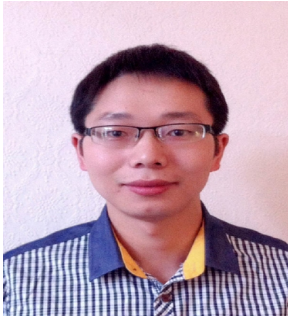
IEEE SSCI 2017 Tutorial

Title: Evolutionary Computation for Dynamic Multiobjective Optimization Problems
Tutorial Speakers: Shengxiang Yang and Shouyong Jiang

Abstract:
Many real-world optimization problems involve multiple conflicting objectives to be optimized and are subject to dynamic environments, where changes may occur over time regarding optimization objectives, decision variables, and/or constraint conditions. Such dynamic multiobjective optimization problems (DMOPs) are challenging problems due to their nature of difficulty. Yet, they are important problems that researchers and practitioners in decision-making in many domains need to face and solve. Evolutionary computation (EC) encapsulates a class of stochastic optimization methods that mimic principles from natural evolution to solve optimization and search problems. EC methods are good tools to address DMOPs due to their inspiration from natural and biological evolution, which has always been subject to changing environments. EC for DMOPs has attracted a lot of research effort during the last two decades with some promising results. However, this research area is still quite young and far away from well-understood. This tutorial provides an introduction to the research area of EC for DMOPs and carry out an in-depth description of the state-of-the-art of research in the field. The purpose is to (i) provide detailed description and classification of DMOP benchmark problems and performance measures; (ii) review current EC approaches for DMOPs; (iii) present current applications in the area of EC for DMOPs; (iv) analyse current gaps and challenges in EC for DMOPs; and (v) point out future research directions in EC for DMOPs.

Biographies of presenters:

Prof. Shengxiang Yang (http://www.tech.dmu.ac.uk/~syang/) got his PhD degree in Systems Engineering in 1999 from Northeastern University, China. He is now a Professor of Computational Intelligence (CI) and Director of the Centre for Computational Intelligence (http://www.cci.dmu.ac.uk/), De Montfort University (DMU), UK. He has worked extensively for 20 years in the areas of CI methods, including EC and artificial neural networks, and their applications for real-world problems. He has over 230 publications in these domains. His work has been supported by UK research councils (e.g., Engineering and Physical Sciences Research Council (EPSRC), Royal Society, and Royal Academy of Engineering), EU FP7 and Horizon 2020, Chinese Ministry of Education, and industry partners (e.g., BT, Honda, Rail Safety and Standards Board (RSSB), and Network Rail, etc.), with a total funding of over £2M, of which two EPSRC standard research projects have been focused on EC for DMOPs. He serves as an Associate Editor or Editorial Board Member of eight international journals, including IEEE Transactions on Cybernetics, Evolutionary Computation, Information Sciences, Neurocomuting, and Soft Computing. He is the founding chair of the Task Force on Intelligent Network Systems (TF-INS) and the chair of the Task Force on EC in Dynamic and Uncertain Environments (ECiDUEs) of the IEEE CI Society (CIS). He has organised/chaired over 40 workshops and special sessions for several major international conferences. He is the founding co-chair of the IEEE Symposium on CI in Dynamic and Uncertain Environments. He has co-edited 12 books, proceedings and journal special issues. He has been invited to give a number of keynote speeches at international conferences and workshops and over 40 seminars in different countries.



Dr. Shouyong Jiang is working as a postdoc at Newcastle University, U.K. He received the B.Sc. degree in information and computation science and the M.Sc. degree in control theory and control engineering from Northeastern University, Shenyang, China in 2011 and 2013, respectively. He received the Ph.D. degree from the School of Computer Science and Informatics, De Montfort University, Leicester, U.K., in 2017. His current research interests include evolutionary computation, multi-objective optimization, and dynamic multi-objective optimization.