

continued from previous page

systems. Self-organizing applications dynamically change their functionality and structure without direct user intervention—with these types of changes being initiated in response to changes in requirements and the environment.

- Eiben. A. E., and J. E. Smith. 2015. *Introduction to Evolutionary Computing*. New York, US-NY: Springer. <http://www.springer.com/us/book/9783662448731>.

This 299-page textbook is suitable for undergraduate and graduate courses in artificial intelligence and computational intelligence, and for self-study by practitioners and researchers engaged with all aspects of bio-inspired design and optimization. The authors organized the material to focus on problems, on how to represent these problems, and then on how to choose and design algorithms for different representations.

- Trefzer, M. A., and A. M. Tyrrell. 2015. *Evolvable Hardware—From Practice to Application*. New York, US-NY: Springer. <http://www.springer.com/us/book/9783662446157>.

This 438-page book covers the basic theory, practical details, and advanced research on the implementation of evolutionary methods on physical substrates. Most examples are from electronic engineering applications, including transistor-level design and system-level implementation. The contributing authors present an overview of the successes achieved. The book serves as a point of reference for both academic and industrial researchers.

- Tsutsui, S., and P. Collet, Eds. 2013. *Massively Parallel Evolutionary Computation on GPGPUs*. New York, US-NY: Springer. <http://www.springer.com/us/book/9783642379581>.

This 465-page book is the first book dedicated to the exciting developments in the area of parallel evolutionary algorithms. There have been many attempts to develop platforms for running parallel evolutionary algorithms using multi-core machines, massively parallel cluster machines, or grid computing environments. Recent advances in general-purpose computing on graphics processing units (GPGPU) have opened up new possibilities in this area. ■

ABOUT THE AUTHOR

Ronan Nugent is an electronics engineer by training. From 1989 to 1994, he developed embedded hardware and software systems for a control and communications company, and ran the design department's ISO 9001 quality assurance and product engineering programs. He was a partner in a campus startup from 1995 to 1999, managing its feasibility study on a new imaging technology, and supervising the patenting, licensing, tradeshow demonstrations, and test implementations. He joined Springer-Verlag, now Springer (<http://www.springer.com/us/>), the world's leading academic book publisher, in 2000. He is a Senior Editor in the Computer Science Editorial team, responsible for books and journals in areas such as bio-inspired computing, artificial intelligence, theoretical computer science, and information security.

The CRC Press Series in Biomimetics

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■ ABSTRACT

This paper summarizes the motivation for the CRC Press Series in Biomimetics. The paper then lists and briefly describes the five titles in the series as an annotated reference list. Three of these titles are forthcoming in 2016 and 2017. Additional details on each title are available at <https://www.crcpress.com/Biomimetics-Series/book-series/CRCBIOSEER>. Three related titles by Yoseph Bar-Cohen, the editor of the series, preceded the series and the paper lists these separately.

MOTIVATION FOR THE SERIES

Biomimetics is the use of Nature as a model for copying, adapting concepts, and inspiration. The topic is increasingly becoming a branch of science and engineering seeking to understand and mimic Nature's solutions. While many aspects of nature are still beyond our understanding or capability to adapt, significant progress continues. The motivation for the series is to:

- Provide a comprehensive state-of-the-art review of the field in one book series
- Document significant biological inventions and models that are being adapted or serving as a model to inspire innovation of new technologies
- Fill gaps in the published literature
- Cover the latest progress and the current challenges to innovation related biomimetics.

REFERENCES — FROM THE SERIES

- Anderson, I.A., J. Montgomery, and J. Vincent. 2016. *Ocean Innovation: Biomimetics Beneath the Waves*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Ocean-Innovation-Biomimetics-Beneath-the-Waves/Anderson-Vincent-Montgomery/9781439837627>.

This 400-page book by Iain A. Anderson and his colleagues is forthcoming in May 2016. — There is something about the ocean that captures our imagination and this book covers the subject from a biomimetics perspective. It describes encounters with the things that live in the sea and discusses how they survive in their natural surroundings. It focuses on the solutions that these sea creatures bring to the challenge of existence in a medium that is almost 800 times denser than air at sea level. The book reviews these various solutions and suggests methods for adapting them to our own use—whether for underwater exploration or our daily life at the sea surface.

