

# PRATEEK PURI

## PHD – Physics

📞 760 - 927 - 7764 | ✉ [prateek.puri01@gmail.com](mailto:prateek.puri01@gmail.com) | 🌐 [linkedin.com/in/prateek-puri](https://www.linkedin.com/in/prateek-puri)

### OBJECTIVE

I am excited about using data-driven insights to develop high-impact solutions to challenging problems. At FINRA, I helped modernize financial regulation by leveraging deep learning technologies to pinpoint manipulative market behavior putting investors at risk. I previously earned a doctorate degree in atomic, molecular, and optical physics from UCLA while investigating topics at the intersection of quantum computing and quantum chemistry and am excited to apply my technical and communication skills towards engineering evidence-based, scalable policy recommendations at RAND.

Previously, I also served as a Data Scientist at Crisis Text Line where I applied text analytics to parse millions of digital counseling conversations to understand evolving trends in teenage mental health. In addition to my research-based work, I enjoy communicating technical concepts to general audiences and have authored freelance articles for outlets such as *Scientific American* and the *UCLA Newsroom*.

### TECHNICAL SKILLS

**PROGRAMMING:** Python (Pyspark, Keras, scikit-learn, Pandas), SQL, Scala, Mathematica, Git, Markdown, Excel

**STATISTICAL MODELING:** Anomaly detection, convolutional neural networks, Bayesian probabilistic modeling, multivariate regression, time-series analysis, clustering, binary classification methods

**QUANTITATIVE METHODS/VISUALIZATION:** Experimental design, Monte-Carlo simulations, A/B testing, statistical inference, Dash, Plotly, matplotlib, Tableau

### EDUCATION

#### UNIVERSITY OF CALIFORNIA, LOS ANGELES

Doctor of Philosophy, Physics (2015-2019)

Master of Science, Physics (2014-2015)

Bachelor of Science, Physics (2009-2014, *Summa Cum Laude*)

*Los Angeles, CA*

*Sept. 2009 – June 2019*

### AWARDS AND RECOGNITIONS

- FINRA BOND Award (Being Outstanding Notable and Dedicated, 2020-2021)
- National Science Foundation Graduate Student Research Fellowship Recipient (2015-2018)
- UCLA Departmental Fellowship Recipient (2015-2018)
- Representative on the Math and Physical Sciences Graduate Student Council
- Leo. P Delsasso Fellowship Recipient (2014)
- Recipient of the E. Lee Kinsey Prize for the Most Outstanding Graduating Senior in Physics (2014)
- *Summa Cum Laude*, B.Sc. Physics (2014)
- *Highest Departmental Honors*, B.Sc. Physics (2014)
- Selected for the Army Research Office Undergraduate Research Apprenticeship Program (2013)

## INFORMATION SCIENCE/QUANTITATIVE EXPERIENCE

### FINRA

SENIOR DATA SCIENTIST

*Washington, D.C.*

*July 2020 – June 2022*

- Processed 10 TB+ time-series datasets through AWS data pipelines to build neural network fraud detection models that flag financial actors who are manipulating markets and taking advantage of investors
- Designed dashboards using Python Dash to allow financial regulators to interact with massive datasets in real-time and efficiently extract take-home insights
- Onboarded 5+ data scientists onto the FINRA deep learning initiative, managed teams of data scientists, and conducted extensive interviews to match incoming talent to high-priority project needs
- Constructed image-based recommendation algorithms to efficiently direct regulators to events of interest based on prior evaluations, increasing fraud discovery efficiency by 5X
- Developed Bayesian frameworks to estimate the uncertainty of model predictions, allowing regulators to prioritize events of interest and reduce manipulation review workloads by 30%

### CRISIS TEXT LINE

DATA SCIENTIST

*New York, NY*

*July 2020 – Present*

- Parsed the transcripts of 50M+ digital counseling conversations using natural language processing techniques to track evolving mental health trends during the COVID-19 pandemic
- Authored a [data-driven study](#) detailing the intensification of teenage eating disorders during the pandemic
- Connected research findings to actionable policy interventions by organizing data discussions with non-profit administrators, children's mental health professionals, and other key stakeholders

