Raghav Govind JHA

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ⓘ Date of Birth: January 23, 1989   Citizenship: Indian

💼 Employment

September 2019 - August 2022	Postdoctoral Fellow, Perimeter Institute for Theoretical Physics, Canada

🎓 Education

2013 – 2019	**Ph.D. Physics,** *Syracuse University,* Syracuse, New York, USA
	Thesis: Holography, large N, and *supersymmetry* on the lattice
2011 – 2013	**M.Sc. Physics,** *St. Xavier's College & Bose Institute,* Kolkata, India
2010 – 2011	**M.S. in Nanomaterials,** *Université Pierre et Marie Curie (UPMC Paris VI)* Paris, France
2007 – 2010	**B.Sc. Physics (Honours),** *St. Stephen's College,* Delhi, India

📖 Publications and preprints (Authors are mostly listed in alphabetical order)

Citations (as per iNSPIRE database): 157, h-index: 7

1. Non-perturbative phase structure of the bosonic BMN matrix model
   arXiv:2201.08791 (to be published in JHEP)
   N. S. Dhindsa, R. G. Jha, A. Samlodia, A. Joseph, and D. Schaich

2. Thermal phase structure of dimensionally reduced super-Yang–Mills
   arXiv:2201.03097
   D. Schaich, R. G. Jha, A. Joseph

3. Tensor renormalization of three-dimensional Potts model
   arXiv:2201.01789
   R. G. Jha

4. Introduction to Monte Carlo for Matrix Models
   arXiv:2111.02410, SciPost Phys. Lect. Notes 46 (2022)
   R. G. Jha

5. Large-N limit of two-dimensional Yang–Mills theory with four supercharges
   arXiv:2109.01001
   N. S. Dhindsa, R. G. Jha, A. Joseph, and D. Schaich

6. Tensor renormalization group study of the $3d$ $O(2)$ model
   arXiv:2105.08066, Phys. Rev. D 104, 094517 (2021)
   J. Bloch, R. G. Jha, R. Lohmayer, M. Meister

7. Three-dimensional super-Yang–Mills theory on the lattice and dual black branes
   arXiv:2010.00026, Phys. Rev. D 102, 106009 (2020)
   S. Catterall, J. Giedt, R. G. Jha, D. Schaich, T. Wiseman

8. Positive geometries for all scalar theories from twisted intersection theory
   arXiv:2006.15359, Phys. Rev. Research 2, 033119 (2020)
   R. G. Jha, N. Kalyanapuram

9. Critical analysis of two-dimensional classical XY model
   arXiv:2004.06314, J. Stat. Mech. (2020) 083203
   R. G. Jha

10. Thermal phase structure of a supersymmetric matrix model
    arXiv:2003.01298, PoS LATTICE2019 (2020) 069
    D. Schaich, R. G. Jha, A. Joseph

11. Finite N unitary matrix models
    arXiv:2003.00341
    R. G. Jha

12. Tensor renormalization group study of the non-Abelian Higgs model in two dimensions
    arXiv:1901.11443, Phys. Rev. D 99, 114507 (2019)
    A. Bazavov, S. Catterall, R. G. Jha, J. U-Yockey

13. Lattice quantum gravity with scalar fields
    arXiv:1810.09946, PoS LATTICE2018 (2019) 043
    R. G. Jha, J. Laiho, J. U-Yockey

14. The properties of $D1$-branes from lattice super Yang–Mills theory using gauge/gravity duality
    arXiv:1809.00797, PoS LATTICE2018 (2019) 308
    R. G. Jha

15. Removal of the trace mode in lattice $\mathbb{N} = 4$ super Yang-Mills theory
    arXiv:1808.04735, Phys. Rev. D 98, 095017 (2018)
    S. Catterall, J Giedt, R. G. Jha

16. Nonperturbative study of dynamical SUSY breaking in $\mathbb{N} = (2, 2)$ Yang-Mills
    arXiv:1801.00012, Phys. Rev. D 97, 054504 (2018)
    S. Catterall, R. G. Jha, A. Joseph

17. Truncation of lattice $\mathbb{N} = 4$ super Yang-Mills
    EPJ Web of Conferences 175, 11008 (2018)
    S. Catterall, J Giedt, R. G. Jha

18. Testing the holographic principle using lattice simulations
    arXiv:1710.06398, EPJ Web of Conferences 175, 08004 (2018)
    R. G. Jha, S. Catterall, D. Schaich, T. Wiseman

19. Testing holography using lattice super-Yang-Mills on a 2-torus
    arXiv:1709.07025, Phys. Rev. D 97, 086020 (2018)
    S. Catterall, R. G. Jha, D. Schaich, T. Wiseman

⊞ Talks and Posters

Invited Talks/Seminars/School Lectures [18]

> Holography with large matrices on the lattice (March 24, 2022) at Institute of Nuclear Sciences, Universidad Nacional Autónoma de México, Mexico City, Mexico [Slides(PDF)]

