John W. Fisher III*	A Critical Assessment of Two Methods for Heterogeneous Information Fusion *Valentina Dragos, Xavier Lerouvreur, Sylvain Gatepaille*	Langevin Monte Carlo Filtering for Target Tracking *Fernando Iglesias Garcia, Mélanie Bocquel, Hans Driessen*	Multiscale Network Generation *Alexander Gutfraind, Ilya Safro, Lauren Meyers*
10:50	OptFuse: Low-rank Factor Estimation by Optimal Data-Driven Linear Fusion of Multiple Signal-Plus-Noise Matrices *Himanshu Nayar, Raj Rao Nadakuditi*	Uncertainty Representation, Quantification and Evaluation for Data and Information Fusion *J. de Villiers, K. Laskey, A.-L. Jousselme, E. Blasch, A. de Waal, G. Pavlin, P. C.G. Costa*	A New Nonlinear State Estimator Using the Fusion of Multiple Extended Kalman Filters *Zhansheng Duan, Xiaoyun Li*	Utilizing Covariates in Partially Observed Networks *David Marchette, Elizabeth Hohman*
11:15	Distributed Sensing for Quickest Change Detection of Point Radiation Sources *Gene T Whipps, Emre Ertin, Randy Moses*	URREF for Veracity Assessment in Query-Based Information Fusion Systems *Erik Blasch, Alex Aved*	Joint Antenna and Propagation Model Parameter Estimation Using RSS Measurements *P. Kasebzadeh, C. Fritsche, E. Özkan, F. Gunnarsson, F. Gustafsson*	Detectability Analysis of Detection and Estimation of Structured Action From Cluttered Data *Karl Granström, Peter Willett, Yaakov Bar-Shalom*
11:40	Adaptive Search for Multi-class Targets with Heterogeneous Importance *Beipeng Mu, Gregory Newstadt, Dennis Wei, Alfred Hero III, Jonathan How*	Gradual and Binary Conflicts in Bayesian Networks Applied to Sensor Failure Detection *Max Krueger*	Tracking of Wireless Mobile Nodes in the Presence of Unknown Path-loss Characteristics *Muhammad Waqas Khan, Naveed Salman, Andrew H. Kemp, Lyudmila Mihaylova*	Hidden Network Reconstruction From Information Diffusion *Forrest Crawford*

Independence F	Independence G	Independence H	Independence I
Ba-Tuong Vo ***Sensor, Resources and Process Management for Information Fusion Systems***	**Ron Mahler** ***Random sets and processes***	**Joseph T. Bernardo** ***Fusion Enabled Decision Support***	**Garfield Mellema** ***MSTWG– Part 1***
Stochastic Nonlinear Model Predictive Control Based on Deterministic Scenario Generation *Christof Chlebek, Uwe D Hanebeck*	Distributed Multi-Target Tracking Via Generalized Multi-Bernoulli Random Finite Sets *Bailu Wang, Wei Yi, Suqi Li, Mark Morelande, Lingjiang Kong, Xiaobo Yang*	Cognitive and Functional Frameworks for Hard/Soft Fusion for the Condition Monitoring of Aircraft *Joseph T. Bernardo*	Multi-Target Tracking for Multistatic Sonobuoy Systems *Sofia Suvorova, Mark Morelande, Bill Moran, Fiona Fletcher, Sergey Simakov*
Improving ORM Utilizing Implicit Collaboration & Context Sensitive Fusion *Ken Hintz, Ivan Kadar*	Joint Multi-Bernoulli RFS for Two-target Scenario *Suqi Li, Wei Yi, Mark Morelande, Bailu Wang, Lingjiang Kong*	Dynamic Resource Management and Information Integration for Proactive Decision Support and Planning *M. Mishra, D. Sidoti, D. F. M. Ayala, X. Han, G. Avvari, L. Zhang, K. R Pattipati, W. An, J. Hansen, D. Kleinman*	Sensor Selection From Independence Graphs Using Submodularity *Thomas Powers, David W Krout, Les Atlas*
Sparsity Promoting Sensor Management for Estimation: An Energy Balance Point of View *Sijia Liu, Feishe Chen, Aditya Vempaty, Makan Fardad, Lixin Shen, Pramod Varshney*	The Multiple Model Labeled Multi-Bernoulli Filter *Stephan Reuter, Alexander Scheel, Klaus Dietmayer*	A Revised Method for Ranking Generalized Fuzzy Numbers *Yu Luo, Wen Jiang, XiYun Qin, Jun Zhan*	The GFMT HPMHT Puzzle *Peter Willett, Tod E Luginbuhl, Marcus Baum*
Dynamic, Distributed Sensor Scheduling and Value of Information *Dipankar Maity, John S. Baras*	The Cardinalized Optimal Linear Assignment (COLA) Metric for Robotic Map Evaluation *P. Barrios, G. Naqvi, M. D. Adams, K. Y. K. Leung, F. Inostroza*	Correlation Coefficient Based Template Matching: Accounting for Uncertainty in Selecting the Winner *Nicholas Napoli, Kamal Premaratne, Laura E Barnes*	Generalizations to the Track-Oriented MHT Recursion *Stefano Coraluppi, Craig Carthel*
	Tracking Targets with Pairwise-Markov Dynamics *Ronald P. S. Mahler*	Towards Subjective Networks: Extending Conditional Reasoning in Subjective Logic *Lance Kaplan, Magdalena Ivanovska, Audun Josang, Francesco Sambo*	Parameter Estimation for Multistatic Active Sonar Using Extended Fixed Points *Martina Broetje, Kolja Pikora*

Technical Program—Tues. Early PM

Time	Independence B	Independence C	Independence D	Independence E
13:00-15:00	**Robert Lynch** ***Applications of data fusion***	**Max Kruger** ***Uncertainty management and reasoning***	**Hans Driessen** ***Sequential Monte Carlo Methods for Complex Systems***	**Tien Pham** ***Real-World Problems with Network Abstractions***
13:00	Adaptive Filtering of Imprecisely Time-stamped Measurements with Application to AIS Networks *Leonardo Maria Millefiori, Paolo Braca, Karna Bryan, Peter Willett*	Solving Conflicts in Database Fusion with Bayesian Networks *Eleonora Laurenza*	Monte Carlo Based Distance Dependent Chinese Restaurant Process for Segmentation of 3D LIDAR Data Using Motion and Spatial Features *M. Tuncer, D. Schulz*	Advances in Network Sciences Via Collaborative Multi-Disciplinary Research *Dinesh Verma, Ananthram Swami, Tien Pham, Will E Leland, Greg Cirincione*
13:25	Joint Radar Alignment and Odometry Calibration *Dominik Kellner, Michael Barjenbruch, Jens Klappstein, Juergen Dickmann, Klaus Dietmayer*	A Real Z-box Experiment for Testing Zadeh's Example *Jean Dezert, Albena Tchamova, Deqiang Han*	An Evaluation of Monte Carlo for Nonlinear Initial Uncertainty Propagation in Keplerian Mechanics *Chao Yang, Kevin Buck, Mrinal Kumar*	Adaptive Dynamics, Control, and Extinction in Networked Populations *Ira Schwartz, Brandon Lindley, Leah Shaw*
13:50	Learning Under Uncertainty for Interpreting the Pattern of Volcanic Eruptions *Galina L. Rogova, Marcus Bursik, Solene Pouget*	Evidential Relational Clustering Using Medoids *Kuang Zhou, Arnaud Martin, Quan Pan, Zhunga Liu*	An Expectation Maximisation Algorithm for Behaviour Analysis in Video *Olga Isupova, Lyudmila Mihaylova, Danil Kuzin, Garik Markarian, François Septier*	RDF Versus Attributed Graphs: The War for the Best Graph Representation *Michael Margitus, Gregory Tauer, Moises Sudit*
14:15	New Algorithms for Daylight Harvesting in a Private Office *Rohit Kumar*	Active Data Collection for Inadequate Models *Gabriel Terejanu*	How Can Subsampling Reduce Complexity in Sequential MCMC Methods and Deal with Big Data in Target Tracking? *A. De Freitas, F. Septier, L. Mihaylova, S. Godsill*	A Network Science Approach to Open Source Data Fusion and Analytics for Disaster Response *D. Shah, C. Anderson, P. Breimyer, S. Foster, K. Geyer, J. Griffith, A. Heier, A. Majumdar, O. Simek, N. Stanisha, F. Waugh*
14:40	Fault Detection and Exclusion of Cycle Slips for Carrier-Phase in GNSS Positioning *M. Kaddour, M. El Badaoui El Najjar, Z. Naja, N. Aittmazirte, N. Moubayed*	Two Novel Methods for BBA Approximation Based on Focal Element Redundancy Deqiang Han, Jean Dezert, Yi Yang	Data Fusion for Unsupervised Video Object Detection, Tracking and Geo-Positioning *D. G. Kolev, D. Kangin, G. Markarian*	

