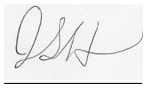
THE UNIVERSITY OF BRITISH COLUMBIA

Curriculum Vitae for Faculty Members

Date : May 5, 2023

Please initial: 

1. SURNAME: Heyl **FIRST NAME:** Jeremy
MIDDLE NAME(s): Samuel

2. DEPARTMENT: Physics and Astronomy

3. FACULTY: Science

4. PRESENT RANK: Professor **SINCE:** 1 July 2013

5. POST-SECONDARY EDUCATION

University or Institution	Degree	Subject Area	Dates
Princeton University	A.B.	Astrophysics	1988/9 - 1992/6
Durham University		Physics	1992/9 - 1993/9
Cambridge University	M.Sc.	Astronomy	1993/9 - 1994/9
University of California – Santa Cruz	Ph.D.	Astrophysics	1994/9 - 1997/12

Special Professional Qualifications

6. EMPLOYMENT RECORD

(a) Prior to coming to UBC

University, Company, or Organization	Rank or Title	Dates
Princeton University Observatory	Research Assistant	1989/6 - 1989/9
IBM Corporation	Consultant	1990/6 - 1990/9
National Astronomical and Ionospheric Center	Research Assistant	1991/6 - 1991/8
The Central Astronomical Observatory at Pulkovo	Visiting Researcher	1992/6 - 1992/9
California Institute of Technology	Lee A. DuBridge Postdoctoral Fellow in Theoretical Astrophysics	1998/1 - 2000/8
Harvard-Smithsonian Center for Astrophysics	Chandra Fellow	2000/9 - 2003/7

(b) at UBC

Rank or Title	Dates
Assistant Professor, Tier II Canada Research Chair	2003/8 – 2008/6
Associate Professor, Tier II Canada Research Chair	2008/7 – 2013/6
Professor, Tier II Canada Research Chair	2013/7 – 2013/8
Professor	2013/9 – present

(c) Date of granting of tenure at U.B.C. : 1 July 2008

7. LEAVES OF ABSENCE

University, Company or Organization at which Leave was taken	Type of Leave	paid/unpaid	Dates

8. TEACHING

(a) Areas of special interest and accomplishments

I have taught students of various ages from preschool, elementary and high school students both in person and through teleconferences (through the Columbus Musueum of Science and Industry, COSI), undergraduate students, graduate students and retirees. I have found that the most effective way to teach is to kindle the learners' interest by hooking the new knowledge into something that they already know. The next step is to extend this knowledge in hopefully a surprising way. It is great when the learners themselves can make or anticipate a few of the steps especially the last one. The emotional response of surprise or the effort in making the logical progression helps solidify the knowledge.

Similarly I have found that more work that the learners do, the more effectively that they learn the new concepts. This comes under the category of "Everything I needed to know about learning I learned in kindergarten". Learning in elementary schools involves relatively little listening and lots of doing. In university there is of course a different balance between these activities but the "doing" is no less important — in larger classes this takes the form of questions for the students to answer to each other during the lectures, and in the smaller groups I have used tutorial sessions with myself and my teaching assistants giving one-on-one guidance to solve the tutorial problems — I have found these techniques effective both in elementary (where they are more customary) and more advanced courses (which even today often take the form of a traditional lecture); it limits the students' frustration and reinforces the important concepts, and as a bonus it is a lot more fun for both the students and the instructor!

Starting in the fall of 2009 I have redeveloped ASTR 303 and ASTR 311 to follow a more interactive model. The small class size of the former allow a real seminar-style class with ongoing assessment of the student's participation. I kept the students up-to-date with weekly homework and in-class assessment. Partipication, retention and student satisfaction increases dramatically over the previous year. The second course (ASTR 311) was much larger, so a seminar approach was not feasible. Here I used peer instruction, clicker questions and on-going assessment to increase student involvement. Again the students met the learning goals and expressed satisfaction with the course. In the fall of 2012 I taught an upper-level/graduate course in astrophysics (that I have taught in the past, so I have a point of comparison) and increased student engagement and

retention, building on the successes of the earlier courses.

In the fall of 2014, I relaunched ASTR 508, Stellar Astrophysics, as a highly interactive computing laboratory course. And in the spring of 2015 I began to develop ASTR 311 as a distance education course. This distance education course has grown to about 200 students per year offered throughout the year from 50 students at the start. For the summer of 2021, I launched a summer web-oriented section for ASTR 333 (Exoplanets).

