

Cliff Burgess

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Education

B.Sc. (Hons) Physics & Applied Mathematics

The University of Waterloo (1976-1980)

Undergraduate Awards:

Science Faculty Alumni Gold Medal;

Sir Isaac Newton Fellowship

Co-op work experience:

Chalk River Nuclear Laboratories

(Plutonium Lab, Nuclear Physics Branch, Special Projects Branch);

Polish Academy of Sciences (Warsaw)

Ph.D. Theoretical High Energy Physics

The University of Texas at Austin (1980-1985)

Graduate Awards:

NSERC 1967 Centennial Fellowship;

John Archibald Wheeler Entrance Scholarship;

Graduate Research Fellow

Thesis Supervisor:

Steven Weinberg

Academic Experience

McMaster University (2005 – present)

Professor of Physics

Appointment: Full Professor 2005

Perimeter Institute for Theoretical Physics (2004 – present)

Associate Faculty

McGill University (1987 – 2005)

Professor of Physics

Appointments: James McGill Professor 2003; Full Professor 1995; Associate Professor 1991; Assistant Professor 1987

Institute for Advanced Study Princeton (1985 – 1987)

Research Member

Postdoctoral Awards: NSERC Postdoctoral Fellowship

**Visiting
Appointments**

CERN Theory Division (2014 – 2015)
Scientific Associate

CERN Theory Division (2007 – 2008)
Scientific Associate

McMaster University (2004 – 2005)
Visiting Professor

Institute for Advanced Study Princeton (2000 – 2001)
Research Member
Ambrose Monell Foundation Fellow

Universitat de Barcelona (1998 – 1999)
Visiting Professor

Université de Neuchâtel (1993 – 1994)
Visiting Professor
Swiss National Foundation Fellow

**Professional
Awards/Prizes**

Buchalter Cosmology Prize 2016

*Canadian Association of Physicists & Centre de Recherches
Mathématiques Prize in Theoretical Physics 2010*

Fellow of the Royal Society of Canada, Elected 2008

Killam Foundation Research Fellow 2005 – 2007

**Selected
Community
Service**

Scientific Advisor, Rencontres de Moriond Cosmology 2014-2017

Steering Committee, SNOLab 5-year Plan 2016

Advisory Committee on TRIUMF (ACOT) 2011-2014

Physics at the LHC 2012, Int'l Program Committee 2011-2012

NSERC Subatomic Long Range Planning Committee 2010-2011

IPP Member of Council 1992 – 95 and 2003 – 2006.

NSERC Subatomic Grant Selection Committee 2004 – 2007

SNOLAB Experiment Assessment Committee 2004 – 2007

Research Interests

My interests lie at the interface between particle physics and cosmology, linking Dark Matter, Dark Energy and Primordial Fluctuations to fundamental physics. I use ideas like branes and extra dimensions from string theory to tackle problems in cosmology. I am developing Effective Field Theory for open systems since these techniques (some of which come from condensed matter) seem the most appropriate for quantum gravity at observable scales.

Selected Publications

Books and selected contributions to books

The Standard Model: A Primer, *C.P. Burgess and Guy D. Moore*, Cambridge University Press, 2007

Supersymmetry and Supergravity, *C.P. Burgess*, in the Encyclopedia of Physics (2nd Edition, 1991) and (3rd Edition, 2004), VCH Publishers, New York.

Selected Invited Review Articles

EFT Methods in Inflation, *C.P. Burgess*, in the proceedings of the school 'Effective Field Theory,' Les Houches France, July 2007

Testing General Relativity with Present and Future Astrophysical Observations, *C.P. Burgess* contribution to book by E. Berti et.al., Cambridge University Press, 2015 (arXiv:1501.07274 [gr-qc])

The Cosmological Constant Problem: Why it is Hard to get Dark Energy from Micro-Physics, *C.P. Burgess*, in the proceedings of the school 'Post-Planck Cosmology,' Les Houches France, July 2013 (arXiv:1309.4133 [hep-th]).

