Karan Govil

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EDUCATION

PENNSYLVANIA STATE UNIVERSITY University Park, PA
Ph.D., Physics (GPA: 3.8/4.0), May 2015 (expected)

INDIAN INSTITUTE OF TECHNOLOGY Chennai, India
Master & Bachelor of Technology, Aerospace Engineering (GPA: 8.2/10.0), May 2009

APPLIED EXPERIENCE/INDEPENDENT PROJECTS

PENNSYLVANIA STATE UNIVERSITY Nov 2014 - Present

Recommender systems for Yelp, Amazon, IMDb datasets

- Implemented collaborative filtering and nearest neighbor techniques to create recommender systems for restaurants, movies, and various products using the Elastic MapReduce framework on Amazon Web Services clusters.
- Evaluated natural language processing (NLP) algorithms with various bag of words models (K-means clustering, probabilistic models including LDA, Gibbs sampling) and Google's Word2Vec, in conjunction with classifier algorithms like naive Bayes, random forest, SVM, and logistic regression to the above datasets.

Web scraping for 2012 US presidential election data

- Analyzed various sets of US Presidential election data from HuffPost pollster API and governor races data from Real Clear Politics to extract information about pollster bias, and used statistical methods like bootstrap analysis to predict election results from polling data.

Backtesting of algorithmic trading strategies

- Formulated an algorithmic trading simulator in Python to do backtesting on dual moving average cross-over strategies, and mean reversion strategies for correlated and co-integrated stocks.

TECHNICAL SKILLS

Computer Languages:	C++, Python (SciPy, NumPy, Pandas, Scikit, Gensim Matplotlib), HTML/CSS
Tools:	SQL, AWS, MongoDB, Git, SVN, Vim, Linux, LaTeX
Scientific Computing:	Mathematica, MATLAB, R

POSITIONS OF RESPONSIBILITY AND AWARDS

- Teaching assistant in the Physics department at Pennsylvania State University, for over 5 years; guided over 200 students every week through discussions for undergraduate physics courses and helped improve course curriculum.
- Graduate teaching award 2014; David. C. Duncan Graduate Fellowship 2010-2014, and Clifford Roberts graduate Fellowship 2009 for excellence in research, NSF scholarship 2014.

RESEARCH EXPERIENCE

PENNSYLVANIA STATE UNIVERSITY August 2010 - Present
Graduate Research Assistant, Theoretical physics **(PI: Prof. Murat Günaydin)**

- Innovated a novel solution to non-linear equations of motion for higher spin theories in curved spaces in four and six dimensions; proposed new holographic dualities between conformal field theories and higher spin theories.
- Discovered the existence of infinite families of higher spin algebras and their supersymmetric extensions in four and six dimensions & designed a new formalism for their construction.

INDIAN INSTITUTE OF TECHNOLOGY January 2008 - April 2009
Masters thesis, Applied Physics **(PI: Prof. P.C. Deshmukh)**

- Conceived novel relativistic correlation confinement resonances in the Xenon $5s$ photoionization due to the cascading of spin-orbit interaction activated inter channel coupling effect in $4d$ photoionization.

References and technical resume with research details available upon request.