Surya Dutta

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Education

Yale University — **May 2018** ***(Expected)***
Currently Pursuing B.S. in Physics *(Intensive)* | GPA: **3.8/4.0** — New Haven, CT

Relevant Coursework: Physical Processes in Astronomy • Gravity, Astrophysics, & Cosmology
Classical Mechanics • Quantum Mechanics and Natural Phenomena
Modern Physics Laboratory

Fields of Interest: Astrophysics, Aerospace Engineering, Cosmology, Experimental Physics, Low-Temperature Physics

Yale University Likely Letter Recipient: Top 150 out of 31,000 applicants to Yale College

Chattahoochee High School — **May 2014**
High School Diploma: ***Summa Cum Laude*** — Johns Creek, GA
SAT: **2400/2400** Superscore | ACT: **36/36** Composite

Research Experience

The Cryogenic Underground Observatory for Rare Events (CUORE) Experiment — **Feb 2016 - Present**

Experimental Physics Research Assistant *with CUORE, a large multinational collaboration building a ton-scale underground detector for extremely rare nuclear events operated at 10 mK*

Student Researcher, **Maruyama Lab | Yale University**, New Haven, CT

Thermal Modeling Working Group
Project: ***Monte Carlo Photon/Phonon Simulations for CUORE Upgrade with Particle Identification (CUPID)***

- Conducting research and development for next-generation of ton-scale cryogenic detectors
- Expanding current thermalization models for CUORE by improving mathematical models and design parameters
- Exploring optimality conditions and discrimination power to obtain stronger thermal signals and lower backgrounds
- Developing and analyzing Monte-Carlo simulations using the Geant4 and ROOT toolkits (based on C++)

On-Site Research Assistant *(May - Aug 2016)* | **Laboratorio Nazionali del Gran Sasso**, Assergi, Italy

- Conducted critical tasks on-site prior to commissioning and data acquisition, such as installing calibration hardware, diagnosing vacuum and cryogenic systems, assisting clean room operations, and setting up security networks
- Developed slow monitoring systems to accurately and securely monitor the cryostat using responsive LabVIEW virtual instruments, video streams, and a custom-built web interface using the Angular, Bootstrap, and MongoDB frameworks

Presentations:

- 10/14/2016 - **2016 Fall Meeting of the APS Division of Nuclear Physics**, Vancouver, BC, Canada

The McKinsey Research Group — **May 2015 - Aug 2015**

Visiting Student Researcher | Lawrence Berkeley National Laboratory, Berkeley, CA

Project: ***Monte Carlo Simulations for Dark Matter Particle Detection in Liquid Helium-4***

- Under the mentorship of Dr. Scott Hertel and Dr. Daniel McKinsey.
- Investigated the use of superfluid liquid helium-4 crystalline properties as a viable candidate for the detection of dark matter particles, specifically low-mass (<10 GeV) weakly interacting massive particles (WIMPS).
- Developed Monte-Carlo simulations, using the Python language, to create optimality conditions for the detection of low mass WIMPS using phonon energy kinematics and probabilistic functions.

Presentations:

- 1/23/2016 - **2016 National Collegiate Research Conference**, Cambridge, MA
- 4/10/2016 - **2016 CUSJ Spring Symposium**, New York, NY

Extracurricular Experience

Yale Undergraduate Research Association (YURA) — Jan 2015 - Present

Founder and President | Yale University, New Haven, CT

- **Co-founded 501(c)3 non-profit student organization** to support the undergraduate research community, and to provide information, resources, and advising for students interested in research at Yale.
- Established growing community of **more than 1500 undergraduate researchers** at Yale
- **Lead 20 Executive Board members** and oversee public initiatives including event planning and resource building, as well as manage internal tasks including fundraising and developing institutional memory
- Initiated and developed first university-wide **database of research mentors**, including 1400+ listings from 60+ departments. Produce guides and auxiliary resources to assist undergraduates looking for research opportunities
- Heading and organizing the first **intercollegiate undergraduate research conference** at Yale (Spring 2017), with 100 interdisciplinary presenters. Initiated and organized the annual Yale Undergraduate Research Showcase in Fall 2015
- Develop and coordinate **annual series of workshops and events** to facilitate undergraduate research for 500+ attendees

The Yale Scientific Magazine — Jan 2015 - Present

Scientific Writer and Layout Editor (2015-2016) | Yale University, New Haven, CT

- Editor for Yale Scientific Magazine, the oldest collegiate scientific publication.
- **Published three scientific articles** on astronomy (evolution of galaxies outside the Milky Way, technology (self-powered piezoelectric sensors), and the environment (how dust is affecting the drought in California).
- Assist with layout production, with expertise on graphic design and typography.

Link to all published works: http://www.yalescientific.org/author/suryabratadutta/

Yale Undergraduate Science Olympiad Outreach — Jan 2015 - Present

Exam Writer and Director (2015) | Yale University, New Haven, CT

- National non-profit organization dedicated to improving the quality of K-12 science education
- Host annual invitational tournament at Yale University with 50 teams from around the US.
- Written tests for **Astronomy (2017)**, **Technical Problem Solving (2016)**, and **Experimental Design (2016)** events
- **Event Director (2015)**: ensured high quality and integrity of all aspects of the exams given at the tournament to provide the maximum level of enrichment and practice for high school student competitors.

Yale Information Technology Services — Jan 2015 - May 2016

Media Technician | Yale University, New Haven, CT

- Support and maintain media equipment, and provide software support for multimedia software.
- **Project Specialist Coordinator (Jan 2016 - May 2016)**: Lead a team of 20 project specialists to complete free, on-request graphic design and event support to Yale students, faculty, and administrators.
- **Areas of Expertise**: Adobe Suite (Indesign, Photoshop, Premier Pro, After Effects), Video Editing, DSLR Photography

Skills

Programming : C++ (Scientific Programming) • Python • Java • Bash

Software: Git • Linux/Unix • Windows OS • Microsoft Office Suite • Autodesk Inventor • Solidworks • Adobe Creative Suite

General: Research • Data Analysis • Experimental Physics • Monte Carlo Simulations • 3D Modeling
Leadership • Public Speaking • Website Development • Graphic Design • Filmmaking/VFX

Awards

- **Alan S. Tetelman 1958 Fellowship for International Research in the Sciences** - March 2016
- **George J. Schulz Summer Fellowship in the Physical Sciences** - April 2015