






# Raghav Govind **JHA**

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 Date of Birth : January 23, 1989    Citizenship : Indian

## Employment

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2019 - | Postdoctoral Fellow, Perimeter Institute for Theoretical Physics

## Education

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2013 – 2019	<b>Ph.D. Physics</b> , <i>Syracuse University</i> , Syracuse, New York, USA Thesis title : <b>Holography, large <math>N</math>, and supersymmetry on the lattice</b> GPA : 3.86/4.0
2011 – 2013	<b>M.Sc. Physics</b> , <i>St. Xavier's College &amp; Bose Institute</i> , Kolkata, India
2010 – 2011	<b>MS in Nanomaterials</b> , <i>UPMC, University of Paris 6</i> , Paris, France
2007 – 2010	<b>B.Sc. Physics (Honours)</b> , <i>St. Stephen's College</i> Delhi, India

## Publications and preprints

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1. Tensor renormalization group study of the 3d  $O(2)$  model [[2105.08066](#)]
2. Three-dimensional super-Yang–Mills theory on the lattice and dual black branes [Phys. Rev. D **102**, 106009 (2020)] [[2010.00026](#)]
3. Positive geometries for all scalar theories from twisted intersection theory [Phys. Rev. Research **2**, 033119 (2020)] [[2006.15359](#)]
4. Critical analysis of two-dimensional classical XY model [J. Stat. Mech. (2020) 083203] [[2004.06314](#)]
5. Thermal phase structure of a supersymmetric matrix model [PoS LATTICE2019 (2020) 069] [[2003.01298](#)]
6. Finite  $N$  unitary matrix models [[2003.00341](#)]
7. Tensor renormalization group study of the non-Abelian Higgs model in two dimensions [Phys. Rev. D **99**, 114507 (2019)] [[1901.11443](#)]
8. Lattice quantum gravity with scalar fields [PoS LATTICE2018 (2019) 043] [[1810.09946](#)]
9. The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality [PoS LATTICE2018 (2019) 308] [[1809.00797](#)]
10. Removal of the trace mode in lattice  $\mathcal{N} = 4$  super Yang-Mills theory [Phys. Rev. D **98**, 095017 (2018)] [[1808.04735](#)]
11. Nonperturbative study of dynamical SUSY breaking in  $\mathcal{N} = (2, 2)$  Yang-Mills [Phys. Rev. D **97**, 054504 (2018)] [[1801.00012](#)]
12. Truncation of lattice  $\mathcal{N} = 4$  super Yang-Mills [EPJ Web of Conferences 175, 11008 (2018)]

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13. Testing the holographic principle using lattice simulations [EPJ Web of Conferences 175, 08004 (2018)] [[1710.06398](#)]
  14. Testing holography using lattice super-Yang-Mills on a 2-torus [Phys. Rev. D **97**, 086020 (2018)] [[1709.07025](#)]

## Talks & Posters

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### Invited Talks/Seminars/Lectures **[11]**

- › Old and new methods for new and old problems in Physics (March 8, 2021) [Online] at Indian Institute of Technology (IIT) Madras [[Slides\(PDF\)](#)]
- › Probing holographic dualities with lattice supersymmetric Yang-Mills theories (February 25, 2021) [Online] at Massachusetts Institute of Technology [[Slides\(PDF\)](#)] [[Video \(YouTube\)](#)]
- › New tool for old problems - Tensor network approach to spin models and gauge theories (October 14, 2020) [Online] [1 hour] at University of Liverpool, UK [[Slides\(PDF\)](#)]
- › Tensor Networks : Algorithm & Applications (June 10-11, 2020) - Two lectures lasting 1.5 hours each for CyberTraining Summer School 2020 at Rensselaer Polytechnic Institute, USA [Online due to COVID-19 pandemic] [[Lecture 1 & 2](#)]
- › Numerical Approaches to Holography (August 28, 2019) [1 hour] at Ashoka University, Haryana, Sonapat, India [[Slides\(PDF\)](#)]
- › Numerical Approaches to Holography (August 8, 2019) [1 hour] at Indian Institute of Science Education and Research (IISER) Mohali, India
- › Holographic dualities and tensor renormalization group study of gauge theories (March 11, 2019) [1 hour] at Perimeter Institute, Waterloo, Canada [[Video \(PIRSA\)](#)]
- › Supersymmetry breaking and gauge/gravity duality on the lattice (April 6, 2018) [25+5 minutes] at UC Boulder, Colorado, USA [[Slides\(PDF\)](#)]
- › Recent results from lattice supersymmetry in  $2 \leq d < 4$  dimensions (January 31, 2018) [25+5 minutes] at ICTS, Bangalore, India [[Video \(YouTube\)](#)]
- › Testing holography through lattice simulations (April 4, 2017) [40+5 minutes] at Yukawa Institute for Theoretical Physics, Kyoto, Japan [[PDF](#)]
- › Supersymmetry on the lattice (April 17, 2016) [30+5 minutes] at April Meeting 2016 - Salt Lake City, Utah, USA [[Slides\(PDF\)](#)]

