

**DR. William Joseph Capecchi**

9502 Watts Rd #115

Verona, Wisconsin 53593 United States

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Email: william.capecchi@gmail.com

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**Availability:****Job Type:** Permanent, Temporary, Term, Detail, Seasonal, Summer, Presidential Management Fellows, Recent Graduates, Multiple Appointment Types, Internships, Intermittent, Telework**Work Schedule:** Full-time, Part-time, Shift work, Intermittent, Job sharing, Multiple Schedules

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**Desired Locations:**Minneapolis, Minnesota, United States; Twin Cities, Minnesota, United States

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**Work Experience:****Research Scientist****University of Wisconsin- Madison**

1150 University Ave

Madison, WI

**5/2023 - Present****Salary:** \$95,000.00 USD Bi-weekly**Hours per week:** 40**Duties, Accomplishments and Related Skills:**

Principal Investigator on a collaboration between the University of Wisconsin- Madison and Princeton Plasma Physics Lab studying fast ion physics in a lithium walled plasma environment.

Principal duties include facilitation of a \$1.4 million dollar DOE grant, management of support staff (a UW student and research intern), design and construction of novel diagnostic tools to support research interests, maintenance and upgrades of existing diagnostic and supporting plasma machines, particularly the Neutral Beam on loan from TAE technologies which requires considerable collaborative input from UW technical staff.

Accomplishments include the first measure of a beam heated low recycling plasma discharge (an important milestone towards a fully beam fueled plasma discharge and a step along the path to a plasma fusion energy source), design and construction of a tungsten wire calorimeter to better diagnose beam behavior for improved plasma control, multiple publications in scientific journals and presentations at scientific conferences.

Related skills include a deep technical knowledge of plasma systems, vacuum systems, coding, development of novel scientific tools, troubleshooting and redevelopment, and an ability to think creatively to solve new problems.

**Supervisor:** Jay Anderson (6082656668)**Okay to contact this Supervisor:** Yes

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**Postdoctoral Researcher****University of Wisconsin- Madison**

1150 University Ave

Madison, WI

**9/2019 - 5/2023****Hours per week:** 40**Duties, Accomplishments and Related Skills:**

The primary research goal of this position was to establish heating of hydrogen plasmas in a novel lithium-walled environment via a secondary heating mechanism of a neutral beam injector. Regular duties include operation of multiple supporting diagnostics, analysis of data, collaboration between teams of scientists at remote locations, identifying promising avenues of research to achieve research objectives, writing up research results and presenting at national conferences.

Major accomplishments include:

- Optimization of beam heating within operational limits as well as identification of pathways to improve heating achieved through extensive modeling using both industry software and self-developed beam models
- Measurement of the first beam heating of a low-recycling plasma in the field
- Routine analysis and monitoring of neutral beam data and synthesis with other scientists' data to inform research objectives
- Methodical maintenance and upgrades to neutral beam
- Publication of scientific paper and presentations at national conferences

Related skills:

- Coding
- Statistics
- Data analysis
- Modeling
- Electrical engineering
- CAD

**Supervisor:** Jay Anderson ((608) 265-6668)

**Okay to contact this Supervisor:** Yes

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## **Sr. Simulation Engineer**

**Donaldson Inc**

1400 W 94th St

Bloomington, MN

**8/2017 - 9/2019**

**Hours per week:** 40

### **Duties, Accomplishments and Related Skills:**

- Technical lead on collaboration with University of MN to develop liquid filtration model.
- Completed work on dust loading diagnostic bench with laser distance transducer technology to provide essential experimental validation to dust loading algorithm improvement.
- Developed first principles dust loading algorithm to improve accuracy of filter life model. Entire parameter spaces could be modeled before prototyping and testing, drastically reducing time and cost of new product lines.
- Improved physics of filtration efficiency modeling through simulation of particle trajectories in flow
- Established validation database to compare modeling tools to experimental data to reduce development cycle time and lower lab costs by leveraging historical data and modeling.

**Supervisor:** Matt Anderson (612-626-4318)

**Okay to contact this Supervisor:** Yes

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## **Education:**

**University of Wisconsin- Madison** Madison, WI United States

Doctorate degree 1 / 2017

**GPA:** 3.275 of a maximum 4.0

**Credits Earned:** 93 Semester Hours

**Major:** Plasma physics

### **Relevant Coursework, Licenses and Certifications:**

Research, 53 credits Theoretical Physics- Dynamics Quantum Mechanics I and II Theoretical Physics- Electrodynamics Electronic Aids to Measurement Statistical Mechanics Introduction to Plasmas Applied Optics Basic Astrophysics Plasma Waves and Instabilities Plasma Confinement and Heating Plasma

Magnetohydrodynamics Plasma Kinetic and Radiation

**St. John's University** Collegeville, MN United States

Bachelor's degree 5 / 2009

**GPA:** 3.55 of a maximum 4

**Major:** Physics and Mathematics

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**Job Related Training:**

Electric Utilization Training (2/23/21)  
Basic Electrical Safety (9/9/19)  
Compressed Gases and Cryogenic Liquified Gases (9/9/19)  
Hydrogen Gas Safety (9/10/19)  
Lithium Safety (9/10/19)  
Cybersecurity Awareness (7/10/23)

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**Affiliations:**

American Physical Society - Member

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**Professional Publications:**

A. Maan, D.P. Boyle, R. Majeski, S. Banerjee, M. Francisquez, R. Kaita, W. Capecchi, et al. "Improved neutral and plasma density control with increasing lithium wall coatings in the Lithium Tokamak Experiment- $\beta$  (LTX- $\beta$ )" Nuclear Materials and Energy 35, 101408 (2023).

