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Developing Solutions for Structural Materials in Demanding Environments

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Interview seminar presented to Structural Integrity Associates, Inc
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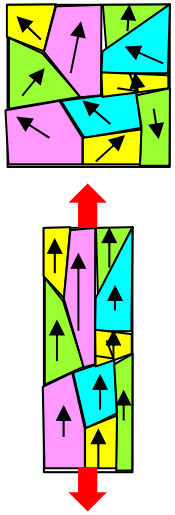
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

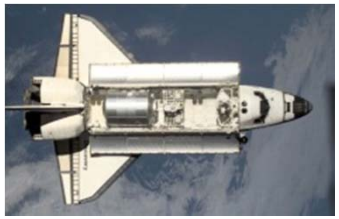
Background: Diverse experience in the durability of structural materials for demanding environments

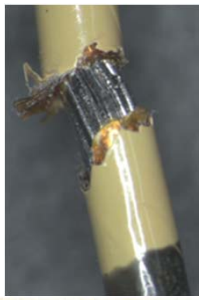
BS Materials Engineering

Internships: sonar transducer materials

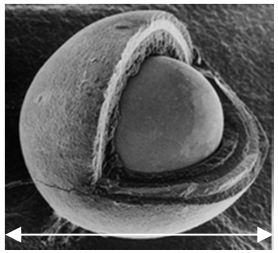


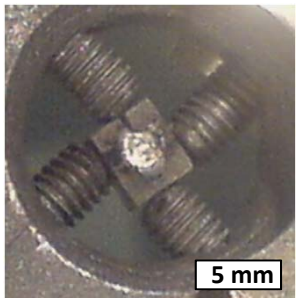
Space Shuttle & ISS Materials & Processes

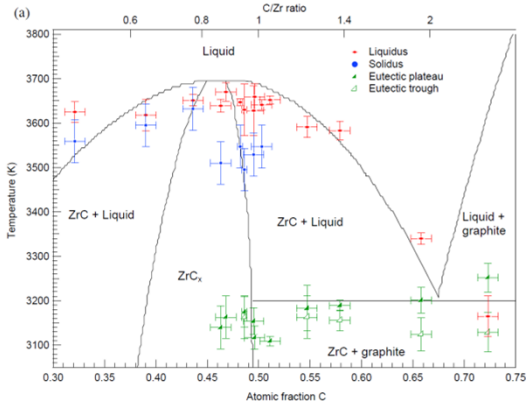




PhD: Durability of ZrC for next-generation high-temperature nuclear fuels







Postdoc: Hydrogen-assisted fracture of stainless steels

Informal science education, training, and public speaking

How can I contribute to Structural Integrity?

Technical Expertise

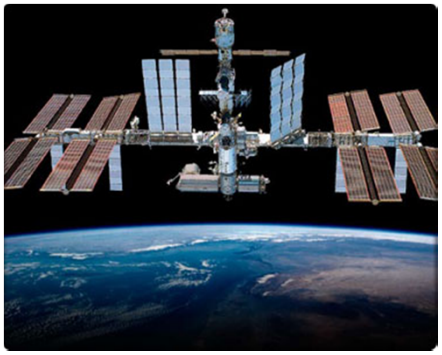
- Materials and metallurgical background
- Failure analysis and materials testing
- Critical analysis