Technical Program—Tues. Early PM

Independence F	Independence G	Independence H	Independence I
X. Rong Li ***Sensor and fusion process management including performance evaluation***	**Mahendra Mallick** ***Target detection and localization; Estimation and filtering; Object tracking***	**Geeth de Mel** ***Trust in Fused Information***	**Jason Aughenbaugh** ***MSTWG – Part 2***
Threat-based Sensor Management for Joint Target Tracking and Classification *Fotios Katsilieris, Hans Driessen, Alexander Yarovoy*	Target Motion Analysis by Inverse Triangulation *Claude Jauffret, Annie-Claude Pérez-Pignol*	ComTrustO: Composite Trust-based Ontology Framework for Information and Decision Fusion *Alessandro Oltramari, Jin-Hee Cho*	Bayesian Broadband Passive Sonar Tracking *Ryan J Pirk, Bryan Yocom, Jason Aughenbaugh*
Non-Parametric Consistency Test for Multiple-Sensing-Modality Data Fusion *Marcos Paul Gerardo Castro, Thierry Peynot, Robert Fitch, Fabio Ramos*	Bernoulli Filter with Linear Equality Constraints *Wanying Zhang, Feng Yang*	Trust Revision for Conflicting Sources *Audun Jøsang, Magdalena Ivanovska, Tim Muller*	Bayesian Passive Sonar Tracking with Conventional Beamformer-Level Data *Ryan J Pirkl, Jason Aughenbaugh*
Mock-Measurement Based Performance Evaluation of Inertial Navigation *Deqiang Han, X. Rong Li, Yu Liu*	Doppler-Only Tracking Under a Minimum Detectable Velocity Constraint *Chongyang He, Liang Yan, Jinfeng Zhang, Xiaoxue Feng, Qian Feng*	FUSE-BEE: Fusion of Subjective Opinions Through Behavior Estimation *Murat Sensoy, Lance Kaplan, Gonul Ayci, Geeth Ranmal de Mel*	Multistatic Tracking Experiment with a WiFiRAD Passive Radar *Maciej Wielgo, Stanisław Rzewuski, Jacek Misiurewicz, Anna Kurowska, Mateusz Malanowski*
Artificial Neural Networks for Estimation and Fusion in Long-Haul Sensor Networks *Qiang Liu, Xin Wang, Nageswara Rao*	Terminative Joint Sequential Object Detection and Tracking Based on Fused Test Statistics *Mengqi Ren, Ruixin Niu*	Multimodal Fusion Approach to Improving Quality of Information in Tactical Networks *Kevin S Chan, Kelvin Marcus, Lisa Scott, Rommie Hardy*	Configuration Selection for Fusion of Range-Only Measurements From Multistatic Radars for Air Collision Warning *Wenbo Dou, Peter Willett, Yaakov Bar-Shalom*
Accuracy and Consistency in Estimation and Fusion Over Long-Haul Sensor Networks *Qiang Liu, Xin Wang, Nageswara Rao*	A Comparison of Tracking Algorithms for Supermaneuverable Targets *Christopher Kreucher, Kristine L Bell, David Sobota*	Crowdsourcing with Multi-Dimensional Trust *Xiangyang Liu, He He, John S. Baras*	

Technical Program—Tues. Late PM

Time	Independence B	Independence C	Independence D	Independence E
15:30-17:10		**Paulo Costa**	**Subrata Das** ***Big Data fusion***	**James Ferry**
15:30		ETUR Working Group meeting	Secure and Resilient Distributed Machine Learning Under Adversarial Environments *Rui Zhang, Quanyan Zhu*	Real world problems for Networking Panel
15:55			Fusing Social Network Data with Hard Data *Thirumalaisamy Abirami, Ehsan Taghavi, Thia Kirubarajan, Ratnasingham Tharmarasa, Anne-Claire Boury-Brisset*	
16:20			Temporal and Multi-Source Fusion for Detection of Innovation in Collaboration Networks *Benjamin A. Miller, Michelle S Beard, Manfred Laubichler, Nadya T Bliss*	
16:45			Distributed Big Data Search for Analyst Queries and Data Fusion *Subrata Das, Ria Ascano, Matthew Macarty*	

Technical Program—Tues. Late PM

Independence F	Independence G	Independence H	Independence I
Ruixin Niu **Sensor and fusion process management including performance evaluation**	**Peter Willett** ***Target detection and localization***	**Lance Kaplan** ***Trust in Fused Information***	**Garfield Mellema** ***MSTWG – Part 3***
Censoring in Distributed Radar Tracking Systems with Various Feedback Models *Armond Conte, II, Ruixin Niu*	Divide and Hough Transform Method for Fast Track Initiation in Dense Clutters *Jun Liu, Liu Yu*	Trust Metric Integration in Resource Constrained Networks Via Data Fusion *Thomas Babbitt, Boleslaw K Szymanski*	Multistatic Tracking Working Group meeting
Statistical Evaluation of Information Source Performance *Dominic Schaub*	A Fault-tolerance Detection Formulation for Distributed Multisensor Systems *Shengli Zhao, Jie Zhou*	Semiring-Based Trust Evaluation for Information Fusion in Social Network Services *Peixin Gao, John S. Baras, Jen Golbeck*	
New Trends in Radio Network Positioning *Kamiar Radnosrati, Fredrik Gunnarsson, Fredrik Gustafsson*	Data Fusion with ML-PMHT for Very Low SNR Track Detection in an OTHR *Kevin Romeo, Yaakov Bar-Shalom, Peter Willett*	On the Quality Estimation of Optimal Multiple Criteria Data Association Solutions *Jean Dezert, Kaouthar Benameur, Laurent Ratton, Jean-François Grandin*	
A Method for Evaluating Joint Tracking and Classification Performance *Le Zhang, Jian Lan, X. Rong Li*	Fault Tolerant Fusion Approach Based on Information Theory Applied on GNSS Localization *Joelle Al Hage, Nourdine Aittmazirte, Maan El Badaoui El Najjar, Denis Pomorski*	Optimal Fusion Rules for Label Fusion of Dependent Classification Systems *James Fitch, Mark E Oxley, Christine M Schubert Kabban*	

