

**Symposium on Undergraduate Nano-Education:
"Addressing the Challenges of Nanoscale Science & Engineering Education"**

Presentation:

Incorporating Nanomaterials into a New Ceramics Textbook

M. Grant Norton and C. Barry Carter

School of Mechanical and Materials Engineering, Washington State University, Pullman WA

Presenter Biography:

M. Grant Norton is professor in the School of Mechanical and Materials Engineering at Washington State University and Associate Dean of Research and Graduate Programs. He obtained his PhD in Materials from Imperial College, London and spent two years at Cornell University before joining Washington State University in 1991. He spent the 1999/2000 academic year as a Visiting Professor at Oxford University. From 2000 to 2005 Professor Norton was Chair of Materials Science at Washington State University. He is author or co-author of over 160 papers, several book chapters, and two textbooks, one on X-ray diffraction and most recently Ceramic Materials: Science and Engineering, published by Springer. Professor Norton serves as Deputy Editor-in-Chief of Journal of Materials Science, is on the International Editorial Board of Journal of Materials Education, and is on the Editorial Board of Journal of Nanotechnology. Prior to entering academia, Norton worked for two major European multinationals. Professor Norton has consulted for a number of companies and organizations, including an interesting project on the World War II memorial in Washington D.C. He recently formed GoNano Technologies, Inc., a university spin off company focused on alternative energy applications for nanomaterials.

Abstract:

One of the challenges with incorporating nanomaterials into the traditional materials science and engineering (MS&E) curriculum is how to do it without: Adding extra credit hours (generally unpopular with students), omitting the fundamentals (generally unpopular with faculty), or adding extra courses (generally unpopular with administrators). Thus, the approach that is most commonly adopted is to integrate topics on nanomaterials/nanotechnology within the framework of an existing course or courses. In this way it is possible to create a curriculum that is infused throughout with "nano". Even though many faculty are now teaching courses that include some discussion of nanomaterials (e.g., their synthesis or properties) there are very few materials science textbooks that address topics related to nanomaterials within the context of the broader fundamentals, which themselves remain important. In this presentation I will describe how we have incorporated nanomaterials into a new textbook on ceramics [1]. This textbook provides a completely new and updated approach to the teaching of a subject that has its roots in the earliest human history. I will show specific examples of how and where nanomaterials can be integrated with the "ceramics" theme and what specific topics can be covered, i.e., ones where there is sufficient understanding and ones that are likely to excite or inspire students to continue their study of ceramics (one of our ultimate goals).

[1] C.B. Carter and M.G. Norton, 'Ceramic Materials: Science and Engineering' Springer, New York (2007).