

Luke Chamandy

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Fields of Research

- Astrophysical fluids and plasmas:
 - Turbulent dynamos, with emphasis on galaxies and the interstellar medium
 - Binary stellar systems, with emphasis on common envelope evolution

Positions Held

Postdoctoral Positions

- Oct 2016–present: Postdoctoral Associate, University of Rochester (with Eric Blackman & Adam Frank)
- Oct 2014–Sep 2016: Postdoctoral Fellow, University of Cape Town & University of the Western Cape (with Russ Taylor)

Teaching Positions

- Oct-Dec 2013: Teaching Assistant, Inter-University Centre for Astronomy and Astrophysics, Pune
- Aug 2006–Jul 2009: Physics Teacher (IB diploma), Mahindra United World College of India, Pune
- Aug 2004–May 2005: Science and Mathematics Teacher, Jaanimmarik School, Kuujuaq, Canada
- Aug 2001–May 2002: Teaching Assistant, Dept. of Astronomy and Astrophysics, University of Toronto
- Jan 2000–May 2001: Teaching Assistant, Dept. of Physics, Queen's University, Canada

Summer Research Positions

- Jul 2001–Aug 2001: Summer Research Student, Canadian Institute for Theoretical Astrophysics (with Chris Thompson)
- May 1999–Aug 1999: Summer Research Student, Department of Physics & Astronomy, Queen's University (with Larry Widrow)

Voluntary Outreach Positions

- Mar 2003–Aug 2003: Volunteer, Families for Children, Coimbatore, India
Led re-organization of the library and coordinated computer instruction for children
- Oct 2003–Dec 2003: Volunteer, Rural Institute of Development Education, Kanchipuram, India
Conducted research into child labour in India

Academic History

- Jul 2009–Sep 2014: Ph.D., Inter-University Centre for Astronomy and Astrophysics, Pune, India
Doctoral dissertation: *The Origin of Large-scale Magnetic Fields in Galaxies*
Thesis Advisor: Kandaswamy Subramanian
Degree awarded: April 13, 2015
- Aug 2005–May 2006: B.Ed., Ontario Institute for Studies in Education, University of Toronto
Teaching subjects: Physics, General Science
Specialization: Gifted Education
- Aug 2001–Mar 2003: M.Sc., Astrophysics, University of Toronto
Project Advisor: Chris Thompson
- Jun 2000–May 2001: B.A. (Minor), Philosophy, Queen's University, Canada

Aug 1997–May 2000: B.Sc. (Honours), Physics, Queen’s University, Canada
Subject of Specialization: Astrophysics
Honours Thesis Advisor: Kayll Lake

Aug 1995–May 1997: D.E.C., Physical Sciences, Marianopolis College, Montreal

Supervision of Students

Aug 2018–present: Co-supervisor of Ms. Yangyuxin Zou, Ph.D., University of Rochester

Apr 2018–present: Supervisor of Mr. Yisheng Tu, B.Sc. Research Student, University of Rochester

Nov 2013–Jan 2014: Co-supervisor of Mr. Janhavi Tripathi, B.Sc. final year project, University of Pune

Contributions to Successful Grant Proposals

- Jan 2020: Extreme Science and Engineering Discovery Environment (XSEDE):
L. Chamandy, A. Frank, E. G. Blackman, Y. Zou, B. Liu, J. Carroll-Nellenback
Common Envelope Evolution in Stars
260,000 Node hours requested on Stampede 2 at Texas Advanced Computing Center.
224,262 Node hours awarded on Stampede 2 for the period from Apr 1, 2020 to Mar 31, 2021.
- Jan 2019: Extreme Science and Engineering Discovery Environment (XSEDE):
L. Chamandy, A. Frank, E. G. Blackman, B. Liu, J. Carroll-Nellenback
Common Envelope Evolution in Stars
250,000 Node hours requested on Stampede 2 at Texas Advanced Computing Center.
190,341 Node hours awarded on Stampede 2 for the period from Apr 1, 2019 to Mar 31, 2020.
- Jan 2018: National Science Foundation grant #1813298 (Galactic Astronomy Program)
“Interacting Binaries: Mass Transfer and Common Envelope Evolution”
PIs: A. Frank, E. G. Blackman
Amount awarded: \$291,367
Start date: Sep 1, 2018
- Oct 2017: Extreme Science and Engineering Discovery Environment (XSEDE):
A. Frank, B. Liu, **L. Chamandy**, J. Carroll-Nellenback
Mass Transfer in Evolved-Star Binary Systems: From Roche-Lobe Overflow to Bondi-Hoyle
230,000 Node hours requested on Stampede 2 at Texas Advanced Computing Center.
165,652 Node hours awarded on Stampede 2 for the period from Jan 1 to Dec 31, 2018.
- Oct 2016: Extreme Science and Engineering Discovery Environment (XSEDE):
A. Frank, J. Carroll-Nellenback, B. Liu, **L. Chamandy**
Mass Transfer in Evolved-Star Binary Systems: From Roche-Lobe Overflow to Bondi-Hoyle
4.2 million CPU hours requested on Stampede at TACC,
and 3.9 million CPU hours on Comet at San Diego Supercomputer Center.
139,385 CPU hours awarded on Stampede and 980,222 CPU hours on Comet
for the period from Jan 1 to Dec 31, 2017.

