

# Pratyush Das

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## Education

<b>Institute of Engineering &amp; Management, Kolkata</b> <i>Bachelor of Technology in Computer Science and Engineering. CGPA: 8.00/10</i>	2017-2021(Expected)
<b>Don Bosco School, Park Circus, Kolkata</b> <i>High School</i>	2016

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## Experience

<b>IRIS-HEP - Fellow</b> Supervisor - Dr. Jim Pivarski(Princeton University) <ul style="list-style-type: none"><li>• Awkward Array: Library for nested, variable-sized data using NumPy-like idioms<ul style="list-style-type: none"><li>- Created a source to source compiler to generate equivalent Python for a subset of C++.</li><li>- Created a specification based test generation framework.</li><li>- Created a source to source compiler to generate equivalent parallel CUDA from specification(Python and type information).</li></ul></li></ul>	June, 2020 - September, 2020
<b>IRIS-HEP - Fellow</b> Location: Fermi National Accelerator Laboratory, USA - LHC Physics Centre Supervisor - Dr. Jim Pivarski(Princeton University) <ul style="list-style-type: none"><li>• uproot: Python implementation of ROOT I/O, an open source file format storing over an exabyte of HEP data<ul style="list-style-type: none"><li>- Completed ROOT file writing interface by adding functionality to write ROOT files with TTrees.</li><li>- uproot has become one of the most widely used Physics libraries (50K+ downloads)</li></ul></li></ul>	June, 2019 - September, 2019
<b>DIANA-HEP - Fellow</b> Location: Fermi National Accelerator Laboratory, USA - LHC Physics Centre Supervisor - Dr. Jim Pivarski(Princeton University) <ul style="list-style-type: none"><li>• uproot<ul style="list-style-type: none"><li>- Co-developed the uproot library with Jim Pivarski; authored the ROOT file writing interface.</li><li>- Examined ROOT serialization of objects and added functionality to write ROOT files with strings and histograms.</li></ul></li></ul>	June, 2018 - September, 2018
<b>DIANA-HEP - Summer Student</b> Supervisors - Dr. Jim Pivarski(Princeton University), Dr. Viktor Khristenko(CERN) <ul style="list-style-type: none"><li>• spark-root - Apache Spark datasource for ROOT<ul style="list-style-type: none"><li>- Separated spark bindings from TTree reading code.</li></ul></li><li>• root4j - Java implementation of ROOT file reader<ul style="list-style-type: none"><li>- Optimized codebase to facilitate interoperability</li></ul></li></ul>	June, 2017 - August, 2017

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## Summer Schools

<b>Computational and Data Science for High Energy Physics</b> <i>Princeton University</i>	2019
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## Programming Languages and Tools

**Experienced:** Python, CUDA, \*nix

**Familiar:** C, C++, Java, ROOT

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## Publications

- J.Pivarski, I.Osborne, **P.Das**, A.Biswas, P.Elmer, "Awkward Array: JSON-like data, NumPy-like idioms", Proceedings of the 19th Python in Science Conference (SciPy, USA), 2020, Pages 68-74, DOI: 10.25080/Majora-342d178e-00b. 2020
- N.Saha, **P.Das**, H.N.Saha, "Authorship Attribution of Short Texts using a Multi Layer Perceptron", International Journal of Applied Pattern Recognition, 2018 Vol. 5 No. 3, Pages 251-259, DOI: 10.1504/IJAPR.2018.10016100. 2018

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## Talks at Conferences

- Python in High Energy Physics.  
-*PyCon USA (Remote)* 2020
- Python in High Energy Physics  
-*SciPy India (Indian Institute of Technology, Bombay)* 2019
- The Scikit-HEP Project: Overview and Prospects - Eduardo Rodrigues et al.  
-*24th International Conference on Computing in High Energy and Nuclear Physics (University of Adelaide)* 2019
- Writing files with uproot (DOI: 10.5281/zenodo.3959734)  
-*PyHEP (Abington, UK)* 2019
- Writing files with uproot  
-*ROOT Users' Workshop (Academy of Sciences and Arts of Bosnia and Herzegovina)* 2018

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## Talks at Meetings

- CUDA backend for the Awkward Array project  
-*Princeton University Liberty Research Group Meeting (Remote)* 2020

- PR 5297: Testing Facilities - Vassil Vassilev, Pratyush Das  
-*ROOT Team Meeting(Remote)* 2020
- Writing TTrees with uproot  
-*IRIS-HEP Topical Meeting: Summer student project presentations(Remote)* 2019
- Writing files with uproot  
-*DIANA Meeting: Updates on ROOT I/O(Remote)* 2018
- Separation of Concerns - Refactoring code between ROOT4J and Spark-Root  
-*DIANA Meeting: Student Projects(Remote); CMS Big Data Science Projects(Remote)* 2017

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## Academic Achievements

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- Awarded the IRIS-HEP undergraduate fellowship by Princeton University. 2020
- Awarded travel grant to speak at PyCon USA 2020 in Pittsburgh, USA. 2020
- Awarded travel grant to attend PLMW and POPL 2020 in New Orleans, USA. 2019
- Awarded travel grant to attend CoDaS-HEP summer school at Princeton University. 2019
- Awarded the IRIS-HEP undergraduate fellowship by Princeton University. 2019
- Awarded travel grant to speak at ROOT Users' Workshop 2018 in Sarajevo, Bosnia and Herzegovina. 2018
- Awarded the DIANA-HEP undergraduate fellowship by Princeton University. 2018

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## Extracurricular Achievements

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- International Rated Chess Player (Federation Internationale des Echecs) 2016
- Adhyayan National Student Leadership Contest (Adhyayan India) - Third 2015
- IT Quiz (Computer Society of India) - Second 2014

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## Major Open Source Contributions

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- uproot (Core developer) - Designed ROOT file writing interface.
- Awkward Array - Designed transpilers from a subset of C++ to Python and parallel CUDA, and an automatic test generator.
- uproot-methods - Enabled support to recognize hook for multidimensional uproot histograms.
- root4j - Optimized interface for interoperability.
- spark-root - Separated spark bindings from TTree reading code.
- cling - Configured installer to build using LLVM binary.[Supervised by Dr. Vassil Vassilev(Princeton University)]
- ROOT - Added ROOTUnitTestSupport and fixed several rootcling bugs.[Supervised by Dr. Vassil Vassilev(Princeton University)]
- Clang - Upstreamed patches from Cling.[Supervised by Dr. Vassil Vassilev(Princeton University)]

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## Featured in Media

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- *Princeton leads efforts to develop national data training framework for high energy physics* - Princeton University News 2019