

ROBERT A. MCNEES
Curriculum Vitae
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Loyola University Chicago
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- CURRENT** **Loyola University Chicago**
Associate Professor, Department of Physics
- RESEARCH** General Relativity, Cosmology, String Theory, and Particle Physics.
- EDUCATION** **University of Texas, Austin, TX**
Ph.D. in Physics, 2002
Dissertation: "String Theory, Holography, and UV-IR Mixing"
Advisor: Willy Fischler
- University of North Carolina, Chapel Hill, NC**
B.S. in Physics, 1995
- PREVIOUS** **Perimeter Institute for Theoretical Physics, 2007 - 2009**
POSITIONS Postdoctoral Researcher
- University of Waterloo, 2008 - 2009**
Lecturer, Department of Physics
- Brown University, 2005 - 2007**
Postdoctoral Research Associate, Department of Physics
- University of Michigan, 2002 - 2005**
Postdoctoral Fellow, Department of Physics
- University of Texas, 1998 - 2002**
Graduate Research Assistant, Weinberg Theory Group
- TEACHING** **Assistant Professor, Loyola University Chicago, 2009 - Present**
EXPERIENCE Physics 111: College Physics 1
Physics 112: College Physics 2
Physics 126F: Freshman Project
Physics 351: Electricity and Magnetism
Physics 380: Introduction to Particle Physics
Physics 391: Research
Honors 204: Science and Society - "Federal Funding of the Sciences"

Lecturer, University of Waterloo, 2008 - 2009

Introduction to Physics

Mechanics and Waves 2

Mathematical Physics

Modern Particle Physics

Perimeter Institute for Theoretical Physics, 2008 - 2009

Mentor, International Summer School for Young Physicists

Lecturer, EinsteinPlus Workshop for High School Teachers

Brown University, 2006 - 2007

Supervisor, Graduate Reading Groups on Black Holes, AdS/CFT

Michigan Center for Theoretical Physics, 2003 - 2005

Lecturer, Special Topics for Graduate Students

Teaching Assistant, Department of Physics, UT-Austin, 1996-1999

Honors Modern Physics

Electricity and Magnetism Lab

Waves and Optics Lab

Grader, Department of Physics, UT-Austin, 2000-2002

Graduate Cosmology

RESEARCH
EXPERIENCE

Loyola University Chicago, 2009 - Present

Active research projects in the areas of General Relativity, Quantum Gravity, Cosmology, Particle Physics, and Undergraduate Physics Education

Perimeter Institute for Theoretical Physics, 2007 - 2009

Postdoctoral Researcher in the String Theory Group

Brown University, 2005 - 2007

Postdoctoral Research Associate in the High Energy Theory Group

University of Michigan at Ann Arbor, 2002 - 2005

Postdoctoral Fellow in the High Energy Theory Group and the Michigan Center for Theoretical Physics

University of Texas at Austin, 1996 - 2002

Graduate Research Assistant in the Weinberg Theory Group

Oak Ridge National Laboratories, 1992 and 1993

Summer REU in the Engineering Physics and Mathematics Division

University of North Carolina at Chapel Hill, 1991 - 1995

Undergraduate Research Assistant in the Washburn Research Group

GRANTS AND
AWARDS

Loyola University Chicago Sujack Master Teacher Award, 2014

Nominee: LUC Ignatius Loyola Award for Excellence in Teaching, 2014

Nominee: LUC Provost's Award for Excellence in Teaching Freshman, 2014

KITP Scholar, 2014-2016

Kavli Institute for Theoretical Physics
University of California Santa Barbara

Loyola University Chicago Summer Research Stipends

2015: "Investigations of Modified Theories of Gravitational Physics"

2011, 2012: "The Formulation and Application of Gravitational Dualities"

NSF Grant PHY-0714747 in support of "Northeast Regional String Theory
Conference Program" (PI: David Lowe, Brown University), 2007

University of Texas School of Natural Sciences Fellowships, 1996-98

Rotary International Ambassadorial Scholar, 1995-96

STUDENT
PROJECTS

Research projects and reading courses with students at Loyola University Chicago

Alex Gilman, Spring 2015 - Present

"A MATHEMATICA Package for Efficient, Parallelized Calculations in General Relativity"

Edward Varty and Kevin Kadowaki, Summer 2012 - Spring 2014

"Numerical Search for Transient Hubble Acceleration in Quintessence Cosmologies"

Poster presented at Chicago Area Research Symposium, April 2013

Hwi Seon Kim, Summer 2013 - Fall 2013

"Physically Realistic Version of a Paradox in Special Relativity"

Momoko Takahashi, Summer 2012 - Spring 2013

"Physically Realistic Description of the Twin Paradox, Applied to Krugman's
Relativistic Theory of Trade"

Stephanie Miller, Fall 2010-Spring 2011

"2+1+1 Decomposition of Maxwell's Equations on a Curved Spacetime"

Eric Wilkinson, Fall 2009-Spring 2010

"Numerical Simulations of Accelerated Hubble Expansion Driven by Quintessence"

