

Neil B. Morley

Adjunct Professor

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Current Position

University of California, Los Angeles, Mechanical & Aerospace Engineering Department

- Full Professor, Adjunct: 2006 – Present
- Associate Professor, Adjunct: 2001 – 2006
- Research Scientist/Lecturer: 1997 – 2001

DESCRIPTION: Adjunct appointment to teach and conduct nuclear energy related research in heat transfer and fluid dynamics. Current topics include tritium breeding and nuclear reactor cooling technologies; magneto-hydrodynamics of free surface and closed channel liquid metal flows in strong magnetic fields and with complex geometries; magnetohydrodynamic and free surface effects on turbulence and turbulent heat transfer for flows of molten salts; scalar transport and bubble dynamics. Established experimental research laboratory, the Magneto-Thermofluid Omnibus Research (MTOR) Laboratory, with multiple, interchangeable liquid metal and electrolyte flow facilities, magnetic field facilities, and measurement capabilities such as particle image velocimetry, and high speed digital imaging, ultrasonic and magnetic induction measurements, *etc.* Developed state of the art numerical simulation tools and computing hardware to study various important phenomena in nuclear fission and fusion coolants and high heat flux components. Held various leadership and service roles in the national and international nuclear fusion research community.

Education

University of California, Los Angeles, Ph.D. (1994) and M.S. (1990) in Nuclear Engineering

MAJOR FIELD: Nuclear Engineering, Applied Plasma Physics and Fusion Technology

MINOR FIELDS: Electromagnetic Theory (Physics Department), Fluid Dynamics (Math Department)

DISSERTATION: *“Numerical and experimental modeling of liquid metal, thin film flows in a quasi-coplanar magnetic field.”*

University of New Mexico, Albuquerque, B.S. (1988) in Electrical Engineering

EMPHASIS: Circuit Analysis, Electromagnetic Theory (Electrical & Computer Engineering Department)

GPA: 3.94/4.0, Summa cum Laude, Top EECE graduate

Teaching Experience

Adjunct Professor (current), University of California, Los Angeles, Mechanical & Aerospace Engineering Department (1994-ongoing)

DESCRIPTION: Supervision of graduate and undergraduate student research and co-chairmanship of Doctoral and Masters Committees. Teaching departmental courses in Nuclear and Mechanical Engineering (Mathematics of Engineering, Fundamentals of Nuclear Power, Nuclear Reactor Theory, Nuclear Science and Engineering) with strong student evaluations

Professional Experience and Service

Panel Leader for Power Extraction, Magnetic Fusion Energy Sciences (MFES) Research Needs Workshop (ReNeW) (2008-2009)

DESCRIPTION: ReNew is a year-long planning effort to develop a comprehensive strategic plan for the Department of Energy Fusion Energy Sciences program that will guide the program during the next 20 year period.

Task Coordinator and Steering Committee Member, US/Japan TITAN Collaboration (2007-ongoing)

DESCRIPTION: TITAN is a new 6-year collaboration (2007-2013) on issues of Fusion Engineering Science of interest to both the US and Japanese Universities. Coordinating task "Flow Control and Thermofluid Modeling" for the US, including experiments utilizing the UCLA MTOR facility.

Program Advisory Committee Member, Department of Plasma Science and Technology, Princeton Plasma Physics Laboratory (2008-ongoing)

DESCRIPTION: Periodically assess the progress and prospects for the department and issue advisory report

Editorial Advisory Board, Fusion Engineering and Design, Elsevier Science Ltd., North Holland Press (Jan 2008 – ongoing)

DESCRIPTION: Member of editorial board responsible for journal content

Member, ITER Blanket Conceptual Design Review Committee (May – July, 2007)

DESCRIPTION: Evaluation and recommendations concerning the proposed shielding blanket design and fabrication plans for the US ITER Project Office, US Department of Energy.

Principal Member, US Test Blanket Module Program Planning Group (2005-2008)

DESCRIPTION: Preparation of technical plan and cost estimate proposal for the US participation in ITER Test Blanket Module Program to utilize the ITER facility for reactor technology testing.

Independent Research and Computational Consulting, (2000-ongoing)

DESCRIPTION: Consulting and contract work on a number of research projects related to high performance fluid mechanics code development and material development and compatibility for applications in fusion and fission

Technical Program Committee Member, Topical Meeting on Fusion Energy Series, American Nuclear Society (2000-ongoing)

DESCRIPTION:

- Technical Program Committee for TOFE-18, San Francisco, CA (2008)
- Technical Program Committee for TOFE-17, Albuquerque, NM (2006)
- Technical Program Committee for TOFE-16, Madison, WI (2004)
- Technical Program Committee for TOFE-15, Washington, D.C. (2002)

Fusion Energy Division Executive Committee Member, American Nuclear Society (2005-2008)

DESCRIPTION: Election to Executive Committee responsible for the organization and operation of the ANS Fusion Energy Division programs and symposia, 3 year appointment. Currently serving a year as the Awards Sub-Committee Chairman.

Assistant Editor, Fusion Engineering and Design (2005)

DESCRIPTION: *Special Issue on Proceedings of the 7th International Symposium on Fusion Nuclear Technology*, Tokyo, Japan, May 2005. Parts A and B, Fusion Engineering and Design, Vol. 81, 2006.

Associate Director, Center for Energy Science and Technology Advanced Research (CESTAR), UCLA School of Engineering and Applied Science (2005-Ongoing)

DESCRIPTION: Help establish and coordinate new UCLA CESTAR mission, activities, meetings, and symposia.