Challenges for String Cosmology, *C.P. Burgess* and Liam McAllister, Classical and Quantum Gravity 28 (2011) 204002 (18 pages) (selected for 2011-2012 Highlights of Classical and Quantum Gravity).

Effective Theories and Modifications of Gravity, *C.P. Burgess*, chapter in *Foundations of Space and Time: Reflections on Quantum Gravity*, edited by J. Murugan, Cambridge University Press, 2010 ([arXiv:0912.4295v1](https://arxiv.org/abs/0912.4295v1) [gr-qc]).

String Cosmology: Cosmic Defects in the Lab, *C.P. Burgess*, 'News and Views' article, Nature Physics 4 (2008) 11.

Lectures on Cosmic Inflation and its Potential Stringy Realizations, *C.P. Burgess*, Classical and Quantum Gravity 24 (2007) S795-S852, and Proceedings of Science (arXiv:0708.2865 [hep-th])

Introduction to Effective Field Theory, *C.P. Burgess*, Annual Reviews of Nuclear and Particle Science 57 140508, (hep-th/0701053)

The Great Cosmic Roller-Coaster Ride, *C.P. Burgess and F. Quevedo*, Scientific American November 2007.

Quantum Gravity and Precision Tests, *C.P. Burgess*, chapter in *Towards Quantum Gravity*, edited by D. Oriti. Cambridge University Press, 2006, (gr-qc/0606108).

Towards a Natural Theory of Dark Energy: Supersymmetric Large Extra Dimensions, *C.P. Burgess*, in the proceedings of Strings and Cosmology, Texas A&M University, College Station Texas, March 2004, AIP Conference Proceedings 743 (2005) 417-449, (hep-th/0411140)

Quantum Gravity in Everyday Life: General Relativity as an Effective Field Theory, *C.P. Burgess*, Living Reviews in Relativity 7 (2004) 5 (57 pages), (gr-qc/0311082)

Goldstone and Pseudo-Goldstone Bosons in Nuclear, Particle and Condensed-Matter Physics, *C.P. Burgess*, Physics Reports C330 (2000) 193-261 (hep-th/9808176)

Summary of publication/citation history

Taken from InSPIRE (Stanford) database: Jul 31 2017

Total of 242 citeable publications (h-index of 60) of which 189 are published in refereed research journals (h-index of 58).

(My publications appear in the journals: Journal of High Energy Physics; Journal of Cosmology & Astrophysics; Nuclear Physics B; Physics Letters B; Physical Review Letters; Physical Review D (Particles & Fields); Physical Review B (Condensed Matter); Astrophysical Journal; Monthly Notices of the Royal Astronomical Society; etc)

InSPIRE (Stanford) Topcite citation statistics (July 31, 2017)

<i>Statistic:</i>	<i>All publications</i>	<i>Refereed publications</i>	<i>Total for field</i>
<i>Number of docs:</i>	242	189	662,840
<i>Total Citations:</i>	11,325	10,747	19,428,039
<i>500-999 Citations:</i>	1 (0.41%)	1 (0.53%)	3,106 (0.47%)
<i>250-499 Citations:</i>	4 (1.6%)	4 (2.1%)	6,680 (1.0%)
<i>100-249 Citations:</i>	24 (9.9%)	23 (12%)	28,139 (4.2%)
<i>50-99 Citations:</i>	42 (17%)	40 (21%)	51,242 (7.7%)

For an up-to-date list of my publications and citations see [here](#).