- Bar-Cohen, Y., Ed. 2011. *Biomimetics: Nature-Based Innovation*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Biomimetics-Nature-Based-Innovation/BarCohen/9781439834763>.

This 788-page book provides an extensive review of the current state of the art in biomimetics. It documents key biological solutions that provide a model for innovations in engineering and science. Its 20 chapters address a range of topics, including sensing and organs, actuators and artificial muscles, materials, robotics, supporting tools, various applications, biomimetic processes, and future challenges.

[Special Feature Editor's note: A review of this book is in *INSIGHT* 17 (2):64-65, July 2014. The review is also available on the Natural Systems Working Group (NSWG) website: <https://sites.google.com/site/incosenswg/>.]

- Bonde, P. 2017. *Mechanical Circulatory Support: Principles and Practice*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Mechanical-Circulatory-Support-Principles-and-Practice/Bonde/9781482201376>.

This 450-page book by Pramod Bonde is forthcoming in March 2017. — Strides made in the last four decades in the field of engineering and medicine established mechanical support for heart failure patients as a viable and effective strategy. This technology saw an improvement in its application since the 1980s. However, most of the currently available books relate to outdated technology. There is an imminent need for a comprehensive reference work that details the latest developments in this technology. This textbook covers all clinical, design, technical, and relevant engineering aspects regarding mechanical circulatory devices.

- Kumar, P. and K. P. Singh. 2016. *Natural Biophotonic Architectures: Complex Optical Effects and Biomimetic Application*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Natural-Biophotonic-Architectures-Complex-Optical-Effects-and-Bioimimetic/Kumar-Singh/9781482232172>.

This 350-page by Pramod Kumar and Kamal P. Singh is forthcoming in September 2016. — The book documents key developments in the field of complex optical effects in natural biophotonic architectures. It provides a model for inspiration, reviews the current state of the art, and describes and discusses challenges in understanding Nature's capabilities to manipulate light. It describes the photonic architecture in the eye system of various insects, its spectral and polarization sensitivity, and functions. It also discusses developments of new optics-based device concepts motivated by Nature.

- Mazzoleni, I. 2013. *Architecture Follows Nature: Biomimetic Principles for Innovative Design*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Architecture-Follows-Nature-Biomimetic-Principles-for-Innovative-Design/Mazzoleni/9781466506077>.

In this 264-page book, Ilaria Mazzoleni considers the functions and properties of animal 'skins' (including hides, scales, feathers, shells, etc.) as potential inspirations for building coverings. The author systematically analyzes twelve case studies from the perspective of four major functions of skin—communication, thermoregulation, water balance, and protection. Mazzoleni offers suggestions on how natural designs can influence architectural design concepts.

Special Theme Editor's note: A review of this book is in *INSIGHT* 17 (4):64-65, December 2014. Both the review and an accompanying e-interview with the author are available on the NSWG web site: <https://sites.google.com/site/incosenswg/>. ■

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- Bar-Cohen, Y. and D. Hanson. 2009. *The Coming Robot Revolution – Expectations and Fears about Emerging Intelligent, Humanlike Machines*. New York, US-NY: Springer. <http://www.springer.com/cn/book/9780387853482>.
- Bar-Cohen, Y., Ed. 2005. *Biomimetics – Biologically Inspired Technologies*. Boca Raton, US-FL: CRC Press. <https://www.crcpress.com/Biomimetics-Biologically-Inspired-Technologies/BarCohen/9780849331633>.
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BIOGRAPHY

Dr. Yoseph Bar-Cohen is the editor of the CRC Press series in Biomimetics. He is a senior research scientist and a supervisor of the Electro-active Technologies Group at the Jet Propulsion Laboratory, Pasadena, CA. In his Nondestructive Evaluation and Advanced Actuators (NDEAA) laboratory, he led the development of novel methods and mechanisms related to electro-mechanics, actuated by electro-active materials as well as the development of ultrasonic nondestructive evaluation methods. Dr. Bar-Cohen initiated the Society for Optical Engineering (SPIE) conference on artificial muscles, which he has chaired since 1999. He challenged engineers and scientists worldwide to develop a robotic arm driven by artificial muscles to arm wrestle with humans and win, and organized the first arm-wrestling contest in 2005. He has more than 370 publications, holds 28 patents, and is the recipient of numerous awards.



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