

Craig O. Heinke

Associate Professor of Physics
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Date of birth: Nov. 19, 1975

Ingenuity New Faculty
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Research Interests

Understanding neutron stars, black holes, white dwarfs, and how they accrete matter in binary systems; the interior physics of neutron stars; and how stars interact in dense clusters, through observations at multiple wavelengths: X-ray, optical, infrared, and radio.

Education

Ph.D. Astronomy, Harvard University, Cambridge, MA, June 2004, advisor J. E. Grindlay
M.A. Astronomy, Harvard University, Cambridge, MA, June 2002
B.A. Physics, Carleton College, Northfield, MN, June 1997, *Magna Cum Laude*

Positions

Associate Professor Dept. of Physics, U. of Alberta	July 2012– Edmonton, AB, Canada
Assistant Professor Dept. of Physics, U. of Alberta	July 2008–June 2012 Edmonton, AB, Canada
Research Associate Supervisor C. L. Sarazin, U. of Virginia	Aug. 2007–June 2008 Charlottesville, VA, USA
Lindheimer Postdoctoral Fellow Dept. of Physics & Astronomy, Northwestern U.	Sept. 2004–Aug. 2007 Evanston, IL, USA
Peace Corps Volunteer Euthini Community Day Secondary School	1997–1999 Euthini, Malawi, Central Africa

Honors

Martha Cook Piper Research Prize, University of Alberta, 2012
Avenue Edmonton “Top 40 Under 40”, 2012
Ingenuity New Faculty, Alberta Innovates, 2010-2013
Lindheimer Postdoctoral Fellowship, Northwestern University, 2004-2007
Certificate of Distinction in Teaching (Graduate School of Arts and Sciences, Harvard Univ.), 2004
Fireman Award for Best Doctoral Dissertation (Astronomy Dept., Harvard Univ.), 2004
Distinction in Major (Physics Dept., Carleton College), 1997

Supervision

Postdoctoral researcher **J. Gladstone** (Avadh Bhatia Fellow), Oct. 2009–present.
PhD students **K. Elshamouty** Sept. 2012–present, **A. Bahramian** Sept. 2012–present.
Master’s students **M. Chowdhury**, Jan. 2009–Jan. 2011; **K. Elshamouty** Sept. 2010–Aug. 2012;
A. Bahramian Sept. 2011–Aug. 2012.

Co-supervised Ph.D. student **P. Maksym** (at Northwestern U., 2006–2007)

Undergraduate research projects (Phys 499): 15 students in nine semesters (winter 2009–winter 2013).

Undergraduate summer research: 11 student research projects over 4 summers (2009-2012).

7 papers have been published involving graduate & undergraduate student research.

Two of my NSERC summer students (**Coomber & Engel**) have subsequently won NSERC MSc-level scholarships; **Engel** has won a Rhodes Scholarship.

Scientific Service

Member of Scientific Organizing Committee for *Compact Binaries in Globular Clusters* workshop, Lorentz Center, Netherlands, Sept. 2012.

Member (& Secretary) of Gemini Users' Committee, representing Canada, 2012–.

Currently SuperChair for CanTAC (allocates time on overseas Canadian telescopes), previously Galactic Panel Chair, 3-year term as member. Member of Time Allocation Committees for Rossi X-ray Timing Explorer (3 times), *Chandra* X-ray Observatory (twice), National Radio Astronomy Observatory (2 year term). External referee for NSERC, Gemini, CFHT.

Lead author of the white paper “Accretion Powered Compact Objects: Theory and Observations” (Heinke et al. 2010), delivered to Canadian Astronomical Society, for the Canadian Long Range Plan decadal review of astrophysical research in Canada. Coauthor of another paper “The Future of X-ray Astronomy in Canada” (Gallo et al. 2010), also for Canadian Long Range Plan.

Member of (Canadian) High-Energy Astrophysics Disciplinary Working Group, and coauthor of report to Canadian Space Agency on high-energy astrophysics research (Kaspi et al. 2009). This report helped influence the CSA to invest in the Japanese Astro-H X-ray satellite telescope.

Co-organizer of *MODEST-6, Modeling Dense Stellar Systems* conference (Northwestern U., 2005).

Referee for dozens of papers for Astrophysical Journal (including Supplement & Letters), Astronomical Journal, Astronomy & Astrophysics, Monthly Notices of the Royal Astronomical Society, Journal of Cosmology and Astroparticle Physics, averaging 8 papers/year.

University Service, Outreach

Focus Area Coordinator for Astrophysics on Physics Strategic Planning Committee, 2012–.

Member of 4 Physics Dept. new faculty hiring committees in 2007-08, 2009-10, 2012, and 2012-13.

Co-investigator on U. of Alberta TLEF project “Enhancing Astronomy Education through On-Campus Telescopes”, \$55,507 over two years (2011-2013).

Arranged creation of scale model of solar system for west atrium of U. Alberta CCIS (science) building (<http://www.ualberta.ca/~stars/planets.html>), 2009-2011.

Colloquium organizer for U. Alberta Physics Dept., 2009-2011.

