**Hao Jiang**

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Summary

* Current R&D mechanical engineer in Target Engineering, Neutron Technology Division, Oak Ridge National Laboratory.
* Seven year research staff and three year postdoc researcher in Materials Science and Technology Division, Oak Ridge National Laboratory.
* Author and co-author 28 Journal and conference papers and 29 technical reports; US Patent No. 8,664,529, “Ultra High Performance Connectors for Power Transmission Applications”; ORNL Invention Disclosure-201202886, “Mechanical Property Testing on Fuel Cladding Using Modified Expansion Plug”.
* PhD graduate from Herrick Labs, Mechanical Engineering School, Purdue University; Engineer of vibration & mechanics in Trane Commercial Systems, Ingersoll Rand, WI; Research faculty in Automotive Engineering Department, Shanghai.
* Expert in computational solid mechanics, Finite Element Analysis (FEA), explicit dynamic analysis, fatigue analysis and computer simulations using MATLAB, VBA etc. Solid background in structural analysis. Adept in dynamics testing procedure, instrumentation, and data analysis.

Professional Experiences

**Researcher Oak Ridge National Laboratory, TN 2014-Present**

* Conducted SNS PPU 2MW target Water-Cooled Shroud (WCS) design evaluation. Qualified the PPU design for water-cooled shroud at 2MW 1.3GeV to meet the structural design criteria under various conditions, including static analyses using FEA to determine the stresses and deflections in the water-cooled shroud structure for service operation condition, and FE-SAFE fatigue analysis.
* Performed evaluation of SNS PPU 2MW target vessel structural analyses results to meet the structural requirements within the Structural Design Criteria, including stresses in PPU target from static and dynamic analyses to meet the criteria for Protection against Plastic Collapse, the criteria for Protection against Local Failure, the criteria of Ratcheting and maximum deflection within acceptable range.
* Developed ABAQUS user subroutine to support SNS PPU 2MW target R&D relating to cavitation damage study. The developed user subroutine was used to predict bubble nuclei growth and collapse intensity, correlate with observed damage patterns as a qualitative measure of damage potential.
* Developed the modified Erosion Depth Progression Method (EDPM) model using MATLAB to incorporate gas rate history/void fraction data into cavitation-induced erosion damage prediction on SNS target with consideration of a gas injection correction scaling factor.
* Supported SNS blue target T22 leak investigation. Conducted structure analysis using FEA of static load and dynamic at 1.4 MW beam power and FE-SAFE fatigue analysis on the blue target and the jet-flow target for potential answer to the structural failure.
* Evaluated three current SNS target mercury vessel designs including the blue target, jet-flow target and original target at 1.7MW 1.3Gev beam power with structural analyses using FEA of static thermal stress and dynamic pulse as well as FE-SAFE fatigue analyses.
* Conducted SNS PPU test target design evaluation with structural pulse analysis using FEA for five service operation condition at 1.4MW beam power and two operation condition at 1.7MW beam power, as well as FE-SAFE fatigue analysis on base metal and on the weld joints of PPU test target vessel.
* Evaluated SNS modified ORTE-003 target design with structural pulse analysis and dynamic modal analysis using FEA.
* Performed SNS blue target mercury with rigid wall boundary simulations and analysis to investigate the impact of the boundary on the mercury for predicting cavitation and its distribution.
* Predicted strain responses from the SNS MTX-008 target using FEA. Developed C++ Code to identify MTX-008 target sensor location elements.
* Investigated sag of overhead transmission conductors ACSR and ACSS for safety under gravity and electricity induce thermal loading etc. using FEA simulations.
* Developed cone-wedge-ring-expansion test to evaluate the tensile hoop properties of irradiated nuclear fuel cladding in a hot cell. The cone-wedge-ring-expansion test method has been validated through a series of pilot testing.
* Investigated spent fuel vibration integrity during normal transportation conditions. Develop methodology to link hot-cell testing data with BWR finite element analysis (FEA) interface efficiency simulation protocols for evaluating fuel properties in a hot-cell.
* Investigated the Spent Nuclear Fuel (SNF) assembly dynamic deformation during normal vibration mode, as well as the cask’s internal transient shock mode during normal condition of transport using FEA simulations to support Used Fuel Disposition Campaign (UFDC) program.
* Investigated nuclear fuel assembly flow-induced vibration interaction between fuel clad and spacer grid in support of the Consortium for Advanced Simulation of Light Water Reactors (CASL) program. Studied grid-to-rod contact interaction under flow-induced impact in PWR using FEA simulations and quantified contact forces for the fretting-impact wear bench tests in the effort of minimizing fretting damage.
* Studied the fogging mechanism of scintillating plastic panels used for the gamma detection of Radiation Portal Monitor (RPM). Investigate stress-strain profile in the plastic scintillators under certain environmental conditions lead to fogging using FEA.
* Utilized ABAQUS-Tosca topology optimization tool to design an example structure in which the material utilization was minimized while the strength was maximized without paying penalties in structural integrity. The designed non-conventional structure was 3D printed with plastic material.