D.P. Boyle, J. Anderson, S. Banerjee, R.E. Bell, W. Capecchi, et al. "Extending the low-recycling, flat temperature profile regime in the lithium tokamak experiment- $\beta$  (LTX- $\beta$ ) with ohmic and neutral beam heating" Nucl. Fusion 63, 056020 (2023).

W. Capecchi, J.K. Anderson, D.P. Boyle, P.E. Hughes, A. Maan, R. Majeski, D.B. Elliott, C. Hansen "Neutral beam prompt loss in LTX- $\beta$ " Nucl. Fusion 61, 126014 (2021).

P.E. Hughes, W. Capecchi, D.B. Elliott, R.E. Bell, C. Hansen, D.P. Boyle, R. Majeski, et al. "Toroidal plasma acceleration due to NBI fast ion losses in LTX- $\beta$ " Plasma Phys. Control. Fusion 63, 085020 (2021).

W. Capecchi, J. K. Anderson, P. J. Bonofiglo, J. Kim, R. M. Magee, K. J. McCollam, R. McConnell, et al. "A Measure of Fast Ion Beta at Marginal Stability in the Reversed Field Pinch" Nuclear Fusion 59, 086026 (2019).

W. Capecchi, J.K. Anderson, P.J. Bonofiglo, J. Kim, S. Sears, "A collimated neutron detector for RFP plasmas in MST" Rev Sci Instrum 87, 11D826 (2016).

J.K. Anderson, J. Kim, P.J. Bonofiglo, W. Capecchi, S. Eilerman, M.D. Nornberg, J.S. Sarff, S. Sears, "Dynamics of a reconnection-driven runaway ion tail in a reversed field pinch plasma" Phys. Plasmas 23, 055702 (2016).

J. Kim, J.K. Anderson, W. Capecchi, P.J. Bonofiglo, S. Sears, "Analysis techniques for diagnosing runaway ion distributions in the reversed field pinch" Rev Sci Instrum 87 11D819 (2016).

P. J. Bonofiglo, J. K. Anderson, A. F. Almagri, J. Kim, J. Clark, W. Capecchi, S. H. Sears, J. Egedal "Development Toward a Fast Ion Loss Detector for the Reversed Field Pinch" Rev. Sci. Instrum. 87, 11D824 (2016).

J.K. Anderson, W. Capecchi, S. Eilerman, J.J. Koliner, M.D. Nornberg, J.A. Reusch, J. Sarff, L. Lin, "Fast ion confinement in the three-dimensional helical reversed-field pinch" Plasma Physics and Controlled Fusion 56 (9) 094006 (2014).

L. Lin, J.K. Anderson, D.L. Brower, W. Capecchi, W.X. Ding, S. Eilerman, C.B. Forest, et al. "Energetic-particle-driven instabilities and induced fast-ion transport in the RFP" Physics of Plasmas 21, 056104 (2014).

B.E. Chapman, J.K. Anderson, D.L. Brower, W. Capecchi, D. Carmody, K. Caspary, et al. "Micro- and Macro-Instability, and Large Density and  $\beta$  in Improved Confinement MST RFP Plasmas" Proceedings of the 25th IAEA Fusion Energy Conference. St. Petersburg, Russia (2014).

K.C. Hammond, S.D. Massidda, W. Capecchi, F.A. Volpe, “Metamaterial lens of specifiable frequency-dependent focus and adjustable aperture for electron cyclotron emission in the DIII-D tokamak” Journal of Infrared, Millimeter, and Terahertz Waves 34, 437–455 (2013).

W. Capecchi, N. Behdad, F. A. Volpe “Reverse chromatic aberration and its numerical optimization in a metamaterial lens” Optics Express 20 (8) pp. 8761-8769 (2012)

W. Capecchi, T.Q. Sibley “When the trivial is nontrivial” Pi Mu Epsilon Journal 13 (6) pp. 333-336

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**References:**

<b>Name</b>	<b>Employer</b>	<b>Title</b>	<b>Phone</b>	<b>Email</b>
Jay Anderson (*)	University of Wisconsin-Madison	Senior Scientist	6082656668	jkanders@wisc.edu
Richard Majeski (*)	Princeton Plasma Physics Laboratory	Managing Principal Research Physicist	6092433112	rmajeski@pppl.gov
Matt Anderson (*)	University of Minnesota	Teaching Associate Professor	612-626-4318	mja@umn.edu

(\*) Indicates professional reference

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