### INSIGHT DATA SCIENCE

FELLOW

*New York, NY*

*Jan. 2020 – May 2020*

- Prototyped an AWS-hosted, interactive dashboard to help farmers markets that generate \$10M+ in annual revenue predict weekly sales
- Improved sales forecasting MAPE by over 25% over current baselines, creating an avenue for individual vendors to reduce improper stocking costs by thousands of dollars per year
- Used SQL to merge millions of rows of data from historical weather, search engine, and public transportation datasets and generated forecasting models in Python to produce weekly market sales predictions
- Engaged directly with market stakeholders to define performance metrics and identify dominant sales predictors

### MAMMOTH MOUNTAIN RACE DEPARTMENT

TIMING TECHNICIAN

*Mammoth Lakes, CA*

*Nov. 2019 – Jan. 2020*

- Constructed sensor systems to measure race times of competitors in downhill skiing events with millisecond-accuracy and coordinated with other team members to manage event flow
- Utilized industry-standard software to publish live results online and to respond rapidly to real-time race events such as false-positive sensor detections and racer collisions

### UCLA HUDSON LABS

GRADUATE STUDENT RESEARCHER

*Los Angeles, CA*

*Sept. 2014 – June 2019*

- Collaborated with a team of researchers to develop a novel method for synthesizing molecules through laser-assisted quantum state control with applications in pharmaceutical and materials development
- Assessed the effect of quantum state manipulations on reaction outcomes through A/B testing frameworks, regression analysis, and experimental design
- Crafted data visualizations in Mathematica, presented findings at international conferences, and published four first-author articles in journals such as [Science](#) and [Nature Chemistry](#)

## DOCTORAL RESEARCH DESCRIPTION

*Advisor: Professor Eric Hudson*

*Thesis Title: Sympathetically cooled quantum chemical dynamics and progress towards a technique for internal state readout of a molecular ion*

*Through precise control of electromagnetic fields and lasers, we induce collisions between molecules and atoms at temperatures roughly one-thousandth of a degree above absolute zero. At these temperatures, both species exhibit quantum behavior relevant to both quantum information studies as well as quantum chemistry. Specifically, the observed collisions can be utilized to construct a molecule-based quantum computing platform and to also create designer molecules through the novel reaction mechanisms present in the low-temperature regime.*

## PUBLICATIONS

- 1) Ming Li, Michael Mills, **Prateek Puri**, Alexander Petrov, Eric R. Hudson, and Svetlana Kotochigova, **Physical Review A** **99**, 062706 (2019).
- 2) **Prateek Puri**, Michael Mills, Christian Schneider, Elizabeth P. West, Ionel Simbotin, John Montgomery, Robin Cote, Arthur Suits, and Eric R. Hudson, **Nature Chemistry** **11**, 615-619 (2019).
- 3) Michael Mills, **Prateek Puri**, Ming Li, Steven J. Schowalter, Alexander J. Dunning, Christian Schneider, Svetlana Kotochigova, and Eric R. Hudson, **Physical Review Letters** **122**, 233401 (2019).
- 4) **Prateek Puri**, Michael Mills, Elizabeth West, Christian Schneider, and Eric R. Hudson, **Review of Scientific Instruments** **89**, 077808 (2018).
- 5) **Prateek Puri**, Michael Mills, Christian Schneider, Ionel Simbotin, John Montgomery, Robin Cote, Arthur Suits, and Eric R. Hudson, **Science** **29**, 1370-1375 (2017).
- 6) Michael Mills, **Prateek Puri**, Yanmei Yu, Andrei Derevianko, Christian Schneider, and Eric R. Hudson, **Physical Review A** **96**, 033402 (2017).
- 7) Steven J. Schowalter, Alexander J. Dunning, Kuang Chen, **Prateek Puri**, Christian Schneider, Eric R. Hudson, **Nature Communications** **7**, 12448 (2016).
- 8) Alexander J. Dunning, Alexander Petrov, Steven J. Schowalter, **Prateek Puri**, Svetlana Kotochigova, and Eric R. Hudson, **The Journal of Chemical Physics** **143**, 124309 (2015).
- 9) **Prateek Puri**, Steven J. Schowalter, Svetlana Kotochigova, Alexander Petrov, and Eric R. Hudson, **The Journal of Chemical Physics** **141**, 014309 (2014).

