Foreword

The fields of bio-inspired computing, artificial life, and computing with natural means have seen impressive growth over the past few years. Evolutionary algorithms, artificial neural networks, and swarm intelligence are now routinely applied to the solution of hard problems. Moreover, researchers have used these techniques as sophisticated computational tools for the study of biological phenomena. In the book before you, Leandro Nunes de Castro and Fernando José Von Zuben have compiled an impressive array of chapters that attest to the state-of-the-art of these fields.

During the past few years a new wind has been sweeping through the computing terrain, slowly changing our fundamental view of computers. We want them, of course, to be faster, better, more efficient — and proficient — at their tasks. But, more interestingly, we are trying to imbue them with abilities hitherto found only in nature, such as evolution, learning, development, growth, and collectivity. Natural organisms are complex adaptive systems — and our artifacts are now beginning to follow in their footsteps. I call this trend *the new computing ABC*: Adaptation, Bio-inspiration, and Complexity. A tour de force of this fascinating new alphabet is amply provided in the volume in hand.

The themes treated herein, whose designations juxtapose terms emblematic both of nature and of computer science, capture the essence of the new ABC. Darwin probably would have frowned upon evolutionary machines, genetic programming, ant algorithms, and particles swarms. Or, rather, might he have regarded these with wonder and awe?

Whatever Darwin's putative stand upon these strange juxtapositional monikers, the most disconcerting of all undoubtedly being *artificial* life, I am most certain the modern reader, an epitome of *natural* life, will find this volume enlightening and enjoyable.

Perhaps Darwin's conclusion in *Origin of Species* concerning life on Earth is also apt herein: *from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.*

Enjoy!

Professor Moshe Sipper
Department of Computer Science
Ben-Gurion University, Israel