Technical Program—Wed. AM

Time	Independence B	Independence C	Independence D	Independence E
10:00-12:00	**Gerhard Kurz** ***Directional Estimation***	**M. Dolores Ruiz** ***Data mining and machine learning in data fusion***	**Juan Manuel Corchado** ***Intelligent Information Fusion***	**Benjamin Noack** ***Advances in Distributed Kalman Filtering***
10:00	Heart Phase Estimation Using Directional Statistics for Robotic Beating Heart Surgery *Gerhard Kurz, Uwe D Hanebeck*	Fast Imbalanced Classification of Healthcare Data with Missing Values *Talayeh Razzaghi, Oleg Roderick, Ilya Safro, Nick Marko*	Fusion of Sentiment Analysis and Emotion Recognition to Model the User's Emotional State *David Griol, Jose Manuel Molina, Jesus García*	Track Association Using Augmented State Estimates *Chee-Yee Chong, Shozo Mori*
10:25	Multimodal Circular Filtering Using Fourier Series *Florian Pfaff, Gerhard Kurz, Uwe D Hanebeck*	Online Sparse Gaussian Process Regression for Trajectory Modeling *Mattias Tiger, Fredrik Heintz*	Improving Scene Classification by Fusion of Training Data and Web Resources *Dongzhe Wang, Kezhi Mao, Gee Wah Ng*	Comparison of Augmented State Track Fusion Methods for Non-full-rate Communication *Chee-Yee Chong, Felix Govaers, Shozo Mori, Wolfgang Koch*
10:50	Statistical Estimation and Clustering of Group-invariant Orientation Parameters *Yu-Hui Chen, Dennis Wei, Gregory Newstadt, Marc De Graef, Jeffrey Simmons, Alfred Hero III*	Troll Detection by Domain-Adapting Sentiment Analysis *Chun Wei Seah, Hai Leong Chieu, Kian Ming A. Chai, Loo Nin Teow, Lee Wei Yeong*	Multi-source Data Clustering *Tiancheng Li, Juan Corchado, Javier Bajo, Shudong Sun*	Chernoff Fusion of Gaussian Mixtures for Distributed Maneuvering Target Tracking *Melih Günay, Umut Orguner, Mubeccel Demirekler*
11:15	Non-Identity Measurement Models for Orientation Estimation Based on Directional Statistics *Igor Gilitschenski, Gerhard Kurz, Uwe D Hanebeck*	Fuzzy Meta-Association Rules for Information Fusion *M. Dolores Ruiz, Juan Gómez-Romero, Maria Martin-Bautista, Daniel Sánchez, Miguel Delgado Calvo-Flores*	On the Use and Misuse of Bayes Filters *Tiancheng Li, Javier Prieto, Juan Corchado, Javier Bajo*	Approximation of Powers of Gaussian Mixtures *Jiří Ajgl, Miroslav Šimandl*
11:40	Cyclic Bayesian Bounds for Filtering in Periodic State Space *Eyal Nitzan, Tirza Routtenberg, Joseph Tabrikian*	Variational Inference for Graphical Models of Multivariate Piecewise-Stationary Time Series *Hang Yu, Justin Dauwels*	A Unified Approach for Domain-Specific Tweet Sentiment Analysis *Patricia Ribeiro, Li Weigang, Tiancheng Li*	The Exact Algorithm for Multi-sensor Asynchronous Track-to-Track Fusion *Kelin Lu, Kuochu Chang, Rui Zhou*

Independence F	Independence G	Independence H	Independence I
Galya Rogova ***Ontologies, graphs, and semantic reasoning for high level fusion***	**Michael Beard** ***Sensor management***	**Marcus Baum** ***Extended Object and Group Tracking***	**Antonio Zea** ***Data Fusion Methods for Indoor Localization of People and Objects***
Discover Trending Domains Using Fusion of Supervised Machine Learning with Natural Language Processing *Shilpa Lakhanpal, Ajay Gupta, Rajeev Agrawal*	A State Estimation and Malicious Attack Game in Multi-Sensor Dynamic Systems *Jingyang Lu, Ruixin Niu*	Probabilistic Data Association for Tracking Extended Targets Under Clutter Using Random Matrices *Michael Schuster, Johannes Reuter, Gerd Wanielik*	Particle Filtering for Positioning Based on Proximity Reports *Yuxin Zhao, Feng Yin, Fredrik Gunnarsson, Mehdi Amirijoo, Emre Özkan, Fredrik Gustafsson*
Use of Background Knowledge in Natural Language Understanding for Information Fusion *Stuart C. Shapiro, Daniel R. Schlegel*	Sensor Control for Multi-target Tracking Using Cauchy-Schwarz Divergence *Michael Beard, Ba-Tuong Vo, Ba-Ngu Vo, Sanjeev Arulampalam*	A Bayesian Compressed Sensing Kalman Filter for Direction of Arrival Estimation *Matthew B Hawes, Lyudmila Mihaylova, François Septier, Simon Godsill*	Improving Indoor Localization by User Feedback *Lukas Koeping, Szymon Bobek, Frank Deinzer, Marcin Grzegorzek, Grzegorz J. Nalepa, Mateusz Slazynski*
Consensus: a Comprehensive Solution to the Grand Challenges of Information Fusion *Dale Lambert, Adam Saulwick, Kerry Trentelman*	Scheduling Multifunction Radar for Search and Tracking *Marion Byrne, Kruger White, Jason L Williams*	Converted Measurements Random Matrix Approach to Extended Target Tracking Using X-band Marine Radar Data *Gemine Vivone, Paolo Braca, Karl Granström, Antonio Natale, Jocelyn Chanussot*	Proximity Report Triggering Threshold Optimization for Network-Based Indoor Positioning *Feng Yin, Yuxin Zhao, Fredrik Gunnarsson*
Hidden Relationships Discovery Through High-Level Information Fusion *Claire Laudy*	Learned Ultra-Wideband RADAR Sensor Model for Augmented LIDAR-based Traversability Mapping in Vegetated Environments Juhana Ahtiainen, Thierry Peynot, Jari Saarinen, Steven Scheding, Arto Visala	The Sequence Monte Carlo Multi-Bernoulli Filter for Extended Targets *Meiqin Liu, Tongyang Jiang, Senlin Zhang*	Environment Perception Using Grid Occupancy Estimation with Belief Functions *Jean Dezert, Julien Moras, Benjamin Pannetier*
Scalable Uncertainty Treatment Using Triple Stores and the OWL 2 RL Profile *Laécio L Santos, Rommel N Carvalho, Marcelo Ladeira, Li Weigang, Kathryn Laskey, Paulo C.G. Costa*		A Generalised Labelled Multi-Bernoulli Filter for Extended Multi-target Tracking *Michael Beard, Stephan Reuter, Karl Granström, Ba-Tuong Vo, Ba-Ngu Vo, Alexander Scheel*	Dynamic-Occlusion Likelihood Incorporation in a PHD Filter Based Range-Only Tracking System *Snezhana Jovanoska, Felix Govaers, Reiner S. Thomä, Wolfgang Koch*

