

MEGHAN B. MCGARRY

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EDUCATION

Ph.D. **University of Wisconsin - Madison**, Physics
2005 - 2013 *Probing the Relationship Between Magnetic and Temperature Structures
with Soft X-Rays on the Madison Symmetric Torus*
Advisor: Daniel J. Den Hartog

B.A. **University of California, Berkeley**, Physics & Astrophysics
1999 - 2002

TECHNICAL SKILLS

Computer Programming	C++, IDL, Perl, Python
Databases	MDSPPlus, SQL
Languages	English (native), Mandarin (intermediate), Spanish (proficient)
Operating Systems	Linux/Unix, Mac, Windows
Software	Emacs, L ^A T _E X, Microsoft Office Suite, Vectorworks
Version Control	CVS, Git, GitHub

RESEARCH EXPERIENCE

2014 - 2017 **University of Wisconsin - Madison**, Engineering Physics Dept.
Assistant Scientist, Consortium for Verification Technology
Postdoctoral Researcher (2014 - 2015)
Led multi-disciplinary team using the Cyclus nuclear fuel cycle simulator to model proliferation issues in a systems-level framework: produced complex heterogeneous synthetic datasets of nuclear material diversion to test anomaly detection algorithms, examined state and regional historical data to quantify factors that motivate proliferation, modeled Iran's nuclear capabilities under the Joint Comprehensive Plan of Action.

2008 - 2014 **University of Wisconsin - Madison**, Physics Dept.
Postdoctoral Researcher (2013 - 2014), Madison Symmetric Torus
Graduate Research Assistant (2008 - 2013)
Led a group of ten on multi-year project to design, develop, and commission a double-filter soft x-ray tomography diagnostic: characterized impact of impurities on transmission of beryllium filters, measured perturbations in plasma electron temperature.

2006 - 2008 **University of Wisconsin - Madison**, Engineering Physics Dept.
Graduate Research Assistant, Pegasus
Designed SXR pinhole imaging camera to study magnetic structure.

2002 - 2005 **Harvard-Smithsonian Center for Astrophysics**
Science Mission Planner, Chandra X-ray Observatory
Scheduled observations and wrote programs to maintain daily science operations.

- 2001 **University of Hawaii at Manoa**, Institute for Astronomy
Research Experience for Undergraduates
Used spectral modeling to determine galactic redshifts.
- 2000 **University of California, Berkeley**, Space Sciences Lab
Cal Summer Science Undergraduate Fellow, SETI
Looked for optical extraterrestrial signals using coincidence-counting.

POLICY EXPERIENCE

- 2015 **61st Pugwash Conference**
Co-rapporteur - Nuclear Energy and Nonproliferation
Co-wrote the working group summary report on nuclear energy and non-proliferation.
- 2014 **Natural Resources Defense Council**
Consultant - Energy Policy
Wrote a white paper analyzing recent progress at the National Ignition Facility.
- 2009, 2011 **Union of Concerned Scientists**, Summer Symposium
Participant - Global Security Policy
Presented original research on high-powered microwave anti-satellite weapons.
- 2009 **U.S. Congress Fusion Day**, Washington, D.C.
Participant
Met with representatives to discuss fusion research and US energy policy.

TEACHING EXPERIENCE

- 2005 - 2006 **University of Wisconsin - Madison**, Physics Dept.
Graduate Teaching Assistant - Introductory Physics
Taught discussion, laboratory and exam sessions for 100 students.

MENTORING

- 2016 - 2017 Owen Selles, Masters Student (UW Nelson Institute-Environment and Resources)
- 2016 - 2017 Drew Buys, Masters Student (UW LaFollette School of Public Affairs)
- 2015 - 2017 Chris Hoffman, Masters Student (UW Nelson Institute-Environment and Resources)
- 2014 Mike Gionet, Undergraduate (UW Engineering Physics)
- 2012 Michelle Okoniewski, Masters Student (UW Engineering Physics)
- 2011 - 2014 Jay Johnson, Undergraduate (UW Physics)
- 2011 Zachary Billey, Ph.D. Student (UW Physics)
- 2011 Jessica Rubio, Undergraduate (UW Engineering Physics)

