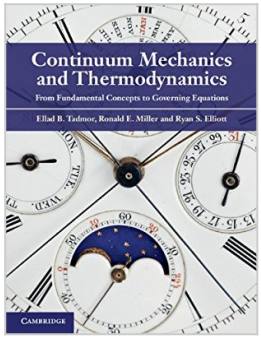


# Continuum Mechanics and Thermodynamics

*By Ellad B. Tadmor, Ronald E. Miller, Ryan S. Elliott*



**Continuum Mechanics and Thermodynamics** By Ellad B. Tadmor, Ronald E. Miller, Ryan S. Elliott

Continuum mechanics and thermodynamics are foundational theories of many fields of science and engineering. This book presents a fresh perspective on these fundamental topics, connecting micro- and nanoscopic theories and emphasizing topics relevant to understanding solid-state thermo-mechanical behavior. Providing clear, in-depth coverage, the book gives a self-contained treatment of topics directly related to nonlinear materials modeling. It starts with vectors and tensors, finite deformation kinematics, the fundamental balance and conservation laws, and classical thermodynamics. It then discusses the principles of constitutive theory and examples of constitutive models, presents a foundational treatment of energy principles and stability theory, and concludes with example closed-form solutions and the essentials of finite elements. Together with its companion book, Modeling Materials, (Cambridge University Press, 2011), this work presents the fundamentals of multiscale materials modeling for graduate students and researchers in physics, materials science, chemistry and engineering.

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**Continuum Mechanics and Thermodynamics By Ellad B. Tadmor, Ronald E. Miller, Ryan S. Elliott Bibliography**

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Review
"I find it quite impressive that despite writing about such an old subject, these authors were able to present it with a very distinct personal style and perspective. The book is written in a very contemporary style and is full of well-thought out (solved) examples. I found it very enjoyable to read. Nearly every other page has footnotes which are in turns quirky, humorous or just plain factual but always informative and add an exceptional value to the text."
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"The authors present the material clearly, with care taken to provide detailed derivations when needed and heuristic arguments, when those suffice. The end-of-chapter exercises are well-designed, and this text could very profitably be used as the basis for an undergraduate/graduate course in continuum mechanics, suitable for both science and engineering students. The author should be congratulated on producing a fine textbook, one that meets the needs of a variety of disciplines."
Andrew Resnick, Cleveland State University for Contemporary Physics

About the Author
Ellad B. Tadmor is a Professor of Aerospace Engineering and Mechanics at the University of Minnesota. He received his BSc and MSc in Mechanical Engineering from the Technion - Israel Institute of Technology in 1987 and 1991, and his PhD from Brown University in 1996. His research focuses on the development of multiscale theories and computational methods for predicting the behavior of materials directly from the interactions of the atoms making up the material. He has published over 40 papers in this area and two textbooks (see http://modelingmaterials.org for information on the books). Professor Tadmor is the Director of the Knowledgebase of Interatomic Models project (https://openkim.org) which is tasked with developing standards for atomistic simulations and improving transferability of interatomic potentials. He has been a Postdoctoral Research Fellow at Harvard University, Associate Professor at the Technion (Israel), and Erasmus Mundus Scholar at the Ecole Normale Superieure in Lyon (France). He received the MRS Graduate Student Award in 1995 for his work on developing the quasicontinuum method, one of the leading multiscale methods, and has received numerous awards for excellence in teaching, including the Salomon Simon Mani Award in 2001. Professor Tadmor is on the editorial board of the Journal of Elasticity.

Ronald E. Miller is Professor of Mechanical and Aerospace Engineering at Carleton University. He has worked in the area of multiscale materials modeling for over 15 years and has published more than 40 scientific articles in the area.

Ryan S. Elliott is Associate Professor of Aerospace Engineering and Mechanics at the University of Minnesota. An expert in stability of continuum and atomistic systems, he has received many awards for his work.

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