### Contributed Talks **[2]**

- › Testing holographic principle through lattice studies (June 22, 2017) [15+5 minutes] at Lattice 2017, Granada, Spain
- › Lattice quantum gravity with scalar fields (July 23, 2018) [15+5 minutes] at Lattice 2018, East Lansing, Michigan, USA

### Posters **[1]**

- › The properties of D1-branes from lattice super Yang-Mills theory using gauge/gravity duality at the 36<sup>th</sup> Annual International Symposium on Lattice Field Theory 24 July 2018

## Teaching Experience (as a TA)

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- › Recitation Instructor for PHY 216 (General Physics II for Honors and Majors) and grader for PHY 662 (Quantum Mechanics II) Spring 2019

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- › Recitation Instructor for PHY 215 (General Physics I for Honors and Majors) and grader for PHY 312 (Relativity & Cosmology) 2018
  - › Grader for PHY 424 (Electromagnetism) and PHY 360 (Waves and Oscillations) Fall 2016
  - › Recitation Instructor for PHY 212 General Physics II Spring 2016
  - › Grader for PHY 641 (Statistical Mechanics) and PHY 731 (Electromagnetic theory) 2015
  - › Recitation Instructor for PHY 211 General Physics I 2014
  - › Lab Instructor for General PHY 101 Fall 2013

## Academic Achievements

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- › Henry Levinstein Fellowship for Outstanding Senior Graduate Student - Department of Physics, Syracuse University [\$ 2000] 2017
- › College of Arts and Sciences Fellowship for best performance in introductory Graduate Courses - Syracuse University [\$ 1700] 2014
- › CSIR/UGC-NET - Junior Research Fellowship (JRF) by Government of India March 2013
- › Erasmus Mundus Scholarship for pursuing M.S at UPMC, University of Paris VI [ about \$15000] 2010
- › National Top 25 Students (out of 5153 students) in National Graduate Physics Examination (NGPE) 2009
- › KVPY (Kishore Vaigyanik Protsahan Yojana) Scholarship by Department of Science & Technology, Government of India [about \$ 3500] 2008
- › Merit certificate by University of Delhi (11<sup>th</sup> in the university out of  $\approx$  1200 students) 2008
- › NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute (TIFR), Mumbai 2008

## Computer Skills

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C/C++, Python, Julia, Matlab, Mathematica,  $\text{\LaTeX}$ , Gnuplot, and Bash

## Professional Services and Grants

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- › Quantum Fields and Strings Seminar Organizer at Perimeter Institute [January 2020 - March 2021].
- › Referee for Physical Review D and Physical Review Letters
- › Co-wrote USQCD computing grants in 2017 and 2018 and was awarded about 12M core-hours on Fermilab pi0 machine each year.

## Upcoming preprints (work in progress)

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- › Phase structure of BMN matrix model at finite couplings [with A. Joseph and D. Schaich]
- › Scalar bound states in  $\mathcal{N} = (2, 2)$  SYM at large  $N$  and finite temperatures [with A. Joseph, D. Schaich, N. Dhindsa]
- › Parallel software for large  $N$  supersymmetric gauge theories [with D. Schaich et al.]

## References

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Available on request.

Last updated: 15 March 2021