(b) Courses taught at UBC [*for last 5 years*]

Session	**Course Number**	**Scheduled lecture hours per week**	**Class Size**	**Hours Taught**			
				Lectures	**Tutorials**	**Labs**	**Other** (Office hours)
sum 2016	ASTR 311	3	77	36		0	36
win 2016	ASTR 311	3	149	36	18	0	36
win 2015	ASTR 508	3	4	36		0	36
sum 2017	ASTR 311	3	77	36		0	36
win 2017	ASTR 300	3	26	36		0	36
win 2017	ASTR 311	3	139	36	18	0	36
sum 2018	ASTR 311	3	74	36		0	36
win 2017	ASTR 300	3	26	36		0	36
win 2018	ASTR 311	3	123	36	18	0	36
win 2018	ASTR 508	3	8	36		0	36
sum 2019	ASTR 311	3	63	36		0	36
win 2019	ASTR 311	3	183	36	18	0	36
win 2019	ASTR 333	3	133	36		0	36
sum 2020	ASTR 311	3	117	36		0	36
win 2020	ASTR 311	3	97	36	18	0	36
win 2020	ASTR 333	3	153	36		0	36
win 2020	ASTR 508	3	3	36		0	36
sum 2021	ASTR 311	3	61	36		0	36
sum 2021	ASTR 333	3	99	36		0	36
win 2021	ASTR 311	3	73	36	18	0	36
win 2021	ASTR 333	3	92	36		0	36
win 2021	ASTR 311	3	100	36	18	0	36
win 2021	ASTR 333	3	90	36		0	36

(c) Graduate Students Supervised

Student Name	Program Type	Year		Principal Supervisor	Co-Supervisor(s)
		Start	Finish		
Yoram Lithwick	PhD	1998	1999	Peter Goldreich	Jeremy Heyl
Don Lloyd	PhD	1998	2003	Lars Hernquist	Jeremy Heyl
Dastegir Al-Quaderi	MSc	2003	2007	Jeremy Heyl	
Jonathan Benjamin	MSc	2004	2005	Jeremy Heyl	
Anand Thirumalai	MSc	2005	2007	Jeremy Heyl	
Alain Prat	PhD	2006	2015	Jeremy Heyl	
Kelsey Hoffman	PhD	2006	2011	Jeremy Heyl	
Dan Mazur	PhD	2006	2012	Jeremy Heyl	
Anand Thirumalai	PhD	2007	2012	Jeremy Heyl	
Ramandeep Gill	PhD	2007	2012	Jeremy Heyl	
Raminder Samra	MSc	2010	2012	Harvey Richer	Jeremy Heyl
Samara Pillay	MSc	2011	2013	Jeremy Heyl	Jaymie Matthews
Ryan Goldsbury	PhD	2012	2016	Harvey Richer	Jeremy Heyl
Javiera Parada	MSc	2013	2015	Harvey Richer	Jeremy Heyl
Silvestre Aguilar-Martinez	PhD	2015	2015	Matt Choptuik	Jeremy Heyl
Arman Akbarian	PhD	2015	2015	Matt Choptuik	Jeremy Heyl
Graham Reid	PhD	2015		Matt Choptuik	Jeremy Heyl
Ilaria Caiazzo	PhD	2015	2020	Jeremy Heyl	
Javiera Parada	PhD	2016		Harvey Richer	Jeremy Heyl
Leesa Fleury	PhD	2018		Jeremy Heyl	
Demet Kirzmiribayrak	PhD	2018		Jeremy Heyl	
Paul Ripoche	PhD	2019		Jeremy Heyl	

Supervisory Committees (in the case of M.Sc. this means being a second reader on the dissertation):

Student Name	**Program Type**	**Year**		**Principal Supervisor**	**Co-Supervisor(s)**
		Start	**Finish**		
Bruno Mundim	PhD	2002	2008	Matthew Choptuik	
Anna Sajina	PhD	2002	2008	Douglas Scott	
Robert Ferdman	PhD	2003	2009	Ingrid Stairs	
Wan Yan Wong	PhD	2003	2009	Douglas Scott	
Saul Davis	PhD	2004	2010	Harvey Richer	
Laura Kasian	MSc	2004	2009	Ingrid Stairs	
A. James Charbonneau	MSc	2004	2009	Ariel Zhitnitsky	
Sanaz Vafaei	MSc	2004	2009	Ludovic Van Waerbeke	
Mya Warren	PhD	2006	2012	Joerg Rottler	
Kyle Lawson	MSc	2006	2011	Ariel Zhitnitsky	
Andres Ruberg	MSc	2006	2011	Harvey Richer	
Robert Stead	PhD	2006	2012	David Jones	
Jean-Francois Caron	MSc	2006	2011	Ariel Zhitnitsky	
Stephan Ettenauer	PhD	2007		Jens Dilling	
Michael Sitwell	PhD	2008	2014	Kris Sigurdson	
Silvestre Martinez	PhD	2008		Matthew Choptuik	
Kyle Lawson	PhD	2008		Ariel Zhitnitsky	
Arman Akbarian	MSc	2008		Matthew Choptuik	
Samantha Lawler	PhD	2009		Brett Gladman	
Sarah Greenstreet	MSc	2009		Brett Gladman	
Riccardo Comin	PhD	2009		Andrea Damascelli	
Mike Alexandersen	PhD	2010		Brett Gladman	
Ronald Gagne	MSc	2010		Paul Hickson	
Nikita Blinov	PhD	2010	2016	David Morrissey	
Raminder Samra	MSc	2010		Harvey Richer	
Ryan Goldsbury	PhD	2011		Harvey Richer	
Jiae Kim	PhD	2011	2018	Hirohisa Tanaka	
Gray (Graham) Reid	PhD	2012	2021	Matthew Choptuik	
Arash Khazraie	PhD	2013	2018	George Sawatzky	
Dagoberto Contreras	PhD	2013	2019	Douglas Scott	
Victoria Grandy	MSc	2013		Ingrid Stairs	
Marta Zonno	PhD	2014	2020	Andrea Damascelli	
Lindsay Forestell	PhD	2014	2019	Kris Sigurdson	
Anffany Chen	PhD	2014	2020	Marcel Franz	
Carolin Hofer	PhD	2015	2020	Gary Hinshaw	
Shuailiang Ge	PhD	2015	2021	Ariel Zhitnitsky	
Ryan Day	PhD	2015	2021	Andrea Damascelli	