 **Postdoc Research Associate Oak Ridge National Laboratory, TN** 2011-2014

* Studied integrity of ACSR and ACSS full tension two-stage splice connector system at higher operation temperature. Established finite element models of conductor and connector systems to perform forming and thermal cycling simulation using ABAQUS codes. Estimated shear resistance capacity and effective lifetime of ACSR and ACSS connector systems based on FEA results.
* Designed and evaluated ultra-high performance connectors for power transmission application. U.S. patent has been issued based on this research.
* Performed dynamics analysis of bending fatigue testing system for spent fuel vibration integrity study. Used FEA to assist the development of Cyclic Integrated Reversible-bending Fatigue Tester (CIRFT).
* Evaluated expanded plug method for mechanical property testing on fuel cladding using FEA. Developed the modified expansion plug testing protocol to mitigate the deficiencies associated with the current expanded plug method.
* Evaluated fracture toughness of various materials including Mag alloy, graphite and pipeline steels using advanced spiral notch torsion test FEA model. Developed fatigue pre-crack procedure for fracture toughness testing.
* Developed wire-concrete-steel FEA model for high pressure hydrogen storage tank using ABAQUS concrete material model to investigate stress distribution and design tank.

**Vibration & Mechanics Engineer**  **Technical Center, Trane Commercial Systems, WI** 2009-2010

* + - * Performed dynamic qualification and stress analysis on isolation base of next generation air handler to avoid iso-base failure during operation and shipping. Utilized FEA to do dynamic simulation to guide design modification. Acquired dynamic and shaker test data using LMS Test Lab, as well as performed order analysis of vibration data on bearings of rotating component, fan and motor.
			* Investigated line reliability on scroll compressor chiller system using FEA dynamic stress analysis to avoid failure during operation. Correlated modal test and FEA modal analysis using MAC (Modal Assurance Criteria) in LMS Virtual Lab to identify correlating modes by natural frequencies and mode shapes. Measured max displacement of the line in steady state, and speed sweep test to validate max equivalent stress using modal stress scaling.
			* Studied vibration damper application on the line of scroll compressor chiller system to reduce local high stress and vibration. Implemented ANSYS Workbench damper model on the system model and tuned damper frequency to interested frequency range, as well as predicted the dynamic performance and verified with test.
			* Conducted sound rating and vibration test on centrifugal compressor chiller with variable speed drive. Compared the vibration and noise performance of different variable speed drives. Estimated sound powers by surface vibration to evaluate the noise contribution of different components and different loading conditions.

 **Research Assistant Herrick Labs, Mechanical Engineering School, Purdue University** 2004-2008

* + - * Developed analytical and finite element models using MATLAB and ANSYS to model material damage, simulate dynamic response and predict acoustic radiation based on the sound transmission theory in order to do structural health monitoring in homogeneous thin metallic sheets and sandwich honeycomb panels.
			* Performed modal test using impact hammer and accelerometers to identify natural frequencies and mode shapes of sandwich honeycomb panel. Estimated material properties by comparing the model frequencies and mode shapes between the test results and finite element model results.
			* Conducted random incidence sound transmission measurement test as a non-contact method to identify geometric and material damage in the panels. Measured sound intensity using intensity probe and Managed B&K PULSE with reverberation chamber and semi anechoic enclosure.
			* Investigated structural dynamic influences in the non-contact measurement technique based on the structural acoustics. Performed Vibro-acoustic tests of acoustic loading superposing with shaker vibration and surface velocity scanning tests using laser Doppler vibrometer by Polytec PI (model PSV400).

