# Raghav Govind Jha

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ℹ 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 | **Ph.D. Physics,** *Syracuse University,* Syracuse, New York, USA<br>Thesis : Holography, large $N$, and *supersymmetry* on the lattice |
| 2011 – 2013 | **M.Sc. Physics,** *St. Xavier's College & Bose Institute,* Kolkata, India |
| 2010 – 2011 | **MS in Nanomaterials,** *UPMC, University of Paris 6,* Paris, France |
| 2007 – 2010 | **B.Sc. Physics (Honours),** *St. Stephen's College* Delhi, India |

## 📖 Publications and preprints

Citations : **100+**, $h$-index : 7

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)]

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

## 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, Sonepat, 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 $2 \leqslant d < 4$ 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 36th Annual International Symposium on Lattice Field Theory                    24 July 2018

# 🈯 Teaching Experience (as a TA)

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

- ❯ 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

- ❯ Henry Levinstein Fellowship for Outstanding Senior Graduate Student - Department of Physics, Syracuse University [USD 2000]                                                                  2017
- ❯ College of Arts and Sciences Fellowship for best performance in introductory Graduate Courses - Syracuse University [USD 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 [EUR 12000]      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 USD 3500 in two years]                                                2008
- ❯ Merit certificate by University of Delhi (11$^{th}$ in the university out of $\approx$ 1200 students)     2008
- ❯ NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute (TIFR), Mumbai 2008

## 💻 Computer Skills

C/C++, Python, Julia, Matlab, Mathematica, LaTeX, Gnuplot, and Bash

## 🈯 Professional Services and Grants

- ❯ 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 both years.

## 📖 Upcoming preprints (work in progress)

- ❯ 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

Available on request.

Last updated: 27 May 2021