**Selected Invited
Lecture Series**

Effective Field Theories & Inflation, 3-hour lecture series presented to: Les Houches Summer School Post-Planck Cosmology, Les Houches France, **July 2017**

Explorations in Particle Astrophysics, 10-hour lecture series presented to: Perimeter Scholars International, Perimeter Institute, April 2016

Beyond the Standard Model, 5-hour lecture series presented to: XVIII Swieca School of Physics, Campos do Jordao, Brazil, January 2015

The Cosmological Constant Problem: Why it is Hard to get Dark Energy from Micro-physics, 3-hour lecture series presented to: Les Houches Summer School Post-Planck Cosmology, Les Houches France, **July 2013**

Effective Field Theory and Cosmology, 3-hour lecture series presented to: Essential Cosmology for the Next Generation (Cosmology on the Beach), Cancun, Mexico, **January 2012**

Inflation, Dark Matter and Dark Energy, 4-hour lecture series presented to: Nordic Winter School on Cosmology and Particle Physics, Gausdal, Norway, **January 2011**

Inflation and Fundamental Physics, 2-hour lecture series presented to: UniverseNET School on Cosmology, Lecce, Italy, **August 2010**

Introduction to the Standard Model, 4-hour lecture series presented to: TRIUMF Summer Institute, Vancouver, BC, **July 2009**

Physics Beyond the Standard Model, 3-hour lecture series presented to: Universite de Paris IX/Bielefeld International Graduate Course on Physics Beyond the Standard Model, Bielefeld, Germany, **September, 2008** and to the Benasque School on Flavor Physics, Benasque, Spain, **August, 2008**

Effective Field Theory, 5-hour lecture series presented to: British Universities Graduate Summer Schools (BUSSTEPP) in York, England, **August 2007** and 3-hour lecture series at BUSSTEPP in Edinburgh, Scotland, **September 2006**

Cosmic Inflation, 4.5-hour lecture series presented to: Cargèse School on Cosmology and Particle Physics Beyond the Standard Models, Cargèse, France, **August 2007** and to the CERN RTN Graduate School, Geneva, Switzerland, **January 2007** and to the Central European Joint Program of Doctoral Studies in Theoretical Physics (Particle Physics, Gravity and Cosmology), Dubrovnik, Croatia, **August 2006** and a 3-hour lecture series presented to: International Graduate School on Cosmology, Universite de Paris XI/Bielefeld, Paris, France, **March 2006**

**Selected Recent
Invited Conference
Talks**

Effective Field Theory & Modified Gravity: The view from below

Testing Gravity 2017, Vancouver BC, **Jan 2017**

Quantum Vacuum & Gravitation 2017, MITP Mainz, **Mar 2017**

Prospects for Testing Gravity

Gravity and Experiment, Paris, France, **Dec 2016**

Inflation Outside the Box

FANCY 2016, Odense, Denmark, **Oct 2016**

String Inflation after Planck, Liverpool UK, **Sept 2016**

The Future is Stochastic (Probably)

Gordon Conference (String Thy & Cosmol), Tuscany Italy, **May 2017**

Utrecht Cosmology Symposium, Utrecht Netherlands, **June 2016**

Atlantic Symposium on General Relativity, Halifax NS, **June 2016**

Aspects of String Pheno & Cosmology, ICTP Italy, **May 2016**

Theory & Experiment in Quantum Gravity, Galiano Island, **Aug 2015**

Self-tuning Under the Microscope

Quantum Gravity from UV to IR, KITP Santa Barbara, **May 2015**

Dark Energy (Naturally): A Bad Cop, a Wet Blanket & a Cold Shower

Beyond Λ CDM, Oslo Norway, **Jan 2015**

A more complete listing of my recent talks can be found [here](#).

