

Anil Radhakrishnan

| Curriculum Vitae |

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*Physics PhD student focusing on using machine learning to
understand physics and vice versa*

Education

- **North Carolina State University** **North Carolina, United States of America**
Doctor of Philosophy in Physics 2020–present
- **University of Illinois at Urbana Champaign** **Illinois, United States of America**
Bachelor of Science in Physics, Minor in Mathematics 2016–2019
- **Delhi Private School** **Sharjah, United Arab Emirates**
High School Diploma 2012–2016

Honors and Awards

- **Lorella M. Jones Summer Research Award (2019)[\$2500]** *Department of Physics Honors*
This award supports summer research positions for outstanding undergraduate physics students. I was presented this award to support my research with Professor Benjamin Hooberman
- **Lee Teng Undergraduate Fellowship (Summer 2018)[\$5400]** *Illinois Accelerator Institute*
11-week internship at Fermilab in combination with Fundamentals of Accelerator Physics Course at U.S. Particle Accelerator School (USPAS)
- **Dean's List (Fall 2016-Fall 2017)** *College of Liberal Arts and Sciences*
The Dean's List is prepared each semester to honor all full-time students whose grade-point average (GPA) for that semester ranks in the upper 20 percent of their college.
- **LAS James Scholar (Spring 2017-Spring 2018)** *College of Liberal Arts and Sciences Honors*
The James Scholar Honors Program at the University of Illinois provides opportunities for high achieving students to go beyond what is required by their normal course load and do more detailed honor courses.

Employment

- **University of Illinois at Urbana-Champaign** **Urbana, IL**
Undergraduate Researcher: Experimental High Energy *August 2018–present*

I work on using deep learning algorithms to discriminate between prompt leptons and heavy flavor leptons in events from the ATLAS detector at CERN under Prof. Benjamin Hooberman. This involves maintaining a public codebase accessible to the group and other collaborators where new techniques can be implemented to compare their effectiveness. The preliminary version of the Model developed for the task was presented at the 3rd ATLAS Machine Learning Workshop[3].

- **Fermi National Accelerator Laboratory** **Batavia, IL**
Lee Teng Undergraduate Fellowship: Applied Superconductivity *May 2018–August 2018*

I worked under Dr. Mattia Checchin to study the effects of the enriched surface layer on superconducting radio-frequency cavities. This study involved measuring quench fields and potential gradients of cavities and developing code to efficiently analyze the data and perform theoretical simulations. The data processing code I wrote for this improved computational processing speeds 50 times and also allowed for effortless handling of bulk data[2].

- **University of Illinois at Urbana-Champaign** **Urbana, IL**
Undergraduate Researcher: Experimental Condensed Matter *October 2016–May 2018*

I made important contributions to a spin dynamics project under Prof. Virginia Lorenz. I worked in collaboration with a graduate student for preparing and characterizing samples for time resolved magneto-optic Kerr effect(MOKE) measurements of heavy metal and ferromagnetic thin films. I also worked on python simulations to predict likely experiment results. Additionally, I was in charge of setting up an optical system for using magnetization induced second harmonic signals to image the magnetic ordering of ferromagnets and later metallic antiferromagnets. The paper from the work on magnetic thin films has been published in Nature Nanotechnology[1].

Technical and Personal skills

- **Programming Languages:** • Proficient in: C++, python, Julia, Matlab, Labview, L^AT_EX • Familiar with: Mathematica, C, HTML, BASH.
- **Industry Software Skills:** • AutoCAD, OriginPro, Linux, Windows
- **Technical Skills:** Working experience in : cleanroom photolithography (lift-off and ion mill), DC magnetron Sputtering, Atomic Layer Deposition, X-ray reflectivity measurement, 4-point probe measurements for sample characterization, Vertical Testing for superconducting cavities, Using ultrafast femtosecond lasers and designing and setting up optical systems, designing and printing 3d structures on desktop 3d printer, soldering and machining
- **Languages:** English (Bilingual Proficiency), Hindi (Minimum Professional Proficiency), Malayalam (Native Proficiency)

Interests and Extra-Curricular Activity

- I was the vice-president of the Society of Physics Students, UIUC chapter for the year 2018. I founded an undergraduate journal club where students are invited to pick a peer-reviewed journal

and discuss its significance with their peers and also present their own research. I was also in charge of representing the organizations to people outside of the University and organizing annual tours to national labs for the members.

- o I am also extensively involved in Physics outreach projects and was the outreach and charity officer for the Society of Physics Students for the year of 2017. Along with few other students I performed interesting physics demos before and after the Saturday Physics for Everyone, which are public lectures given every alternate Saturday in the fall semester. I was also in charge of the award-winning physics demos done by Society during Engineering Open House, a science fair conducted by the University targeted towards exposing the public towards interesting science.

Publications

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- [1] Wenrui Wang, Tao Wang, Vivek P. Amin, Yang Wang, Anil Radhakrishnan, Angie Davidson, Shane R. Allen, T. J. Silva, Hendrik Ohldag, Davor Balzar, Barry L. Zink, Paul M. Haney, John Q. Xiao, David G. Cahill, Virginia O. Lorenz, and Xin Fan. Anomalous spin-orbit torques in magnetic single-layer films. URL: <https://www.nature.com/articles/s41565-019-0504-0>, doi:10.1038/s41565-019-0504-0.

Presentations

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- [2] Mattia Chechhin Anil Radhakrishnan. Characterizing the dirty layer in superconducting rf accelerating cavities, 2018. Lee Teng Final talks and poster session. URL: <https://indico.fnal.gov/event/17634/>.
- [3] Ben Hooberman Anil Radhakrishnan Matt Zhang Shun Akatsuka, Shion Chen. Machine learning techniques for soft leptons, 2018. ATLAS ML Workshop.