Aaditya Salgarkar

Residence: Porto, Portugal
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Objective

Use the quantitative skills acquired during my PhD as well as knowledge of the fundamentals of algorithms and machine learning to solve real world problems in the industry

Education and experience

PhD in theoretical Physics *University of Porto, Portugal*
Fellow of Simon's collaboration on nonperturbative Bootstrap, Grade: 18/20 *2017 - present*
Thesis on conformal Regge theory, concerning high energy scattering in conformal field theories and its relation to string theory
Supervised by Prof. Miguel Costa, the head of the department of Physics

Visiting researcher *International Center for Theoretical Science*
Research assistant *2016 - 2017*
Worked as a research assistant with Prof. Rajesh Gopakumar, the director of the institute
Studied a novel approach to conformal bootstrap, called Polyakov bootstrap

Master's degree in Physics *Indian Institute of Technology, Kharagpur*
Integrated Master's degree program, Grade : 8.22/10 *2011 - 2016*
National rank 4948 in Joint Entrance Examination 2011
Thesis on Conformal Bootstrap, awarded 10/10 for two semesters
Relevant courses: Mathematical methods, Probability and statistics, Numerical methods, Statistical mechanics I and II, Real analysis, Complex analysis

Research projects

- **Conformal multi-Regge theory** : M. Costa, V. Goncalves, AS, J. V. Boas, arXiv, 53 pages
  Proposed a novel 'Multi-Regge limit' for correlation functions in conformal field theories
  keywords: noncompact group representation theory, conformal correlation functions, partial differential equations
- **Towards bootstrapping RG flows: sine-Gordon in AdS** : A. Antunes, M. Costa, J. Penedones, AS, B. van Rees, arXiv, Published in: JHEP 12 (2021), 094, 62 pages
  Proposed a novel technique to study renormalization group flow by considering quantum field theories in AdS space
  keywords: conformal correlation functions, semidefinite programming, convex optimization
- **The perturbative CFT optical theorem and high-energy string scattering in AdS at one loop** : A. Antunes, M. Costa, T. Hansen, AS, S. Sarkar, arXiv, Published in: JHEP 04 (2021), 088, 71 pages
  Proposed a perturbative generalization of Optical theorem to conformal field theories
  keywords: string theory, representation theory, differential equations

Technical skills

Tools C++, Python, Mathematica, LaTeX, Vim

Programming achievements

Competitive programming	Codeforces maximum rating 1535 Profile, World rank 334 (97%ile) in Round 873, Complete profile, AtCoder maximum rating 1114 Profile
Heuristic programming	Implemented a Simulated Annealing algorithm based on threshold acceptance in AtCoder Heuristic Contest 019, Code for world rank 253 among 2793 (91%ile)

Talks and conferences

Invited talk	Tata institute of fundamental research, Mumbai, India, 2022
School	LACES 2019, Galileo Galilei Institute for Theoretical Physics, Florence, Italy
Annual conferences	Month long conferences on conformal bootstrap, with talks from leading researchers in the field : Bootstrap 2022 (Porto,Portugal), 2020, 2021 (online), 2019 (Perimeter institute, Canada), 2018 (Caltech, USA)
Other conferences	Simons foundation meeting, New York, USA, 2021 Iberian Strings, a meeting of researchers in string theory in the Iberian region, 2022 (Gijón), 2019 (Santiago de Compostela, Spain), Analytical and S matrix bootstrap : Azores, Portugal, 2018
Summer research	Undegraduate researcher at MPI for Gravitational Physics, Berlin in summer 2015

Positions of responsibilty

Kshitij	Asia's largest techno-management fest, the flagship even of IIT Kharagpur Core team member, 2012-13, Head '13-'14, Steering committee member '14-'15, Created and organized events such as Business plan presentation, Managed the publicity of the event, created new events based on Game theory, launched a campaign to name an Android version after Lassi leading to national media coverage, Led the team of core team heads in the overall organization of the fest.

Other achievements

Olympiads	Qualified for the Indian National Mathematics Olympiad in 2011 via Regionals, Captained a team of four in the institute level Maths Olympiads in IIT Kharagpur
Chess	Member of University of Porto Chess team, Lichess: Profile

Languages

English, Hindi, Marathi (All fluent), Portuguese (Level: $\gtrsim$ A2)