Selected Recent Colloquia

Gravitational Waves: the Sounds of Spacetime

Universite de Montreal, Montreal QC, **Apr. 2016**

Self-tuning Under the Microscope: Extra Dimensions, Brane Back-reaction and the Cosmological Constant Problem

Stanford University, Stanford CA, **Nov. 2015**

Naturalness, Hierarchies & the LHC: the Dog that Didn't Bark

Austrian Academy of Sciences, Vienna Austria, **Mar. 2015**

What is the Universe Made of? The case for Dark Energy & Dark Matter

Chung-Ang University, Seoul South Korea, **Oct. 2014**

National Taiwan University, Taipei Taiwan, **Jun. 2014**

Last Chance to be Wrong About What They'll See at the LHC

Penn State University, State College PA, **Sep 2012**

Tufts University, Somerville MA, **Apr. 2012**

Purdue University, West Lafayette IN, **Dec. 2011**

University of Alberta, Edmonton AB, **Oct. 2011**

Perimeter Institute, Waterloo ON, **Sep. 2011**

SNOLab, Sudbury ON, **Apr. 2011**

Carleton University, Ottawa ON, **Mar. 2011**
Universite de Montreal, Montreal QC, **Nov. 2010**
UC Davis, Davis CA, **Feb. 2010**
Munich Inter-university Physics Colloquium, TU Munich, **Feb. 2010**
Simon Fraser University, Vancouver BC, **Dec. 2009**
University of British Columbia, Vancouver BC, **Dec. 2009**
McMaster University, Hamilton ON, **Oct. 2008**
McGill University, Montreal QC, **Sep. 2008**

Finding the gravity of every situation: Implications of the AdS/CFT Correspondence

Universite de Montreal, Montreal QC, **Nov. 2010**
University of Houston, Houston TX, **Sep. 2009**

A more complete listing of my recent talks can be found [here](#)

Recent Research Seminars

Effective Theories for Point Sources

Caltech, Pasadena CA, **Apr 2017**
Fermilab, Batavia IL, **Apr 2017**

The Future is Stochastic (Probably)

University of Michigan, Ann Arbor MI, **Jan 2017**
Neils Bohr Institute, Copenhagen Denmark, **Nov 2016**
Perimeter Institute, Waterloo ON, **Feb 2016**
Canadian Institute for Theoretical Astrophysics, Toronto ON, **Sep 2015**
University of Toronto, Toronto ON, **Nov. 2015**
University of Pennsylvania, Philadelphia PA, **Oct. 2015**

Self-tuning Under the Microscope: Implications for the LHC

EPFL, Lausanne Switzerland, **Mar. 2015**
Univeritat de Barcelona, Barcelona Spain, **Mar. 2015**
CERN Theory Division, Geneva Switzerland, **Mar. 2015**
Technische Universitat Dresden, Dresden Germany, **Nov 2014**

Large Fields, Open EFTs & Stochastic Inflation

LAPTh, Annecy-le-Vieux, France, **Feb 2015**
University of Amsterdam, Amsterdam Netherlands, **Feb 2015**
Oxford University, Oxford UK, **Feb 2015**
CERN Theory Division, Geneva Switzerland, **Nov 2014**
IPMU, Tokyo Japan, **Oct 2014**
DAMTP Cambridge University, Cambridge UK, **Oct 2014**
Southampton University, Southampton UK, **Oct 2014**
Universite de Geneve, Geneva Switzerland, **Sep 2014**

A more complete listing of my recent talks can be found [here](#)

**Selected Recent
Outreach Talks**

Gravitational Waves: the Sounds of Spacetime

Ontario Assoc of Physics Teachers, York University, **May 2017**
Engineering & Science Olympics, McMaster University, **Nov 2016**
Royal Astronomical Society of Canada, Waterdown ON, **June 2016**
Undergraduate Astronomy Club, McMaster University, **Mar. 2016**

Higgs @ CERN: What is it and what does its discovery mean?

Einstein Plus, Perimeter Institute, **Jul. 2015**
Einstein Plus, Perimeter Institute, **Jul. 2014**;
Origins Institute Public Lecture, McMaster University, **Oct. 2012**
Open Streets McMaster, Hamilton, **Sep. 2012**
Ontario Assoc of Phys Teachers, Perimeter Inst, Waterloo ON, **Apr. 2012**

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