IEEE CIS Seminar

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School of Engineering & Information Technology

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Venue: LT12, Bldg. 32 (LT North), Northcott Drive, UNSW Canberra, ADFA

RSVP at http://tinyurl.com/act-cis-5jun23B.

Multiobjective Optimization and Beyond: Methods and Applications

Abstract: Multi-objective optimization problems (MOPs) are ones that require simultaneous optimization of multiple conflicting objectives to attain the state of Pareto-optimality, where improving solutions in terms of one objective leads to deterioration in terms of one or more of the other objectives. Many real-life problems belong to the class of MOPs and a number of algorithms exist for solving them. In some special cases of MOPs, multiple subsets of the Pareto-optimal set could independently generate the same Pareto-Front. Such problems are referred to as Multi-modal MOPs (MMMOPs), where a many-to-one mapping exists from solution space to objective space. The discovery of equivalent solutions across such different subsets is important during decision-making to facilitate the downstream analysis.

In this talk, we will first provide a brief introduction to MOPs, followed by an application to the real-life problem of drug design. This will be followed by a discussion on the basic concept of multi-modality in MOPs. We will then discuss the crowding illusion problem in MMMOPs. A method for solving MMMOPs with a graph Laplacian-based Optimization using Reference vector assisted Decomposition (LORD) will thereafter be discussed. The talk will conclude with the mention of an application of MMMOPs to the problem of building energy optimization.

About the speaker: Prof. Sanghamitra Bandyopadhyay did her B Tech, M Tech and Ph.D. in Computer Science from Calcutta University, IIT Kharagpur and Indian Statistical Institute respectively. She then joined the Indian Statistical Institute as a faculty member, and became the Director in 2015. Since 2020 she is continuing in her second tenure as the Director of the Institute. Her research interests include computational biology, soft and evolutionary computation, artificial intelligence and machine learning. She has authored/co-authored several books and numerous articles in journals, book chapters, and conference proceedings and has a citation h-index of more than 60. Prof. Bandyopadhyay has worked in many Institutes and Universities worldwide. She is the recipient of several awards including the Shanti Swarup Bhatnagar Prize in Engineering Science, TWAS Prize, Infosys Prize, JC Bose Fellowship, Swarnajayanti fellowship, INAE Silver Jubilee award, INAE Woman Engineer of the Year award (academia), IIT Kharagpur Distinguished Alumni Award, Humboldt Fellowship from Germany, Senior Associateship of ICTP, Italy, young engineer/scientist awards from INSA, INAE and ISCA, and Dr. Shanker Dayal Sharma Gold Medal and Institute Silver from IIT, Kharagpur, India. She is a Fellow of the Indian National Science Academy (INSA), National Academy of Sciences, India (NASI), Indian National Academy of Engineers (INAE), Indian Academy of Sciences (IASc), Institute of Electrical and Electronic Engineers (IEEE), The World Academy of Sciences (TWAS), International Association for Pattern Recognition (IAPR) and West Bengal Academy of Science and Technology. She serves as a member of the Science, Technology and Innovation Advisory Council of the Prime Minister of India (PM-STIAC). In 2022, she received the Padma Shri award,the fourth highest civilian award of the Government of India.