Ishir Dutta

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Education

Colgate University, ***Bachelor of Arts (Summa Cum Laude)*** **Hamilton, NY • May 2017**

- Double Major: Physics (Honors), Mathematics

Academic and Leadership Awards

Benton Scholar Award (May 2017): Awarded to recognize graduating Benton Scholars who have demonstrated outstanding contributions in the areas of global awareness, leadership, and academic achievement. Scholars are invited to join upon admission to Colgate University and are high-achieving, motivated students committed to global leadership.

Phi Beta Kappa National Honor Society (May 2017)

Physics and Astronomy Alumni Award (May 2017): Awarded to students majoring in physics and astronomy who have made the most significant progress in the study of their major subject and the relations of this science to other fields of learning.

Dean's Award for Academic Excellence [Distinction] (August 2013 - May 2017): This award is presented each term to students who achieve a term grade point average of 3.30 [3.60] or higher while successfully completing at least 3.75 course hours.

Lila and Curtiss '25 Frank Scholarship (January 2017 - May 2017): This award recognizes academic achievement, excellent character, and promise of salutary leadership in constructive phases of American life.

Sigma Pi Sigma National Physics Honor Society (October 2016)

George W. Cobb Award (April 2016): Recognition of outstanding leadership and effective influence among fellow students on campus, as well as among prospective students in developing interest in Colgate.

Charles A. Dana Scholar (April 2015): Selected in recognition of superior academic achievement as well as demonstrated leadership in the college community.

Phi Eta Sigma National Academic Honor Society (November 2014)

Dodge Prize (April 2014): Awarded to the two students who achieve the highest academic record during their first year.

Research Experience

Big Switch Networks **Santa Clara, CA • October 2017 - present**

Research Assistant, Office of the Founder/CTO

- Collaborated across Business Development and Engineering teams to define, build and deploy software prototypes aimed at expanding Big Switch's network management and monitoring capabilities across public cloud platforms.

The Evolution of the Galápagos Mantle Plume **Colgate University • July 2017 - October 2017**

Advisor: Karen S. Harpp

- Prepared rock samples from different islands for geochronological and geochemical analysis, including X-ray fluorescence, ICP-MS, and Ar-Ar dating, to characterize mantle sources of volcanic material in the Galápagos Archipelago.

Biogenic Nanoparticles in Municipal Wastewater Treatment **Colgate University • August 2016 - June 2017**

Advisor: Linda Y. Tseng

- Analyzed water quality data to characterize nanoparticle behavior in wastewater treatment plants with the goal of informing better treatment process design and to maximize efficiency in reuse and recycling of water.

Möbius Polarization of Light **Colgate University • January 2016 - August 2016**

Advisor: Enrique J. (Kiko) Galvez

- Designed a workflow that created 3D printed objects from 2D surface plots to easily visualize and communicate electric field patterns of interfering Laguerre-Gauss beams.

Discriminatory Forces on Chiral Molecules **Colgate University • June 2015 - August 2015**

Advisor: Enrique J. (Kiko) Galvez

- Self-taught introductory optics. Assembled and operated an apparatus that used Poincaré beams and a path-displacement interferometer to detect optical forces on chiral molecules in solution.

Publications and Presentations

Peer-Reviewed Articles

E. J. Galvez, **I. Dutta**, K. Beach, J. J. Zeosky, J. A. Jones, and B. Khajavi, "Multitwist Möbius strips and twisted ribbons in the polarization of paraxial light beams," *Scientific Reports*, *7*(1), 13653 (2017).

Conference Proceedings

E. J. Galvez, and **I. Dutta**, "Deducing 3-dimensional polarization fields from projective measurements," *Proceedings of SPIE* 10120, Complex Light and Optical Forces XI, 101200B (February 27, 2017).

J. A. Jones, B. Regan, J. Painter, J. Mills, **I. Dutta**, et al., "Searching for the helical-gradient force on chiral molecules," *Proceedings of SPIE* 10120, Complex Light and Optical Forces XI, 101200M (February 27, 2017).

E. J. Galvez, K. Beach, J. J. Zeosky, **I. Dutta**, J. A. Jones, and B. Khajavi, "Möbius polarization in non-collinear Poincaré-beam superpositions," *Frontiers in Optics, OSA Technical Digest*, Optical Society of America, paper JTh2A.111 (October 17, 2016).