Interpersonal skills

- Project management
- Technical communication
- Leading and working in teams

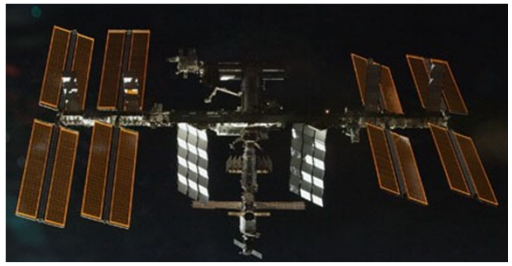
Consulting experience

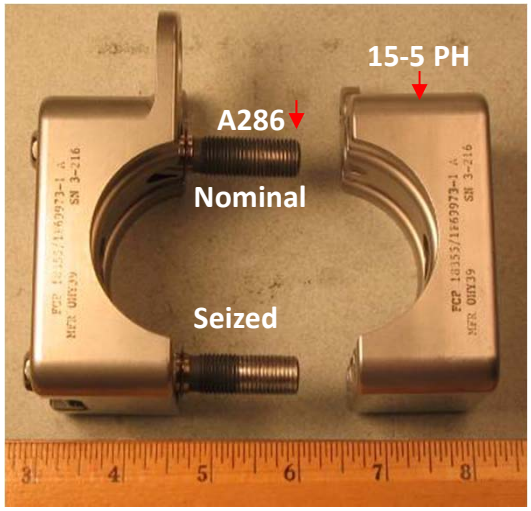
- Provide metallurgical guidance and expertise to other Sandia & NASA groups
- Customer-focused



Case 1: Systematic manufacturing defects caused galling and difficult on-orbit removal of fastener

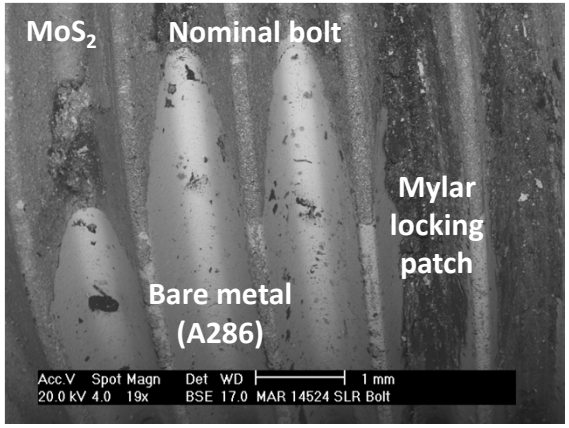
Astronauts remove stubborn launch restraint bolt on STS-115

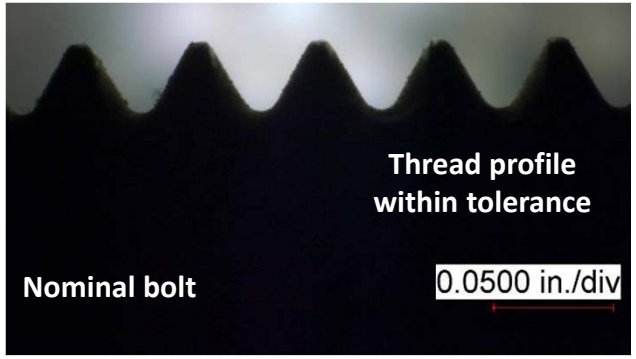


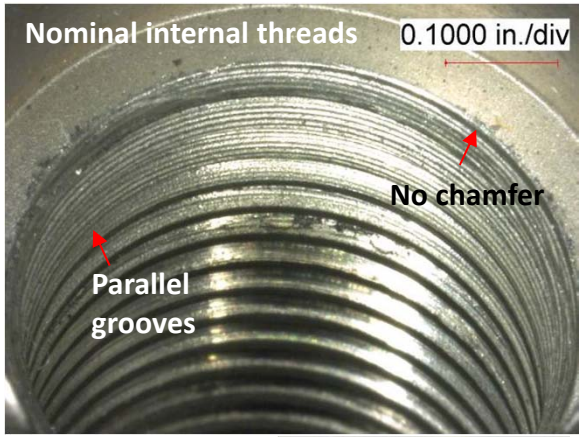


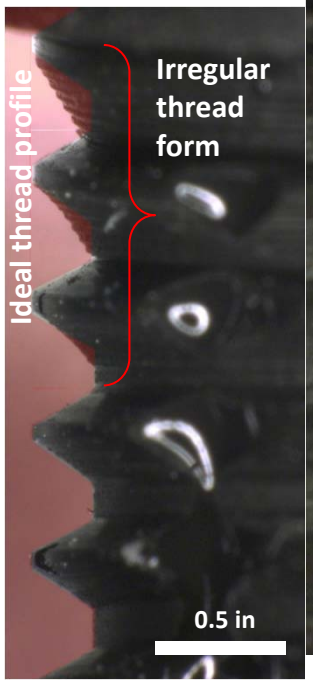
Irregularities suggested a systematic problem with this lot and warrant investigation of hardware from this vendor.