PROFESSIONAL DEVELOPMENT

- 2015 American Nuclear Society Member
- 2007 - 2013 American Physical Society (APS) Member
- 2013 Union of Concerned Scientists Global Security Professional Meeting, Segni, Italy
- 2008 APS Opportunities in Energy Research Workshop, New Orleans, Louisiana

2003 NASA X-Ray Astronomy School, Wallops Island, Virginia

HONORS AND AWARDS

2014 - 2015 Consortium for Verification Technology Postdoctoral Fellowship
2008, 2010, 2011 Hirschfelder Fellowship for Women in Physics, Mathematics, Chemistry
2004 Smithsonian Institution Special Achievement Award
2003 NASA Group Achievement Award - Chandra Mission Planning and Review Subgroup
2001 NSF Research Experience for Undergraduates Fellowship
2000 Cal Space Summer Undergraduate Fellowship

SERVICE

2016 Women in Physics Panelist - Marquette University, WI
2016 Judge - Nonproliferation & Policy Session, American Nuclear Society Student Meeting
2015 Article Reviewer, *Review of Scientific Instruments*
2015 Engineering Career Panelist - Edgewood College, WI
2015 Organized Local Screening for "The Man Who Saved The World", UW Madison
2008 - 2009 Graduate Representative - Climate and Diversity Committee, UW Physics
2008 - 2009 Co-Chair -Sea Kayaking Interest Group, Wisconsin Union Hoofers Outing Club
2006 - 2007 Graduate Representative - Graduate Program Committee, UW Physics
2004 - 2005 Mentor - 6th and 7th Grade, Cambridge Science Clubs for Girls Program
2003 Mentor - NSF Research Experiences For Undergraduates, Harvard University

INVITED TALKS

State-Level Decision-Making in a Regional Model of Proliferation Risk
Oct 2016 Consortium for Verification Technology Workshop
Ann Arbor, Michigan

Cyclus Nuclear Fuel Cycle Simulator as a Synthetic Testbed of Systems-Level Diversion Signatures
Sept 2016 Holtz Center for Science and Technology Studies
University of Wisconsin-Madison
June 2016 Global Security Seminar
Lawrence Livermore National Laboratory
June 2016 Chemical Engineering and Material Science Seminar
University of California, Irvine

Modeling Material Diversion with the Cyclus Fuel Cycle Simulator
Oct 2015 International Student Young Pugwash Meeting
Nagasaki, Japan
Apr 2015 Union of Concerned Scientists Global Security Webinar Series

Defining the Threat of High-Powered Microwave Weapons in Space
Jul 2011 Union of Concerned Scientists Summer Symposium on Science and World Affairs
King's College, London, England

High Powered Microwave Weapons - Political Fantasy or the Future of Space Warfare?
Feb 2011 CISAC Research Seminar on International Security, Natural Science and
Social Science, Stanford University

Feb 2011	Science, Technology, Engineering and Policy Group Seminar, UC Berkeley
Jul 2009	Union of Concerned Scientists Summer Symposium on Science and World Affairs Fudan University, Shanghai, China

Soft X-ray Tomography on MST

Oct 2009	Plasma Physics Seminar, Consorzio RFX, Padua, Italy
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TECHNICAL PUBLICATIONS

M.B. McGarry, C. Hoffman, D. Buys, B. Mouginot, P.P.H. Wilson, “State-level Decision Making in Cyclus to Assess Multilateral Enrichment”, *Proceedings of the 58th INMM Annual Meeting*, submitted 9-June-2017

L.M. Reusch, D.J. Den Hartog, P. Franz, J. Goetz, **M.B. McGarry**, and H.D. Stephens, “Calibration of a two-color soft x-ray diagnostic for electron temperature measurement”, *Rev. Sci. Instrum.*, **87**, 11E332 (2016)

M.B. McGarry, P.P.H. Wilson, T. Atwood, “Cyclus as a Synthetic Testbed of Systems-Level Diversion Signatures”, *Proceedings of the 57th INMM Annual Meeting*, submitted 9-June-2016

