

Karan N. Shah

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EDUCATION **Georgia Institute of Technology**, Atlanta, Georgia USA

M.S., Computational Science & Engineering Expected Dec 2019
B.S., Computer Science (Threads: Intelligence, Modeling-Simulation) May 2018
B.S., Physics
Thesis: “*Analysis of Uncertainty in Machine Learned Density Functionals*”
Advisor: Dr. Andrew Medford

RESEARCH EXPERIENCE **Georgia Institute of Technology**, Atlanta, GA USA

Gravity Group, Center for Relativistic Astrophysics **Aug 2018 - present**
Advisor: Dr. Deirdre Shoemaker
Project: Analysis of Binary Blackhole Mergers in LIGO observations

Medford Group, School of Chemical & Biomolecular Engineering **Jan 2017 - present**
Advisor: Dr. Andrew Medford
Project: Determination of Exchange Correlation Functionals through Deep Learning
Using ensembles of neural networks to build surrogate density functionals

Otte Lab, Center for Relativistic Astrophysics **Jan 2016 - May 2018**
Advisor: Dr. A. Nepomuk Otte
Project: Segmented Schwarzschild-Couder Telescope Model for GrOptics ray tracing package
Added telescope model to GrOptics, written in C++(with CERN ROOT)

Data Driven Education Group, Center for 21st Century Universities **Aug 2015 - May 2018**
Advisor: Dr. Robert Kadel, Dr. Amanda Madden
Project: Inferring student success predictors from Georgia Tech MOOC data

Lawrence Livermore National Laboratory, Livermore, CA USA

Technical Scholar, Physics Division **Aug 2017 - May 2018**
(50% Lab Employee, Full Time Student)

Intern, Data Science Summer Institute **May 2017 - Aug 2017**
Advisor: Dr. Michael Schneider
Project: Hierarchical Probabilistic Inference of Cosmic Shear & Intrinsic Galaxy Properties
Used MCMC techniques to determine posterior distributions of galaxy properties

Wolfram Research, Boston, MA USA

Wolfram Mentorship Program **Nov 2016 - Jan 2017¹**
Wolfram Summer School **June 2016- July 2016²**
Advisors:¹Dr. Todd Rowland, ²Dr. Giorgia Fortuna
Project: Classifying Cellular Automata using Machine Learning

HONORS AND AWARDS	<ul style="list-style-type: none"> • Datmo Applied Machine Learning Fellowship, December 2017 • Amazon Web Services Research Grant (\$8000), September 2017 (Advisor: Dr. Madden) • President's Undergraduate Research Award: Fall 2017, Fall 2016 • Fellow, Data Science Summer Institute, LLNL, Summer 2017 • Student Travel Awards: JupyterCon 2017 (NYC), WSSSPE 2016 (Manchester, UK) • Top 10 percentile in Indian National Astronomy Olympiad, 2012
OUTREACH AND LEADERSHIP	<p><i>Senator, Graduate Student Senate, Georgia Tech</i> Sept 2018 - Present Representing Computational Science & Engineering in the Student Government Association.</p> <p><i>Reviewer, President's Undergraduate Research Award (PURA)</i> May 2018 - Present Reviewed Physics and CS research proposals for the Fall 2018 PURA.</p> <p><i>Co-founder, Bitcoin@Tech, Georgia Tech's Bitcoin Club</i> Aug 2014 - May 2015</p>
COMPUTER SKILLS	Python (NumPy, SciPy, SymPy, Pandas, PyMC3, Tensorflow, Keras), C++, Mathematica, Matlab, L ^A T _E X, HTML/CSS, Arduino Processing
PUBLICATIONS	Shah, K., & Schneider, M. D., "HIERARCHICAL PROBABILISTIC INFERENCE OF MULTI-VARIATE GALAXY DISTRIBUTIONS FOR WIDE-FIELD OPTICAL IMAGING SURVEYS" MANUSCRIPT IN PREP
RESEARCH PRODUCTS	<p>Machine Learning approaches to Density Functional Theory Link: http://www.github.com/karanprime/surrogate_functionals</p> <p>GrOptics Telescope Package Link: http://www.github.com/groptics/GrOptics (branch "karan")</p> <p>Cellular Automata Classification through Machine Learning Link: http://www.github.com/karanprime/mlforca</p>
SELECTED ACADEMIC PROJECTS	<p>Modeling human migration as an N-body problem (For CX 4230 Simulations) Link: http://www.github.com/karanprime/MigrationSimulator</p> <p>Cellular Automata Simulator (For PHYS 3226 Computation Physics) Link: http://www.github.com/karanprime/Cellular-Automata-Project</p> <p>Sunset Observation Project (For PHYS 2021 The Solar System) Link: http://www.karan.sh/projects/sunset</p>
SUPPLEMENTAL EXPERIENCE	<p><i>Analyst and Developer, Cryptomen.com - Startup</i> July 2014 - Feb 2015 Part of a five-person startup that raised \$47,000 in cryptocurrency investment.</p> <p><i>Student Assistant, Center for Non Linear Science, GT</i> Jan 2015 - Aug 2015 Supervisor: Dr. Predrag Cvitanovic Assisted Dr. Cvitanovic in producing video lectures and maintaining website for a MOOC on chaos theory (Link: http://chaosbook.org)</p>
MISC	Responsible Conduct of Research Stage 1 Certificate, CITI, License 15693882