Inspection of failed hardware and procurement paperwork





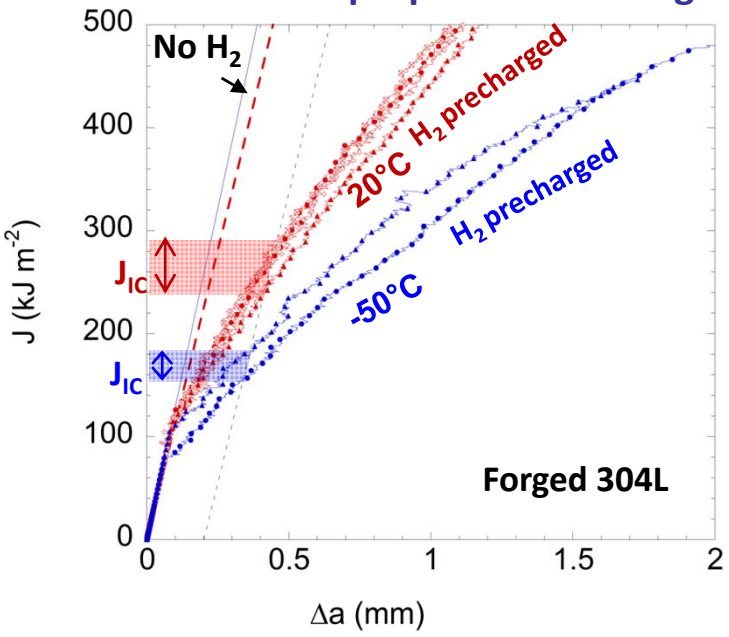




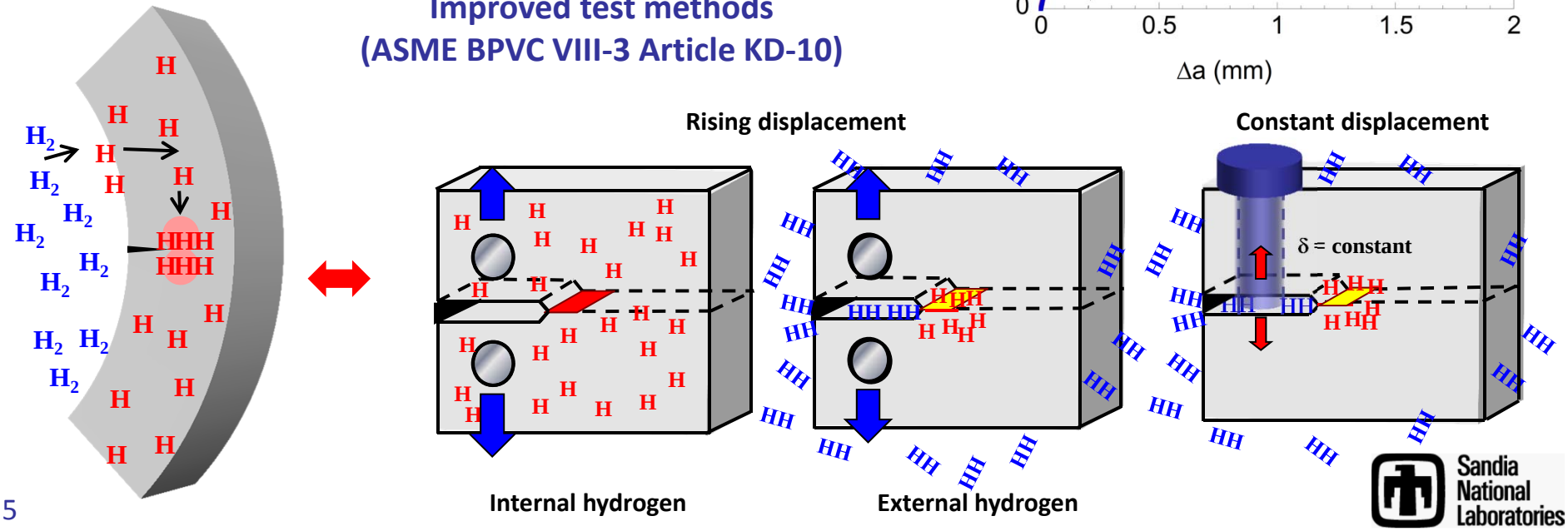
Case 2: Quantifying resistance to hydrogen-assisted fracture aids design and code/standard development