Student Name	Program Type	Year		Principal Supervisor	Co-Supervisor(s)
		Start	Finish		
Oscar Hernandez	PhD	2015	2021	Sonia Bacca	
Christian Olsen	PhD	2016		Josh Folk	
Joschua Hellemeier	PhD	2016	2021	Paul Hickson	
Javiera Parada	PhD	2016	2021	Harvey Richer	
Xunyu Liang	PhD	2016	2022	Ariel Zhitnitsky	
Christopher Mann	MSc	2016	2021	Harvey Richer	
Robin Newhouse	PhD	2016	2022	Alison Lister	
Deborah Christine Good	PhD	2017	2021	Ingrid Stairs	
Yau Chuen Yam	PhD	2017	2022	George Sawatzky	
Eleni Marina Lykiardopoulou	PhD	2017		Jens Dilling	
Nicolas Savard	PhD	2017	2022	Reiner Kruecken	
Michael Kinach	PhD	2017		Matthew Choptuik	
Aaron Kraft	PhD	2017		Doug Bonn	
Fengqiu Dong	MSc	2018	2020	Ingrid Stairs	
Yukiya Saito	PhD	2018	2023	Reiner Kruecken	
Kathryn Crowter	PhD	2018		Ingrid Stairs	
Guy Leckenby	PhD	2019		Iris Dillman	
Alexandra Tully	PhD	2019		Sarah Burken	
Fenqqiu Dong	PhD	2021		Ingrid Stairs	
Simone Hagey	MSc	2022	2022	Aaron Boley	
Simone Hagey	PhD	2022		Aaron Boley	

(d) Undergraduate Students Supervised

Student Name	Year		Principal Supervisor	Co-Supervisor(s)
	Start	Finish		
Ryan Shannon	2003	2004	Jeremy Heyl	
Derek MacKay	2003	2004	Jeremy Heyl	
Flora Ge	2004	2005	Jeremy Heyl	
Mark McAnerin	2006	2007	Jeremy Heyl	
Ramandeep Gill	2006	2007	Jeremy Heyl	
Hong Tsui	2007	2008	Harvey Richer	Jeremy Heyl
Ronald Gagne	2008	2009	Harvey Richer	Jeremy Heyl
Matthew Penrice	2008	2009	Jeremy Heyl	
Magnus Haw	2010	2010	Jeremy Heyl	
Chenruo (John) Qi	2010	2010	Jeremy Heyl	
Chenruo (John) Qi	2011	2012	Jeremy Heyl	
Melody Wong	2012	2013	Jeremy Heyl	
Alysa Obertas	2013		Jeremy Heyl	
Alistair Barton	2014		Jeremy Heyl	
Asha Asvathaman	2014		Jeremy Heyl	
Matthew Willet	2014		Jeremy Heyl	
Van Bettauer	2014		Jeremy Heyl	
Amber Hollinger	2015	2017	Jeremy Heyl	
Chris Mann	2015	2017	Harvey Richer	Jeremy Heyl
Conor Omand	2015	2017	Jeremy Heyl	
Mona Zhao	2015	2017	Jeremy Heyl	Harvey Richer
Rachel Gledhill	2016	2017	Harvey Richer	Jeremy Heyl
Ronan Kerr	2016	2018	Harvey Richer	Jeremy Heyl
Maryum Sayeed	2016	2017	Harvey Richer	Jeremy Heyl
Bi Cheng Wu	2016		Harvey Richer	Jeremy Heyl
Katie Rink	2018	2020	Jeremy Heyl	
Chenoa van den Boogaard	2018	2020	Jeremy Heyl	
James Hagerty	2019	2021	Harvey Richer	Jeremy Heyl
Sarah Thiele	2019	2021	Harvey Richer	Jeremy Heyl
Stephanie Grondin	2019	2021	Harvey Richer	Jeremy Heyl
Helen Du	2020	2021	Harvey Richer	Jeremy Heyl