J.J. Koler, M.R. Cianciosa, J. Boguski, J.K. Anderson, J.D. Hanson, B.E. Chapman, D.L. Brower, D.J. Den Hartog, W.X. Ding, J.R. Duff, J.A. Goetz, **M.B. McGarry**, L.A. Morton, E.B. Parke, “3D Equilibrium Solutions for a Current-Carrying Reversed-Field Pinch Plasma with a Close-Fitting Conducting Shell”, *Phys. Plasmas*, **23**, 032508 (2016)

K.D. Huff, M.J. Gidden, R.W. Carlsen, R.R. Flanagan, **M.B. McGarry**, A.C. Opatowsky, E.A. Schneider, A.M. Scopatz, P.P.H. Wilson, “Fundamental Concepts in the Cyclus Fuel Cycle Simulator Framework”, *Adv. Eng. Softw.*, **94**, 46 (2016)

M. Galante, L. Reusch, D.J. Den Hartog, P. Franz, J. Johnson, **M.B. McGarry**, M. Nornberg, H. Stephens, “Determination of Z_{eff} by Integrating Measurements from X-ray tomography and Charge Exchange Recombination Spectroscopy”, *Nuc. Fusion*, **55**, 123016 (2015)

J. Sarff, A. Almagri, J. Anderson, M. Borchardt, W. Capecchi, D. Carmody, K. Caspary, B. Chapman, D. Den Hartog, J. Duff, S. Eilerman, A. Falkowski, C. Forest, M. Galante, J. Goetz, D. Holly, J. Koler, S. Kumar, J. Lee, D. Liu, K. McCollam, **M. McGarry**, V. Mirnov, L. Morton, S. Munaretto, M. Nornberg, P. Nonn, S. Oliva, E. Parke, M. Poeschel, J. Reusch, J. Sauppe, A. Seltzman, C. Sovinec, D. Stone, D. Thuecks, M. Thomas, J. Triana, P. Terry, J. Waksman, G. Whelan, D. Brower, W. Ding, L. Lin, D. Demers, P. Fimognari, J. Titus, F. Auriemma, P. Franz, R. Lorenzini, E. Martinez, B. Momo, P. Piovesan, M. Puiatti, M. Spolaore, D. Terranova, P. Zanca, V. Davydenko, A. Ivanov, S. Polosatkin, N. Stupishin, D. Spong, D. Craig, H. Stephens, R. Harvey, M. Cianciosa, J. Hanson, B. Breizman, M. Li, L. Zheng, “Overview of Results from the MST Reversed Field Pinch Experiment”, *Nuc. Fusion*, **55**, 104006 (2015)

M.B. McGarry, P. Franz, D.J. Den Hartog, J.A. Goetz, “Effect of Beryllium Filter Purity on X-ray Emission Measurements”, *Plasma Phys. Contr. F.*, **56**, 125018 (2014)

M.B. McGarry, P. Franz, D.J. Den Hartog, J.A. Goetz and J. Johnson, “Note: Effect of Photodiode Aluminum Cathode Frame on Spectral Sensitivity in the Soft X-ray Energy Band”, *Rev. Sci. Instrum.*, **85**, 096105 (2014)

L.M. Reusch, M.E. Galante, P. Franz, J.R. Johnson, **M.B. McGarry**, H.D. Stephens, and D.J. Den

Hartog, “An integrated data analysis tool for improving measurements on the MST RFP”, *Rev. Sci. Instrum.*, **85**, 11D844 (2014)

M.B. McGarry, “Probing the relationship between magnetic and temperature structures with soft x-rays on the Madison Symmetric Torus” *Ph.D. Dissertation - Physics*, University of Wisconsin-Madison (2013)

