

Derek Sutherland

University of Washington
Seattle, WA 98195, U.S.A.
Tel: 407.754.4511
Email: das1990@uw.edu

Research Interests Plasma Physics, Fusion Energy Science, Nuclear Physics, Nuclear Engineering, Experimental Physics, Computational Physics, High Performance Computing.

Education **Doctor of Philosophy**, Plasma Physics and Fusion Energy
Adviser: Professor Thomas Jarboe, jarboe@aa.washington.edu
University of Washington, Seattle, WA, expected January 2017

Bachelor of Science, Nuclear Engineering and Physics
Adviser: Professor Dennis Whyte, whyte@psfc.mit.edu
Massachusetts Institute of Technology, Cambridge, MA, June 2012

Experience *Research Associate on HIT-SI* September 2012 - Present
University of Washington, Seattle, WA, 98195, U.S.A.

Professor Spring 2015 Quarter
University of Washington, Seattle, WA, 98195, U.S.A.

- Graduate Course AA523: Tokamak Fusion Physics and Technology

Professor Autumn 2015 Quarter
University of Washington, Seattle, WA, 98195, U.S.A.

- Graduate Course AA523: Nuclear Reactor Physics and Technology

Student Internship Summer 2012
General Fusion Inc., Burnaby, BC, Canada

National Undergraduate Fellowship Program Student Internship Summer 2011
General Atomics, DIII-D National Fusion Facility, San Diego, CA, U.S.A.

Student Internship Summer 2010
General Fusion Inc., Burnaby, BC, Canada

Student Internship Summer 2009

Los Alamos National Laboratory, Los Alamos, NM, U.S.A.

Presentations and Articles

Invited Talks

An overview of the HIT-SI3 research program and its implications for magnetic fusion energy, *36th Annual Fusion Power Associates Meeting*, Washington, D.C., December 16-17, 2015.

An overview of the HIT-SI3 research program and its implications for magnetic fusion energy, *18th International Spherical Tokamak Workshop*, Princeton, NJ, November 3-6, 2015.

The Dynamak Reactor System, *Exploratory Plasma Research Conference*, Madison, Wisconsin, August 5 - 8, 2014.

An Imposed-dynamo spheromak roadmap, *34th Annual Fusion Power Associates Meeting*, Washington, D.C., December 10-11, 2013.

The Dynamak: An advanced spheromak reactor system with imposed-dynamo current drive and next-generation nuclear power technologies, *2013 US-Japan Workshop on "Advanced Control and Confinement Improvement of Innovative Compact Toroidal Configurations"*, September 24-26, 2013, Kobe, Japan.

Production of Biodiesel and Biogasoline via Coupling a LBE-cooled Reactor to Hydrogen and Biofuel Plants, *ANS Winter Conference*, San Diego, CA, November 2012.

Posters

Two-photon absorption laser induced fluorescence (TALIF) neutral density measurements and two-fluid (plasma-neutral) 3D Extended-MHD simulations with PSI-TET on the HIT-SI3 experiment, *57th Annual American Physical Society, Division of Plasma Physics Conference*. Poster BP12.00048, Savannah, GA, November 16-20, 2015.

Overview of the HIT-SI3 experiment, *56th Annual American Physical Society, Division of Plasma Physics Conference*. Poster UP8.00062, New Orleans, LA, October 27-31, 2014.

The Dynamak: An advanced spheromak reactor system with imposed-dynamo current drive and next-generation nuclear power technologies, *55th Annual American Physical Society, Division of Plasma Physics Conference*. Poster GP8.00063, Denver, CO, November 11-15, 2013.

The Dynamak: An advanced fusion reactor concept with imposed-dynamo current drive and next-generation nuclear power technologies, *25th International Atomic Energy Agency Fusion Energy Conference*, St. Petersburg, Russia, October 13-18, 2014, FIP/P8-25, pg. 580.

Studies of prompt losses from neutral beam injection into DIII-D, *53rd Annual American Physical Society, Division of Plasma Physics Conference*. Poster JP9.00078, Salt Lake City, UT, November 14-18, 2011.

Neutron Activation Diagnostics for FRCHX at AFRL, *51st American Physical Society, Division of Plasma Physics Conference*, Poster JP8.00033, Atlanta, GA , November 2-6, 2009.

Publications

B.N. Sorbom, et al., ARC: A compact, high-field, fusion nuclear science facility and demonstration power plant with demountable magnets, *Fusion Eng. and Design* **100** (2015) 378-405.

T.R. Jarboe, B.A. Nelson, D.A. Sutherland, A mechanism for the dynamo terms to sustain closed-flux current, including helicity balance, by driving current which crosses the magnetic field, *Phys. Plasmas* **22** (2015) 072503.

C. Hansen, et al., Numerical studies and metric development for validation of magnetohydrodynamic models in the HIT-SI experiment, *Phys. Plasmas* **22** (2015) 056105.

T.R. Jarboe, et al., A Proof of Principle of Imposed Dynamo Current Drive: Demonstration of Sufficient Confinement, *Fus. Sci. and Tech.* **66** (2014) 3.

D.A. Sutherland, et al., The dynamak: An advanced spheromak reactor concept with imposed-dynamo current drive and next-generation nuclear power technologies, *Fusion Eng. Des.*, **89** (2014) 4, 412-425.

Awards and Recognition

CoMotion \$50k Innovation Fund Award, University of Washington, June 2015.

CoMotion Graduate Innovators Award, University of Washington, May 2015.

Forbes' 30 Under 30 in Energy, Forbes Magazine, January 2015.

William E. Boeing Endowed Graduate Fellowship, University of Washington, November 2012.

ANS Student Design Competition Finalist: Production of Biodiesel and Biogasoline via Coupling an LBE-Cooled Reactor to Hydrogen and Bio-fuel Plants, ANS Winter Conference, San Diego, CA, November 2012.

Irving Kaplan Award for academic achievement by a junior in the MIT Department of Nuclear Science and Engineering, May 2011.

ANS Alpha Nu Sigma Honor Society Inductee, May 2011.

Computer Skills

Languages & Software: MATLAB/GNU Octave, Mathematica, Fortran, C/C++, Objective-C
Operating Systems: OS X, iOS, UNIX, Linux, Windows