Posters (Presenting Author)

J. Smeraldi, L. Y. Tseng, **I. Dutta**, and D. Rosso, "Naturally occurring nanoparticles in water resource recovery facilities," Association of Environmental Engineering and Science Professors (AEESP), June 20-22, 2017, Ann Arbor, MI.

I. Dutta, and L. Y. Tseng, "Biogenic nanoparticles in wastewater treatment," Undergraduate Research Day, Syracuse University Physics Department, November 12, 2016, Syracuse, NY.

I. Dutta, E. J. Galvez, J. J. Zeosky, and K. Beach, "Möbius polarization of light," 2016 Frontiers in Optics/Laser Science, The Optical Society, October 18, 2016, Rochester, NY.

In Process

J. Smeraldi, L. Y. Tseng, **I. Dutta**, G. Rajagopalan, and D. Rosso, "Naturally occurring nanoparticles in biological wastewater treatment," Manuscript in preparation (2018).

Teaching Experience

Divisions of Natural Sciences and Social Sciences **Colgate University • August 2014 - May 2017**

Peer Tutor (PHYS 131, 232; MATH 214, 250; GEOG 328)

- Led weekly collaborative and one-on-one problem-solving sessions to increase student proficiency and confidence.
- Provided regular feedback to faculty about student progress and common student questions to address pacing of course.
- Assisted students in finding research opportunities and connecting with upperclassmen, faculty, and alumni.

Division of Natural Sciences **Colgate University • September 2013 - June 2017**

Science Outreach Coordinator

- Developed and conducted demonstrations to explore physical phenomena ranging from rocket launches to volcanic eruptions at different levels of complexity tailored for students from Pre-K to Grade 11.

edX Online Education Initiatives **Colgate University • November 2014 - December 2015**

Course Developer (CORE 138S: Advent of the Atomic Bomb; FSEM 144: Emerging Global Challenges)

- Designed and implemented two innovative, online courses on the edX platform. The 2014 course (CORE 138S) focused on constructing new mechanisms to increase engagement with the material and with other users, as well as building modules about atomic physics and special relativity for a general audience.
- The 2015 course (FSEM 144) involved implementing the first-ever online course designed for children by university students taking a course designed, in turn, by an all-student team.

Social Sector Experience

Development Alternatives **New Delhi, India • June 2014 - July 2014**

Intern

- Assessed marketing models and distribution channels for Aqua+, a chlorine-based solution for water purification, for feasibility of use in the slums of Delhi. Created numerical simulations of profitability, refining the existing models.
- Tested the capacity and efficiency of flexipump, a low-cost hand pump, and developed a training toolkit and protocol for further testing at partner farms across India.

CanSupport **New Delhi, India • March 2012 - May 2013**

Volunteer

- Conducted outreach to corporate donors, schools, and colleges in New Delhi to raise funds for and secure participation in the annual Walk for Life.

Leadership Experience

Office of Admission **Colgate University • February 2014 - present**

Volunteer

- Met and corresponded with school counselors and prospective students. Expanded Colgate outreach by connecting with the United States-India Educational Foundation (USIEF) and the US Embassy in New Delhi.

Office of International Student Services **Colgate University • March 2014 - May 2017**

Core Group Leader

- Designed improved methods for integrating incoming international students to campus, served as mentor, and assisted staff in organizing orientation for the classes of 2018-2020.

Leadership and Faculty Recruitment **Colgate University • March 2014 - June 2016**

Student Representative

- Selected by senior staff to serve as a member of hiring committees for faculty and cabinet-level staff positions.

Skills & Interests

Computing: Matlab, edX, LaTeX (advanced); Netfabb, MakerBot, Python (intermediate); JavaScript, VPython, C, R (elementary)

Interests: Renewable energy, education, science outreach, 3D printing, paddleboarding, hiking, dogs, crossword puzzles

Off-Campus Study: Seoul, South Korea; San Francisco, CA; Southwest United States; Dallas, TX; Houston, TX

Languages: English, Hindi (fluent); French (working proficiency); Spanish, Bengali (beginner)