Technical and Language Skills

Programming languages: Proficiency with Fortran, IDL, Python, Git, CVS, SVN.

Software: Proficiency with ASTROBEAR, VisIt, MESA. Familiarity with MPI, PENCIL CODE.

Languages: English (native), French (fluent).

Code Development

L. F. S. Rodrigues & **L. Chamandy**, MAGNETIZER, doi:10.5281/zenodo.3817091

Refereed Publications

22. **L. Chamandy** & A. Shukurov, 2020
Parameters of the Supernova-Driven Interstellar Turbulence
(Special Issue: “New Perspectives on Galactic Magnetism”, Eds: S. A. Mao & A. Fletcher)
Galaxies 8(3), 56 (arXiv:2007.14159)
21. Y. Zou, A. Frank, Z. Chen, T. Reichardt, O. De Marco, E. G. Blackman, J. Nordhaus, B. Balick, J. Carroll-Nellenback, **L. Chamandy** & B. Liu, 2020
Bipolar Planetary Nebulae from Outflow Collimation by Common Envelope Evolution
MNRAS, 497, 2855 (arXiv:1912:01647)
20. **L. Chamandy**, E. G. Blackman, A. Frank, J. Carroll-Nellenback & Y. Tu, 2020
Common Envelope Evolution on the Asymptotic Giant Branch: Unbinding within a Decade?
MNRAS, 495, 4028 (arXiv:2004.06829)
19. T. Reichardt, O. De Marco, R. Iaconi, **L. Chamandy** & D. Price, 2020
The impact of recombination energy on simulations of the common envelope binary interaction
MNRAS, 494, 5333 (arXiv:1911.02759)
18. R. Beck, **L. Chamandy**, E. Elson & E. G. Blackman, 2019
Synthesizing Observations and Theory to Understand Galactic Magnetic Fields: Progress and Challenges
(Special Issue: “New Perspectives on Galactic Magnetism”, Eds: S. A. Mao & A. Fletcher)
Galaxies 8(1), 4 (arXiv:1912.08962)
17. **L. Chamandy**, E. G. Blackman, A. Frank, J. Carroll-Nellenback, Y. Zou & Y. Tu, 2019
How Drag Force Evolves in Global Common Envelope Simulations
MNRAS, 490, 3727 (arXiv:1908.06195)
16. G. Guidarelli, J. Nordhaus, **L. Chamandy**, Z. Chen, E. G. Blackman, A. Frank, J. Carroll-Nellenback & B. Liu, 2019
Hydrodynamic Simulations of Disrupted Planetary Accretion Disks Inside the Core of an AGB Star
MNRAS, 490, 1179 (arXiv:1908.00157)
15. **L. Chamandy**, Y. Tu, E. G. Blackman, J. Carroll-Nellenback, A. Frank, B. Liu & J. Nordhaus, 2019
Energy Budget and Core-Envelope Motion in Common Envelope Evolution
MNRAS, 486, 1070 (arXiv:1812.11196)
14. L. F. S. Rodrigues, **L. Chamandy**, A. Shukurov, C. M. Baugh & A. R. Taylor, 2019
Evolution of Galactic Magnetic Fields
MNRAS, 483, 2424 (arXiv:1809:10521)
13. **L. Chamandy** & N. K. Singh, 2018
Non-linear Galactic Dynamos and the Magnetic Rüdler Effect
MNRAS, 481, 1300 (arXiv:1805:05548)
12. **L. Chamandy**, A. Frank, E. G. Blackman, J. Carroll-Nellenback, B. Liu, Y. Tu, J. Nordhaus, Z. Chen & B. Peng, 2018
Accretion in Common Envelope Evolution
MNRAS, 480, 1898 (arXiv:1805.03607)
11. H. Zhou, E. G. Blackman & **L. Chamandy**, 2018
Derivation and Precision of Mean Field Electrodynamics with Mesoscale Fluctuations
Journal of Plasma Physics, 84, 3 (Special issue: *50 Years of Mean Field Electrodynamics*)
(arXiv:1710.04064)
10. **L. Chamandy** & N. K. Singh, 2017
A New Constraint on Mean-field Galactic Dynamo Theory
MNRAS, 468, 3657 (arXiv:1612:05289)
9. **L. Chamandy**, A. Shukurov & A. R. Taylor, 2016
Statistical Tests of Galactic Dynamo Theory
ApJ, 833, 43 (arXiv:1609.05688)
8. **L. Chamandy**, 2016
An Analytical Dynamo Solution for Large-scale Magnetic Fields of Galaxies
MNRAS, 462, 4402 (arXiv:1608.01119)