Scientific consultant to Virginia Museum of Science film project “Globular Clusters”, Oct. 2008.

Co-coordinator of Physics Open Houses at Northwestern U. (outreach for area junior high students), spring 2005, 2006; PI of successful 2006 grant proposal for \$2000.

Member of Harvard University Astronomy Department Curriculum Review Committee, 2004

External Awards of Research Funding, Observing Time as Principal Investigator

2010: Alberta Ingenuity New Faculty Award, \$279,000 in research funding over 3 years.

2008, 2011: NSERC Discovery Grants, \$27,486/year (2008-2010), \$28,000/year (2011-2015).

PI on approved proposals: 9 *Chandra* X-ray (82 hours total, plus funds for analysis), 2 Hubble (13.5 hours total, plus funds), 6 XMM X-ray (79 hours total, plus funds), 10 Gemini optical & IR imaging & spectroscopy (55 hours total), 2 VLA radio imaging (12 hours total), and 17 Swift X-ray (4.7 hours total).

Co-I on many successful proposals, acquiring >400 hours of *Chandra* time under eight different PIs, on seven proposals acquiring >100 hours of Hubble imaging, and on successful proposals for RXTE, Swift, Suzaku and XMM (X-ray), Gemini, TNG (optical and near-infrared), Herschel (far infrared) and the VLA (radio).

Invited Colloquium/Seminar Talks, 2008–present

Harvard Astrophysics Colloquium, Cambridge MA, May 2012

U. Wisconsin-Milwaukee Physics Colloquium, Milwaukee WI, March 2012

Northwestern U. Astrophysics Seminar, Evanston IL, March 2012

U. Alberta Physics Colloquium, Edmonton AB, Sept. 2011

Texas A&M University Astrophysics Seminar, College Station TX, Feb. 2011

UBC Astronomy Colloquium, Vancouver BC, Feb. 2011

Canadian Institute for Theoretical Astrophysics Seminar, Toronto ON, Oct. 2010

McGill Joint Astrophysics Colloquium, Montreal QC, Oct. 2010

UBC TRIUMF Colloquium, Vancouver BC, July 2010

Nat'l Observatory of Athens, Institute of Astron. & Astrophysics Seminar, Athens Greece, July 2010

UBC Astronomy Colloquium, Vancouver BC, October 2009

University of Toronto Astrophysics Colloquium, Toronto ON, Nov. 2008

Carleton College Physics Seminar, Northfield, MN, April 2008

Invited Conference Talks, 2008–present

X-ray Binaries 13, Bormio, Italy, Jan. 2013

Compact Binaries in Globular Clusters, Leiden, Netherlands, Sept. 2012

Extreme Quantum Chromodynamics, Georgetown U., Washington DC, Aug. 2012

Astrophysical Transients, Institute for Nuclear Theory, Seattle WA, July 2011

Physics of Neutron Stars, Ioffe Institute, St. Petersburg, Russia, July 2011

Canadian Astronomical Society (CASCA) 2011, London ON, May 2011

Canadian Institute for Advanced Research (Cosmology & Gravity), Whistler BC, Apr. 2011

Modeling Dense Stellar Systems-10, KIAA/NAOC, Beijing, China, Sept. 2010

Binary Star Evolution: Mass Loss, Accretion, and Mergers, Mykonos, Greece, June 2010

Neutron Star Atmosphere Workshop, KITP, Santa Barbara CA, April 2010

Defining the Neutron Star Crust, Los Alamos National Laboratory, Santa Fe NM, May 2009

Formation and Evolution of Globular Clusters, KITP, Santa Barbara CA, Jan. 2009

A Decade of Accreting Millisecond Pulsars, Amsterdam, April 2008

Outreach Talks, Interviews 2008–present

W. P. Wagner High School, Edmonton, Dec. 14, 2012

Royal Astronomical Society of Canada, Edmonton, Dec. 10, 2012

Northern Alberta Physics Teachers Meeting, Edmonton, Dec. 7, 2012

Interview for CBC Radio One program “Silver and Exact” on mirrors, Dec. 2011.

ELLA (Edmonton Lifelong Learners Association), May 2011.

E.W. Stokes Primary School, Washington DC, May 2011.

Gave interviews for several print, electronic, and radio (CBC Quirks & Quarks, CBC Edmonton Radio Active) news sources relating to discovery of superfluidity in neutron star cores, Feb. 2011.

Garneau School 5th/6th grade students, June 10, 2010.

Royal Astronomical Society of Canada, Edmonton, May 10, 2010.

Gave 11 interviews for radio (CBC Quirks & Quarks), TV (City TV Edmonton, French CBC Edmonton), web-based (e.g. Space.com) and print (Edm. Journal, Edm. Sun-Times, Canadian Press, Physics World, Sky & Telescope) media relating to Nature paper, Nov. 2009.

Visiting undergrad CUPC students (& judged talks), Oct. 3, 2009.

Northern Alberta Physics Teachers Meeting, Edmonton, Dec. 2008

“Stellar Exotica in Globular Clusters”, Northern Prairies Starfest, Sept. 2008