(e) Continuing Education Activities

Educational consultant to Nickelodeon Television Network, 2001
Speaker for Amateur Telescope Makers, Boston Chapter, 2001
Portable Planetarium Presentation at Community Nursery School, Lexington MA, 2003
Speaker at RASC, Vancouver Chapter, 2003
Electronic Expert for COSI (Columbus Ohio Science Musuem), 2004-2006, 2011−

Speaker at the Summerhill, North Vancouver, 2004

Speaker at the Ideal Mini School, Vancouver, 2005

Speaker at MISC, 2008

Demonstrations at Immaculate Conception School, Vancouver, 2008−

Educational consultant to Magnetar Games, Vancouver, 2009−

Speaker at New Bright Lights, 2010

Demonstrations at St. Patrick Regional Secondary, Vancouver, 2012−

Demonstrations at Camp Byng, Pacific Spirit Area, Scouts Canada, 2012−

Alumni-Faculty Forum, "Life in the Universe," Princeton Unviersity, 2012

(f) Visiting Lecturer (indicate university/organization and dates)

QED & Quantum Vacuum, Low Energy Frontier, Institut d'Études Scientifiques de Cargèse, April 2012.

(g) Other

Instructional Skills Workshop, Teaching and Academic Growth, UBC, April 2007.

Multiple-Choice Question Writing Workshop, Teaching and Academic Growth, UBC, May 2010.

9. SCHOLARLY AND PROFESSIONAL ACTIVITIES

(a) Areas of special interest and accomplishments

Theory and phenomenology of neutron stars, white dwarfs, black holes and gamma-ray bursts; strong-field QED, properties of matter in strong magnetic fields; theoretical astrophysics

Some of my major theoretical accomplishments are the discovery that QED increases the excepted polarization fraction of thermally emitting neutron stars by a factor of ten to over fifty percent, the identification of Type-I burst oscillations as Rossby waves in the neutron-star ocean and the discovery of new techniques to detect Earthlike planets with transit timing and to constrain axion physics with magnetic white dwarfs. Some of my computational advances are new algorithms that yield a factor of one thousand increase in the speed of worldline-numerics calculations of effective actions in quantum-field theory and a similar factor of one thousand speed-up of accurate calculations of the structure of atoms in strong magnetic fields. On the observational side are the first measurements of the evolution the luminosity function of galaxies and the first detailed comparison of semi-analytic galaxy-formation models with observations, which yielded early evidence for the now accepted concordance (or ΛCDM) model of cosmology.

(b) Research or equivalent grants [*for last 10 years*]

(indicate under COMP whether grants were obtained competitively (**C**) or non-competitively (**NC**)

Granting Agency	**Subject**	**COMP**	**$ per year**	**Years**	**Principal Investigator**	**Co-Investigator(s)**
NASA Chandra Fellow	Probing Neutron-Star Physics	C	100,000	2000-2003	J. Heyl	
CFI CRC	Parallel Computer for Compact-Object Physics	C	120,000	2003	J. Heyl	
BCKDF CRC	Parallel Computer for for Compact-Object Physics	C	120,000	2003	J. Heyl	
NSERC Discovery	Nuclear Processes on Neutron Stars	C	33,000	2004-2007	J. Heyl	
NSERC Discovery	Neutron-Star Physics	C	37,000	2007-2012	J. Heyl	
NSERC Discovery	Neutron Stars	C	32,000	2012-2017	J. Heyl	
NSERC Engage	Astrophysics Data for Computer Games	C	25,000	2015	J. Heyl	
NSERC Discovery	Connecting Astrophysics and Fundamental Physics	C	46,000	2017-2022	J. Heyl	
CSA Mission Co-Investigator	IXPE Magnetar Study	C	50,000	2019-2022	J. Heyl	V. Kaspi
CITA National Fellow	Magnetar Physics	C	31,500	2020-2022	J. Heyl	D. Gonzales
UBC EEF	Building Equity in Physics Graduate Education	C	18,000	2020	A. Ruosi	J. Heyl
CSA FAST	High-Throughput X-ray Spectroscopy	C	50,000	2020-2021	S. Safi-Harb	J. Heyl
UBC GCRC	Ars Scientia	C	50,000	2021-2022	A. Damascelli	J. Heyl S. Rosenblum
CSA JWST	Ancient Brown Dwarfs	C	75,000	2021-2022	I. Caiazzo	J. Heyl H. Richer

(c) Research or equivalent contracts [*for last 10 years*] (indicate under COMP whether contracts were obtained competitively (**C**) or non-competitively (**NC**)

Granting Agency	**Subject**	**COMP**	**$ per year**	**Years**	**Principal Investigator**	**Co-Investigator(s)**
CSA Mission Concept	Colibrì High-Resolution X-ray telescope	C	90,000	2018-2020	J. Heyl	