7. **L. Chamandy** & A. R. Taylor, 2015
Non-linear Galactic Dynamos and the Magnetic Pitch Angle
ApJ, 808, 28 (arXiv:1506.03245)
6. **L. Chamandy**, A. Shukurov & K. Subramanian, 2015
Magnetic Spiral Arms and Galactic Outflows
MNRAS, 446, L6 (arXiv:1408.3937)
5. **L. Chamandy**, A. Shukurov, K. Subramanian & K. Stoker, 2014
Non-linear Galactic Dynamos: A Toolbox
MNRAS, 443, 1867 (arXiv:1403.2562)
4. **L. Chamandy**, K. Subramanian & A. Quillen, 2014
Magnetic Arms Generated by Multiple Interfering Galactic Spiral Patterns
MNRAS, 437, 562 (arXiv:1308.0432)
3. **L. Chamandy**, K. Subramanian & A. Shukurov, 2013
Galactic Spiral Pattern and Dynamo Action II: Asymptotic Solutions
MNRAS, 433, 3274 (arXiv:1301.4761)
2. **L. Chamandy**, K. Subramanian & A. Shukurov, 2013
Galactic Spiral Patterns and Dynamo Action I: A New Twist on Magnetic Arms
MNRAS, 428, 3569 (arXiv:1207.6239)
1. M. Ishak, **L. Chamandy**, N. Neary & K. Lake, 2001
Exact Solutions with W-modes
PhRvD 64, 024005 (gr-qc/0007073)

Conference Proceedings

- L. Chamandy**, A. Shukurov & A. R. Taylor, 2018
New Insights on Galactic Dynamos
IAU Focus Meeting 8 (in press, arXiv:1810.07246)
- L. Chamandy**, A. Frank, E. G. Blackman, J. Carroll-Nellenback, B. Liu, Y. Tu, J. Nordhaus
Z. Chen & B. Peng, 2018
Accretion in Common Envelope Evolution
IAU Symposium 343 (in press, arXiv:1810.04757)
- L. Chamandy**, K. Subramanian & A. Shukurov, 2013
Galactic Spiral Patterns and Dynamo Action
IAU Symposium 294, 249
- M. Ishak, **L. Chamandy** & K. Lake, 2001
Exact Solutions with W-modes: Trapping of Gravitational Waves Inside Neutron Stars
American Institute of Physics Conference Series 586, 550

Conference Presentations

Invited Review Talks

- May 2019 *Review of Numerical Simulations of Common Envelope Evolution*
Common Envelope Evolution 2019
Center for Computational Astrophysics, Flatiron Institute, New York, United States

Other Conference Talks

- Jul 2020 *An Analytical Dynamo Model for the Large-scale Magnetic Field in a Galactic Disc*
The Interstellar Magnetic Field Inference Engine Consortium Workshop
Leiden, The Netherlands (talk given remotely)
- Jul 2020 *Simulating Common Envelope Evolution Involving an Asymptotic Giant Branch Primary*
EAS Ann. Meeting Sympos. 8: Common envelope systems: progenitors, mergers and survivors
Leiden, The Netherlands (talk given remotely)
- Jul 2019 *Evolution of Galactic Magnetic Fields*
Modeling MeerKATs: Comparing galaxy formation simulations to MeerKAT surveys
Kruger Park, South Africa