 **Research Faculty Automotive Engineering Department, Tongji University Shanghai, China** 1998-2001

* Analyzed Static Stress of Front Suspension of Santana AG4 by FEM, sponsored by Shanghai Volkswagen.
* Performed Noise Control in Chery 1.6SPI, sponsored by Chery Automotive Company.
* Studied Test Method for Identifying the Characteristic of the Rubber Parts in the Suspension System, sponsored by the Funds of Supporting the Young Faculties of Tongji University.
* Designed Leaf Spring for the Rear Suspensions of Santana Pickup sponsored by Shanghai Volkswagen.
* Simulated and Analyzed Automotive Suspension Kinematics and Elastic Kinematics with ADAMS, sponsored by Huizhong Automotive Company.
* Investigated Influences of Wind on the Safety of Vehicles driving on Long Span Bridges at Sea, sponsored by Shanghai International Shipping Center.
* Designed and Developed Adjustable Damping Absorber, sponsored by Shanghai Volkswagen.

 **Teaching Assistant Mechanical Engineering School, Purdue University** 2006-2007

“Noise Control”, Spring 2007

“Introduction to Mechanical Engineering Design”, Fall 2006 and Spring 2007

* Demonstrated noise control experiments, such as sound pressure level and sound power level measurements, acoustic material impendence measurement, and room acoustic etc. Instructed students how to use microphone, accelerometer, calibrator, Siglab and MATLAB, and tutored students in their noise control course project.
* Assisted students to do design projects using knowledge of DVP&R (Design Verification Planning and Reporting) and FMEA (Failure Modes and Effects Analysis), and instructed them using milling machine, lathe, and grinder etc. to make a hammer as well.

 **Instructor Automotive Engineering Department, Tongji University Shanghai, China** 1998-2001

* “Theory of Automobile” and “Introduction to Vibration Analysis”
* Assistant of visiting German Professors in Chinese-German Joint College
* Advisor of student club of SAE (Society of Automotive Engineering)

Education

**Ph.D.** Mechanical Engineering School, **Purdue University,** West Lafayette, IN, Sept. 2008

 Specialized in Vibration and Acoustics GPA: 4.0/4.0

**Dissertation**: “Material Damage Modeling and Detection in a Thin Metallic Sheet and Sandwich Panel Using Passive Acoustic Transmission”

**M.S.** Automotive Engineering Department, **Tongji University,** Shanghai, China, March 1998

 Specialized in Vibration and Noise Control GPA: 3.5/4.0

**Dissertation**: “Design and Development of Adjustable Damping Absorber”

**B.S.** Automotive Engineering Department, **Tongji University,** Shanghai, China, July 1995

 Major in Automotive Design and Manufacturing GPA: 3.75/4.0

Technical Publications

Journal Papers:

H. Jiang, J.J. Wang (2018) “Development of cone-wedge-ring-expansion test to evaluate the tensile hoop properties of nuclear fuel cladding”, Progress in Nuclear Energy (108) 372-380

J.J. Wang, H. Wang, H. Jiang, B. Bevard (2018) “High burn-up spent nuclear fuel transport reliability investigation”, Nuclear Engineering and Design (330) 497-515

H. Jiang, J. Qu, R. Y. Lu, J.J. Wang (2016) “Grid-to-rod flow-induced impact study for PWR fuel in reactor”, Progress in Nuclear Energy (91) 355-361

H. Jiang, J.J. Wang (2016) “Spent nuclear fuel system dynamic stability under normal conditions of transport”, Nuclear Engineering and Design (310) 1-14

H. Jiang, J.J. Wang, H. Wang (2016) “The impact of interface bonding efficiency on high-burnup spent nuclear fuel dynamic performance”, Nuclear Engineering and Design (309) 40-52

J.J. Wang, H. Wang, H. Jiang, B. Bevard (2016) “Spent Nuclear Fuel Vibration Integrity Study”, WMS Journal, Volume 2, issue 1, October 2016

H. Jiang, J.J. Wang (2014) “Methodology for Mechanical Property Testing of Fuel Cladding Using a Expanded Plug Wedge Test”, Journal of Nuclear Materials, Volume 446, Issues 1-3, March, Pages 27-37

H. Wang, J.J. Wang, T. Tan, H. Jiang, T. Cox, R. Howard, B. Bevard, M.E. Flanagan (2013) “Development of U-Frame Bending System for Studying the Vibration Integrity of Spent Nuclear Fuel”, Journal of Nuclear Materials, Volume 440, Issue1-3, Pages 201-213

H. Jiang, D.E. Adams, K. Jata (2006) “Material Damage Modeling and Detection in a Homogeneous Thin Metallic Sheet and Sandwich Panel using Passive Acoustic Transmission”, Structural Health Monitoring: An International Journal, Vol.5, No.4, 373-387