(d) Invited Presentations

Invited Symposia Lectures

1. Heyl, J. S., Shaviv, N. J., **Lithwick, Y.** 1999, "The Optics of Neutron-Star Magnetospheres," *AAS/High Energy Astrophysics Division Meeting #31*, 10.01.
2. Heyl, J. 2000, "Neutron Star Cooling for High B Fields," *Spin, Magnetism and Cooling of Young Neutron Stars at ITP*.
3. Heyl, J. 2002, "The QED-GRB Connection (some things you should remember if the field is strong)," *2002 Sackler Meeting at Harvard*.
4. Heyl, J. 2003, "What can Neutron Stars Tell Us about QED and Vice Versa?," *2003 CIAR meeting at Mount Tremblant*.
5. Heyl, J. 2003, "Do Old Neutron Stars Shiver to Keep Warm?," *2003 AstroGravs meeting at the University of Maryland*, ed. J. Centrella.
6. Heyl, J. 2004, "Magnetars," *The XXII Texas Symposium on Relativistic Astrophysics*, ed. P. Chen and G. Madejski, (12 pages).
7. Heyl, J. 2005, "Magnetars," *XI Canadian Conference on General Relativity and Relativistic Astrophysics*, ed. Kristin Schleich and Don Witt.
8. Heyl, J. 2008, "Magnetars," *American Physical Society – Northwest Meeting*, A1002+.
9. Heyl, J. 2008, "High-field Neutron Stars - Theoretical Overview," *The XXIV Texas Symposium on Relativistic Astrophysics*, ed. L. van Waerbeke.
10. Heyl, J., **Gill, R. S.** 2013, "Magnetic Reconnection Instabilities in Soft-Gamma Repeaters," *Proceedings of the Thirteenth Marcel Grossman Meeting on General Relativity*, ed. Kjell Rosquist, Robert T. Jantzen and Remo Ruffini, (3 pages).
11. Heyl, J., **Mazur, D.** 2013, "The structure of magnetic fields in neutron stars," *QVG2013 : Workshop Quantum Vacuum and Gravitation (Toulouse).*
12. Heyl, J. 2013, "The structure of magnetic fields in neutron stars," *LaB2013 : Laboratory Astrophysics Workshop (Paris).*

Invited Lectures

- "The Optics of Neutron-Star Magnetospheres"

  1999 February: Princeton Astrophysics Seminar, Columbia Astronomy Seminar,

  2000 January: Astronomy Seminars at MIT and Berkeley

  2000 April: University of Michigan High-Energy-Physics Seminar

  2004 February: Simon Fraser University, UBC

- "Shedding New Light on Neutron-Stars"

  1999 October: Canadian Institute for Theoretical Astrophysics Seminar, ITP Astrophysics Seminar

  2000 January: Caltech Astronomy Colloqium

- "What Does Cholesterol Have to Do with Neutron-Star Magnetospheres?"

  2000 January: Penn State Astronomy Colloquium

  2000 February: UCSB Astronomy Seminar

- "Probing the Properties of Neutron-Stars"

  2000 October: University of Washington Astronomy Colloquium

- "What can QED Tell Us about Compact Objects and Vice Versa?"

  2001 February: University of Michigan Astronomy Seminar

- "El Niño, the Jet Stream and Type-I X-ray Bursts"

  2002 January: Astronomy Seminars at Harvard and University of Michigan

  2002 February: Princeton Astronomy Seminar

  2002 March: Seminar at Cambridge

- "The Nuclear EOS and QED in Astrophysics"

  2002 February: Yale Astronomy Colloquium

- "Do Old Neutron Stars Shiver to Keep Warm?"

  2002 November: SCIPP Seminar

- "The Secret Life of Neutron Stars"

  2002 November: Colloquiums at UCSC Physics, Wesleyan Astronomy and University of Maryland Astronomy

  2003 January: Seminar at MIT, Colloquiums at Chicago and McGill

  2003 Feburary: Astronomy Colloquium at UBC

  2004 April: Astronomy Colloquium at Berkeley

2004 October: Seminar at HIA

2005 March: Colloquium at UVic

2005 November: Colloquium at TRIUMF

- "Magnetars"

  2005 March: Seminar at TRIUMF

  2005 July: Seminar at Durham

  2006 July: Seminar at Glasgow

- "Diffractive Microlensing"

  2010 March: Colloquium at CITA

- "Pseudospectral Methods for Atomic Physics"

  2010 April: Workshop at KITP

- "Production of Positrons from Pulsars and Magnetars"

  2010 December: Nuclear Astrophysics Workshop at TRIUMF

  2013 November: Colloquium at IRAP, Toulouse

- "Probing Axions with Compact Stars"

  2012 May: Seminar at Glasgow

  2012 June: Seminar at Princeton

  2013 October: Seminar at GRAPPA, Unviveristy of Amsterdam

- "What Can You Do with Seven Thousand White Dwarfs in the Globular Cluster 47 Tucanae?"

