

# Aditya Dhumuntarao

NSF GRFP FELLOW · GRADUATE STUDENT AT THE UNIVERSITY OF CAMBRIDGE

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## Education

### University of Cambridge, Churchill College

May 2017

Department of Applied Mathematics and Theoretical Physics

MASTERS OF ADVANCED STUDY, PART III OF THE MATHEMATICS TRIPOS

### Arizona State University, Barrett the Honors College

May 2016

Department of Physics & School of Mathematics and Statistical Sciences

(HONORS) BACHELORS OF SCIENCE IN PHYSICS, & BACHELORS OF SCIENCE IN MATHEMATICS

*Undergraduate Thesis: Quantum Matter Coupled to Classical Gravity*

## Research

### Origins Project Undergraduate Research Assistant

Gravitation

Advisors: Dr. Maulik Parikh, Dr. Paul Davies

Arizona State University

QUANTUM MATTER COUPLED TO CLASSICAL GRAVITY

Aug. 2015 — May 2016

Selected as one of five to conduct research studying the regime of validity of the semi-classical limit of quantum gravity primarily using techniques from quantum field theory and string theory. UNDERGRADUATE HONORS THESIS.

### Physics and Astronomy Research Experience for Undergraduates Program

Particle Phenomenology

Advisors: Dr. Joseph Kapusta

University of Minnesota

AdS/CFT CORRESPONDENCE ON A PURE SU(3) GAUGE THEORY

May 2015 — Present

Selected as one of thirteen to conduct theoretical research studying the gauge/gravity duality applied to a pure SU(3) gauge theory as a simplified extension of quantum chromodynamics. PUBLICATION IN PREPARATION.

### Jack H. Hawes Recipient, Research Assistant

Theoretical Cosmology

Advisor: Dr. Carl Gardner

Arizona State University

SELF INTERACTING DARK MATTER MODELS OF SATELLITE GALAXIES

May 2014 — May 2015

Investigated a proposed form of strongly self-interacting dark matter using cosmological codes, such as RAMSES and GADGET2, to study the formation of dwarf satellite galaxies.

### Computational Science for Undergraduates in Mathematics (REU)

Applied Mathematics

Advisors: Dr. Wenbo Tang

Arizona State University

BISTABLE DYNAMICS OF CHAOTIC TOPOLOGICAL FLOW STRUCTURES

May 2013 — Jan. 2015

Selected as one of thirteen to characterize the influence of topological fluid structures, such as eddies and hyperbolic flows, in determining the fate of a turbulent chemical mixing process during the summer of 2014. PUBLICATION IN AIP: FLUIDS.

## Publications

2015	TANG, W., & DHUMUNTARAO, A., <i>Bistability in Inhomogeneity — Effects of Flow Coherent Structures on the Fate of a Bistable Reaction</i> . <b>AIP — Physics of Fluids</b> , 27(7), (2015)	Published
2016	DHUMUNTARAO, A., BARTZ, S., & KAPUSTA, J., <i>Anti de-Sitter Space/Conformal Field Theory Correspondence on a Pure SU(3) Gauge Theory</i> .	In Prep.
	DHUMUNTARAO, A., <i>A Very Verbose Introduction to Path Integral Quantum Field Theory</i>	In Prep.

## Summer Programs

2016	<b>Summer School on Quantum and Kinetic Theory for Complex Systems</b> , University of California Santa Barbara, Department of Mathematics, Santa Barbara, CA, June 2016.
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## Experience

### TEDxASU, Outliers: Embracing Your Vision

Operations Director

Worked as the Lead Organizer. Managed all event-day logistics, oversaw the ticketing and registration needs, worked as the primary graphic designer, and coordinated with the Executive Director in directing speakers. TEMPE, AZ, APRIL 2016.