Technical Program—Wed. Early PM

Time	Independence B	Independence C	Independence D	Independence E
13:00-15:00	**Uwe Hanebeck** ***Directional Estimation***	**Satish Iyengar** ***Data mining and machine learning in data fusion (CAT)***	**Jesus Garcia** ***Context-based Information Fusion***	**Felix Govaers** ***Distributed/decentralized fusion***
13:00	Performance of Maximum Likelihood Estimation for Multipath TDOA Passive Ranging *Benjamin Shapo, Christopher Kreucher*	Generic Object Recognition Based on the Fusion of 2D and 3D SIFT Descriptors *Miaomiao Liu, Xinde Li, Jean Dezert, Chaomin Luo*	A Proposal for Improving Spoken Dialog Systems Using Context Information Fusion *Ikram Chairi, David Griol, Jesus García, Jose Manuel Molina*	Distributed Particle Filtering Via Optimal Fusion of Gaussian Mixtures *Jichuan Li, Arye Nehorai*
13:25	Bayesian Filtering for Orientational Distributions: A Fourier Approach *Jin Seob Kim, Gregory Chirikjian*	A Novel Approach for Trajectory Feature Representation and Anomalous Trajectory Detection *Wenhui Feng, Chongzhao Han*	Context Driven Tracking Using Particle Filters *Rik Claessens, Gregor Pavlin, Patrick de Oude, Karl Tuyls*	Cooperative Terrain Based Navigation and Coverage Identification Using Consensus *Andre R. Braga, Emre Özkan, Carsten Fritsche, Fredrik Gustafsson, Marcelo Bruno*
13:50	Track Before Detect DOA Tracking of Extended Targets with Marked Poisson Point Processes *A. Saucan, T. Chonavel, C. Sintes, J. M. Le Caillec*	Anomaly Detection in Maritime Data Based on Geometrical Analysis of Trajectories *Behrouz Haji Soleimani, Erico N. De Souza, Casey Hilliard, Stan Matwin*	Context-Based Ground Target Tracking - An Integrated Approach *Michael Mertens, Martin Ulmke*	On Threshold Optimization for Aircraft Conflict Detection *Huimin Chen, Vesselin P. Jilkov, X. Rong Li*
14:15	Direction of Arrival Estimation in Sensor Arrays Using Local Series Expansion of the Received Signal *F. Gustafsson, G. Hendeby, D. Lindgren, G. Mathai, H. Habberstad*	Evidential Multinomial Logistic Regression for Multiclass Classifier Calibration *Philippe Xu, Franck Davoine, Thierry Denoeux*	Adaptive Sensor Fusion Architecture Through Ontology Modeling and Automatic Reasoning *Enrique Marti, Jesus García, Jose Manuel Molina*	A Hybrid Prediction Method and Its Application in the Distributed Low-cost INS/GPS Integrated Navigation System *X. Wang, J. Chen, W. Ni*
14:40	Direct Single Sensor TDOA Localization Using Signal Structure Information *Christian Steffes, Marc Oispuu*	Ship Movement Anomaly Detection Using Specialized Distance Measures *B. Liu, E. N. De Souza, C. Hilliard, S. Matwin*	Data-driven Detection and Context-based Classification of Maritime Anomalies *Giuliana Pallotta, Anne-Laure Jousselme*	On Track-to-Track Data Association for Automotive Sensor Fusion *Bharanidhar Duraisamy, Tilo Schwarz, Christian Wöhler*

Independence F	Independence G	Independence H	Independence I
Kathryn Laskey ***Situation representation and estimation***	**Kyle DeMars** ***Space Object Detection, Tracking, Identification, and Classification***	**Wolfgang Koch** ***Extended Object and Group Tracking***	**Erik Blasch** ***Image fusion and video tracking***
Unified Traffic Situation Estimation Model with Application in Longitudinal Vehicle State and Route Prediction *Florian Kuhnt, Ralf Kohlhaas, Thomas Schamm, J. Marius Zöllner*	Relative Multiple Space Object Tracking Using Intensity Filters *Keith LeGrand, Kyle DeMars*	An Extended Target Tracking Model with Multiple Random Matrices and Unified Kinematics *Karl Granström, Peter Willett, Yaakov Bar-Shalom*	Adaptive Relevance Feedback for Fusion of Text and Visual Features *Leszek Kaliciak, Hans Myrhaug, Ayse Goker, Dawei Song*
Vessel Trajectory Partitioning Based on Hierarchical Fusion of Position Data *Xianbin Wu, Lin Wu, Yongjun Xu, Zhulin An, Boyu Diao*	Gaussian Mixture Multiple-Model Multi-Bernoulli Filters for Nonlinear Models Via Unscented Transform Techniques *Tongyang Jiang, Meiqin Liu, Xie Wang, Senlin Zhang*	Maritime Group Motion Analysis: Representation, Learning, Recognition, and Deviation Detection *Allen Waxman, Haijun Hu, Daniel Martin*	Tracking of Dolphins in a Basin Using a Constrained Motion Model *Clas Veibäck, Gustaf Hendeby, Fredrik Gustafsson*
Air Traffic Monitoring Using Datastream Analysis Techniques *Gereon Schüller, Philip Schmiegelt, Andreas Behrend*	Joint Estimation of Target State and Ionosphere State for OTHR Based Tracking *Hang Geng, Liang Yan*	Partial Likelihood for Unbiased Extended Object Tracking *Florian Faion, Antonio Zea, Marcus Baum, Uwe D Hanebeck*	Combining Passive Visual Cameras and Active IMU Sensors to Track Cooperative People *Wenchao Jiang, Zhaozheng Yin*
Framework for Situation Assessment and Threat Evaluation with Application to an Air Defense Scenario *José Fernando Basso Brancalion, Douglas Marques, Karl H Kienitz*	Challenges of Multi-Target Tracking for Space Situational Awareness *Brandon Jones, Daniel Bryant, Ba-Tuong Vo, Ba-Ngu Vo*	Exploiting Clutter: Negative Information for Enhanced Extended Object Tracking *Antonio Zea, Florian Faion, Uwe D Hanebeck*	Improved Multi-Focus Image Fusion *Amina Jameel, Fouzia Noor*
	Information Weighted Consensus-based Cooperative Space Object Tracking to Overcome Malfunctioned Sensors and Noisy Links *B. Jia, K. Pham, E. Blasch, D. Shen, Z. Wang, X. Tian, G. Chen*	GPU-Accelerated Progressive Gaussian Filtering with Applications to Extended Object Tracking *Jannik Steinbring, Uwe D Hanebeck*	Labeled Multi-Bernoulli Track-Before-Detect for Multi-Target Tracking in Video *Tharindu Rathnayake, Amirali Khodadadian Gostar, Reza Hoseinnezhad, Alireza Bab-Hadiashar*

