



Submission Deadline—December 1, 2018

Intrinsic and extrinsic size effects in materials

Size effects in materials due to both microstructural (intrinsic) and dimensional (extrinsic) constraints are actively pursued by researchers in all areas of materials science. Collectively these two types of size effects, along with the chemical composition, govern a variety of properties of materials. While much insight has been provided into the origins of these length-dependent materials properties, debates within the materials science community are ongoing. For example, the well-known Hall-Petch effect that a polycrystal with a smaller average grain size is stronger may be rationalized by the dislocation pile-up model, the grain boundary ledge model, or the geometrically necessary dislocation model, among others. Another example is the diameter dependence of yield/flow in micro and nanopillars, whose mechanism may significantly vary in different materials. Moreover, advancing knowledge of the combined intrinsic and extrinsic size effects can open up new avenues for designing materials with superior properties.

This *JMR* Focus Issue will cover advances in exploring intrinsic and extrinsic size effects in all types of materials by theories, experiments, simulations, and modeling. Material systems will range from metallic, porous, granular, polymeric, and amorphous materials, with relevant size scales from microns to the nanoscale. Properties under investigation will be diverse, as well, from mechanical, electrical, optical, acoustic, to thermal properties. Review and original research articles concerning interactions between intrinsic and extrinsic size effects in materials as well as size dependence of multiphysics phenomena are encouraged.

Manuscripts are solicited in the following areas:

- ◆ Discoveries of new size effects in materials
- ◆ New theories and models to rationalize, explain, and predict size effects in materials
- ◆ Novel experimental and modeling techniques that enable exploration of materials across length scales
- ◆ Applications of the size effects to designing materials with unprecedented properties

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MANUSCRIPT SUBMISSION

To be considered for this issue, new and previously unpublished results significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by **December 1, 2018**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select "Focus issue: *Intrinsic and extrinsic size effects in materials*" as the manuscript type. **Note our manuscript submission minimum length of 3250 words, excluding figures, captions, and references, with at least 6 and no more than 10 figures and tables combined. Review articles may be longer but must be pre-approved by proposal to the Guest Editors via jmr@mrs.org. The proposal form and author instructions may be found at www.mrs.org/jmr-instructions.** All manuscripts will be reviewed in a normal but expedited fashion. Papers submitted by the deadline and subsequently accepted will be published in the Focus Issue. Other manuscripts that are acceptable but cannot be included in the issue will be scheduled for publication in a subsequent issue of *JMR*.

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