## Presentations

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- 2016 **Sundial Science Conference**, “Black Holes and the Information Paradox.” Tempe, AZ, April 2016.
- 2015 **Joint Mathematics Meeting**, “Bistability in Inhomogeneity – Effects of Flow Coherent Structures on the Fate of a Bistable Reaction.” San Antonio, TX, January 2015.
- Society of Physics Students: Regional Body Meeting**, “Bistability in Inhomogeneity – Effects of Flow Coherent Structures on the Fate of a Bistable Reaction.” Arizona State University, Feb 2015.
- APS 2015 March Meeting**, “Bistability in Inhomogeneity – Effects of Flow Coherent Structures on the Fate of a Bistable Reaction.” San Antonio, TX, March 2015.
- Summer Undergraduate Research Expo**, “Anti deSitter Space/Conformal Field Theory Correspondence on a Pure SU(3) Gauge Theory.” University of Minnesota, August 2015. Poster
- Society of Physics Students: Regional Body Meeting**, “Anti deSitter Space/Conformal Field Theory Correspondence on a Pure SU(3) Gauge Theory.” Northern Arizona University, October 2015.
- APS Division of Nuclear Physics**, “Anti deSitter Space/Conformal Field Theory Correspondence on a Pure SU(3) Gauge Theory.” Sante Fe, New Mexico, October 2015. Poster
- APS Four Corners Conference**, “Anti deSitter Space/Conformal Field Theory Correspondence on a Pure SU(3) Gauge Theory.” Arizona State University, October 2015.
- 2014 **Mentoring through Critical Transition Points Colloquium**, “Bistability in Inhomogeneity – Effects of Flow Coherent Structures on the Fate of a Bistable Reaction.” Arizona State University, June 2014.
- Mentoring through Critical Transition Points Colloquium**, “Self Interacting Dark Matter Models of Satellite Galaxies.” Arizona State University, June 2014.
- ASU Applied Mathematics Seminar**, “Bistability in Inhomogeneity – Effects of Flow Coherent Structures on the Fate of a Bistable Reaction.” Arizona State University, October 2014.
- APS New England Section Regional Meeting**, “Bistable Dynamics in Chaotic Flow Structures.” Wentworth Institute of Technology, November 2014.

## Academic Accolades

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- 2016 **National Science Foundation Graduate Research Fellowship Award**, \$ 100,000 National  
Recognized by the National Science Foundation as an outstanding graduating student in a field supported by the NSF-supported. Awarded funding for five years of graduate study.
- 2016 **Charles Wexler Mathematics Prize**, \$2000  
Awarded the highest honor from ASU’s Mathematics Department in recognition of outstanding achievements in mathematics throughout one’s undergraduate career.
- 2016 **Outstanding Undergraduate Award**,  
Awarded the highest physics honor from the Physics Department of Arizona State University in recognition of outstanding achievements in physics throughout one’s undergraduate career.
- 2015 **Origins Project Undergraduate Research Scholarship**, \$10000  
Awarded to five ASU undergraduates for conducting research related to the mission of the Origins Project. Studied the coupling of quantum matter to classical gravity.
- 2015 **National Science Foundation Grant [1460141]**, \$6200 National  
Awarded funding from the National Science Foundation to conduct theoretical physics research in Quantum Chromodynamics at the University of Minnesota.
- 2015 **SPS National Leadership Scholarship**, \$2000 National  
National recognition for outstanding academic performance and high level of SPS activity.
- 2015 **Arek Dieterle Memorial Award**, \$1500  
Awarded to an outstanding undergraduate member of the Society of Physics Students who displays leadership and dedication to outreach.
- 2015 **Jack H. Hawes Memorial Mathematics Scholarship**, \$2500  
Awarded to mathematics undergraduates for academic achievement and involvement in research.
- 2015 **Motil Travel Award**, \$200  
One of five Arizona State University Physics students to be awarded funding to attend and present at a national conference. *Attended the 2015 Department of Nuclear Physics Conference.*
- 2014 **National Science Foundation Grant [1148771]**, \$5000 National  
Awarded funding from the National Science Foundation to conduct mathematical fluids research at Arizona State University.

2011-2015 **President's Award**, \$36,000 **National**  
 Recipient of the ASU New American University Merit Scholarship for high academic achievement in high school.  
 Present **Dean's List**, Awarded for academic excellence every semester.

## Professional Employment

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### Teaching Assistant

**Arizona State University**

GENERAL PHYSICS: ELECTRICITY AND MAGNETISM

*Jan. 2016 – May 2016*

MATHEMATICAL METHODS IN PHYSICS II

*Jan. 2015 – May 2015*

Experience in working as a teaching assistant. Held office hours, wrote class notes, made presentations, employed professional teaching methods, and delivered lectures on various subject matter. *References: Dr. Cecilia Lunardini*

### Assistant Grader

**Arizona State University**

MATHEMATICAL METHODS IN PHYSICS I

*Aug. 2015 – Dec. 2015*

QUANTUM MECHANICS II

*Jan. 2016 – May 2016*

STATISTICAL AND THERMAL PHYSICS

*Aug. 2015 – Dec. 2015*

Experience in grading. Effectively handled grading over 140 assignments per week in Fall 2015 semester. *References: Dr. Tanmay Vachaspati*

## Leadership

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2015-2016 **President**, Sigma Pi Sigma ( $\Sigma\Pi\Sigma$ ) **ASU**  
 2014-2016 **Vice President (2014) & President (2015)**, Society of Physics Students **ASU**  
 2015-2016 **Operations Director**, TEDxASU and The Origins Project Club **TEDx**

## Technical

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### Computer Languages

BASH, MATLAB, FORTRAN, Java, HTML, CSS, Mathematica

### Cosmological Codes

RAMSES, MUSIC, GADGET2

### Computational Tools

Terminal, Emacs,  $\text{\LaTeX}$