- Jul 2019 *Energy Budget and Drag Force in 3D Global AMR Simulations of Common Envelope Evolution*
The Beginning and Ends of Double White Dwarfs
Copenhagen, Denmark
DOI: 10.5281/zenodo.3265340
- Jun 2019 *Synthesizing Theory and Observation to Understand Galactic Magnetic Fields*
New Perspectives on Galactic Magnetism
Newcastle, United Kingdom
DOI: 10.5281/zenodo.3352391
- Aug 2018 *New Insights on Galactic Dynamos*
IAU Focus Meeting 8: New Insights in Extragalactic Magnetic Fields
Vienna, Austria
- Aug 2018 *Accretion in Common Envelope Evolution*
IAU Symposium 343: Why galaxies care about AGB stars
Vienna, Austria
- Aug 2017 *Effects of Small-scale Magnetic Fields on Large-scale Galactic Dynamos*
Plasma Universe and its Structure Formation
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Jul 2017 *Simulations of Common Envelope Evolution with AstroBEAR: First Results*
The Physics of Evolved Stars II: The Role of Binarity
Nice, France
- Apr 2016 *Simulating the Cosmic Evolution of Magnetic Fields*
Institute for Data-Intensive Astronomy Data Science Workshop
University of the Western Cape, Cape Town, South Africa
- Jun 2015 *Non-linear Galactic Dynamos and Magnetic Pitch Angles*
Origin, Evolution, and Signatures of Cosmological Magnetic Fields
Nordita, Stockholm
- Dec 2014 *Dynamo Action in Spiral Galaxies*
Square Kilometre Array Bursary Conference
Stellenbosch, South Africa
- Oct 2014 *Dynamo Action in Spiral Galaxies*
Cosmic Magnetic Fields: Current Knowledge and Future Ideas
Krakow, Poland
- Sep 2013 *Building Magnetic Arms with Large-scale Dynamos*
Dynamics of Earth and Planetary Cores
Centre for Earth Sciences, Indian Institute of Science, Bangalore
- Jun 2012 *Galactic Spiral Patterns and Dynamo Action: A New Twist on Magnetic Arms*
East-Asia School and Workshop on Laboratory, Space and Astrophysical Plasmas
Jeju, South Korea

Posters

- Apr 2019 *Global 3D Simulations of Common Envelope Evolution using AMR*
Spring Symposium: The Deaths and Afterlives of Stars
Space Telescope Science Institute, Baltimore, United States
- Aug 2012 *Galactic Spiral Patterns and Dynamo Action: A New Twist on Magnetic Arms*
IAU Symposium 294, Solar and Astrophysical Dynamos
Beijing, China

Seminars and Colloquia

- Aug 2020 *Magnetic Field Evolution in Galaxies and Common Envelope Evolution in Stars*
Physics Seminar (talk given remotely)
Institute of Mathematical Sciences, Chennai, India

- Aug 2020 *Magnetic Field Evolution in Galaxies and Common Envelope Evolution in Stars*
Seminar (talk given remotely)
Indian Institute of Astrophysics, Bengaluru, India
- Jun 2020 *Magnetic Field Evolution in Galaxies and Common Envelope Evolution in Stars*
Research Seminar (talk given remotely)
National Institute of Science Education, Bhubaneswar, India
- May 2020 *Magnetic Field Evolution in Galaxies and Common Envelope Evolution in Stars*
Instituto de Astronomía, Universidad Nacional Autónoma de México
Mexico city, Mexico (talk given remotely)
- Oct 2019 *Simulating Common Envelope Evolution*
Center for Integrated Research Computing Symposium
University of Rochester, Rochester, NY, USA
- Jun 2019 *Global 3D Simulations of Common Envelope Evolution: Progress, Prospects & Perspectives*
Physics Seminar
Newcastle University, Newcastle upon Tyne, United Kingdom
- Aug 2018 *Galactic Dynamos: Toward Statistical Tests of Dynamo Models*
MPS Seminar
Max Planck Institute for Solar System Research, Göttingen, Germany
- Jul 2018 *Accretion in Common Envelope Evolution*
Astrophysics Seminar
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Nov 2017 *Common Envelope Simulations and (Separately) Exploring a New Dynamo Effect*
Astro Seminar
Université de Montréal, Montreal, Canada
- Jul 2017 *Toward Statistical Tests of Galactic Dynamo Theory*
MPIfR Colloquium
Max Planck Institute for Radio Astronomy, Bonn, Germany
- Jul 2017 *Exploring a New Effect in Large-scale Galactic Dynamos*
MPS Seminar,
Max Planck Institute for Solar System Research, Göttingen, Germany
- Mar 2017 *Dynamos in Spiral Galaxies: A New Constraint from Strong Magnetic Fluctuations*
Astro Lunch Seminar
Newcastle University, United Kingdom
- Jan 2017 *Explaining the Global Properties of Spiral Galaxy Magnetic Fields*
Physics & Astronomy Seminar
University of Rochester, Rochester, NY, United States
- Jun 2016 *Large-scale Dynamo Action in Galaxies: Statistical Tests of Galactic Dynamo Theory*
Applied Maths & Physics Seminar
Newcastle University, United Kingdom
- Jan 2016 *Pitch Angles of Magnetic Fields of Galaxies: Toward Statistical Tests of Dynamo Theory*
Astrophysics Seminar
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Oct 2015 *Galactic Dynamos and the Magnetic Pitch Angle*
Astro Lunch Seminar
Newcastle University, United Kingdom
- Jul 2014 *Dynamo Action in Spiral Galaxies*
Physics Seminar
University of the Western Cape, Cape Town, South Africa
- Jul 2014 *Dynamo Action in Spiral Galaxies*
Astronomy Seminar
University of Cape Town, Cape Town, South Africa