> Large N matrix models using Monte Carlo and Bootstrap (February 22, 2022) at University of Surrey, Surrey, UK [Online] [Slides(PDF)]

> Introduction to tensor networks and spin systems (January 11, 2022) at Azim Premji University, Bengaluru, India

> Tensor networks and spin models (December 7, 2021) at Indian Institute of Science Education and Research (IISER), Mohali, India [Slides(PDF)]

> Real-space tensor renormalization for spin models in three dimensions (November 19, 2021) at Perimeter Institute, Waterloo, Canada

> Solving matrix models at large and finite N (June 28 and 29, 2021) - Two lectures for Summer School 2021 at Rensselaer Polytechnic Institute, USA [Online] [Lecture 1 & 2]

> Holographic gauge theories on the lattice at (June 23, 2021) [Online] at Dublin Institute for Advanced Studies, Dublin, Ireland [Slides(PDF)] [Video (YouTube)]

> Old and new methods for new and old problems in Physics (March 8, 2021) [Online] at Indian Institute of Technology (IIT) Madras, India [Slides(PDF)]

> Probing holographic dualities with lattice supersymmetric Yang-Mills theories (February 25, 2021) [Online] at Massachusetts Institute of Technology, Boston, USA [Slides(PDF)] [Video (YouTube)]

> New tool for old problems - Tensor network approach to spin models and gauge theories (October 14, 2020) [Online] at University of Liverpool, Liverpool, UK [Slides(PDF)]

> Tensor Networks: Algorithm & Applications (June 10 and 11, 2020) - Two lectures 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) at Ashoka University, Sonepat, India [Slides(PDF)]

> Numerical Approaches to Holography (August 8, 2019) at Indian Institute of Science Education and Research (IISER) Mohali, India

> Holographic dualities and tensor renormalization group study of gauge theories (March 11, 2019) at Perimeter Institute, Waterloo, Canada [Video (PIRSA)]

> Supersymmetry breaking and gauge/gravity duality on the lattice (April 6, 2018) at UC Boulder, Colorado, USA [Slides(PDF)]

> Recent results from lattice supersymmetry in $2 \leqslant d < 4$ dimensions (January 31, 2018) at ICTS, Bangalore, India [Video (YouTube)]

> Testing holography through lattice simulations (April 4, 2017) at Yukawa Institute for Theoretical Physics, Kyoto, Japan [Slides(PDF)]

> Supersymmetry on the lattice (April 17, 2016) at April Meeting 2016 - Salt Lake City, Utah, USA [Slides(PDF)]

Contributed Talks and Posters [3]

> Testing holographic principle through lattice studies (June 22, 2017) at Lattice 2017, Granada, Spain

> Lattice quantum gravity with scalar fields (July 23, 2018) at Lattice 2018, East Lansing, Michigan, USA

> The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality (24 July 2018) at Lattice 2018, 36th Annual International Symposium on Lattice Field Theory [Poster]

📘 Teaching Experience

> 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 PHY 101 General Physics   Fall 2013

🔨 Academic Awards

> 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   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) conducted by Indian Association of Physics Teachers (IAPT)   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 (11th in the university out of $\approx$ 1200 students)   2008
> NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute of Fundamental Research (TIFR), Mumbai   2008

💻 Computer Skills

> <u>Classical</u>: C/C++, Python, Julia, Matlab, Mathematica, LaTeX, and Bash
> <u>Quantum</u>: QisKit (IBM), Cirq (Google)

📘 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 (since 2020), and Machine Learning: Science and Technology (an IOP Journal) (since 2021)
> Awarded USQCD computing grants of $\approx$ 12M core-hours on Fermilab pi0 machine each year in 2017 & 2018.

👥 Mentorship Experience

> Nikhil Kalyanapuram (PSI student at Perimeter Institute, now PhD candidate at Penn State)   2019-2020
> Navdeep Dhindsa (PhD student at IISER Mohali)   2020-
> Vamika Longia (PhD student at IISER Mohali)   2021-

👥 References

1. Simon Catterall - Professor of Physics, Syracuse University, NY, USA
   ✉ smcatter@syr.edu   📱 +13154435978

2. Toby Wiseman - Professor of Theoretical Physics, Imperial College, London, UK
   ✉ t.wiseman@imperial.ac.uk   📱 +442075947832

3. Pedro Vieira - Faculty at Perimeter Institute, Waterloo, Canada and ICTP-SAIFR, São Paulo, Brazil
   ✉ pedrogvieira@gmail.com   📱 +15195697600 (8611)

4. Joel Giedt - Associate Professor, Rensselaer Polytechnic Institute, Troy, NY, USA
   ✉ giedtj@rpi.edu   📱 +15182766455

5. David Schaich - Lecturer in Theoretical Particle Physics, University of Liverpool, Liverpool, UK
   ✉ david.schaich@liverpool.ac.uk   📱 +447568168895

6. A. P. Balachandran - Emeritus Professor of Physics, Syracuse University, NY, USA
   ✉ balachandran38@gmail.com

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