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Soggetti	Mechanics Mechanics, Applied Building materials Materials science Computer science - Mathematics Solid Mechanics Structural Materials Materials Science, general Computational Mathematics and Numerical Analysis
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Nota di contenuto	The Experimental Evidence for Higher Gradient Theories -- Balance Laws for Gradient Materials -- Strain Gradient Elasticity: From Capillarity to the Mechanics of Nano-Objects -- Microscopic interpretation of strain-gradient and generalized continuum models -- Strain Gradient Plasticity: Theory and Implementation -- Finite Gradient Elasticity and Plasticity.
Sommario/riassunto	Over the past 50 years, strain gradient material theories have been developed for the continuum modeling of size effects in materials and structures in terms of their elasticity, plasticity and fracturing. This book puts forward a unifying perspective to combine existing theories involving the higher order gradient of the strain tensor, or of plastic strain. It begins by reviewing experimental findings on the existence (or non-existence) of size effects on the mechanics of materials. In turn,

the book devises first, second and higher order strain gradient theories from general principles, and presents constitutive frameworks that satisfy thermodynamic requirements. The special case of strain gradient plasticity is then developed and illustrated via computational analyses of size effects on the plasticity of metals at small scales. In closing, the book explains the origin of gradient effects in the case of lattice structures by drawing on homogenization theory.