## CONFERENCE PRESENTATIONS

- 1) Prateek Puri\*, Michael Mills, Christian Schneider, Elizabeth P. West, and Eric R. Hudson – *Radiative effects in cold atom-ion chemistry and the development of a molecular ion qubit*. **Poster presentation** at the 50th Annual Meeting of the APS Division of Atomic Molecular and Optical Physics (June 2019).
- 2) Michael Mills\*, Prateek Puri, Christian Schneider, Elizabeth P. West, and Eric R. Hudson – *Control of atom-ion reactions at low temperature*. **Poster presentation** at the 26th International Conference on Atomic Physics (July 2018).
- 3) Prateek Puri\*, Michael Mills, Christian Schneider, and Eric R. Hudson – *Dynamic and optical control of sympathetically cooled chemistry in a hybrid atom-ion trap*. **Poster presentation** at the 49th Annual Meeting of the APS Division of Atomic Molecular and Optical Physics (June 2018).
- 4) Michael Mills\*, Prateek Puri, Christian Schneider, and Eric R. Hudson – *Control of atom-ion reactions at cold temperatures*. **Oral presentation** at the 49th Annual Meeting of the APS Division of Atomic Molecular and Optical Physics (June 2018).
- 5) Prateek Puri\*, Michael Mills, Steven Schowalter, Christian Schneider, and Eric R. Hudson – *Quantum chemistry and non-equilibrium thermodynamics in a hybrid atom-ion trap*. **Oral presentation** at the 1st Annual North American Conference on Trapped Ions (August 2017).
- 6) Prateek Puri\*, Michael Mills, Christian Schneider, and Eric R. Hudson – *Quantum chemistry and the synthesis of a novel hypervalent molecule*. **Oral presentation** at the 48th Annual Meeting of the APS Division of Atomic Molecular and Optical Physics (June 2017).
- 7) Michael Mills\*, Prateek Puri, Christian Schneider, and Eric R. Hudson – *Chemical dynamics and non-equilibrium thermodynamics in an atom-ion hybrid trap*. **Oral presentation** at the 48th Annual Meeting of the APS Division of Atomic Molecular and Optical Physics (June 2017).
- 8) Prateek Puri\*, Michael Mills, Christian Schneider, and Eric R. Hudson - *Non-equilibrium thermodynamics and quantum interactions in an atom-ion hybrid trap*. **Poster presentation** at the Workshop on Roaming and Cold Molecules in Emory University, Georgia (October 2016).

## COMMUNICATION EXPERIENCE

### SCIENTIFIC AMERICAN/UCLA NEWSROOM SCIENCE WRITER

Los Angeles, CA

Sept. 2016 – June 2020

- Wrote op-eds on science policy issues such as [graduate student taxation](#) and [media misinformation](#)
- Reported on [UCLA scientific discoveries](#) in a [publicly understandable, non-technical format](#)

### 314 ACTION FOUNDER/PRESIDENT

Los Angeles, CA

March 2017 – June 2019

- Founded a UCLA campus chapter of the national science advocacy organization 314Action
- Organized discussion panel events with Congressional candidates and local community organizers to encourage public dialogue on the use of scientific information in government
- Organized voter registration drives and published articles on science-related issues in outlets such as Scientific American to advocate for scientific accuracy in legislative discussion

### CAMPUS ORGANIZER

Los Angeles, CA

- Coordinated the marketing campaign for a Kendrick Lamar Hollywood benefit concert that generated over \$15,000 for projects targeted at renovating impoverished villages in India
- Hosted documentary film screenings with public figures such as Roger Waters aimed at raising awareness about various international human rights abuses
- Successfully applied for and obtained over \$30,000 in university funding to host cultural events and educational workshops intended to facilitate student communication and build stronger on-campus communities