Dennis L. Youchison

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Oak Ridge, TN 37830-3115
(865) 298-5901

INTERESTS: Primary interests include fusion engineering/materials research and fission fuel development. Emphasis is in thermal-hydraulics, CFD, heat transfer and neutronics. Other interests include power conversion technology, high temperature materials, physical and chemical vapor deposition, electron beams and accelerators, particle transport, and radiation damage.

EDUCATION:

Ph.D. Nuclear Engineering, August 1989
The Pennsylvania State University

M.S. Nuclear Engineering, August 1984
The Pennsylvania State University

B.S. Nuclear Engineering, May 1982
The Pennsylvania State University

RELATED EXPERIENCE

Distinguished Scientist – Fusion Energy Division
Fusion Technology Group
Oak Ridge National Laboratory
2015 – present

Distinguished Member Technical Staff – EM and Radiation Effects Simulations
Sandia National Laboratories
Dept. 1353
2013 - 2015

Distinguished Member Technical Staff -- Design and testing of Plasma Facing Components and Materials
Sandia National Laboratories
Dept. 1658
November 1994 - 2013

Senior Research Associate --- HHF testing of PFC materials
Sandia National Laboratories/Penn State University
Fusion Technology Dept. 6531
June 1993 - November 1994

Research Associate --- ECR-CVD Diamond Film Deposition
U.S. Naval Research Laboratory
Surface Modification and Analysis Branch
October 1990 - December 1992

Research Associate --- PSU Hot Metallurgy Laboratory
Materials testing and PIE of irradiated borated steels
January1989 - September 1990

Project Engineer --- Sputtering/Redeposition Experiments
Westinghouse Electric Corporation R&D Center
Optical Devices and Directed Energy Research
April 1988 - December 1988

Research and Teaching Assistant
Nuclear Engineering Department
The Pennsylvania State University
Research activities included development of ITAP
ion-optics code and beam optimization studies
January 1987 - March 1988, January 1989 - September 1990

Project Engineer --- Particle Beam Sputtering Research
Westinghouse Electric Corporation R&D Center
Optical Devices and Directed Energy Research
Designed optics for AFWL/SDIO program on electron beam
direct drive of RF linear accelerators
January 1986 - December 1986

Guest Researcher --- Design & Development of ISIS
Particle Beam Sputtering System
Westinghouse Electric Corporation R&D Center
Optical Devices and Directed Energy Research
DOE Fusion Engineering Research in Industry Appointments
June 1984 - December 1984
June 1983 - December 1983

Research Assistant, Nuclear Engineering Dept.
The Pennsylvania State University
Research activities involved sputtering analysis
of impurity control surfaces.
January 1985 - December 1985
December 1983 - May 1984

Engineer Co-op, Emergency Preparedness Dept.
GPU Nuclear Corporation, TMI Units I & II
Development of accident scenarios and implementation
of drills

June 1982 - August 1982

SOCIETY MEMBERSHIPS: American Vacuum Society, Society of Photoelectronic Instrumentation Engineers (SPIE), American Nuclear Society, Institute of Electrical and Electronics Engineers-senior member, American Society of Mechanical Engineers, Alpha Nu Sigma, Nuclear Engineering Honor Society, Tau Beta Pi Engineering Honor Society

HONORS AND AWARDS:
Sandia Distinguished Member of Technical Staff 2003
2010 Sandia Employee Recognition Award – ITER Team
Sandia Award for Excellence, 1996
Office of Naval Technology Postdoctoral Fellowship (1990-1992)
Two appointments to DOE Fusion Engineering Research Residency in Industry Program (DOE-ANL, 1983 & 1984)
Awarded DOE Graduate Energy Traineeship (1982)
Duquesne University Academic Scholarship
PSU's Dean's List (5), National Dean's List

SPECIAL DUTIES:
Chair Fusion Technology Committee, IEEE/NPSS (2010-2012)
Standing Committee Member IEEE/NPSS Fusion Technology, (since 2009)
IEA NTFR Annex II Subtask 1 Leader (2009-2012)
General Chair 22nd IEEE/NPSS Symp. on Fusion Engineering (2007)
Licensed Professional Engineer – New Mexico (2004-present)
Executive Committee Member ANS Fusion Energy Division, (1999-2003)
Coordinator of HHFF User Facility.
Operation of electron beam facilities & customer liason
Committee member for 7th Surface Modification of Metals by Ion Beams Conference, Washington, DC, 1991
Vice-president Penn State Chapter of Alpha Nu Sigma (1983)
Nuclear Engineering Dept. representative to the Graduate Student Association (1983, 1985)
Charter Member of the Engineering Graduate Council (1984)

SPECIAL SKILLS:
high temperature materials, power conversion, fusion engineering, plasma material interactions, plasma facing components, plasma processing, plasma etching and deposition, plasma diagnostics, physical and chemical sputtering, physical vapor deposition, chemical vapor deposition, ECR-PECVD, ion implantation, object oriented computer programming in C, C++, fortran, basic, pascal, labview and assembly, systems programming and device driver development, data acquisition, process monitoring and control, vacuum technology, high voltage engineering, modeling of charged particle optics, accelerator technology, thermal hydraulics, heat transfer, FEM and CFD modeling, materials science-thin films and

coatings, surface characterization, SEM/TEM, XPS, Auger, x-ray diffraction, optical emission spectroscopy, mass spectrometry, langmuir probes, sector magnet mass separator design.

SUPPLEMENTARY ACHIEVEMENTS:

Developed revolutionary, new nuclear fuel matrix for fission applications in high temperature gas reactors and space propulsion reactors. Design of space reactor components. E&M FEM, CFD modeling and design of fusion reactor components. CHF testing of medium-scale divertor mock-ups, HHF testing of photon beam stops, klystrons, magnetrons and gyrotrons, HHF tests of beryllium divertor mock-ups. Development of electron beam control and rastering software. Development of advanced infrared analysis software for real-time absolute temperature calculations with emissivity corrections. HHF tests of helium-cooled heat exchangers. Development and testing of refractory alloys. Thermal hydraulics testing of porous coatings. Design of sector electron beam bending magnets. Led the team responsible for bringing the EB-1200, 1200 kW electron beam test system on line. Set up High Heat Flux Facility User Facility and WFO center. Successfully negotiated and executed four CRADA agreements between private companies and Sandia. Developed in-vacuo sector bending magnet for EB-1200. PI on LDRD project to deposit thermal barrier coatings using EB-PVD on the EB-1200. Setup EB-1200 instrumentation and test diagnostics. Designed and built computerized optical emission spectroscopy system for use on the EB-1200. US Home Team project leader for ITER task T222, the manufacturing and testing of permanent components for the International Thermonuclear Experimental Reactor project. Principal Investigator on four Russian and four Japanese HHF international exchange experiments. Developed ES&H SOPs and OPs for HHFF operations. Setup DOE approved beryllium handling facility at the HHFF. Installed CO_2 pellet cleaning/decontamination system for HHFF vacuum chambers. Performed over 70 HHF experiments at the HHFF. Modeled charged particle optics for EBTS, EB-60 and EB-1200 electron beam systems. Designed and built new ebeam source for 30 kW EBTS and modified 60 kW EB-60 source for grid control. Recipient of four US patents with one pending. 2009 DOE Research Needs Workshop Thrust 11 leader.

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