***Special Issue on Specifying and Guaranteeing Requirements of Algorithms***

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**Motivation**

With the growing role of digital systems in today’s technology, algorithms are ubiquitous and those algorithms are often viewed as a subsystem. As with any subsystem, requirements of the algorithm and an algorithm guaranteeing performance requirements are needed to build a reliable system. The transition of advanced algorithms to real-world systems is retarded the by absence of sophisticated methods for specifying requirements and algorithms that can guarantee that those performance requirements are satisfied. Implementing advanced algorithms as part of a new product or product enhancement is expensive. Without a cost benefits analysis that supports the implementation of a new algorithm, the conventional algorithm will do just fine. Without requirements and algorithms that guarantee those performance requirements, a cost benefits analysis is impossible. Hence, new advances in advanced algorithms remain dormant. This special issue will focus on the specifying requirements for algorithms and algorithms that guarantee the performance requirements.

**Scope**

All algorithms have input data and formulation of the requirements involves characterization of the data. Characterization of the input data involves random errors and components, underlying structural components of the environment and underlying problem, and anomalous events. Requirements also involve definition of the assessment methods and objective threshold given the input and output data and goals of the subsystem. Sophisticated methods of specifying requirements for algorithms are of interest. Design and development of algorithms that guarantee performance requirements are also of interest. Unique methods that characterize the guaranteed performance of algorithms is also of interest.

**Guest Editors**

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**Anticipated Contributions**

1. W.D. Blair, “Specifying Requirements for Radar Tracking of Maneuvering Targets,” (Tentative).
2. P. Willett, “Guaranteed Performance for Radar Tracking of Maneuvering Targets,” (Confirmed).
3. S. Coraluppi, “Setting the Requirements for Multitarget Tracking Problems,” (Confirmed).
4. C. Chong, “Guaranteeing Performance for Tracking Maneuvering Targets in the Presence of False Alarms,” (Tentative).

**Notional Timeline**

1 Mar 2022 Publication of Call for Papers

1 Jun 2022 Deadline for Submission of Papers

1 Nov 2022 Final decisions for All Submissions

1 Jan 2023 Publication of All Manuscripts

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| **Biographies of Guest Editors**  **W. Dale Blair**is a Principal Research Engineer with the Georgia Tech Research Institute (GTRI) and GTRI Fellow. He received the Ph.D. degree in Electrical Engineering from the University of Virginia, as well as the BS and MS degrees in Electrical Engineering from Tennessee Technological University. Dr. Blair is a recognized expert in the area of multitarget-multisensor tracking that includes optimal estimation, statistical signal processing, decision theory, radar resource allocation, radar signal processing, and radar systems modeling and simulation. He is internationally recognized for his contributions to radar resource allocation for single and multiple sensor systems. He is also internationally recognized for his technical contributions to monopulse processing for unresolved measurements of closely-spaced objects or a target in the presence of sea-surface induced multipath. Dr. Blair was a leader in recognizing the problem of merged measurements and advocating the application of statistically rigorous techniques in monopulse tracking unresolved objects. In 2001, he was selected for the IEEE Fred Nathanson Award for Outstanding Young Radar Engineer for advancement of multitarget-multisensor tracking and radar resource allocation. In 2002, he was elected to the grade of IEEE Fellow for technical leadership and contributions to developing multitarget-multisensor tracking technology and applications. Dr. Blair’s publications include coeditor and coauthor of *Multitarget-Multisensor Tracking: Applications and Advances III* (ARTECH House, 2000); two chapters in *Principles of Modern Radar: Vol I* (SciTech Publishing, 2010); a chapter in *Modeling and Simulation Support for System of Systems Engineering Applications (Wiley, 2015);* 34 refereed journal articles, more than 42 refereed conference papers; and more than 150 other technical papers and reports. His editorial accomplishments include Editor for Radar Systems of the *IEEE Transactions on Aerospace and Electronic Systems (T-AES),* 1996-1999; Editor-In-Chief (EIC) of the T-AES, 1999-2005; and founding EIC for the *Journal for Advances in Information Fusion*, 2005-2013. Dr. Blair served as VP for Publications for the IEEE Aerospace and Electronic Systems Society (AESS) and continues to serve as VP for publications for the International Society for Information Fusion (ISIF).  **Peter Willett** received his BASc (Engineering Science) from the University of Toronto in 1982, and his PhD degree from Princeton University in 1986. He has been a faculty member at the University of Connecticut ever since, and since 1998 has been a professor. He has published 168 journal articles (14 more under review), 355 conference papers, and 10 book chapters and a book on target tracking and data association. He was awarded IEEE Fellow status in 2003. His primary areas of research have been statistical signal processing, detection, machine learning, data fusion and tracking. He has interests in and has published in the areas of change/ abnormality detection, optical pattern recognition, communications and industrial/security condition monitoring. He was editor-in-chief for IEEE Transactions on Aerospace and Electronic Systems from 2006-2011, and served as the AESS Vice President for Publications from 2012-2014. He now serves as Associate EiC of the AES Systems Magazine. Until recently he was associate editor for three active journals – IEEE Transactions on Aerospace and Electronic Systems (for Data Fusion and Target Tracking) and IEEE Transactions on Systems, Man, and Cybernetics, parts A and B. He is also associate editor for the IEEE AES Magazine, associate editor for ISIF’s electronic Journal of Advances in Information Fusion and is Area Editor for the IEEE Signal Processing Society’s Signal Processing Letters. He was founder of editor of the AES Magazine’s periodic Tutorial issues, and was a member of the editorial board of IEEE’s Signal Processing Magazine. He was General Co-Chair (with Stefano Coraluppi) for the 2006 ISIF/IEEE Fusion Conference in Florence, Italy, Executive Chair (with Wolfgang Koch) for the 2008 ISIF/VDE Fusion Conference in Cologne and Emeritus Chair for the 2011 IEEE/ISIF Fusion Conference in Chicago. He will be Program Co-Chair (with Antonio De Maio) for the 2012 IEEE SPS SAM Conference in Hoboken, and was Program Co-Chair (with Eugene Santos) for the 2003 IEEE Conference on Systems, Man & Cybernetics in Washington DC, and Program Co-Chair (with Pramod Varshney) for the 1999 Fusion Conference in Sunnyvale. He was co-organizer of the tracking sub-session at the 1999 IEEE Aerospace Conference, and has been Organizer of the Remote Sensing Track of that conference 2000-2003. Jointly with T. Kirubarajan he co-organized the SPIE “System Diagnosis and Prognosis: Security and Condition Monitoring Issues” Conference in Orlando, 2001-2003. He has been a member of the IEEE Signal Processing Society’s Sensor-Array & Multichannel (SAM) technical committee since 1997, and is its Vice President. He is also a member and officer of the IEEE AESS Board of Governors (2003-2009 & 2011-2016). |