National steering committee for Plasma Facing Components, US DOE (2003-Ongoing)

DESCRIPTION: Member of steering committee for roughly ~\$6M PFC program in the Office of Fusion Energy Science, US Department of Energy.

Guest Editor, Fusion Engineering and Design (2004)

DESCRIPTION: *Special Issue on Innovative High-Power Density Concepts for Fusion Plasma Chambers*, Fusion Engineering and Design, Vol. 72, November 2004.

International Program and Standing Committee Member, International Symposium on Fusion Nuclear Technology Conference Series (1994-ongoing)

DESCRIPTION:

- International Standing Committee (2002-Ongoing)
- International Program Committee for ISFNT-8, Heidelberg, Germany (2007)
- International Program Committee for ISFNT-7, Tokyo, Japan (2005)
- International Program Committee for ISFNT-6, San Diego (2002)
- International Program Committee for ISFNT-5, Rome, Italy (1999)
- Technical Program Committee for ISFNT-4, Tokyo, Japan (1997)
- Local Organizing Committee ISFNT-3, Los Angeles (1994)

Technical Journal and Proposal Reviewer (1994 – ongoing)

DESCRIPTION:

- Physics of Fluids, American Institute of Physics
- Fusion Technology and Nuclear News, American Nuclear Society
- Fusion Engineering and Design, Computers & Fluids, and International Journal of Heat and Mass Transfer, Elsevier Science Ltd. North Holland Press
- Canadian Journal of Physics, NRC Research Press
- Progress in Computational Fluid Dynamics, InderScience Publishers
- Arabian Journal for Science and Engineering, King Fahd University of Petroleum and Minerals
- U.S Departments of Energy and State

Technical Task Leader, Advanced Power Extraction Design Study, U.S. Department of Energy (1998-2003)

DESCRIPTION: Leadership of Fundamental Modeling and Experiments Task for investigation of free surface flows applied to the liquid walls concept in the National APEX study (consisting of researchers from 11 National Laboratories and Universities)

International Steering Committee, 1st Symposium on Free Surface and Interfacial Phenomena, Yugawara, Japan, (2001)

DESCRIPTION: Technical organization and planning of symposium

Guest Editor, Fusion Engineering and Design, Volumes 39-42, North Holland Press (1998)

DESCRIPTION: Proceedings of the 4th International Symposium on Fusion Nuclear Technology

Postdoctoral Fellow, Oak Ridge Institute for Science and Education, U.S. Department of Energy (1995-1996)

DESCRIPTION: D.O.E. postdoctoral award, served at UCLA and the French Commissariat à l'Energie Atomique (CEA/Saclay), to perform research in the area of LM-MHD and thermo-mechanics for fusion reactor applications.

Graduate Student Researcher, University of California, Los Angeles, Mechanical & Aerospace Engineering Department (1998-1994)

DESCRIPTION: Research in the area of liquid metal flow and heat transfer in closed channels, and as thin flowing films in open chutes. Thesis work included the development and numerical solution of a two-dimensional fully-developed nonlinear model of film flow velocity and induced magnetic field profiles, the design and construction of coupled liquid metal flow loop, magnetic field “MeGA-loop” facility capable of performing a variety of lead-bismuth experiments, and the performance of thin film flow MHD experiments measuring the film height evolution and surface electric potential in the MeGA facility.

Visiting Research Fellow, Massachusetts Institute of Technology, Plasma Fusion Center (1990)

DESCRIPTION: Performed experiments to measure the output power and frequency for different cathode geometries and surface treatments in high power, relativistic magnetron.

Electrical Support Technician, Rockwell Power Systems, Albuquerque, New Mexico (1986 – 1988)

DESCRIPTION: Electrical and electronic support for a variety of laser, electron beam, and high voltage experiments both for Rockwell and the Air Force.

Summer Research Fellow, Sandia National Laboratory, Secure Communications Group (1985-86)

DESCRIPTION: Personal computer setup and programming, wiring, and communication system testing for the DOE Secured Communications System (SECOM) for tracking nuclear weapon and nuclear material convoys. Received a DOE "Q" security clearance.

Professional Memberships

- American Physical Society (APS), 1995 - ongoing
- American Society of Mechanical Engineers (ASME), 1998 – 2007
- American Nuclear Society (ANS), 2002 – ongoing
 - Fusion Energy Division Executive Committee (2005-2007)
 - Fusion Energy Division Awards Committee Chairman (2007-ongoing)
- University Fusion Associates, 2003 – ongoing
- Fusion Power Associates, 2003 – ongoing

Awards / Honors

- David Rose - Excellence in Fusion Engineering Award, Fusion Power Associates, October, 2005
- MA-FNT Outstanding Young Fusion Technology Researcher Award, April 2002.
- DOE/ORISE Fusion Energy Postdoctoral Research Fellowship, 1994–1995
- DOE/ORISE Magnetic Fusion Energy Technology Fellowship, 1988–1993
- Institute of Plasma and Fusion Research Fellowships, UCLA, Intermittent 1988–1993
- University of New Mexico:
 - Top graduate EECE Department, Summa cum Laude, 1988
 - Presidential Scholarship, 1984–1988
 - BDM "Old Crow" Scholarship, 1986–1988
 - Freshman Engineering Scholarship, Freshman Chemistry Award, 1985