Technical Program—Wed. Late PM

Time	Independence B	Independence C	Independence D	Independence E
15:30-17:10	**Ba-Ngu Vo** ***Averaging Measures: Wasserstein Barycenters, MMOSPA***	**Michael Lexa** ***Change, Anomaly, and Trend (CAT) Detection in Challenging Environments***	**Lauro Snidaro** ***Context-based Information Fusion***	**Johan Wahlström** ***Applications of data fusion (Automotive)***
15:30	Average Kullback-Leibler Divergence for Random Finite Sets *Luigi Chisci, Giorgio Battistelli, Claudio Fantacci, Alfonso Farina, Ba-Ngu Vo*	Change Detection with an Unknown Sensor Subset: More Information is Not Always Better *Marco Guerriero, Dayu Huang, Jayakrishnan Unnikrishnan, Michael Lexa, Satish Iyengar, Frederick W. Wheeler*	A Framework for Dynamic Context Exploitation *Lauro Snidaro, Lubos Vaci, Jesus García, Enrique Marti, Anne-Laure Jousselme, Karna Bryan, Domenico D Bloisi, Daniele Nardi*	Probabilistic GNSS Signal Tracking for Safety Relevant Automotive Applications *Robin Streiter, Sven Bauer, Gerd Wanielik*
15:55	Association-Free Direct Filtering of Multi-Target Random Finite Sets with Set Distance Measures *Uwe D Hanebeck, Marcus Baum*	Dynamic Data-driven Symbolic Causal Modeling for Battery Performance & Health Monitoring *Soumalya Sarkar, Devesh Jha, Asok Ray, Yue Li*	Situation/Threat Context Assessment *Erik Blasch, Steve Israel*	Data-driven Simulation and Parametrization of Traffic Scenarios for the Development of Advanced Driver Assistance Systems *Marc Zofka, Florian Kuhnt, Christoph Rist, Thomas Schamm, J. Marius Zöllner*
16:20	OSPA Barycenters for Clustering Set-Valued Data *Marcus Baum, Balakumar Balasingam, Peter Willett, Uwe D Hanebeck*	Detecting Trend in Randomly Switched Measurements *Dayu Huang, Marco Guerriero, Xing Wang*	Artifact "Metaphors": Gaining Capability Using "Wrong" Tools *Giovanni Ferrin, Lauro Snidaro, GianLuca Foresti*	Target Detection Using GPS Signals of Opportunity *Maria-Paola Clarizia, Christopher Ruf, Paolo Braca, Peter Willett*
16:45	MMOSPA-based Direction-of-Arrival Tracking with a Passive Sonar Array - An Experimental Study *Marcus Baum, Peter Willett*	Identifying Anomalous Objects in SAS Imagery Using Uncertainty *Calum Blair, John Thompson, Neil Robertson*		IMU Alignment for Smartphone-based Automotive Navigation *Johan Wahlström, Isaac Skog, Peter Händel*

Technical Program—Wed. Late PM

Independence F	Independence G	Independence H	Independence I
Nageswara Rao ***Situation and threat assessment***	**Brandon Jones** ***Space Object Detection, Tracking, Identification, and Classification***	**Todd Martin** ***Uncertainty management and reasoning: Estimation***	
Distributed Belief Propagation for Situation Assessment in Net-Centric Environment *Subrata Das*	On Mutual Information for Observation-to-Observation Association *Islam Hussein, Christopher Roscoe, Matt Wilkins, Paul Schumacher*	Development and Analysis of a Probabilistic Reasoning Methodology for Spectrum Situational Awareness and Parameter Estimation in Uncertain Environments *Todd Martin, Kuochu Chang*	
On Resilience of Cyber-Physical Infrastructures Using Discrete Product-Form Games *Nageswara Rao, Chris Yu Tak Ma, Urvashi Shah, Jun Zhuang, Fei He, David Yau*	Automated State and Dynamics Estimation in Dynamically Mismodeled Systems with Information From Optimal Control Policies *Daniel Lubey, Daniel Scheeres*	Nonlinear Bayesian Filtering Based on Fokker Planck Equation and Tensor Decomposition *Yifei Sun, Mrinal Kumar*	
A Situation Assessment Framework for Cyber Security Information Relevance Reasoning *Shan Lu, Mieczyslaw Kokar*	A Randomized Sampling Based Approach to Multi-Object Tracking *Weston Faber, Suman Chakravorty, Islam Hussein*	Adaptive Lower Bounds for Gaussian Measures of Polytopes *Uwe D Hanebeck, Maxim Dolgov*	
A Graph-Based Evidence Theory for Assessing Risk *Chiara Foglietta, Riccardo Santini, Stefano Panzieri*	Reasoning on Resident Space Object Hierarchies Using Probabilistic Programming *Brian Ruttenberg, Matt Wilkins, Avi Pfeffer*	Large-Scale, Discrete IP Geolocation Via Multi-Factor Evidence Fusion Using Factor Graphs *Sudhanshu Chandekar, Bernd-Peter Paris*	

Technical Program—Thurs. AM

Time	Independence B	Independence C	Independence D	Independence E
10:00-12:00	**Simon Julier** ***Registration***	**David F Crouse** ***Estimation and filtering; Object tracking***	**Yi Chen** ***Signal processing and computer vision***	**Fred Daum** ***Homotopy Methods for Progressive Bayesian Estimation***
10:00	Navigation with SAR and 3D-Map Aiding *Tomas Toss, Patrik Dammert, Zoran Sjanic, Fredrik Gustafsson*	Filter Initialization and Batch Estimation for Tracking with Angular-Only Measurements *Dietrich Fraenken*	DOA Estimation Based on the Microphone Array for the Time-varying Number of Sound Signals *Hongyan Zhu, Kai Guo, Yan Lin*	Renormalization Group Flow in K-Space for Nonlinear Filters, Bayesian Decisions and Transport *Fred E Daum, Jim Huang*
10:25	Bernoulli Filtering From a Single Platform *Simon Julier, Amadou Gning*	Cubature/ Unscented/ Sigma Point Kalman Filtering with Angular Measurement Models *David F Crouse*	Camera Geolocation From Mountain Images *Yi Chen, Gang Qian, Kiran Gunda, Himaanshu Gupta, Khurram Shafique*	Gaussian-Mixture Based Ensemble Kalman Filter *Felix Govaers, Peter Willett, Wolfgang Koch*
10:50	Recursive Joint Track-to-Track Association and Sensor Nonlinear Bias Estimation Based on Generalized Bayes Risk *Mengxi Hao, Xianghui Yuan, Chongzhao Han*	A Computationally Efficient Dynamic Programming Based Track-Before-Detect *Jinghe Wang, Wei Yi, Mark Morelande, Lingjiang Kong*	Distributed Classification Under Statistical Dependence with Application to Automatic Modulation Classification *Hao H, Sora Choi, Pramod Varshney, Wei Su*	Feedback Particle Filter: Application and Evaluation *Karl OE Berntorp*
11:15	Gauge-invariant Registration in Networks *Stephen D Howard, Douglas Cochran, Bill Moran*	The Kalman Laplace Filter: A New Deterministic Algorithm for Nonlinear Bayesian Filtering *Paul Bui Quang, Christian Musso, François Le Gland*	Fusion of Trackers on Thermal Image Sequences *Sebastian Thomé, Eckart Michaelsen, Norbert Scherer-Negenborn, Klaus Jäger, Leo Doktorski*	Multi-Sensor Fusion Using Homotopy Particle Filter *Nima Moshtagh, Moses Chan*
11:40	RoughCough - A New Image Registration Method for Radar Based Vehicle Self-Localization *Klaudius Werber, Michael Barjenbruch, Jens Klappstein, Juergen Dickmann, Christian Waldschmidt*	The Multiple Model Labeled Multi-Bernoulli Filter *Stephan Reuter, Alexander Scheel, Klaus Dietmayer*	Multiple-Model Hypothesis Testing Using Adaptive Representative Model *Bao Liu, Jian Lan, X. Rong Li*	Comparison of Angle-only Filtering Algorithms in 3D Using EKF, UKF, PF, PFF, and Ensemble KF *Syamantak Datta Gupta, Jun Ye Yu, Mahendra Mallick, Mark Coates, Mark Morelande*

