PEOPLE

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## Ronald G. Ballinger

Professor of Nuclear Science and Engineering, and Materials Science and Engineering

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### Education

B.S.M.E., Worcester Polytechnic Institute, 1975
S.M., Nuclear Engineering, Massachusetts Institute of Technology, 1977
S.M., Materials Science, Massachusetts Institute of Technology, 1978
Sc.D., Nucl. Mat. Eng., Massachusetts Institute of Technology, 1982

### Research Interests

- Environmental effects on materials behavior
- Electrochemistry
- Corrosion
- Advanced materials for fusion systems advanced statistical and experimental techniques for experimental analysis
- Nuclear fuel performance analysis

### Recent Professional Service

- US Department of Energy Technical Assistance Group (TAG) for Disposition of N-Reactor Fuel
- US Department of State Technical Advisory Committee on Conditioning of North Korean Reactor (DPRK) Fuel
- US Department of Energy Technical Advisory Committee on Disposition of Savannah River Reactor Site Metallic Fuel
- American Nuclear Society, Materials Science and Technology Division, Committee Member

### Major Product Development

Responsible for the conception, development, and bringing to commercial acceptance of a super alloy, Alloy 908, for use in cryogenic magnet systems. This alloy was chosen as the sheath material for ITER (International Thermonuclear Experimental Reactor).

### Patent

US Patent Number 4785142, issued 11/15/88
European Patent Number 0285952, issued 3/1/92
Title: "Superconductor Cable"
Patent Holders: R.G. Ballinger, D.F. Smith (INCO Alloys, Inc.), B.L. Lake (INCO Alloys, Inc.)

Patent is for a new high strength, Low Coefficient Expansion (COE) alloy for use as a structural material for $Nb_3Sn$ superconducting cables. The use of this new alloy will allow higher current carrying capability by the superconductor and, thus, higher fields and/or smaller hardware. The new alloy also has use in high temperature gas turbine engine applications.

### Recent Teaching Interests

22.A01 Fatigue of Freshmen and Other Materials
22.012 Seminar in Fusion and Plasma Physics

Research profiles:
**Understanding and predicting materials behavior: NSE takes an interdisciplinary approach**

Labs + Groups
**H.H. Uhlig Corrosion Laboratory**

Recent News
**Learning the lessons of Fukushima**
**NSE publishes report on lessons learned from Fukushima-Daiichi accident**
**NSE Professor Ron Ballinger investigates major Boston-area water main break**
**CANES Symposium on "Nuclear Energy in 2050"**

22.033/33 Nuclear Engineering Design

22.32 Power Reactor Operations and Safety

22.63 Engineering Principles for Fusion Reactors

22.72J Corrosion: The Environmental Degradation of Materials

22.721 Nuclear Fuels

22.911 Seminar in Nuclear Engineering

22.912 Seminar in Nuclear Engineering

22.92 Advanced Engineering Internship

## Papers in Refereed Journals

1. Y. Watanabe, R. Ballinger, O.K. Harling, G.E. Kohse, "Effects of Neutron Irradiation on Transpassive Corrosion Behavior of Austenitic Stainless Steels," *Corrosion* 51 (9), 1995, pp. 651-659.
2. B.W. Brisson, R.G. Ballinger, A.R. McIlree, "IGSCC Crack Initiation in Mill Annealed Alloy 600 Tubing in High Temperature Caustic," *Corrosion* 54 (7), 1998, pp. 504-514.

## Papers in Refereed Conferences

1. T. Shoji, S. Suzuki, R. Ballinger, "Theoretical Prediction of SCC Growth Behavior-Threshold and Plateau Growth Rate." Seventh International Symposium on Environmental Degradation of Materials in Nuclear Power Systems - Water Reactors, Breckenridge, CO, 8/7-8/10/95, 881-892.
2. C.H. Jang, D.C. Grundy, R.G. Ballinger, M.M. Steeves, "Characterization of Simulated Production Welds in Alloy 908," *Adv. in Cryogenic Eng.*, in press.
3. M.M. Morra, M.M. Steeves, R.G. Ballinger, "The Effects of Oxygen Concentration, Stress, Temperature and Cold Work on the Constant-Load Stress-Rupture Behavior of Incoloy Alloy 908," *Adv. in Cryogenic Eng.*, in press.
4. B.W. Brisson, R.G. Ballinger, A.R. McIlree, "IGSCC Crack Initiation in Mill Annealed Alloy 600 Tubing in High Temperature Caustic," Eighth International Symposium on Environmental Degradation of Materials in Nuclear Power Systems - Water Reactors, Amelia Island, FL, 8/10-8/14/97.
5. A. Chatelain, B. Anderson, R.G. Ballinger, G. Wikmark, "Enhanced Corrosion of Zirconium-Base Alloys in Proximity to Other Metals: The Shadow Effect," International Topical Meeting on Light Water Reactor Fuel Performance, Park City, UT, 4/10-4/13/2000.

## Invited Lectures

1. June-July 1999. Participant (Lecturer) in MIT Reactor Technology Program for Utility Executives, Sponsored by National Academy for Nuclear Training.
2. July 1999. "Reactor Materials Issues," MIT Nuclear Engineering Department Reactor Safety Course.
3. December 1, 1999. "Competitive Nuclear Power? Yes: The Case for the Pebble Bed Reactor," American Nuclear Society, Northeastern Section.