  2013 October: Colloquium at Anton Pannekoek Institute,

  2013 December: Rome Observatory, University of Washington

  2014 February: Royal Observatory Edinburgh, Arcetri Observatory University of Amsterdam

- "Axions and White Dwarfs"

  2014 June: Accretion Processes in High Astrophysics Meeting, Florence

- "A Cursory Introduction to General Relativity"

  2015 January: Testing Gravity, Vancouver

- "Snow and the Seven Thousand White Dwarfs"

  2015 February: Purdue University Physics Department

  2015 May: TRIUMF

- "Probing Strong Field QED with Neutron Stars"

  2015 September: University of Arizona

  2016 April: eXTP Science Meeting (Fudan, Shanghai)

  2016 May: XIPE Science Meeting (Valencia)

  2017 February: eXTP Science Meeting (Rome)

  2017 November: Polarization Meeting (Strasbourg)

I have typically turned down a few invitiations to speak at conferences and elsewhere each year since arriving at UBC because of family and teaching commitments.

(e) Other Presentations

- "A Field Guide to the High-Energy Universe"

  2003 October: RASC, Vancouver Chapter

  2004 Febrary, 2004 April, 2004 October, 2005 February, 2006 May, 2011 April, 2012 February: COSI electronic expert teleconference with U.S. secondary schools

- "Shaking and Baking Neutron Stars"

  2008 October: MISC meeting

- "Gravitational Waves – Prospects"

  2011 October: Green College Lecture

- "Diffractive Microlensing"

  2012 July: 13th Marcel Grossman Meeting, Stockholm

- "The Structure of Neutron Star Magnetic Fields"

  2013 January: Aspen Meeting on Millisecond Pulsars

  2013 May: Latest Results from the Neutron Star Laboratory, Amsterdam

- "Production of Positrons from Pulsars and Magnetars"

  2013 April : Cargese School on Cosmic Accelerators

(f) Other (list PDFs, RAs, Visitors - including dates)

Postdoctoral Fellows

Denis Gonzalez (June 2019-);

Research Associates

Maxim Lyutikov (September 2004-August 2006); now an associate professor at Purdue University

Visitors

Prof. Dong Lai (Cornell), May 2006

Dr. Kaya Mori (CITA), May 2006

Prof. Edward Brown (MSU), August 2006

Prof. Charles Horowitz (Indiana), August 2006

Prof. Vladimir Usov (Weizmann), August 2007

Prof. Pawan Kumar (Texas), June 2013

Prof. Sang Pyo Kim (Kunsan National University, Korea), August 2013

(g) Conference Participation (Organizer, Keynote Speaker, etc.)

Chair, Scientific Organizing Committee, "Neutron Stars at the Crossroads of Fundamental Physics", 2005 August, a workshop sponsored by PITP, CSA, CITA, CIAR and TRIUMF.

Scientific Organizing Committee, "40 Years of Pulsars", 2007 August

Local Organizing Committee, "Texas Meeting on Relativistic Astrophysics", 2008 Decemeber.

Local Organizing Committee, "CASCA", 2013 June

Co-Chair, Organizing Committee,"Simulating Stars Summer School," 2018 June, Beijing

Online Organizing Committee, "CASCA", 2021 May

10. SERVICE TO THE UNIVERSITY

(a) Memberships on committees, including offices held and dates

Departmental

Observational Cosmology Position Search Committee, 2003−2004

Committee on Initial Appointments, 2003−2007

Chair, Retreat Planning Committee, 2005

Committee on the Hiring Plan, 2007−2007

Editor of Departmental Newsletter, 2007−2010

Committee on Teaching Relief, 2009

Committee on Promotion, Reappointment and Tenure, 2010−2014

Committee on Initial Appointments, 2012−2014

Graduate Admissions Committee, 2015−

Graduate Recruitment Coordinator, 2015−

Graduate Admissions Chair, 2016−

University

Management Committee, Pacific Institute of Theoretical Physics, Program Coordinator for Theoretical Astrophysics, 2006−2008

Faculty Affairs Committee, Faculty of Science, 2008−2012

University Examiner for Muhammed Asfak Hossain, 2009

University Examiner for Maxime Brodeur, 2010

Chair, Final Doctoral Examination for David Dietrich (Chemistry), 2010

University Examiner for Chris Cameron, 2010

University Examiner for Thomas Pfrommer, 2010

Co-organizer, Space Exploration Lecture Series at Green College, 2010−2012

Chair, Final Doctoral Examination for Joshua van Loon (Community and Regional Planning), 2011

Chair, Final Doctoral Examination for Johanna Maria Schuetz (Medical Genetics), 2011