Independence F	Independence G	Independence H	Independence I
Christopher Kreucher ***Particle filters and Monte Carlo methods***	**Pedro A. Forero** ***Applications of data fusion (Nav)***	**Steven Schoenecker** ***Target Classification; Target detection and localization; Object tracking***	
A Laplace-based Particle Filter for Track-Before-Detect *Christian Musso, Paul Bui Quang, Achille Murangira*	Detecting Malicious ADS-B Transmitters Using a Low-Bandwidth Sensor Network *Marcio Monteiro, Thabet Kacem, Alexandre B Barreto, Duminda Wijesekera, Paulo C.G. Costa*	Can This Target Be Tracked? *Steven Schoenecker, Peter Willett, Yaakov Bar-Shalom*	
Non-Line-of-Sight Mitigation for Reliable Urban GNSS Vehicle Localization Using a Particle Filter *Sven Bauer, Robin Streiter, Marcus Obst, Gerd Wanielik*	Passive Tracking of Underwater Acoustic Sources with Sparse Innovations *Pedro A. Forero, Paul A. Baxley, Logan Straatemeier*	Joint Multi-Target Detection and Tracking Using Conditional Joint Decision and Estimation with OSPA-alike Cost *Wen Cao, Jian Lan, X. Rong Li*	
Comparison of Filtering Algorithms for Ground Target Tracking Using Space-based GMTI Radar *Mahendra Mallick, Barbara La Scala, Branko Ristic, Thia Kirubarajan, Joe Hill*	An Efficient Algorithm for Aircraft Conflict Detection and Resolution Using List Viterbi Algorithm *Vesselin P. Jilkov, X. Rong Li, Jeffrey H. Ledet*	Joint Tracking and Classification Based on Kinematic and Target Extent Measurements *Clement Magnant, Audrey Giremus, Eric J. Grivel, Laurent Ratton, Bernard Joseph*	
Saddle Point Method for JPDA and Related Filters *Roy Streit*	A Mobile Acoustic Sensor Fusion Network Using Biologically Inspired Sensors and Synchronization *Socrates Deligeorges, Cathy Lavey, George Cakiades, Jemin George, Yongqiang Wang, Felipe Nunez, Francis Doyle, III*	Individuals Motion Models Based on Probabilistic Distribution Profiles *Victor Frencl, Joao do Val*	
Incorporating Estimated Feature Descriptor Information Into Rao Blackwellized-PHD-SLAM *Felipe Inostroza, Keith Yu Kit Leung, Martin D Adams*	Indoor Localization with a Signal Tree *Wenchao Jiang, Zhaozheng Yin*	Joint Tracking and Classification Based on Conditional Joint Decision and Estimation *Wen Cao, Jian Lan, X. Rong Li*	

Technical Program—Thurs. Early PM

Time	Independence B	Independence C	Independence D	Independence E
13:00-15:00	**Yaakov Bar-Shalom** ***Data association; Estimation***	**Ondrej Straka** ***Estimation and filtering***	**KC Chang** ***Applications of Data Fusion and Predictive Analytics to Finance, Business, and Marketing***	**Frederica Darema** ***Dynamic Data Driven Application Systems for Sensor Data Problems***
13:00	Spatial Clutter Measurement Density Estimation in Nonhomogeneous Measurement Spaces *Woo Chan Kim, Taek Lyul Song*	Bearings-Only Tracking with Fusion From Heterogenous Passive Sensors: ESM/EO and Acoustic *Rong Yang, Yaakov Bar-Shalom, Gee Wah Ng*	Business Data Fusion *Surya Yadav, Gautam Shroff, Ehtesham Hassan, Puneet Agarwal*	A Learning Drift Homotopy Particle Filter *Vasileios Maroulas, Kai Kang, Ioannis Schizas, Michael Berry*
13:25	Scalable Multitarget Tracking Using Multiple Sensors: A Belief Propagation Approach *Florian Meyer , Paolo Braca, Peter Willett, Franz Hlawatsch*	Estimation of State and Measurement Noise Characteristics *Jindřich Duník, Ondřej Straka, Miroslav Šimandl, Oliver Kost, Milos Sotak, Radek Baranek, Zdenek Kana*	Online Playtime Prediction for Cognitive Video Streaming *D. Pasupuleti, P. Mannaru, B. Balasingam, M. Baum, K. R Pattipati, P. Willett, C. Lintz, G. Commeau, F. Dorigo, J. Fahrny*	Multiway Histogram Intersection for Multi-target Tracking *Yu Pang, Bin Jia, Erik Blasch, Carolyn Sheaff, Khanh Pham, Genshe Chen, Haibin Ling*
13:50	Adaptive Kernel Background Intensity Estimation Based on Local 2D Orientation *Johannes Wintenby, Daniel Svensson*	Design of Discrete Second Order Filters for Continuous-Discrete Models *Ondřej Straka, Jindřich Duník, Miroslav Šimandl*	Combinatorial Prediction Markets for Fusing Information From Distributed Experts and Models *Kathryn Laskey, Robin Hanson, Charles Twardy*	Nonlinear Target Tracking for Threat Detection Using RSSI and Optical Fusion *Tommy Chin, Jr, Kaiqi Xiong, Erik Blasch*
14:15	A Survey on Joint Tracking Using EM Based Techniques *Hua Lan, Xuezhi Wang, Liang Yan, Feng Yang, Zengfu Wang, Zhiyuan Shi*	Adaptive Upper-Bound Linear Mean Square Error Filter of Markovian Jump Linear Systems with Generalized Unknown Disturbances *Yuemei Qin, Liang Yan, Yanbo Yang, Quan Pan, Yanting Yang*	A Method to Sparse Eigen Subspace and Eigenportfolios *Onur Yilmaz, Ali Akansu*	Manifold and Transfer Subspace Learning for Cross- Domain Vehicle Recognition in Dynamic Systems *Olga Mendoza-Schrock*
14:40	PHD Filter with Approximate Multiobject Density Measurement Update *Karl Granström, Peter Willett, Yaakov Bar-Shalom*	Multiple-Model Estimation with Heterogeneous State Representation *Yongxin Gao, Yu Liu, X. Rong Li, Vesselin P. Jilkov*	An Application of Interacting Multiple Model Tracking Method to Financial Modeling and Asset Allocation *Shozo Mori, Kuochu Chang, Hajime Takahashi, Chee-Yee Chong*	Pseudo-Real-Time Wide Area Motion Imagery (WAMI) Processing for Dynamic Feature Detection *Ryan Wu, Bingwei Liu, Yu Chen, Erik Blasch, Haibin Ling, Genshe Chen*

