

**Solid Biomechanics** 

Jennifer Clarke



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magnetic dissipation, which is beginning to be recognized as a main mode of dissipation, and emission, in magnetized relativistic jets.

No other recent book claims to cover the whole “zoo” of cosmic jets. Instead, each tends to concentrate on some particular type of object and address it with as much rigor and detail as possible. Sophisticated readers with a particular interest would do better to consult specialized books than to work through *Astrophysical Jets and Beams*. Those interested in jets of active galaxies, for example, should have a look at *Relativistic Jets from Active Galactic Nuclei* (Wiley-VCH, 2012)—to which I contributed a chapter. That book, edited by Markus Böttcher, Daniel Harris, and Henric Krawczynski, offers a good combination of breadth and depth. Equally successful is the series of lectures on stellar jets published as several volumes under the common title *Jets from Young Stars* (Springer, 2007–10). I admire the author’s goal to make *Astrophysical Jets and Beams* a broad-based, student-friendly work. But I cannot enthusiastically recommend it as an introductory text.

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## Solid Biomechanics

Roland Ennos  
Princeton U. Press, Princeton,  
NJ, 2012. \$60.00 (250 pp.).  
ISBN 978-0-691-13550-2

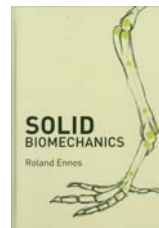
If you’re looking for an engaging and insightful introduction to the mechanical world of living organisms, Roland Ennos’s *Solid Biomechanics* may be the book for you. As the title suggests, Ennos restricts himself to introducing and exploring the mechanics of solid bodies. Still, he is able to cover a wealth of biological contexts and organisms.

Ennos is a biologist at the University of Manchester in the UK and a widely published educator, with particular expertise in the structure and design of plants and animals. His prolific research ranges over such diverse subjects as the structure and mechanical design of trees, statistical analysis in biology, adaptive origins of fingerprints in humans, and silica in grasses as a defense mechanism against herbivores.

*Solid Biomechanics* seamlessly links physics and biology. The basic engineering theory it covers is clearly laid out and supplemented by effectively pedagogical graphs and diagrams. The

discussions of stress, strain, and torsion provide an excellent introduction to the relevant concepts; the commentary on properties of biological materials is particularly accessible. Ennos links the basic engineering theory to practical problems in the natural world by uncovering structures that provide an interesting context for the theory—an approach that will be useful in introductory courses.

The book is divided into five sections. The first is a well-constructed introduction to the properties of materials and underlying mechanical concepts. The second looks at shapes and compositions of such biological structures as polymers and human connective tissues. The third section considers the mechanical properties of structures under bending, compression, and torsion, with a significant application to bone and muscle design and behavior under stress. The fourth looks at mechanical interactions, including the anchoring of plants, a major area of the author’s own research. The brief fifth section discusses the future and limitations of research in structural biomechanics.



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Ennos introduces the basic mathematics without losing the reader in complex formalisms. That feature makes *Solid Biomechanics* a highly accessible work for both undergraduate students in biomechanics, physics, biology, and engineering and scientists looking at the structure of living organisms. Both groups will learn how natural adaptations produce powerful and efficient structures. However, the book's broad scope precludes the author from providing in-depth analyses or even the tools needed for them. That is not necessarily a shortfall, but instructors should be aware of the book's broad but not deep coverage when considering it for a course.

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## new books

### acoustics

**What Fire Is in Mine Ears: Progress in Auditory Biomechanics.** C. A. Shera, E. S. Olson, eds. *AIP Conference Proceedings 1403*. Proc. wksp., Williamstown, MA, July 2011. AIP, Melville, NY, 2011. \$210.00 (722 pp.). ISBN 978-0-7354-0975-0

### astronomy and astrophysics

**Astronomical Polarimetry 2008: Science from Small to Large Telescopes.** P. Bastien, N. Manset, D. P. Clemens, N. St-Louis, eds. *Astronomical Society of the Pacific Conference Series 449*. Proc. wksp., La Malbaie, QC, Canada, July 2008. Astronomical Society of the Pacific, San Francisco, 2011. \$77.00 (466 pp.). ISBN 978-1-58381-780-3

**The Formation and Early Evolution of Stars: From Dust to Stars and Planets.** 2nd ed. N. S. Schulz. *Astronomy and Astrophysics Library*. Springer, Berlin, 2012 [2005]. \$119.00 (515 pp.). ISBN 978-3-642-23925-0

**Gamma Ray Bursts 2010.** J. E. McEnery, J. L. Racusin, N. Gehrels, eds. *AIP Conference Proceedings 1358*. Proc. conf., Annapolis, MD, Nov. 2010. AIP, Melville, NY, 2011. \$178.00 (444 pp.). ISBN 978-0-7354-0916-3

**Pulsar Astronomy.** 4th ed. A. Lyne, F. Graham-Smith. *Cambridge Astrophysics Series 48*. Cambridge U. Press, New York, 2012 [2006]. \$140.00 (345 pp.). ISBN 978-1-107-01014-7

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**Atomic Processes in Basic and Applied Physics.** V. Shevelko, H. Tawara, eds. *Springer Series on Atomic, Optical, and Plasma Physics 68*. Springer, Berlin, 2012.

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**Space Groups (135)  $P4_1/mbc$ —(123)  $P4/mmm$ .** P. Villars, K. Cenzual, eds. *Landolt-Börnstein: Numerical Data and Functional Relationships in Science and Technology, New Series, Part 43A11*. Springer, Berlin, 2012. \$5,119.00 (511 pp.). ISBN 978-3-642-22846-9

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**Renormalization Group and Effective Field Theory Approaches to Many-Body Systems.** J. Polonyi, A. Schwenk, eds. *Lecture Notes in Physics 852*. Springer, Berlin, 2012. \$89.95 paper (348 pp.). ISBN 978-3-642-27319-3

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### fluids

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