Safe and low-cost design with stainless steels for high-pressure H_2 service

Mechanical properties for design



Improved test methods (ASME BPVC VIII-3 Article KD-10)



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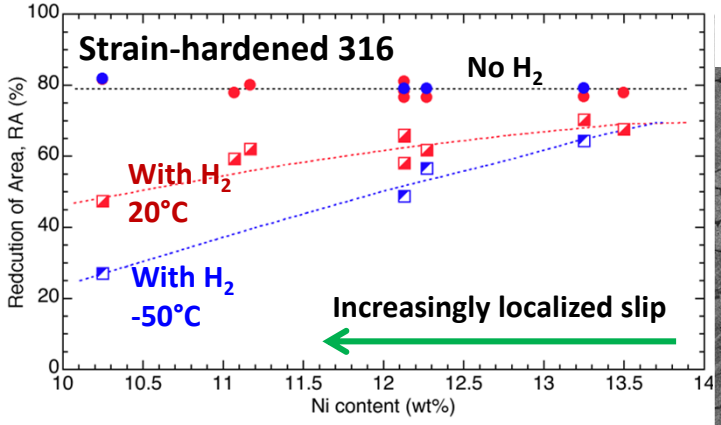
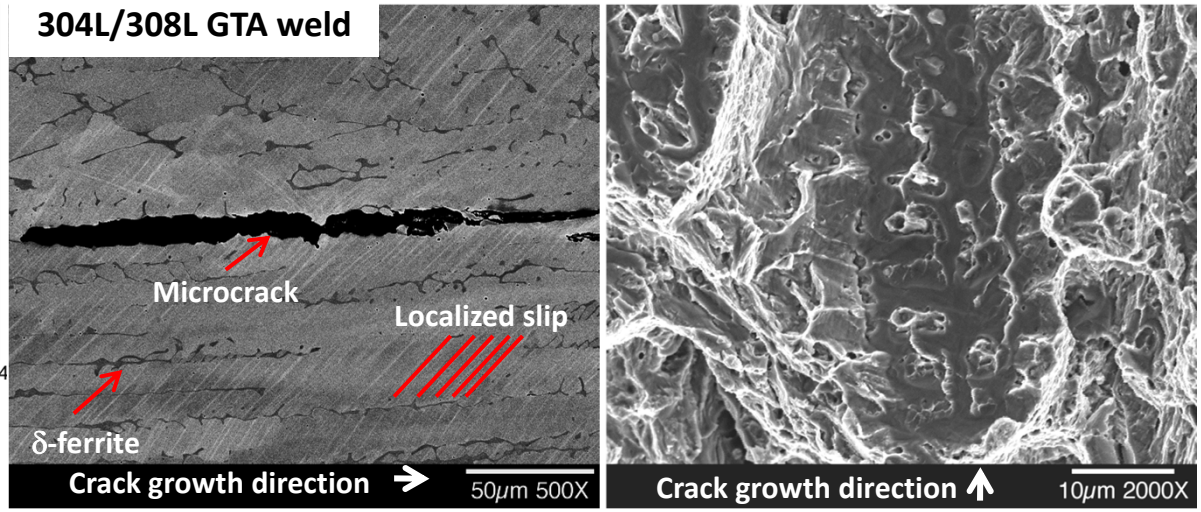
Case 2: Understanding mechanisms of hydrogen-assisted fracture improves manufacturing processes