Independence F	Independence G	Independence H	Independence I
Dave Hall ***Multi-Level Fusion: bridging the gap between high and low level fusion***	**Sean Martin** ***Target Classification***		
Modeling the User's Intention by Means of the Fusion of Several User Models *David Griol, Jose Manuel Molina, Jesus García*	Fuzzy Extreme Learning Machine and Its Applications *Wenbo Zhang, Hongbing Ji*		
Building a "living Database" for Human-Machine Intelligence Analysis *Dave Braines, John B Ibbotson, Alun Preece, Darren Shaw*	Classification of Incomplete Pattern Based on Fusion of Belief Functions *Zhunga Liu, Quan Pan, Jean Dezert, Arnaud Martin, Grégoire Mercier*		
Levels? *Alan N. Steinberg*	Risk-Based Sensor Resource Management for Field of View Constrained Sensors *Sean Martin*		
Video-to-Text Information Fusion Evaluation for Level 5 User Refinement *Erik Blasch, Dan Shen, Genshe Chen, Arslan Basharat, Haibin Ling, Riad Hammoud, Alex Aved, James Nagy*	Benefits of Using Explicit Ground-Plane Information for Grid-based Urban Environment Modeling *Jens Rieken, Richard Matthaei, Markus Maurer*		
Markov Logic Networks for Multi-Level Fusion Support to Intelligence Analysis *Martin Oxenham, Glenn Burgess, Zhuoyun Ao, Edwin El-Mahassni, Marion Byrne*			

Technical Program—Thurs. Late PM

Time	Independence B	Independence C	Independence D	Independence E
15:30-17:10	**Stefano Coraluppi** ***Data association; Object tracking***	**Benjamin Noack** ***Estimation and filtering***	**Zhi Tian** ***Applications of Data Fusion and Predictive Analytics to Finance, Business, and Marketing***	**Vasileios Maroulas** ***Dynamic Data Driven Application Systems for Sensor Data Problems: Belief***
15:30	MCMC and MHT Approaches to Multi-INT Surveillance *Stefano Coraluppi, Craig Carthel, William Kreamer, Alan Willsky*	Determination, Separation, and Tracking of an Unknown Time Varying Number of Maneuvering Sources by Bayes Joint Decision-Estimation *Reza Rezaie, X. Rong Li*	An Application of Data Fusion Techniques in Quantitative Operational Risk Management *Sabyasachi Guharay, Kuochu Chang,*	Information Fusion with Belief Functions: a Comparison of Proportional Conflict Redistribution PCR5 and PCR6 Rules for Networked Sensors *Roman Ilin, Erik Blasch*
15:55	Distributed MHT with Active and Passive Sensors *Stefano Coraluppi, Craig Carthel, Cynara Wu, Mark Stevens, Joel Douglas, Gerard Titi, Mark Luettgen*	Extended Kalman Filter Modifications Based on an Optimization View Point *Martin Skoglund, Gustaf Hendeby*	Market Analysis and Trading Strategies with Bayesian Networks *Kuochu Chang, Zhi Tian*	Information Fusion with Topological Event Spaces *Roman Ilin, Jun Zhang*
16:20	A Maximum Weight Constrained Path Cover Algorithm for Graph-Based Multitarget Tracking *Lingji Chen, Ravi Ravichandran*	Treatment of Biased and Dependent Sensor Data in Graph-based SLAM *Benjamin Noack, Simon Julier, Uwe D Hanebeck*		Modified PCR Rules of Combination with Degrees of Intersections *Florentin Smarandache, Jean Dezert*
16:45	Detecting Changes of Transportation-Mode by Using Classification Data *Angel J. Lopez, Daniel Ochoa, Sidharta Gautama*	An Effective Modeling Framework for Equality-Constrained Dynamic Systems *Linfeng XU, X. Rong Li, Liang Yan, Zhansheng Duan, Qian Feng*		

Independence F	Independence G	Independence H	Independence I
Naser Damer ***Information Fusion in Multi-Biometric Systems***	**James Llinas** ***Multi-Level Fusion: bridging the gap between high and low level fusion***	**Florian Faion** ***Probabilistic RGBD Data Fusion***	
Face Image Resolution Enhancement Based on Weighted Fusion of Wavelet Decomposition *R Raghavendra, Christoph Busch*	Application of Multi-level Fusion for Pattern of Life Analysis *Geoff Gross, Eric Little, Ben Park, James Llinas, Rakesh Nagi*	Anisotropic Point-Based Fusion *Damien Lefloch, Tim Weyrich, Andreas Kolb*	
Fusion of Face and Periocular Information for Improved Authentication on Smartphones *Kiran B. Raja, R Raghavendra, Martin Stokkenes, Christoph Busch*	Ambiguity Reduction of Underwater Targets in Framework of Topic Modeling *Jüri Sildam, Kevin LePage*	RGBD Data Based Pose Estimation: Why Sensor Fusion? *Osman Gedik, Aydin Alatan*	

Social Program

Ice Breaker Reception

Monday July 6, 17:30, conference venue, the Grand Hyatt Washington

The Ice Breaker reception will be an informal gathering, in which Fusion attendees will have an initial opportunity of congregating and officially starting the social program of the conference. Light refreshments will be served.

Welcome Reception

Tuesday July 7, Starting at 18:30, Mansion on O Street

Tuesday will bring an amenable evening to Fusion 2015 attendees in the ***Mansion on O Street***, a unique blend of music museum, executive lodging, restaurant, retreat venue, B&B, tourist attraction, and treasure hunt place. The building is comprised of a series of five interconnected town houses that includes over 100 rooms and over 70 secret doors, and was featured in the National Geographic Traveler and in the Travel Channel as a an ever changing environment that "combines history, art and architecture to craft an exhilarating entertainment experience found nowhere else on earth."

The mansion blends the most unique sensory experience, and is a haven for anyone that loves an adventure and privacy. Filled with antiques, art, music memorabilia, and one-of-a-kind items, the mansion blends history with state of the art technology.

Fusion 2015 attendees will have access to the whole mansion, while enjoying the cocktail party at the exclusive club floor, which was fully reserved for the conference.

Buses will be leaving the Grand Hyatt starting 5:40 P.M. More details will be given during the conference.

Conference Banquet

Wednesday July 8, Starting at 19:00, Donald W. Reynolds Center for American Art and Portraiture

The Fusion 2015 Gala Dinner will be held Wednesday evening at the Donald W. Reynolds Center for American Art and Portraiture, which is a National Historic Landmark that used to be one of the earliest the United States Patent Office buildings and now houses the National Portrait Gallery and the Smithsonian American Art Museum.

The building is a short walk (two blocks) from the conference venue, and conference attendees will have the opportunity to visit both museums before the dinner.

The dinner will be served at the Robert and Arlene Kogod Courtyard, an enclosed courtyard with an elegant glass canopy offering a uniquely sophisticated atmosphere. The space was designed by world-renowned architects Foster + Partners, and its wavy glass-and-steel roof appears to float over the 28,000-square-foot courtyard – providing a distinctive, contemporary accent to the building's Greek Revival style.

The main attraction will be a 17-strong jazz band, which will entertain the guests during the gala dinner. The performance includes a grand piano and will cover various periods of American music.

