

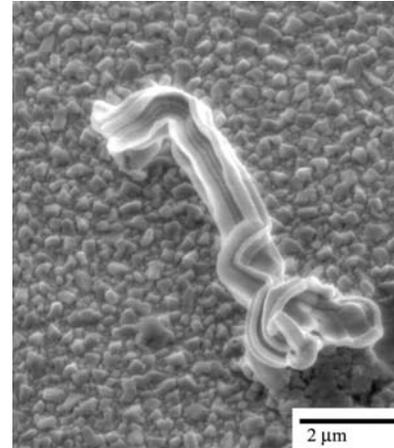
# REU Site: Characterization of Advanced Materials

David Bahr and M. Grant Norton, Washington State University,  
DMR-0139125

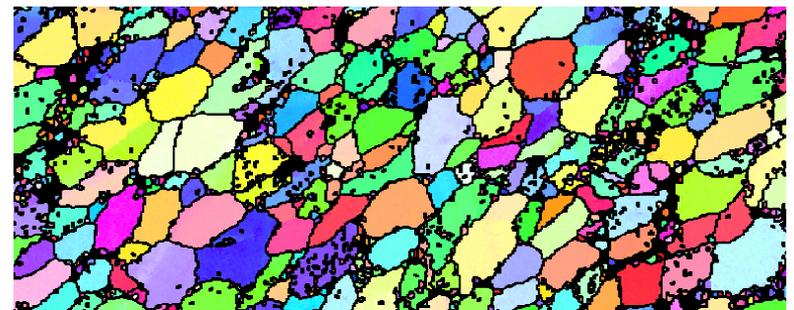
This REU site brings students to WSU to spend 10 weeks each summer focused on interdisciplinary materials research.

During 2003 students worked on projects ranging from tin whisker formation in microelectronics (a failure mechanism which plagues spacecraft) to fundamental studies of mechanical deformation using nanoindentation to characterization of the grain structure of titanium alloys after super plastic deformation. All students used equipment that undergraduates rarely get hands on experience with, particularly electron microscopes, atomic force microscopes, and Raman Spectroscopy.

This summer 5 of the 12 student projects are being submitted for publication in peer reviewed journals.



SEM image of a tin whisker. The diameter ( $\sim 1 \mu\text{m}$ ) is large enough that the whisker likely stems from at least three grains (grain sizes range from  $0.2 \mu\text{m}$  to  $0.5 \mu\text{m}$ ).



Orientation grain map ( $70 \mu\text{m}$  high) of Ti after deformation at  $875^\circ\text{C}$ ,  $0.0001/\text{s}$  (gauge portion).

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## Education:

During the last 5 years of this program (currently renewed for it's second year) we have met significant milestones:

55 Students from 25 Universities in 9 majors worked with 7 faculty in MSE, Chemistry, and Civil Engineering.

25 of the 55 participants are women

22 of 24 of the graduating students currently attend or applying to graduate school in science or engineering

21 Papers and presentations have been made possible by REU student's work

## Outreach:

Undergraduate researchers from this program have gone back to their home institutions and made presentations to schools including Whitman College, Whitworth College, and Clark Atlanta University.

Reporters from both student paper and local paper did articles on the student's poster session the last week of the program.



2003 REU students after their poster session attended by more than 75 people from the WSU community