EDUCATIONAL
WORKSHOPS

Provost's Faculty Retreat, October 2011

"Celebrating Loyola's Teaching Culture"

Center for Ignation Pedagogy series on Exemplary Teaching, October 2011

Video: "**Ignation Pedagogy: Tips from Loyola Faculty**"

UNIVERSITY
SERVICE

Sujack Teaching Award Committee, 2015

University Library Committee, 2009 - Present

Digital Repository Advisory Committee, 2011 - 2013

Club Baseball Faculty Advisor, 2010 - 2012

“Loyola on the Road” Alumni Presentation in San Francisco, November 2012
Guest Lectures at LUREC Winter Ecology course, January 2012

DEPARTMENTAL
SERVICE

Assessment Coordinator, 2011 - Present
Member of Physics Department Textbook Committee, 2015 - Present
Chair of Physics Major Curriculum Reorganization Committee, 2014 - 2015
Departmental advisor for 10-15 physics majors each year, 2009 - Present
Member of the Advanced Lecture Courses Curriculum Committee, 2012 - Present
Member of the Departmental Web Management Committee, 2013 - Present
NTT Faculty Search Committees, 2012 and 2014
Physics Department Representative at Loyola Open House for Prospective Students, 2009 - Present

PROFESSIONAL
SERVICE

Referee for *Physical Review Letters*
Referee for *Physical Review D*
Referee for *Journal of High Energy Physics*
Referee for *Classical and Quantum Gravity*
Referee for *Journal of Cosmology and Astroparticle Physics*

PROFESSIONAL
AFFILIATIONS

Anacapa Society
Theoretical and Computational Physics at undergraduate institutions
American Physical Society
Division of Particles and Fields
Topical Group on Gravitation
National Center for Science Education
Phi Beta Kappa

OUTREACH
ACTIVITIES

Adler Planetarium Astro-Science Workshop, 2012 - Present
Chicago Public Schools Area 19 Science Fair Judge, 2010 - Present
Quantum to Cosmos Festival 2009
Panel Discussion: “The Art of Guesstimation”
Perimeter Institute for Theoretical Physics, 2008 - 2009
Interviews for popular media, Contributor to outreach website, Q&A sessions for visiting students
U.S. Department of Energy National Science Bowl, 2007 - 2009

Moderator and Speaker

College Board National Forum, 1996 and 2000

Panelist and Invited Speaker

SELECTED
TALKS

“AdS and the Fefferman-Graham Expansion: Asymptotic Expansions using
MATHEMATICA and xTENSOR”

Vienna University of Technology, January 2014

“Holographic Renormalization of Asymptotically Lifshitz Spacetimes”

21st Midwest Relativity Meeting, University of Illinois, November 2011

“On Quark Masses in Holographic QCD”

Theory Canada 4, University of Montreal, June 2008

“Boundary Terms Unbound! Variational Principles for Gravitational Theories”

University of Chicago, December 2007

“Everything You Ever Wanted to Know about 2-D Black Holes”

Syracuse University, April 2007

“Actions, Boundary Terms, and AdS/CFT”

Massachusetts Institute of Technology, March 2006

“A New Action for Asymptotically AdS Spacetimes”

Texas A & M University, January 2006

“Inflation, Holography, and Diffeomorphisms”

Columbia University, March 2004

“Inflation as a Holographic RG Flow”

University of Pennsylvania, October 2003

“Inflation and Broken Scale Invariance”

Perimeter Institute for Theoretical Physics, June 2003

CONFERENCES
ORGANIZED

The Second New England String Meeting

Brown University, November 2007

The First New England String Meeting

Brown University, November 2006

Time Dependent Backgrounds In String Theory

Michigan Center for Theoretical Physics, April 2003

SELECTED
CONFERENCES
(PARTICIPANT)

21st Midwest Relativity Meeting

University of Illinois at Urbana Champaign, November 2011

Great Lakes Strings 2011

University of Chicago, April-May 2011

The Fourth New England String Meeting

Brown University, April 2010

Gravitational Thermodynamics and the Quantum Nature of Space Time
International Center for Mathematical Physics (Edinburgh), June 2008

PASCOS 2008

Perimeter Institute for Theoretical Physics, June 2008

The Sowers Theoretical Physics Workshop
Virginia Tech, May 2007

Northeast String Cosmology Meeting
Columbia University, December, May 2006; May 2005; December, May 2004

Cosmo 2006
University of California, Davis, September 2006

Strings
University of Toronto, July 2005
Collège de France, June-July 2004

Quantum Theory of Black Holes
The Ohio State University, September 2004

Superstring Cosmology
Kavli Institute for Theoretical Physics, November-December 2003

QCD and Strings
Michigan Center for Theoretical Physics, May 2003

Great Lakes Cosmology
Michigan Center for Theoretical Physics, May 2003

The Davis Meeting on Cosmic Inflation
University of California, Davis, March 2003