University Examiner for Diana Dragomir, 2012

Chair, Final Doctoral Examination for In-Sun Yu (Chemistry), 2012

University Examiner for Dennis Timmers (Math), 2012

University Examiner for Jonathan Benjamin, 2013

University Examiner for Peter Pawliuk (Electrical Engineering), 2013

TRIUMF Promotions Committee, 2013

Chair, Final Doctoral Examination for Alexandra Royer (Geophysics), 2014

University Examiner for Fernando Michell Falieri Nogueira, 2014

Chair, Final Doctoral Examination for Abdullah Gharaibeh (Electrical and Computer Engineering), 2015

University Examiner for Jessica Ford, 2015

University Examiner for Elham Alipour Khayer, 2015

University Examiner for Ameer Abdelhadi (Electrical and Computer Engineering, 2016

University Examiner for Ivan Sergeevich Klyuzhin, 2017

Chair, Final Doctoral Examination for Hossein Sadeghi Esfahani (Chemistry), 2016

University Examiner for Matthew Coles (Mathematics), 2017

University Examiner for Hideki Tanimura, 2017

University Examiner for Mirko Miorelli, 2017

University Examiner for Shiqin Su, 2019

Chair, Final Doctoral Examination for Ibrahim Sanad (Electrical and Computer Engineering), 2019

TRIUMF Theory Search Committee, 2021

(b) Other service, including dates

11. SERVICE TO THE COMMUNITY

(a) Memberships on scholarly societies, including offices held and dates

High-Energy Astrophysics Division, American Astronomical Society, 1998−
Canadian Astronomical Society, 2004−
CITA Inc., 2004−
International Astronomical Union, 2012−

(b) Memberships on other societies, including offices held and dates

(c) Memberships on scholarly committees, including offices held and dates

CASCA, Long-Range Plan Committee for Astronomy in Canada (LRP2020), 2019-2021
Joint Committee for Space Astronomy (advisory to CSA), 2019-

(d) Memberships on other committees, including offices held and dates

Member of Science Team: X-ray Polarimetry Explorer, Generation-X, eXTP, XIPE
Member of the board of directors, H. R. MacMillan Space Centre, Vancouver, British Columbia, 2004−2007
Member of Disciplinary Working Group on High-Energy Astrophysics, Canadian Space Agency, 2007−2009
Compact Objects Co-Chair Disciplinary Working Group on High-Energy Astrophysics, Canadian Space Agency, 2015−2017

(e) Editorships (list journal and dates)

(f) Reviewer (journal, agency, etc. including dates)

- Journal Referee (typically a few papers each month):

  Astrophys. J.,1994−

  Phys. Rev. D, 1998−

  Phys. Rev. Lett., 2000−

  Mon. Not. Royal Astr. Soc., 2000−

  Astron. Astrophys., 2000−

  Journ. Phys. A, 2002−

  Classical and Quantum Gravity, 2003−

- Proposal Referee (typically 5 proposals each year):

  NASA Advanced Theory Program, 2002, 2003

  Gemini Guest Observer Program (1 proposal annually), 2003, 2005, 2008, 2010, 2011, 2012

Netherlands Organisation for Scientific Research: VIDI grants (1 proposal), 2003
NSERC Discovery Grant (1 proposal annually), 2004−
Etablissement de Nouveaux Chercheurs Program (1 proposal), 2004
National Science Foundation, 2010
Canada Research Chairs (2 proposals), 2010
UK Science & Technology Facilities Council (2 group proposals), 2012
Research Foundation - Flanders (1 proposal), 2012, 2021
Research Foundation - Italy (2 proposals), 2019
Research Foundation - Finland (2 proposals), 2021

- Grant Award Panel (typically 10−100 proposals per panel):

Chandra Guest Observer Program, 2001, 2006, 2007, 2019.
Einstein Fellowship Program, 2009, 2011, 2012
Canadian Space Agency, 2009
National Science Foundation, 2011, 2012

(g) External examiner (indicate universities and dates)

University of California at Santa Cruz, 1998

(h) Consultant (indicate organization and dates)

Educational consultant to Nickelodeon Television Network, 2001,
Consultant to the NAS/NRC Committee on the Physics of the Universe, 2001,
Consultant to the NASA SEU Roadmap Committee, 2002.
Adjudicator, I-Star Awards, Aga Khan Education Board for Canada, 2008−2010.

(i) Other service to the community

Leader, Dunbar 54th Cubs Pack, Vancouver BC, 2010−

12. AWARDS AND DISTINCTIONS

(a) Awards for Teaching (indicate name of award, awarding organizations, date)

Nomination for Killam Teaching Prize, 2012.

