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Preface

CCIS 107 is the second volume of the proceedings of the Fifth International Symposium on Intelligence Computation and Applications (ISICA 2010) held in Wuhan, China, October 22–24, 2010. Thirty-one papers among 267 submissions were selected and included in *CCIS 107*.

This volume features the most up-to-date research in evolutionary design, evolutionary optimization, hybrid evolutionary algorithms, intelligent systems, particle swarm optimization, and predictive modeling.

CCIS 107 is dedicated to the memory of Lishan Kang. ISICA conferences were one of the first series of international conferences on computational intelligence that combined elements of learning, adaptation, evolution and fuzzy logic to create programs as alternative solutions to artificial intelligence. The idea for ISICA came about after Lishan Kang organized an international symposium on evolutionary computation at Wuhan University in 2000. After he was invited to be the Director of the School of Computer Science, China University of Geosciences, he wondered whether he could establish such discussion forums on computational intelligence at China University of Geosciences. With support from his university, the School of Computer Science organized the first ISICA in 2005, in which some of the leading figures from the scientific computing world were invited, including H.-P. Schwefel, Germany, M. Schoenauer, France, D.J. Evans, UK, T. Higuchi, Japan, Z. Michalewicz, Australia, and X. Yao, UK.

The Second ISICA was jointly held in 2007 with the 7th International Conference on Evolvable Systems: From Biology to Hardware (ICES 2007). Since then, ISICA has become an annual event. Sadly, the founder of ISICA, Lishan Kang, passed away last year. However, his spirit will live with us, and inspire us to hold ISICA continually and successfully. Kang firmly believed that evolutionary computation is the foundation of computational intelligence, and computational intelligence is the future of computational science. We truly hope that ISICA will establish a bridge for young researchers to reach this beautiful future one day.

Solutions have been evolving in computational intelligence. So has Kang's research. Kang started his research on the Schwarz algorithm in 1957 under the guidance of Russian computational scientist I.P. Mysovskich. Although the Schwarz algorithm was proposed as early as 1869, it had not attracted enough attention at that time. As a young researcher, Kang became fascinated with the Schwarz algorithm, and submitted his first paper on the multi-domain Schwarz alternating method in 1959. However, his paper was rejected with the only comment being that it was of no practical use. Twenty years later, with the development of parallel computers, researchers' attention was brought back to Kang's results on the Schwarz algorithm. It was like a rebirth of Kang's research. Led by Kang, a group at Wuhan University developed the first distributed computing

system called WuPP-80 in China in 1982. Kang had solved a number of difficult mathematical physics problems using the multi-domain Schwarz alternating method on WuPP-80. Because of Kang's great achievement on asynchronous parallel computing and his theoretical research on the convergence of the Schwarz algorithm with the size of overlapping domains, he was honored with the fourth-class prize of the National Natural Science Award of China in 1993, which was the highest prize awarded to computer science in that year.

After domain decomposition methods reached a level of maturity in the late 1980s, Kang shifted his attention to the new research field of evolutionary computation. There are always great challenges in a new field. But that also means great chances for research. In those years, Kang's students' were excited about evolutionary computation. Meanwhile, there were no foreign research journals and books on evolutionary computation at the Wuhan University Library. Kang sent a student to get a few references from the Beijing Library. In such hard conditions, Kang and his student, Yong Liu, wrote the first research book on evolutionary computation in China, *Non-Numerical Algorithms: (II) Genetic Algorithms* published by China Science Press in 1995.

Being a generation greatly influenced by Chairman Mao, Kang had answered Mao's calling of "Yang Wei Zhong Yong" (to make the foreign things serve China). He had given hundreds of public talks on both the Schwarz alternating method and evolutionary computations at many universities in China starting in the 1980s. Late in his life, Kang still insisted on giving lectures at summer teacher workshops in Guiyang for a number of years till he was diagnosed with stomach cancer. Nowadays thousands of students and researchers in China are following in his footsteps.

With the popularity of "Yang Wei Zhong Yong" in the computational field in China, we would also like to call attention to "Gu Wei Jin Yong" (to make the past serve the present) among researchers. Nengchao Wang, for example, has demonstrated in a keynote speech at ICES 2007 how evolution of Yin and Yang could be used in designing modern computer architectures and algorithms. Hard as it is to believe, even many foreign experts became interested in Wang's speech, given in Chinese. Kang solved the 100-year-old convergence problem existing in the Schwarz algorithm, while Wang uncovered a thousand-year-old mathematical mystery, rediscovering how the ancient mathematician Hui Liu calculated the ratio of a circle's area to the square of its radius π to 3.1416 more than a thousand years ago. The methodology used in calculating π actually shares a similar idea with computational intelligence concerning the evolution of solutions.

Finally, on behalf of the Organizing Committee, we would like to warmly thank the sponsor, China University of Geosciences for helping us in sundry ways to achieve our goals for the conference. We wish to express our appreciation to Springer for publishing the proceedings of ISICA 2010. We also wish to acknowledge the dedication and commitment of the *LNCS* and *CCIS* editorial staff. We would like to thank the authors for submitting their work, as well as the Program Committee members and reviewers for their enthusiasm, time and

expertise. The invaluable help of active members from the Organizing Committee, including Hengjian Tong, Chengyu Hu, Wei Qiang, Hongwei Zhang and Hao Zhang, in setting up and maintaining the online submission systems, assigning the papers to the reviewers, and preparing the camera-ready version of the proceedings, is highly appreciated. We would like to thank them personally for their help making ISICA 2010 a success.

October 2010

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