20th Texas Symposium on Relativistic Astrophysics
University of Texas at Austin, December 2000

TASI-99: Strings, Branes, and Gravity
University of Colorado, June 1999

Winter School on Vector Bundles, Mirror Symmetry, and Lagrangian Submanifolds
Harvard University, January 1998

PEER REVIEWED
PUBLICATIONS
(JOURNALS)

1. “Cosmological constant as confining $U(1)$ charge in two-dimensional dilaton gravity,” with Daniel Grumiller and Jakob Salzer. *Phys. Rev. D.* **90**, 044032 (2014).
2. “Conformal Gravity Holography in Four Dimensions,” with Daniel Grumiller, Maria Irakleidou, and Iva Lovrekovic. Published in *Phys. Rev. Lett.* **112**, 111102 (2014).

3. “The Electric Field at the Chargeless Interface Between Two Regions of Space,” with Asim Gangopadhyaya. Published in *Am. J. Phys.* **82**, 597 (2014).
4. “Black Holes in the C(an)onical Ensemble,” with Daniel Grumiller and Simone Zonetti. Published in *Phys. Rev. D* **86**, 124043 (2012).
5. “Holographic Renormalization of Asymptotically Lifshitz Spacetimes,” with Robert Mann. Published in *JHEP* **1110**, 129 (2011).
6. “Boundary Terms Unbound! Holographic Renormalization of Asymptotically Linear Dilaton Gravity,” with Robert Mann. Published in *Class. Quant. Grav.* **27**, 065015 (2010).
7. “Holographic Description of AdS_2 Black Holes,” with Alejandra Castro, Daniel Grumiller, and Finn Larsen. Published in *JHEP* **0811**, 052 (2008).
8. “On Quark Masses in Holographic QCD,” with Robert C. Myers and Aninda Sinha. Published in *JHEP* **0811**, 056 (2008).
9. “On the Stress Tensor for Asymptotically Flat Gravity,” with Robert Mann, Donald Marolf, and Amitabh Virmani. Published in *Class. Quant. Grav.* **25**, 225019 (2008), .
10. “Dirichlet Boundary Value Problem for Chern-Simons Modified Gravity,” with Robert Mann and Daniel Grumiller. Published in *Phys. Rev. D* **78**, 081502 (R) (2008).
11. “Black Hole Thermodynamics and Hamilton-Jacobi Counterterm,” with Luzi Bergamin, Daniel Grumiller, and Rene Meyer. Proceedings contribution to *Quantum Field Theory Under the Influence of External Conditions*. Published in *J. Phys. A* **41**, 164068 (2008).
12. “The Thermodynamics of Black Holes in Two (and Higher) Dimensions,” with Daniel Grumiller. Published in *JHEP* **0704**, 074 (2007).
13. “Boundary Counterterms and the Thermodynamics of 2-D Black Holes,” with J. Davis. Published in *JHEP* **0509**, 072 (2005).
14. “Black Hole Mass and Hamilton-Jacobi Counterterms,” with A. Batrachenko, J.T. Liu, W.A. Sabra, and W.Y. Wen. Published in *JHEP* **0505**, 034 (2005).
15. “Holography, Diffeomorphisms, and Scaling Violations in the CMB,” with F. Larsen. Published in *JHEP* **0407**, 062 (2004).
16. “Inflation and De Sitter Holography,” with F. Larsen. Published in *JHEP* **0307**, 051 (2003).
17. “Entropy of the Stiffest Stars,” with T. Banks, W. Fischler, A. Kashani-Poor, and S. Paban. Published in *Class. Quant. Grav.* **19**, 4717-4728 (2002).

18. “String Theory, Holography, and UV-IR Mixing,” Ph.D. Dissertation, University of Texas, UMI Publication AAT 3115501 (2002).
19. “The Acceleration of the Universe, A Challenge for String Theory,” with W. Fischler, A. Kashani-Poor, and S. Paban. Published in JHEP **0107**, 003 (2001).
20. “The Interplay Between θ and T,” with W. Fischler, E. Gorbatov, A. Kashani-Poor, S. Paban, and P. Pouliot. Published in JHEP **0006**, 032 (2000).
21. “Correlation Functions of Operators and Wilson Surfaces in the $d=6$, (0,2) Theory in the Large N Limit,” with R. Corrado and B. Florea. Published in Phys. Rev. D **60**, 085011 (1999).
22. “Cryptosystems Based on Chaotic Dynamics,” with V. Protopopescu, R.T. Santoro, and J.S. Tolliver. Oak Ridge National Laboratory Report ORNL/TM-12440 (1993).

BOOK
CHAPTERS

23. “Black holes and thermodynamics — The first half century,” with Daniel Grumiller and Jakob Salzer, for *Quantum Aspects of Black Holes* (Ed. Xavier Calmet).

ADDITIONAL
PUBLICATIONS

24. “A New Boundary Counterterm for Asymptotically AdS Spacetimes.”
<http://arxiv.org/abs/hep-th/0512297>