- May 2014 *Dynamo Action in Spiral Galaxies*
Physics and Astronomy Special Seminar
University of Rochester, Rochester, NY, United States
- Apr 2014 *Dynamo Action in Spiral Galaxies*
Astronomy and Astrophysics Seminar
Université de Montréal, Montreal, Canada
- Apr 2014 *Dynamo Action in Spiral Galaxies*
Physics, Engineering Physics and Astronomy Colloquium
Queen's University, Kingston, Canada

Honours/Awards

- 2018 Journal of Plasma Physics, Featured Article
- 2018 International Astronomical Union Travel Grant
- 2012 International Astronomical Union Travel Grant
- 2003 Natural Sciences and Engineering Research Council of Canada Research Scholarship
(Declined)
- 2001–2002 Ontario Graduate Scholarship
- 1999–2001 Senator Frank Carrel Upper Year Scholarship, Queen's University

Professional Affiliations

- 2020–present Member of the SKA Magnetism Science Working Group
- 2020–present Member of the Interstellar Magnetic Field Inference Engine (IMAGINE) Consortium
- 2018–present Member of the MeerKAT International GHz Tiered Extragalactic Exploration (MIGHTEE) collaboration
- 2015–2018 Research Associate, School of Mathematics, Statistics & Physics,
Newcastle University, U.K.

Review Work

- 2020–present Referee, *Nature Astronomy*
- 2019–present Referee, *Galaxies*
- 2019 Referee, *European Research Council Advanced Grant Proposal*
- 2017–present Referee, *Monthly Notices of the Royal Astronomical Society*
- 2016 Referee, Giant Metrewave Radio Telescope observing proposal
- 2015 Referee, *The Astrophysical Journal*
- Oct 2014 Judge for student talks and poster presentations
Square Kilometre Array Bursary Conference, Stellenbosch, South Africa

Administration

- 2017 Co-organizer, *Plasma Universe and its Structure Formation* Conference
Inter-university Centre for Astronomy & Astrophysics, Pune, India
- 2014–2016 Organizer of Graduate Student Seminars,
Astronomy Department, University of Cape Town

Scientific Outreach

- Nov 2019 Presenter of talk about exoplanets to 8th grade science students
Twelve Corners Middle School, Rochester, New York
- 2015 Mentor in Job Shadowing Programme
Astronomy Department, University of Cape Town

- 2015 Presenter of talks about astronomy to primary school students
Sea Point Primary School, Cape Town, South Africa
- 2013–2014 Contributor to *History of Astronomy Poster Project*,
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Feb 2013 Presenter of public talk *The Search for Planets Outside of our Solar System*,
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- 2010–2013 Presenter in Astronomy & Astrophysics Poster Exhibition for Science Day,
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- Feb 2011 Conductor of Science Day Quiz for the Public,
Inter-University Centre for Astronomy and Astrophysics, Pune, India
- 2009-2011 Presenter of annual astrophysics talks as part of “Faculty Lecture Series”,
Mahindra United World College of India, Pune, India
- 2010 Contributor to Science Day Quiz for School Students,
Inter-University Centre for Astronomy and Astrophysics, Pune, India

Referees

1. Prof. Eric G. Blackman
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2. Prof. Kandaswamy Subramanian
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5. Prof. A. Russ Taylor
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6. Prof. Rainer Beck
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8. Prof. Orsola De Marco
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