(b) Awards for Scholarship (indicate name of award, awarding organizations, date)

American Chemical Society Olympiad Finalist, 1988
Thomas J. Watson Scholar, IBM, 1988−1992
Princeton Department of Physics Manfred Pyka Prize, 1989
Barry Goldwater Scholar, 1990−1992

Marshall Scholar, Marshall Aid Commeroration Commission, 1992−1994
National Science Foundation Fellow, 1994−1997
Phi Beta Kappa, Northern California Association Scholar, 1995
Achievement Reward for College Scientists, ARCS, 1996
Chandra Postdoctoral Fellow, NASA, 2000−2003
Canada Research Chair, 2003−

(c) Awards for Service (indicate name of award, awarding organizations, date)

(d) Other Awards

13. OTHER RELEVANT INFORMATION

(such as current personnel, major equipment, etc.) [*Max. 1 Page*]

Since arriving at UBC I have set up a theoretical high-energy astrophysics group. Over the past few years, the group has consisted of myself, one research associate (Maxim Lyutikov, Caltech Ph.D. 1998, now faculty at Purdue University), and five Ph.D. students who have completed their studies with me. Kelsey Hoffman and Ramandeep Gill earned prestigious CITA fellowships, Dan Mazur is a consultant for CLUMEQ (a Québec supercomputing consortium), Anand Thirumalai has just accepted a faculty position at the Digipen Institute of Technology, and Alain Prat is currently applying for postdoctoral positions. With all of these graduations, my group now consists of myself, doctoral students, Ilaria Caiazzo and Javiera Parada (the latter shared with Harvey Richer), and a team of Undergraduate Research Assistants (also shared with Harvey Richer).

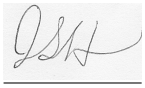
In January 2005, I completed a thirty-four (34) node, dual Opteron Beowulf cluster located in Klinck (at approximate cost of $200,000 from CFI and BCKDF). The group is currently using this system for numerical calculations of atomic physics in strong magnetic fields, the quantum mechanics of the inflaton field, large-scale structure formation and radiative transfer and nuclear processes on and near neutron stars. Members of the gravitational lensing and condensed matter theory groups also use the cluster regularly. Recent publications of the group may be found on the group website `https://www.coolpulsars.org`. As of April 2007, the cluster has been expanded to 42 nodes, and in September 2007 several nodes were updated with dual core processors. In March 2011, all but six nodes were updated with dual core processors and two NVIDIA-CUDA machines were added to the cluster. The current cluster is more than twice as powerful that the original one with only a modest additional investment.

I am also a member of the science team for two x-ray observatories that are planned to include x-ray polarimeters. I discovered that QED increases the expected observed polarization from neutron stars by up to a factor of ten. My former doctoral student Ilaria Caiazzo are working through the consequences of this for the planned missions.

THE UNIVERSITY OF BRITISH COLUMBIA

Publications Record

Date : May 5, 2023

Initials: 

SURNAME: Heyl

FIRST NAME: Jeremy
MIDDLE NAME(s): Samuel

Publication Summary :

	1(a)	1(b)	1(c)	2(a,b,c)	3	4	5
Career Total	174	0	0	47	3	0	0
Last 5 Years Total	64	0	0	18	1	0	0

1 = Refereed Publications [*]: (a) Journals; (b) Conference Proceedings; (c) Other
2 = Non-Refereed Publications : (a) Journals; (b) Conference Proceedings; (c) Other
3 = Books
4 = Patents
5 = Special Copyrights

[*]=include pagination and indicate with an **asterisk** about 5 papers you consider of primary importance.
The names of students working under my supervision are printed in **bold**.

Note on Multiple Author Papers

In astrophysics it is customary for the first author on a paper to have done the bulk (50-90%) of the work toward the paper — this is the case in the bibliography that follows. I have completed several papers with students under my supervision, specifcally those with Gill, Goldsbury, Hoffman, Mazur, Samra, Shannon and Thirumalai. I completed about 30-40% of the work in the my papers with Rosalba Perna, Kaya Mori and Dong Lai (25, 31, 32, 53 and 55). Papers where I am a third or subsequent author my contribution has been more modest (10-20%) with the exception of paper 7 (Ellis et al.) which was part of my Master's thesis where my contribution was larger as reflected by the follow-on paper (13, Heyl et al.). David Spergel supervised my undergraduate thesis which resulted in papers 1-3 and 5-6. Lars Hernquist supervised my Ph.D. thesis which included papers 8-12, 14-16, 18-20 and 30.

Enumerated references begin on the following page. The papers have been cited 5,294 times, yielding an h-index of 37 (these statistics are from Google Scholar on May 5, 2023).

1. REFEREED PUBLICATIONS

(a) Journals

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2. Hernquist, L., Spergel, D. N., Heyl, J. S. 1993, "Structure of Merger Remnants. III. Phase-Space Constraints," *Astrophys. J.*, **416**, 415-424.

3. Heyl, J. S., Hernquist, L., Spergel, D. N. 1994, "Structure of Merger Remnants: IV. Isophotal Shapes," *Astrophys. J.*, **427**, 165-173.

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4. PATENTS

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