

Curriculum Vitae
Richard Jude Anantua

Work Address:
60 Garden St. MS-51
Cambridge, MA 02138

E-mail: ranantua@cfa.harvard.edu
Web: www.richardanantua.com

EDUCATION

- 2011-2016 **Stanford University**, Ph.D. Physics, Sep. 2016,
Thesis: “Towards Multiwavelength Observations of Relativistic Jets from
General Relativistic Magnetohydrodynamic Simulations,”
Advisor: Roger Blandford, Ph.D., Sc.D., FRS
- 2013-2014 **Harvard University**, Ed.M. Education Policy and Management, May 2014,
Cross-registered for courses at the Harvard-Smithsonian Center for
Astrophysics and Harvard Business School
- 2011-2013 **Stanford University**, M.S. Physics, Jan. 2013
- 2006-2010 **Yale University**, B.S. (Physics and Philosophy) and (Economics and
Mathematics), May 2010, Distinction in the (Physics and Philosophy) major

ACADEMIC APPOINTMENTS

HARVARD UNIVERSITY, CAMBRIDGE, MA

Jan. 2019-Present **Postdoctoral Fellow, Harvard-Smithsonian Center for
Astrophysics/Black Hole Initiative**

- Conduct high-energy astrophysics research in Ramesh Narayan Group
- Conduct high-energy astrophysics research in Douglas Finkbeiner Group
- Conduct computational research at Institute for Theory and Computation
U.C. BERKELEY, BERKELEY, CA

Nov. 2016-Jan. 2019 **Postdoctoral Fellow, U.C. Berkeley Department of Astronomy**

- Conducted high-energy astrophysics research on near-horizon emission
modeling of accretion disks and outflows in Eliot Quataert Group
- Advised and collaborated with graduate and undergraduate students

EXPERIENCE

U.C. BERKELEY, BERKELEY, CA

Jul. 2018-Aug. 2018 **Instructor, U.C. Berkeley Department of Astronomy**

- Served as co-instructor for Astron 9 “Order of Magnitude Physics,”
devising original PowerPoint lectures, problem sets, projects and exams

Jul. 2017-Aug. 2017 **Instructor, U.C. Berkeley Department of Astronomy**

- Created Astron 9 “Relativity of Space and Time in Popular Science,”
devising original PowerPoint lectures, problem sets, projects and exams
- Served as Astron 9 Instructor of Record

STANFORD UNIVERSITY, STANFORD, CA

Sep. 2015-Dec. 2015 **Teaching Assistant, Stanford Department of Physics**

- Led discussion section, graded problem sets and worked on course design with Senior Staff Scientist Grzegorz Madejski in the graduate course Ph 216 Back of the Envelope Physics
- Apr. 2013-Jun. 2013 **Teaching Assistant, Stanford Department of Physics**
- Led discussion section, graded problem sets and guest lectured for Prof. Stefan Funk in the undergraduate course Ph 17 Black Holes
- Sep. 2012-Dec. 2012 **Teaching Assistant, Stanford Department of Physics**
- Led discussion section, graded problem sets and tutored students for Prof. Giorgio Gratta in the undergraduate course Ph 45 Light and Heat
- Jun. 2012-Aug. 2012 **GRE Coach, Stanford Humanities and Sciences Early Identification Program**
- Served as a math GRE coach for students of diverse backgrounds
 - Created all instructional material and homework
- SELF-EMPLOYED, NEW YORK CITY, NY
- Aug. 2010-May. 2011 **Private Tutor**
- Advertised and performed tutoring services in chemistry, physics and math for middle and high school students in NYC
- YALE UNIVERSITY, NEW HAVEN, CT
- Sep. 2008-Apr. 2011 **Undergraduate Quantitative Reasoning Tutor**
- Tutored for Yale undergraduates in astronomy, economics, mathematics and physics courses
- May 2009-Aug. 2009 **Research Associate, Jack Harris Lab**
- Modeled using Python code an optomechanical cavity that strongly couples the oscillation of an SiN membrane to cavity electric field modes via radiation pressure in order to lay groundwork for quantum non-demolition measurement of membrane ground state phonon number
- Jun. 2008-Aug. 2008 **Researcher, Science, Technology and Research Scholars**
- Participated in a selective research and presentation program in which I created novel models of the graviton energy per frequency spectrum of Hawking radiating post-inflationary primordial black holes, a newly theorized source of stochastic gravitational wave background (confer Anantua et al., 2009)

