

ROBERT A. MCNEES
Curriculum Vitae
September 2019

Loyola University Chicago
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CURRENT **Loyola University Chicago**
Associate Professor, Department of Physics

RESEARCH General Relativity, Cosmology, String Theory, 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 **Associate Professor, Loyola University Chicago, 2009 - Present**
EXPERIENCE Physics 111: College Physics 1
Physics 112: College Physics 2
Physics 126F: Freshman Project
Physics 301: Mathematical Methods in Physics
Physics 351: Electricity and Magnetism
Physics 380: Introduction to Particle Physics
Physics 391: Research
Honors 204: Science and Society - “Honors Modern Physics”
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

**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

Engineering Physics and Mathematics Division

**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

2017, 2018: "Investigations of Modified Theories of Gravitational Physics"

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

**STUDENT
PROJECTS**

Research projects and reading courses with students at Loyola University Chicago

Collin Dannheim, Luke Ignell, and Brendan O'Donnell, Summer 2019 - Present
"Modeling a looping pendulum" (with Dr. Constantin Rasinariu)

Andrew Fischer and Alec Lancaster, Fall 2017 - Summer 2018
"The special and general theories of relativity"

Barbara Skrzypek and Alex Pizzuto, Spring 2016 - Summer 2017

“The Dynamical Chern-Simons Scalar Field on a Kerr Background”

*Both students awarded 2016-17 **Mulcahey Scholarships***

Alex Gilman, Spring 2015 - Summer 2016

“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”

UNIVERSITY
SERVICE

Faculty Appeals Committee, 2018 - Present

Course Evaluation Software Review Committee, 2018-2019

Plan 2020 Interdisciplinary STEM Committee, 2018

Academic Technology Committee (Alternate member), 2017 - Present

Sujack Teaching Award Committee, 2015

University Library Committee, 2009 - 2017

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

Physics Department Strategic Planning Committee, 2018 - Present

Physics Department Curriculum Committee, 2019 - Present

NTT Faculty Search Committee Chair, 2018-2019 (Two positions filled)

TT Faculty Search Committee Member, 2017-2018

Physics Department Chairperson Search Committee Member, 2017

NTT Faculty Search Committee Member, 2012, 2014, and 2016

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 - 2017
Member of the Departmental Web Management Committee, 2013 - Present
Physics Department Representative at Loyola Open House for Prospective Students, 2009 - Present
Assessment Coordinator, 2011 - Present

PROFESSIONAL SERVICE Referee for *Physical Review Letters*, *Physical Review D*, *Journal of High Energy Physics*, *Classical and Quantum Gravity*, *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 Social media scicomm outreach on [Twitter](#)
Frequent quotes, commentary, and interviews for science stories in various media
[Washington Post](#), [gizmodo](#), [inverse](#), [Live Science](#), [Verge](#), and others
[ComSciCon-Chicago](#), 2016
[Adler Planetarium Astro-Science Workshop](#), 2012 - 2016
Chicago Public Schools Area 19 Science Fair Judge, 2010 - 2015
[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

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"](#)

SELECTED TALKS "Science and Social Media: One Physicist's Experience"
Joint Meeting of the Illinois and Wisconsin sections of the AAPT, Fall 2017

“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

SELECTED
CONFERENCES

27th Midwest Relativity Meeting
University of Michigan, October 2017

26th Midwest Relativity Meeting
Perimeter Institute for Theoretical Physics, October 2016

Fellows at the Frontiers 2016
Northwestern University, September 2016

25th Midwest Relativity Meeting
Northwestern University, October 2015

Convergence 2015
Perimeter Institute for Theoretical Physics, June 2015

21st Midwest Relativity Meeting
University of Illinois at Urbana Champaign, November 2011

Great Lakes Strings 2011
University of Chicago, April-May 2011

PEER REVIEWED
PUBLICATIONS

1. “[Bounds on extra dimensions from micro black holes in the context of the metastable Higgs vacuum](#)” with Katherine J. Mack. Published in Phys. Rev. D. **99**, 063001

(2019).

2. “Menagerie of AdS_2 Boundary Conditions,” with Daniel Grumiller, Jakob Salzer, Carlos Valcárcel, and Dmitri Vassilevich. Published in JHEP **1710**, 203 (2017).
3. “Extremal Black Holes in Dynamical Chern-Simons Gravity,” with Leo Stein and Nicolás Yunes. Class. Quant. Grav. **33**, 235013 (2016).
4. “Cosmological constant as confining $U(1)$ charge in two-dimensional dilaton gravity,” with Daniel Grumiller and Jakob Salzer. Phys. Rev. D. **90**, 044032 (2014).
5. “Conformal Gravity Holography in Four Dimensions,” with Daniel Grumiller, Maria Irakleidou, and Iva Lovrekovic. Published in Phys. Rev. Lett. **112**, 111102 (2014).
6. “The Electric Field at the Chargeless Interface Between Two Regions of Space,” with Asim Gangopadhyaya. Published in Am. J. Phys. **82**, 597 (2014).
7. “Black Holes in the $C(an)$ onical Ensemble,” with Daniel Grumiller and Simone Zonetti. Published in Phys. Rev. D **86**, 124043 (2012).
8. “Holographic Renormalization of Asymptotically Lifshitz Spacetimes,” with Robert Mann. Published in JHEP **1110**, 129 (2011).
9. “Boundary Terms Unbound! Holographic Renormalization of Asymptotically Linear Dilaton Gravity,” with Robert Mann. Published in Class. Quant. Grav. **27**, 065015 (2010).
10. “Holographic Description of AdS_2 Black Holes,” with Alejandra Castro, Daniel Grumiller, and Finn Larsen. Published in JHEP **0811**, 052 (2008).
11. “On Quark Masses in Holographic QCD,” with Robert C. Myers and Aninda Sinha. Published in JHEP **0811**, 056 (2008).
12. “On the Stress Tensor for Asymptotically Flat Gravity,” with Robert Mann, Donald Marolf, and Amitabh Virmani. Published in Class. Quant. Grav. **25**, 225019 (2008), .
13. “Dirichlet Boundary Value Problem for Chern-Simons Modified Gravity,” with Robert Mann and Daniel Grumiller. Published in Phys. Rev. D **78**, 081502 (R) (2008).
14. “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).
15. “The Thermodynamics of Black Holes in Two (and Higher) Dimensions,” with Daniel Grumiller. Published in JHEP **0704**, 074 (2007).
16. “Boundary Counterterms and the Thermodynamics of 2-D Black Holes,” with J. Davis. Published in JHEP **0509**, 072 (2005).

17. “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).
 18. “Holography, Diffeomorphisms, and Scaling Violations in the CMB,” with F. Larsen. Published in JHEP **0407**, 062 (2004).
 19. “Inflation and De Sitter Holography,” with F. Larsen. Published in JHEP **0307**, 051 (2003).
 20. “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).
 21. “String Theory, Holography, and UV-IR Mixing,” Ph.D. Dissertation, University of Texas, UMI Publication AAT 3115501 (2002).
 22. “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).
 23. “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).
 24. “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).
 25. “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
26. “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
27. “A New Boundary Counterterm for Asymptotically AdS Spacetimes.”
<http://arxiv.org/abs/hep-th/0512297>