

## SPECIAL SESSION (SS02)

# Nature-Inspired Metaheuristics: Applications in Engineering Design and Optimization

### Organizers:

#### **Dr. Thompson Stephan**

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Thompson Stephan is currently holding the position of Assistant Professor in the Department of Computer Science and Engineering from Amity University, Noida, India. He received his B.E in Computer Science and Engineering and M.E in Computer Science and Engineering from Anna Univeristy, India. He received the Ph.D. degree in Computer Science and Engineering from Pondicherry University, India. His research interests include Evolutionary algorithms, Cognitive Radio communications, Ad Hoc and Sensor Wireless Networks, vehicular communications and Internet of Things.

#### **Dr. Ramani Kannan**

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Ramani Kannan is a Senior Lecturer in Universiti Teknologi PETRONAS, Malaysia. He received his B.E degree from Bharathiyar University, India. Later on completed his M.E and PhD in Power Electronics and Drives from Anna University respectively. He holds more than 115 publications in reputed international and national journals and conferences. He is an active senior member in IEEE(USA), and members of IE(I), IET(UK), ISTE(I) and Institute of advance engineering and science.

Dr. Ramani is recognized with many awards, including “Career Award for Young Teacher” from AICTE India, 2012; “ Young Scientist Award” in power electronics and Drives, 2015; “Highest Research publication Award” 2017. Award for Outstanding Performance, Service and Dedication 2019 at UTP, Malaysia and “Outstanding Researcher Award” in UTP Q Day 2019, Best Presenter Award, IEEE CENCON 2019 international conference at Indonesia.

EDITOR–Books “Sustaining Electrical Power Resources through Energy Optimization and Future Engineering” Springer Nature Singapore Pte Ltd 2018., and Practical Examples of energy optimization models Springer Nature Singapore Pte Ltd 2019.He has completed 5 funded projects and 7 research projects in progress with a total funding of RM 1080000.00. The grants are FRGS, ASEAN-India, YUTP, KETTHA and STIRF.

He is the Editor-in-Chief for the journal of Asian Scientific Research (2011-2018) and Regional Editor for International Journal of Computer Aided Engineering and technology, Inderscience Publisher, UK from 2015.He is an Associate Editor in IEEE Access since 2018. Dr Ramani is servicing many guest editor such as Elsevier journal, Inderscience, IGI Global and IJPAM etc. His research interest involves in power electronics, inverters, modeling of induction motor and optimization techniques.

Nature-inspired metaheuristics are gaining increasing favour as computational intelligence methods, very useful for global optimization problems. The success of these population-based frameworks is mainly due to their flexibility and ease of adaptation to the most different and complex optimization problems, without requiring any special feature or condition to the objective functions. Nature inspired metaheuristics algorithms have been the target of several studies in the most varied scientific areas due to their high efficiency in solving real world problems. This is also the case of engineering. Among most well-established nature inspired metaheuristics include genetic algorithms, differential evolution, simulated annealing, harmony search, particle swarm optimization, ant colony optimization, firefly algorithm, bat algorithm, etc. The advantages of these algorithms, together with the steady improvement of computer performance, are fostering their increased use in research and industry in a wide variety of engineering branches. These methodologies are empowering the enhancement in engineering design and optimization practices in areas in which classical optimization techniques are still not able effective. The advances in the use of nature-inspired metaheuristics in engineering applications bring an opportunity and also a challenge for researchers to improve and advance in design and optimization of products, systems, and services for societal benefit.

The objective of this special session is to invite high-quality research or review articles that address recent development from a variety of engineering fields in relation to the application of nature-inspired metaheuristics for design and optimization and that, hopefully, will stimulate other researchers to continue the efforts to improve the current state of the art on the aforementioned field.

### Topics of Interest:

The application of nature-inspired algorithms in engineering is very diverse and to cover a good fraction of these applications may take a big volume. Potential topics to show the diversity and effectiveness of nature-inspired optimization algorithms include, but are not limited to:

1. Hybrid algorithms for Multi-objective optimization
2. Algorithm design for Multi-objective optimization
3. Multi-objective optimization in combinatorial/discrete, large-scale problems
4. Constraint handling methods for Multi-objective optimization
5. Benchmarks and performance indicators for multi-objective optimization
6. Structural optimization
7. Energy optimization
8. Scheduling and Routing
9. Software Testing
10. Image Processing
11. Data Mining
12. Other real time applications/Military