ASTM- ACerS Workshop
Strength and Fracture Standards for Ceramics at Micro and Nano Scales
Sunday January 27, 2008, 1 – 5 pm, Daytona, FL

WELCOME TO DAYTONA BEACH!!!
Introduction

Meeting Objectives

- Review the current state-of-the-art of strength and fracture resistance methodologies for miniature test specimens and devices
- Identify needs and opportunities for future work, as well as topics suitable for prestandardization and standardization activities.
- Organize a work group to pursue this.

Organizers

- Robert Cook and George Quinn, NIST
- Steve Gonczy, C28 Chair

Speakers and Format

- 9 Invited Speakers – Government, Industry, and Academia
- Overview of ASTM and the C28 committee
- 10 Technical Talks on nanomechanics
- Panel and Floor Discussion on needs and opportunities
Agenda

1:00  Introduction and Greetings
     Dr. S. Gonczy, Chairman ASTM Committee C-28 (10 min)

1:10  “Overview of ASTM International”
     Kevin Shanahan, ASTM, Int., West Conshohocken, PA (10 min)

1:20  “Overview of ASTM Committee C 28”
     Dr. S. Gonczy, Gateway Materials, Inc., Chicago, IL (10 min)

1:30  “Nanomechanics Measurements and Standards at NIST”
     Dr. R. Cook, NIST, Gaithersburg, MD (15 min)

1:45  “Review of Traditional ASTM International Standards that have Potential for Miniaturization”
     and “Review of Current ASTM Committees E-08, E-28, E-56 Activities and Related NIST SRM’s
     Mr. G. Quinn, NIST - Gaithersburg, MD (20 min)

2:05  “Breaking Invisible Specimens with Zero Force,”
     Prof. R. Ballarini, University of Minnesota, MN (20 min)

2:25  Coffee Break (15 min)

2:40  Characterization of the Mechanical Properties of MEMS Devices Using Nanoscale Techniques”
     Nicholas Randall, CSM - Instruments, Needham, MA (15 min)
2:55 “Fatigue and Tensile Properties of Thin Films through Electrical Testing,”  
Robert Keller and Nicholas Barbosa, NIST, Boulder, CO  (15 min)

3:10 "Lesson Learned at AFRL in Fabrication and Mechanical Testing at the Microscale"  
Dr. Robert Wheeler, WPAFB, Dayton, OH  (15 min)

3:25 "Proof Testing May be Necessary to Enable the Acceptance of Brittle MEMS in High-Reliability Applications"  
Brad Boyce, Sandia National Labs, Albuquerque, NM  (15 min)

3:40 “Nanomechanical Testing and Size Effect of Low-dimensional Nanostructures”  
Prof. X. (Chris) Li, University of South Carolina, SC  (15 min)

3:55 “State of Standardization in Nanoindentation”  
Dr. D. Morris, NIST – Gaithersburg, MD  (15 min)

4:10 “Strength of Miniature Structures: Theta and C-ring Test Specimens”  
Mr. G. Quinn, NIST - Gaithersburg, MD  (5 min)

4:30 Round Panel Discussion  (30 min)

5:00 Closes meeting
**Situation and Opportunity**

**The Situation** – Multiple sources, users, and researchers with *no consensus* on how to test and characterize mechanical properties at the nano and micro scale --

“*Everyone tests and reports differently*”

- **Opportunity** -- A comprehensive, verified set of test standards for global use
  - supported by researchers, equipment manufacturers, testing laboratories, and academia
  - Sponsored and published by ASTM (C28 advanced ceramics committee)