J.S. Sarff, A.F. Almagri, J.K. Anderson, M. Borchardt, D. Carmody, K. Caspary, B.E. Chapman, D.J. Den Hartog, J. Duff, S. Eilerman, A. Falkowski, C.B. Forest, J.A. Goetz, D.J. Holly, J.-H. Kim, J. King, J. Ko, J. Koliner, S. Kumar, J.D. Lee, D. Liu, R. Magee, K.J. McCollam, **M. McGarry**, V.V. Mirnov, M.D. Nornberg, P.D. Nonn, S.P. Oliva, E. Parke, J.A. Reusch, J.P. Sauppe, A. Seltzman, C.R. Sovinec, H. Stephens, D. Stone, D. Theucks, M. Thomas, J. Triana, P.W. Terry, J. Waksman, W.F. Bergerson, D.L. Brower, W.X. Ding, L. Lin, D.R. Demers, P. Fimognari, J. Titus, F. Auriemma, S. Cappello, P. Franz, P. Innocente, R. Lorenzini, E. Martines, B. Momo, P. Piovesan, M. Puiatti, M. Spolaore, D. Terranova, P. Zanca, V. Belykh, V.I. Davydenko, P. Deichuli, A.A. Ivanov, S. Polosatkin, N.V. Stupishin, D. Spong, D. Craig, R.W. Harvey, M. Cianciosa, J.D. Hanson, “Overview of results from the MST reversed field pinch experiment”, *Nucl. Fusion*, **53**, 104017 (2013)

M.B. McGarry, P. Franz, D. J. Den Hartog, J. A. Goetz, M. A. Thomas, M. Reyfman and S. T. A. Kumar, “High-performance double-filter soft x-ray diagnostic for measurement of electron temperature structure and dynamics”, *Rev. Sci. Instrum.*, **83**, 10E129 (2012)

M.B. McGarry, P. Franz, D.J. den Hartog, J.A. Goetz, “A New Double-Foil Soft x-ray Array to Measure Te on the MST Reversed Field Pinch”, *Rev. of Sci. Instrum.*, **81**, 10,10E516 (2010)

G.D. Garstka, E.A. Unterberg, D.J. Battaglia, M.W. Bongard, N.W. Eidietis, R.J. Fonck, M.J. Frost, **M.B. McGarry**, A.C. Sontag, B.J. Squires, G.R. Winz “Attainment of high normalized current by current profile manipulation in the pegasus toroidal experiment”, *J. Fusion Energ.*, **27**, 20 (2008)

M.B. McGarry, B.M. Gaensler, V.M. Kaspi, S.M. Ransom, S. Veljkovic, “X-Ray Timing, Spectroscopy, and Photometry of the Anomalous X-Ray Pulsar Candidate CXOU J010043.1-721134” *Astrophys. J. Lett.*, **627**, L137 (2005)

P.J. Green, J.D. Silverman, R.A. Cameron, D.-W. Kim, B.J. Wilkes, W.A. Barkhouse, A. LaCluyz, D. Morris, A. Mossman, H. Ghosh, J.P. Grimes, B.T. Jannuzi, H. Tananbaum, T.L. Aldcroft, J.A. Baldwin, F.H. Chaffee, A. Dey, A. Dosaj, N.R. Evans, X. Fan, C. Foltz, T. Gaetz, E.J. Hooper, V.L. Kashyap, S. Mathur, **M.B. McGarry**, E. Romero-Colmenero, M.G. Smith, P.S. Smith, R.C. Smith, G. Torres, A. Vikhlinin, D.R. Wik “The Chandra Multi-wavelength Project: Optical Follow-up of Serendipitous Chandra Sources” *Astrophys. J. Suppl. S.*, **150**, 1, 43 (2004)

D. Werthimer, D. Anderson, C.S. Bowyer, J. Cobb, E. Heien, E.J. Korpela, M.L. Lampton, M. Lebofsky, G.W. Marcy, **M.B. McGarry**; D. Treffers “Berkeley Radio and Optical SETI Program:SETI@home, SERENDIP, and SEVENDIP”, *SPIE Proceedings of the Third International Conference on Optical SETI*, **4273** (2001)

POLICY PUBLICATIONS

M.B. McGarry, M. Fisher, D. Djokic, A. Opatowsky, “Earlier Integration of Nuclear Science and Security Policy Training Could Bridge the Gap between Nuclear Security Professionals”, *Proceedings of the 57th INMM Annual Meeting*, submitted 9-June-2016

