

Professor Cary B Forest

Department of Physics at the University of Wisconsin, Madison
Director of the Wisconsin Plasma Physics Laboratory

Biographical Sketch

Dr. Cary B Forest received a Bachelor of Science degree from the University of Wisconsin in 1986 in the Applied Math, Engineering and Physics program. He received a Magnetic Fusion Energy Science Fellowship from the DoE to attend graduate school at Princeton University where he received a Ph.D. in 1992 in the Astrophysical Sciences department. His thesis, supervised by Dr. Masayuki Ono at the Princeton Plasma Physics Laboratory, received the *Simon Ramo Award for Outstanding Doctoral Thesis Research in Plasma Physics* from the APS. In the course of his thesis work he invented and demonstrated a non-inductive method of tokamak formation based upon the bootstrap current. After graduate school he spent 5 years working at General Atomics as a Scientist where his work focused on studies of plasma resistivity, non-inductive current drive, rf heating of plasmas and MHD instabilities in tokamak plasmas (at the time GA operated the largest US tokamak research program). The analysis technique Forest developed during this time for measuring the non-inductive currents driven in tokamaks has since been implemented in most of the world's large tokamaks and played a central role in validating the heating and current drive models being used to predict their behavior on Iter. At the UW, Forest has received the Romnes Fellowship, the Vilas Associate Award and the Kellett Mid Career Award. Nationally, he is the recipient of the Alfred P. Sloan Fellowship, the David and Lucille Packard Foundation Fellowship, and a Research Award from the Alexander von Humboldt Foundation (hosted by the Max Planck Institute for Plasma Physics in Garching, Germany (2005)). He has served as Director of the NSF Physics Frontier Center for Magnetic Self-Organization. He is a fellow of the American Physical Society.

Areas of Technical Specialization

Forest's research program in experimental plasma physics is on the border between nuclear fusion research and the new discipline of laboratory plasma astrophysics. This includes research on liquid metal dynamos and MHD turbulence; research on MHD instabilities in line-tied plasmas and their stabilization by moving metal walls; studies of heat, current transport, and non-inductive currents in tokamaks and RFPs, and most recently a major new initiative on flow-dominated, rather than magnetically dominated plasmas. During his time at Wisconsin, Forest's group has brought into operation four new major experiments, including the Madison Dynamo Experiment (sodium), the Rotating Wall Machine, the Plasma Couette Experiment, and the Big Red Plasma Ball in the Wisconsin Plasma Physics Laboratory. Three of Forest's PhD students have won the Marshall Rosenbluth Thesis Award of the APS.

Selected Professional and Educational Activities

- 2017 Member of National Academy of Sciences committee to develop
A strategic Plan for U.S. Burning Plasma Research
- 2016 Organizer of US-Japan Workshop on Magnetic Reconnection
- 2015 DoE ReNew activity on Frontiers in Plasma Science, Group leader
- 2015 Chairman of the Program Advisory Committee of the MIT Plasma Fusion Science Center
- 2014 APS Counselor, representing the Division of Plasma Physics
- 2013-16 Associate Editor of the Journal of Plasma Physics
- 2012 Member of the Fusion Energy Sciences Advisory Committee (FESAC)
- 2011 Chairman of the Division of Plasma Physics of the American Physical Society,
- 2008-12 *Nuclear Fusion*, Member of Board of Editors,
- 2007 Committee to review ITER Science Planning Process,
National Research Council of the National Academy of Sciences
- 2003-06 National Research Council of the National Academy of Sciences,
Chairman of standing committee on plasma science