FELLOWSHIPS, AWARDS & HONORS

- Galaxies 2018 Volume 6 Issue 1 cover story (cf. Anantua et al., 2018)
<http://www.mdpi.com/2075-4434/6/1>
- Diversifying Academia, Recruiting Excellence (DARE) (2014) Fellowship awarded to ~20% of Stanford doctoral applicants for this fellowship
- Achievement Rewards for College Scientists (ARCS) (2013) (I declined this award to attend Harvard)
- Harvard University Leadership in Education Award (2013), awarded to top 10-15% of Harvard Graduate School of Education applicants
- Stanford University Humanities and Sciences Fellowship (2010)
- Yale College Dean's Research Fellowship (2009)

- AP Scholar with Distinction at Stuyvesant High School (2006) (the most selective NYC Specialized High School Admission Test school (~3% admission rate for Class of '06))
- Prep for Prep Les Pierre Medal (2001), awarded to 1 top male and 1 top female in >100-member cohort at the end of 14-month preparatory component

REFEREED PUBLICATIONS

10. "On the Comparison of AGN with GRMHD Simulations, II. M87," MNRAS (2019) (in prep)
9. **R. J. Anantua**, S. M. Ressler and E. Quataert, "On the Comparison of AGN with GRMHD Simulations, I. Sgr A*," (2019) (submitted to MNRAS)
8. **R. J. Anantua**, R. M. Emami and A. Loeb, "Determining the Composition of Relativistic Jets from Polarization Maps," (2019) (submitted to ApJ) [ArXiv 1909.09230]
7. T. K. Fowler, H. Li and **R. J. Anantua**, "A Quasi-Static Hyper-Resistive Model of Ultra High Energy Cosmic Ray Acceleration by Magnetically Collimated Jets Created by Active Galactic Nuclei," ApJ **885**, 4 (2019)
6. **R. J. Anantua**, R. D. Blandford and A. Tchekhovskoy, "Multiwavelength Observations of Relativistic Jets from General Relativistic Magnetohydrodynamic Simulations," Galaxies **6**, 31 (2018)
5. R. D. Blandford and **R. J. Anantua**, "The Future of Black Hole Astrophysics in the LIGO-VIRGO-LPF Era," J. Phys.: Conf. Ser. **840**, 012023 (2017)
4. M. Ackermann **et al.** (*Fermi*-LAT Collaboration), "Minute-Timescale >100 MeV Gamma-ray Variability During the Giant Outburst of Quasar 3C 279 Observed by *Fermi* -LAT in 2015 June," ApJ **824**, L20 (2016)
3. **R. J. Anantua**, Sean A. Hartnoll, Victoria L. Martin and David M. Ramirez, "The Pauli exclusion principle at strong coupling: Holographic matter and momentum space," JHEP **3**, 104 (2013)
2. **R. J. Anantua** and O. K. Baker, "TeV gamma rays from distant BL Lacs and photon-paraphoton kinetic mixing," Phys. Lett. B **690**, 25-28 (2010)
1. **R. J. Anantua**, R. Easther and J. T. Giblin Jr., "Grand Unification Scale Primordial Black Holes: Consequences and Constraints," Phys. Rev. Lett. **103**, 111303 (2009)

PUBLICATIONS IN PRESS

- R. J. Anantua, "Seeing and Believing: 'Observing' Simulations of Relativistic Jets," (Mar. 2017), Retrieved Dec. 12, 2017 from: <https://kipac.stanford.edu/highlights/seeing-believing-observing-simulations-relativistic-jets>
- R. J. Anantua, "Why Are We Here in the Universe?" (Feb. 2017), Retrieved May 7, 2017 from: <http://magazine.ivy.com/2017/02/why-are-we-here-in-the-universe/>

INVITED TALKS

- Brown Astrophysics Seminar Series, Providence, RI talk on “‘Observing’ JAB Simulations – Towards Understanding Jet/Accretion Flow/Black Hole Systems in Sgr A* and M87” (Nov. 2019)
- “Understanding the Multiwavelength Blazar Variability – Workshop at Stanford” talk on cosmic ray acceleration in jets (Aug. 2019)
- Harvard Quasar Tea, Cambridge, MA talk on “‘Observing’ JAB Simulations – Probing Near Horizon Scales in AGN” (Feb. 2019)
- Diversifying Academia Recruiting Excellence (DARE) 10th Reunion, Stanford, CA talk on “‘Observing’ JAB Simulations” (Nov. 2018)
- Harvard Black Hole Initiative, Cambridge, MA talk on “‘Observing’ JAB Simulations” (Jun. 2018)
- City College of San Francisco talk on “Sgr A* Emission Parametrizations from GRMHD Simulations” (Feb. 2018)