M.B. McGarry, “Integrating Nuclear Science and Policy for a New Generation”, Web blog post, *All*

Things Nuclear, Union of Concerned Scientists, 18-Feb (2016)
<http://allthingsnuclear.org/guest-commentary/integrating-nuclear-science-and-policy-for-a-new-generation>

C. Harrington & **M.B. McGarry** “Rapporteur’s Report: Civilian Nuclear Energy, Energy Resources, and International Cooperation (Working Group 7)”, *61st Pugwash Conference on Science and World Affairs* (2015)
<https://pugwashconferences.files.wordpress.com/2015/10/wg7-report.pdf>

M.B. McGarry and L. Grego, “High Powered Microwave Weapons in Space - Defining the Threat” *Science and Global Security*, submitted Nov 18 (2015)

M.B. McGarry & P.P.H. Wilson, “Modeling Material Diversion with the Cyclus Nuclear Fuel Cycle Simulator,” *61st Pugwash Conference on Science and World Affairs*, available upon request (2015)
<http://pugwash.org/2015/10/20/61st-pugwash-conference-nagasaki-1-5-november-2015/>

M.B. McGarry “The National Ignition Facility High-Foot Campaign: A New Approach to Ignition?” *Natural Resources Defense Council*, submitted June 16 (2014)

CONFERENCE POSTERS

2016 “Using Cyclus to Generate Synthetic Multi-modal, Systems-Level Observables”
M.B. McGarry, P.P.H. Wilson, T. Atwood
University & Industry Technical Interchange, Consortium for Verification Technology

2015 “Survey of Cyclus Application for Non-proliferation”
M.B. McGarry, P.P.H. Wilson,
Consortium for Verification Technology, 2nd Annual Workshop, No. 4

2015 “Agent-Based Modeling of Open and Clandestine Fuel Cycle Facilities”
M.B. McGarry, P.P.H. Wilson,
University & Industry Technical Interchange, Consortium for Verification Technology

2013 “SXR Double-Foil Measurements of Electron Temperature and Impurity Structures on MST”
M.B. McGarry, P. Franz, D.J. den Hartog, J.A. Goetz, J. Johnson,
American Physical Society, Division of Plasma Physics, 55rd Annual Meeting, No. CP8.00094

2011 “Electron Temperature Measurement on MST Using SXR Brightness”
M.B. McGarry, P. Franz, D.J. den Hartog, J.A. Goetz,
American Physical Society, Division of Plasma Physics, 53rd Annual Meeting, No. BP9.00101

2010 “An Upgraded Soft X-Ray Tomography Diagnostic to Measure Electron Temperature on MST”
M.B. McGarry, P. Franz, J.A. Goetz, D.J. den Hartog,
American Physical Society, Division of Plasma Physics, 52nd Annual Meeting, No. PP9.061

2009 “Two-Color SXR Tomography on MST”
M.B. McGarry, J.A. Goetz, D.J. den Hartog, P. Franz
American Physical Society, Division of Plasma Physics, 51st Annual Meeting, No. TP8.053

2008 “Multicolor SXR Tomography on MST”
M.B. McGarry, J.A. Goetz, D.J. den Hartog, B.E. Chapman, Franz, P., Bonomo, F., Marrelli, L.
American Physical Society, Division of Plasma Physics, 50th Annual Meeting, No. NP6.050

2007 “An Upgraded Soft X-ray Pinhole Camera for Current Profile Measurements on the Pegasus Toroidal Experiment”

M.B. McGarry, M.J. Frost, G.R. Winz, A.C. Sontag,

American Physical Society, Division of Plasma Physics, 49th Annual Meeting, No. TP8.113

2004 “A Closer Look at a Possible New Anomalous X-Ray Pulsar”

M.B. McGarry, B.M. Gaensler, S. Veljkovic, V.M. Kaspi, S.M. Ransom,

American Astronomical Society, Meeting 204, No. 74.11

2003 “Simulating the Origin and Evolution of Accreting Millisecond X-Ray Pulsars”

M.B. McGarry, J.S. Heyl

American Astronomical Society, Meeting 203, No. 53.10