X. Jin, L. Zhang, H. Jiang (2002) “The Analysis of Vehicle Vibrations”, Book published by the publisher of Tongji University, Shanghai, China, May 2002

H. Jiang, Z. Yu (2002), “Effect of High Winds on Driving Safety of Vehicles on Long Span Bridges at Sea”, Journal of Tongji University (Natural Science), Vol.30, No.3, 326-330

H. Jiang, Z. Yu (2001), “Effect of Side Wind on Handling Performance of Truck with Trailer”, Journal of Tongji University (Natural Science), Vol.29, No.12, 1451-1455

Conference Proceedings:

H. Jiang, J.J. Wang (2017) “Expanding Plug Wedge Test for Evaluating Hoop Tensile Properties of Fuel Cladding”, PVP2017-65185, Proceedings of the ASME 2017 Pressure Vessels and Piping Conference, July 16-20, Waikoloa, Hawaii, USA

H. Wang, J.J. Wang, H. Jiang (2017) “Fatigue Behavior of Spent Nuclear Fuel Rods in Simulated Transportation Environment”, PVP2017-65842, Proceedings of the ASME 2017 Pressure Vessels and Piping Conference, July 16-20, Waikoloa, Hawaii, USA

J.J. Wang, H. Wang, H. Jiang (2017) “Spent Nuclear Fuel Dynamic Reliability under Normal Condition of Transport with Periodic Transient Shocks”, 14th International Conference on Fracture (ICF 14), June 18-23, Rhodes, Greece

H. Jiang, J.J. Wang, H. Wang (2016) “High-Burnup Spent Nuclear Fuel Interface Bonding Efficiency Study”, INMM 57th Annual Meeting, July 24-28, Atlanta, Georgia, United States

J.J. Wang, H. Wang, H. Jiang (2016) “Spent Nuclear Fuel Transport Reliability Study”, Paper No. 5001, Proceedings of the 18th International Symposium on the Packaging and Transportation of Radioactive Materials, PATRAM 2016 September 18-23, Kobe, Japan

J.J. Wang, H. Wang, H. Jiang, Y. Yan, B. Bevard (2016) “Spent Nuclear Fuel Vibration Integrity Study-16332”, WM2016 Conference, March 6-10, Phoenix, Arizona, USA

J.J. Wang, H. Wang, H. Jiang, B. Bevard (2015) “An Innovative Testing Protocol to Study Spent Nuclear Fuel Vibration Integrity under Normal Condition of Transportation”, Top Fuel 2015, September Zurich, Switzerland

J.J. Wang, H. Wang, H. Jiang, B. Bevard, R. Howard, J. Scaglione (2015) “High Burn-Up Spent Nuclear Fuel Vibration Integrity Study -15134”, WM2015 Conference, March 15-19, Phoenix, Arizona, USA

J.J. Wang, H. Wang, H. Jiang, B. Bevard, R. Howard, J. Scaglione (2015) “Lessons Learned from CIRFT Testing on SNF Vibration Integrity Study”, International High-Level Radioactive Waste Management Conference 2015, April, Charleston, South Carolina, USA

H. Jiang, J.J. Wang, H. Wang (2014) “Potential Impact of Interfacial Bonding Efficiency on Used Nuclear Fuel Vibration Integrity During Normal Transportation”, Proceedings of the ASME 2014 Pressure Vessels & Piping Conference PVP2014-29067, July 20-24, Anaheim, California, USA

H. Jiang, J.J. Wang, H. Wang (2014) “Reversible Bending Fatigue Testing System Design Concepts for Spent Fuel Vibration Integrity Study”, Proceedings of the ASME 2014 Pressure Vessels & Piping Conference PVP2014-29117, July 20-24, Anaheim, California, USA

H. Jiang, J.J. Wang, et al. (2014) “Potential Impact of Interfacial Bonding Efficiency on High-Burnup Spent Nuclear Fuel Vibration Integrity during Normal Transportation,” WM2014 International Conference, March 02-06, Phoenix, AZ, USA

J.J. Wang, H. Wang, H. Jiang (2014) “Potential Effect of Interfacial Bonding on Used Nuclear Fuel Vibration Reliability”, 2014 American Nuclear Society Annual Meeting, June, Reno, Nevada, USA