SELECTED CONFERENCES

- Tracing Cosmic Evolution with Clusters of Galaxies, Sexten, Italy poster on “Observing JAB Simulations— Probing Near Horizon Scales in Simulations” (Jul. 2019)
- 22nd International Conference on General Relativity and Gravitation, Valencia, Spain talk on “Observing JAB Simulations— Probing Near Horizon Scales in Simulations” (Jul. 2019)
- American Astronomical Society 234th Meeting, St. Louis, MO talk on “Cosmic Ray Acceleration in Jets by Accretion Disk Dynamo” (Jun. 2019)
- American Astronomical Society 233rd Meeting, Seattle, WA talk on “Observing JAB Simulations— Probing Near Horizon Scales in Simulations” (Jan. 2019)
- American Astronomical Society 232nd Meeting, Denver, CO talk on “Observing JAB Simulations” (Jun. 2018)
- California Alliance Conference at U.C. Berkeley, poster presentation on “Observing Jet/Accretion Disk/Black Hole Simulations” (Mar. 2018)
- Polarized Emission from Astrophysical Jets, Ierapetra, Greece talk on “Observing Jet Simulations” (Jun. 2017)
- California Alliance Conference at UCLA, Los Angeles, CA poster presentation on “Observing Jet Simulations” (Feb. 2017)
- NSF Theoretical and Computational Astrophysical Network at U.C. Berkeley talk on “Observing Jet Simulations” (Jan. 2017)
- ASIAA M87 Workshop: Towards the 100th Anniversary of the Discovery of Cosmic Jets, Taipei, Taiwan oral presentation on “Observing Jet Simulations” (May 2016)
- California Alliance Conference at U.C. Berkeley poster presentation on “Observing Jet Simulations” (Apr. 2016)
- American Astronomical Society 226th Meeting, Kissimmee, FL poster presentation on “Observing Jet Simulations” (Jan. 2016)

- California Alliance Conference at Caltech, Pasadena, CA poster presentation on “‘Observing’ Jet Simulations” (Apr. 2015)
- National Society of Black Physicists Conference, Baltimore, MD (Feb. 2015)
- Fermi Bubbles Theory and Observations Conference, Menlo Park, CA (SLAC) poster presentation on Parametric Modeling of Fermi Bubbles (Apr. 2013)
- American Physical Society Conference, Anaheim, CA oral presentation on (Anantua & Baker, 2010) (Apr. 2011)

MENTORSHIP

- U.C. Berkeley undergraduate Jeremy Wayland (2017-18), Summer Undergraduate Research Fellowship (SURF) 2018

OUTREACH

- Founded STEM Club, an organization uniting postdocs of color (PoC’s) at Harvard through a monthly series of skill-building workshops and networking dinners starting March 2019
- Served on the American Astronomical Society Diversity and Inclusion Task Force – Data Collection and Metrics for Success Working Group, contributing to the 2018 Final Report:
https://aas.org/files/aas_diversity_and_inclusion_task_force_final_report.pdf

SKILLS

- *C++*, *Mathematica*, *Matlab*, *Python*, *R*, *STATA*, *UNIX*
- National Strength and Conditioning Association: Certified Personal Trainer (2011)
- Five years of formal instruction in Latin; conversational in French and Haitian Creole

ACTIVITIES

- Jun. 2000-Present **Prep for Prep**, NEW YORK, NY
A highly selective leadership development program that incorporates a rigorous 14-month academic component to prepare students for placement in leading independent schools and continues to work closely with the students through high school graduation and beyond
- Sep. 2008-Dec. 2011 **Powerlifting**
Trained for powerlifting competitions, best squat/bench/deadlift (lbs.) 358/309/573 (in competition, 220lbs. class, raw, no wraps), 365/350/600 (in training at ~210lbs., raw, no wraps, lifetime drug-free)
- Oct. 2007-May 2010 **Klib Kreyòl (Haitian Students Alliance)**
Served as vice president, publicizing club history, visiting Haiti for outreach, and coordinating alumni-student events
- Sep. 2006-Sep. 2009 **Yale Rugby**
Played flanker, center