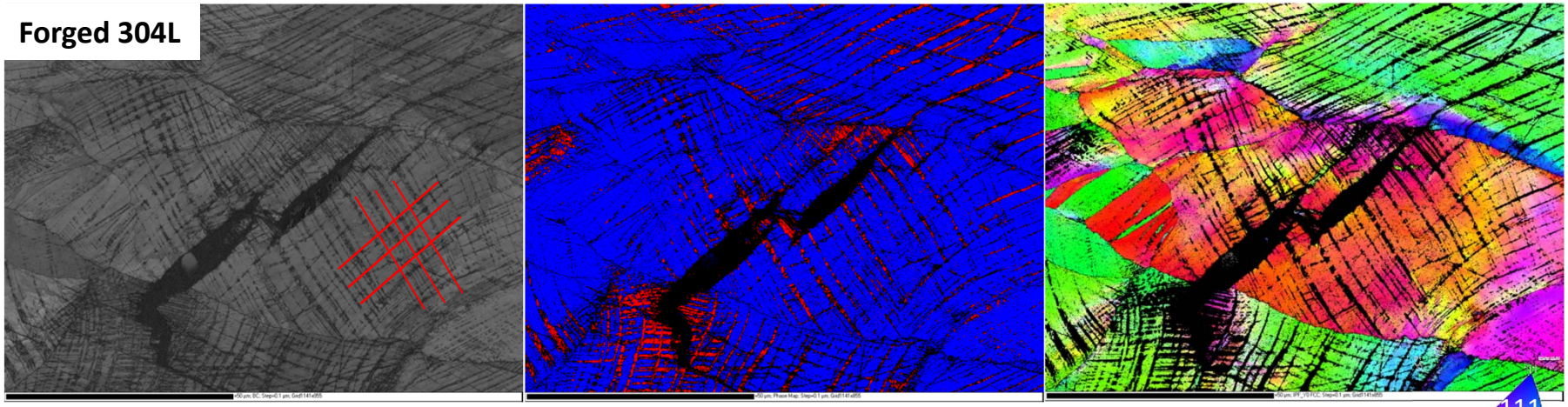
Materials selection



San Marchi *et al.* (2008) *Int J Hydrogen Energy.*

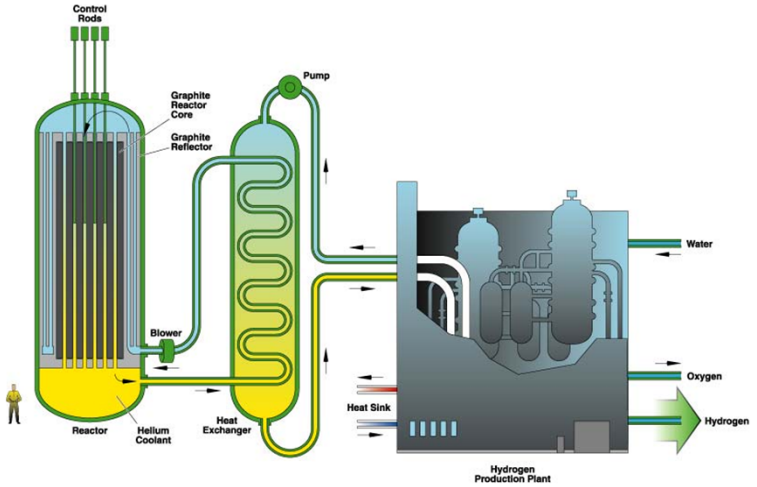
Microstructural engineering





1. Jackson *et al.* (2012) *Corrosion Sci.*
2. Jackson *et al.* (in press) *Met Trans A.*

Objectives: Develop technical solutions for the nuclear power industry while building experience managing projects, teams, and customer relationships



Apply materials and process engineering skillset to problems in diverse technical areas

Contribute to transfer of knowledge to the next generation of the nuclear power industry's workforce

Metallurgical PE exam (Oct 2013)

Take on responsibilities in project management, team leadership, and building customer relationships