H. Jiang, J.J. Wang, F. Ren, D. Lee, J. Chan, G. Sibilant (2012) “Integrity Study of ACSR and ACSS Two Stage Splice Connectors at High Operation Temperatures”, Proceedings of the ASME 2012 International Mechanical Engineering Congress & Exposition IMECE2012, Houston, Texas, USA

J.J. Wang, H. Jiang, F. Ren (2012) “The Reliability Investigation on ACSR Splice Connector Systems Used in Overhead Power Transmission Lines”, Proceedings of International Conference on Renewable Energies and Power Quality, Spain

J. White, S. Sundararaman, H. Jiang, D.E. Adams, and K. Jata (2005) “Integrated Sensing and Material Damage Identification in Metallic and Ceramic Thermal Protection Systems Using Vibration and Wave”, Proceedings of the Quantitative NDE Conference, Maine.

Technical Report:

H. Jiang, “Cavitation-Induced Erosion Damage Modeling with Gas Injection Correction”, ORNL/SNS/ 106010101-TR0067, R00, December 2020

H. Jiang, “Structural Analyses and Evaluation of Three Current Target Mercury Vessels at 1.7MW 1.3Gev Beam Power”, ORNL/SNS/106010101-49- R00, July 2020

H. Jiang, “Thermal Stress and Fatigue Analyses of Three Current Target Mercury Vessels at 1.7MW 1.3Gev Beam Power”, ORNL/SNS/106010101-50- R00, June 2020

H. Jiang, S. Gorti, K. Johns, “PPU Mercury Target Vessel Structural Analyses”, ORNL/SNS/ 106010101-DA0053, June 2020

H. Jiang, “PPU 2MW Target Water-cooled Shroud Structural Analysis”, ORNL/SNS/ 106010101-DA0055, R00, May 2020

D. Winder, C. Barbier, S. Chae, H. Jiang, et al., “T22 Leak Investigation and Resulting Design Changes”, ORNL/SNS/ 106010101-TR0062, August 2020

L. Lin, H. Jiang, C. Barbier, “T22 Target Leak Stress Analysis”, ORNL/SNS/ 106010101-DA0056, R00, May 2020

H. Jiang, “PPU Test Target Mercury Vessel Stress Analyses and Evaluation to Design Criteria”, ORNL/ SNS - 106010101-DA0043, R00, September 2019

H. Jiang, D. Winder, “ORTE-003 Target Module Reevaluation—Stress and Modal Analysis”, ORNL/ SNS 106010101-DA0032-R00, May 2017

H. Jiang, “Blue Target Mercury with Rigid Wall Boundary Simulations and Analysis”, ORNL/ SNS106010101-TR0041, R00, July 2017

H. Jiang, “Mercury Target Engineering, MTX-008 Target Sensor Predictions”, ORNL/ SNS106010101-TR0038, July 2017

J.J. Wang, H. Jiang, “Sag Study of Overhead Transmission Conductors ACSR and ACSS under Tension and High Temperature”, ORNL/LTR-2017/20, January 2017

J.J. Wang, H. Jiang, “Development of Cone Wedge Ring Expansion Test to Evaluate Mechanical Properties of Clad Tubing Structure”, ORNL/TM-2016/279, October 2016

J.J. Wang, H. Wang, H. Jiang, Y. Yan, B. Bevard, J. Scaglione, “FY 2016 Status Report: Documentation of All CIRFT Data including Hydride Reorientation Tests (Draft M2)”, ORNL/SR-2016/424, September 2016

J.J. Wang, H. Jiang, “The Development of Expansion Plug Wedge Test for Clad Tubing Structure Mechanical Property Evaluation”, ORNL/TM-2015/723, April 2016

J.J. Wang, H. Jiang, H. Wang, B. Bevard, J. Scaglione, “Dynamic Deformation Simulation of Spent Nuclear Fuel Assembly and CIRFT Deformation Sensor Stability Investigation”, ORNL/SPR-2015/662, November 2015

J.J. Wang, H. Wang, H. Jiang, Y. Yan, “CIRFT Testing of High-Burnup Used Nuclear Fuel Rods from Pressurized Water Reactor and Boiling Water Reactor Environments”, M2-FCRD-UFD-2015-000101, September 2015

J.J. Wang, H. Jiang, “BWR Spent Nuclear Fuel Interfacial Bonding Efficiency Study”, ORNL/TM-2015/269, June 2015

