MEGHAN B. MCGARRY

http://mbmcgarry.github.io
414 N Sherman Ave ⋄ Madison WI 53704
(608) 332-9678 ⋄ mbmcgarry@wisc.edu

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	MDSPlus, SQL
Languages	English (native), Mandarin (intermediate), Spanish (proficient)
Software	LaTeX, Microsoft Office Suite, Vectorworks
Version Control	CVS, Git, GitHub

RESEARCH EXPERIENCE

2014 - Present **University of Wisconsin - Madison**, Engineering Physics Dept.
Assistant Scientist, Consortium for Verification Technology
Postdoctoral Researcher (2014 - 2015)
Lead multi-disciplinary team using the Cyclus nuclear fuel cycle simulator to model proliferation issues in a systems-level framework: produce complex heterogeneous synthetic datasets of nuclear material diversion to test anomaly detection algorithms, examine state and regional historical data to quantify factors that motivate proliferation, model 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 - present	Drew Buys, Masters Student (LaFollette School of Public Affairs)
2015 - present	Chris Hoffman, Masters Student (Nelson Institute-Environment and Resources)
2014	Mike Gionet, Undergraduate (Engineering Physics)
2012	Michelle Okoniewski, Masters Student (Engineering Physics)
2011 - 2014	Jay Johnson, Undergraduate (Physics)
2011	Zachary Billey, Ph.D. Student (Physics)
2011	Jessica Rubio, Undergraduate (Engineering Physics)

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

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

INVITED TALKS

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

TECHNICAL PUBLICATIONS

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. Koliner, 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. Opotowsky, 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. Koliner, 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. Pueschel, 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. Martines, 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)

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. Veljkovik, "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. Opotowsky, "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)

OTHER PUBLICATIONS

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)

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. Veljkovik, 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