5K Fun Run

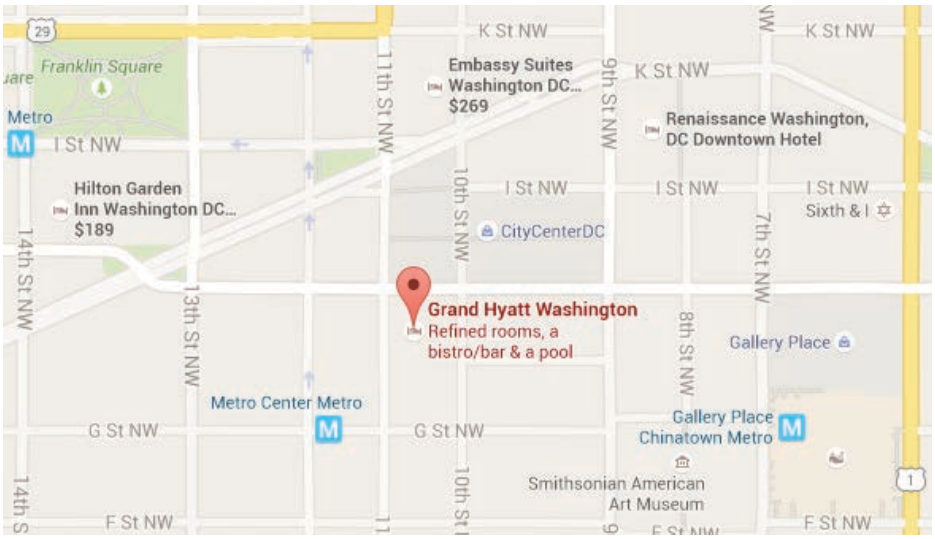
Wednesday July 8, Starting at 06:30, Grand Hyatt Washington

The 5th Annual Fusion 5k run will occur on Wednesday morning at 6:30am. Please meet on the mall near the National Museum of Natural History at the corner of Madison Drive & 12th Street. The course will be a couple of loops around the mall between 7th Street and 14th Street. If there are questions, please contact Darin Dunham. Previous year's results can be found at http://www.isif.org/past-conferences at the bottom of the page.

Conference Site

Meeting Site

Grand Hyatt Washington
1000 H St NW
Washington, DC 20001
Tel: +1 (202) 582-1234
grandwashington.hyatt.com



Registration Desk

Hours of Operation:

- Monday, 7 AM to 7 PM
- Tuesday, 7 AM to 5 PM
- Wednesday, 7 AM to 5 PM
- Thursday, 7 AM to noon

Tutorial participants will obtain tutorial notes related to their registration.

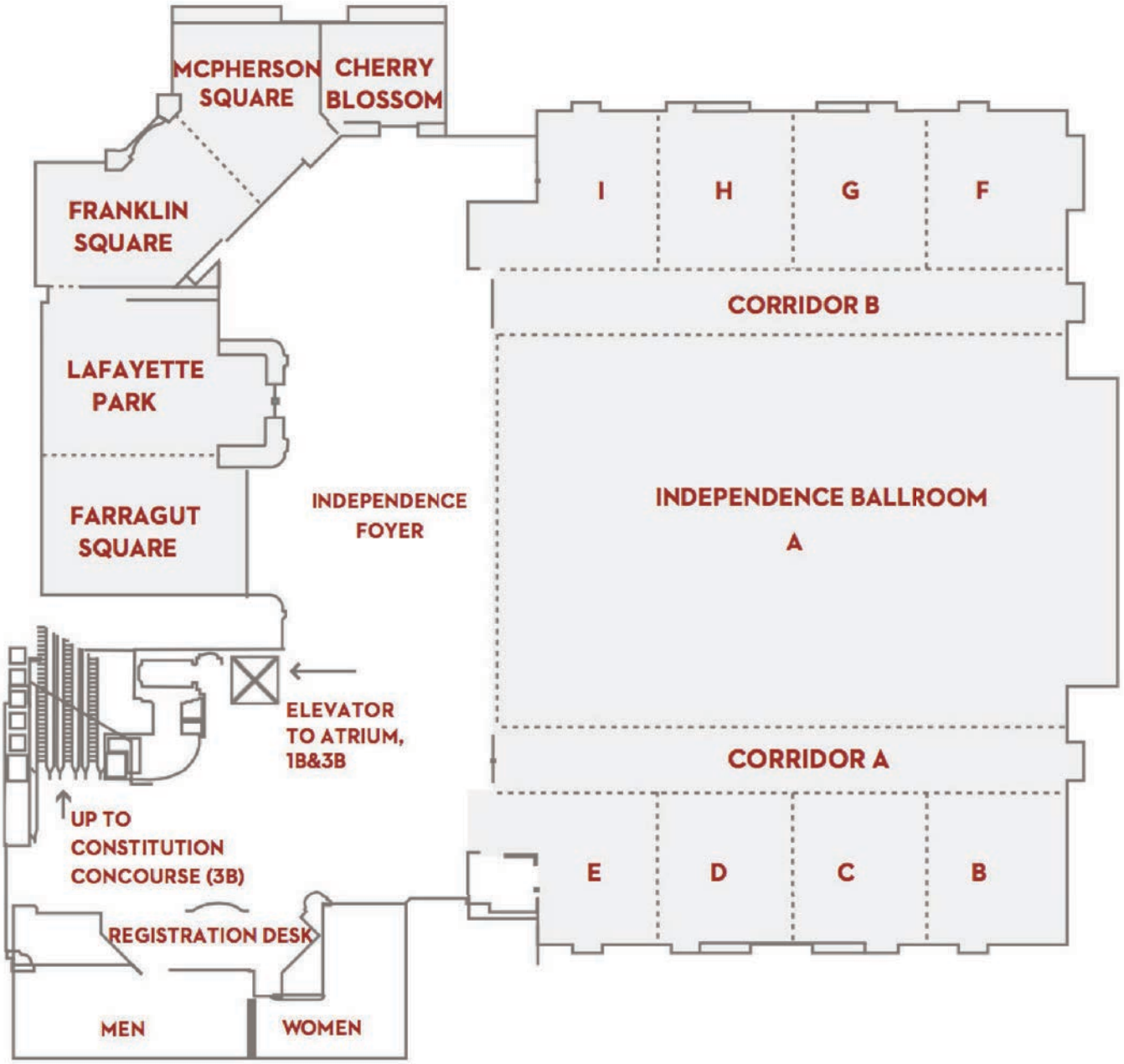
Registration Fee Includes (Regular registration fee only)

Access to all technical program activities with the exception of the tutorials, which have a separate fee
Access to all social program activities, including one reception ticket and one gala dinner ticket
Access to lunch and coffee-break refreshments
Coverage for up to 2 papers. Cost for extra paper submissions is $420
18 months of ISIF membership
Student registrations provide all the benefits of regular registrations, but cover only one paper submission. Cost for extra paper submissions is $420
One copy of the proceedings on USB-thumb drive

Facilities

Projectors and video equipment will be available in each room. Computers will be supplied. Note there will be NO Macintosh computer or video player support. Lapel microphones and laser pointers will be available for all speakers.

General Information



That the name of George Mason should be acclaimed throughout the Republic whose birth pangs he shared, and indeed throughout the free world, will be agreed, I believe, by all American historians. He was the author of the Virginia Declaration of Rights, which was adopted three weeks before the national Declaration of Independence... His chief objection to the new frame of government was that it lacked the sort of guarantees of individual freedom which he had set forth in his Declaration of Rights; and also that it went further than was necessary toward centralization, thus endangering local rights and liberties.*

Dumas Malone, *University of Virginia*

* from the forward, R. A. Rutland, George Mason *Reluctant Statesman*. Louisiana State University Press: BatonRouge, 1961.