J.J. Wang, H. Wang, H. Jiang, “CIRFT Testing of Used Nuclear Fuel Rods from the Limerick Generating Station Boiling Water Reactor”, FCRD-UFD-2015-000635, April 2015

J.J. Wang, H. Wang, H. Jiang, B. Bevard, R. Howard, “CIRFT Testing Results on High Burnup UNF”, M2-FCRD-UFD-2014-000053, September 2014

J.J. Wang, H. Jiang, B. Bevard, J. Scaglione, “Quantification of CIRFT System Biases and Uncertainties Associated When Testing High Burnup Spent Nuclear Fuel”, FCRD-UFD-2014-000604, September 2014

J.J. Wang, H. Wang, H. Jiang, “Using Finite Model Analysis and Out of Hot Cell Surrogate Rod Testing to Analyze High Burnup Used Nuclear Fuel Mechanical Properties”, FCRD-UFD-2014-000603, August 2014

B. Bevard, R. Howard, J.J. Wang, H. Wang, H. Jiang, “FY 2014 Status Report: Vibration Testing of High Burnup Clad Fuel,” FCRD-UFD-2014-000487, March 2014.

J.J. Wang, H. Jiang, H. Wang, “The Impact of Interface Bonding Efficiency on High Burn-up Spent Fuel Vibration Integrity during Normal Transportation”, ORNL/TM-2013/296, August 2013

J.J. Wang, H. Jiang, “Methodology for Mechanical Property Testing on Fuel Cladding Using a Modified Expansion Plug Testing Protocol”, ORNL/TM-2012/462, February 2013

J.J. Wang, T. Tan, H. Jiang, W. Zhang, Z. Feng, “Developing Fatigue Pre-crack Procedure to Evaluate Fracture Toughness of Pipeline Steels Using Spiral Notch Torsion Test,” ORNL/TM-2012/337, October 2012

J.J. Wang, H. Jiang, F. Ren, “The Integrity of ACSR Full Tension Two-Stage Splice Connector at Higher Operation Temperature”, ORNL/TM-2012/323

J.J. Wang, H. Jiang, F. Ren, “The Integrity of ACSS Full Tension Two-Stage Splice Connector at Higher Operation Temperature”, ORNL/TM-2012/324

J.J. Wang, H. Wang, T. Tan, H. Jiang, T. Cox, Y. Yan, “Progress Letter Report on U-Frame Test Setup and Bending Fatigue Test for Vibration Integrity Study,” ORNL/TM-2011/531, May 2012.

Technical Presentations:

Presented “Expanding Plug Wedge Test for Evaluating Hoop Tensile Properties of Fuel Cladding”, PVP2017-65185, ASME 2017 Pressure Vessels and Piping Conference, July 16-20, Waikoloa, Hawaii, USA

Presented “High-Burnup Spent Nuclear Fuel Interface Bonding Efficiency Study”, INMM 57th Annual Meeting, July 24-28, 2016, Atlanta, Georgia, United States

Presented “ACSR-SSC Conductor and Connector Joule Heating Simulation”, ASME 2015 International Mechanical Engineering Congress & Exposition IMECE, Nov. 13-19, 2015, Houston, Texas, USA

Presented “Reversible Bending Fatigue Testing System Design Concepts for Spent Fuel Vibration Integrity Study”, PVP2014-29117, ASME 2014 Pressure Vessels & Piping Conference, July 20-24, Anaheim, California, USA

Presented “Potential Impact of Interfacial Bonding Efficiency on Used Nuclear Fuel Vibration Integrity During Normal Transportation”, PVP2014-29067, ASME 2014 Pressure Vessels & Piping Conference, July 20-24, Anaheim, California, USA

Presented “Integrity Study of ACSR and ACSS Two Stage Splice Connectors at High Operation Temperatures”, ASME 2012 International Mechanical Engineering Congress & Exposition IMECE, Nov. 9-15, 2012 Houston, Texas, USA

US Patent

US Patent No. 8,664,529, Issued: March 4, 2014, “Ultra High Performance Connectors for Power Transmission Applications”.

Invention Disclosure

ORNL Invention Disclosure-201202886, “Mechanical Property Testing on Fuel Cladding Using Modified Expansion Plug”, June 21, 2012

Awards

In a team to receive a Significant Event Award from ORNL for successful Proton Power Upgrade (PPU) target design completion in 2020

In a team to receive a Significant Event Award from ORNL for developing Cyclic Integrated Reversible-bending Fatigue Tester (CIRFT) in 2014

Professional Association Memberships

ASME