

JAYA NAGARAJAN-SWENSON

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EDUCATION

Mount Holyoke College, South Hadley, MA.

August 2018 - Present

Bachelor of the Arts double major in Astronomy and Biological Sciences, GPA 3.93.

South Asia Summer Language Institute, University of Wisconsin, Madison.

June - August 2020

Eight-week (two semester) Tamil Language intensive, GPA 4.00.

RESEARCH

Galactic Astrophysics, Mount Holyoke College

February 2020 - Present

Research Mentor: Dr. Jason Young

- **Research Goal:** Study the evolution and formation of low surface-brightness (LSB) spiral galaxies.
- **Project 1:** Creating velocity fields and deriving rotation curves from the emission lines of various Low Surface Brightness galaxies. Will be submitted as a senior thesis.
 - Using IRAF to collect data from the VIRUS-P IFU at UT Austin's McDonald Observatory.
 - Developing and adapting Python code to create velocity fields from 3D spectral data cubes of diverse galaxies from VIRUS-P.
 - Deriving dark matter content from rotation curves and archival measurements of gas and star mass in said LSB galaxies.
- **Project 2:** Determining the impact of hot dust on star formation in Low Surface Brightness galaxies.
 - Repurposed existing pipelines to deconvolute raw data from the Spitzer and GALEX Space Telescopes and apply Independent Component Analysis (ICA) to photometric data.
 - Processed data from 40 galaxies using SAOImageDS9.
 - Manuscript in preparation for submission to *Monthly Notices of the Royal Astronomical Society*.
- **Project 3:** Used the Common Astronomy Software Applications package (CASA) to map 21 cm atomic galactic hydrogen in UGC 628 using archival Very Large Array (VLA) data.
 - Awarded remote time on the VLA to collect additional data on UGC628 and its environment (Summer 2020).

Field Ecology, University of Virginia Blandy Experimental Farm NSF-REU Program

May - July 2021

Research Mentors: Dr. David Carr and Kelsey Schoenemann

- **Research goal:** Examine and understand bumble bee hive success.
- **Abstract title:** It's (on) the bee's knees! The effect of local habitat and time on pollen foraging efficiency of *Bombus impatiens*.
- Assisted ongoing ecological research about the influence of landscape and local habitat on *B. impatiens*.
- Collected pollen from foragers, recorded and analyzed hive video, and assisted floral surveys.

PROPOSALS AND GRANTS

Co-I McDonald Observatory, University of Texas at Austin: **7 nights**.

January 2021

"IFU Spectroscopy of a Post-Burst LSB Spiral" (P.I. Jason Young)

Grant NASA Space Grant, Massachusetts Space Grant Consortium, **\$1,500**

September 2021

OBSERVING EXPERIENCE

McDonald Observatory, 2.7m Harlan J. Smith Telescope, VIRUS-P Instrument. 7 nights. Primary targets: LSB Spiral SDSS J010223.55+203334.6 and HSB Spiral 2MFGC 731	<i>October 2021</i>
Amherst College Observatory, 11-inch Celestron telescope. 2 nights. Primary targets: various open and globular clusters in the Milky Way. Data used for a semester-long independent project for an Amherst College class.	<i>September 2021</i>
McDonald Observatory, 2.7m Harlan J. Smith Telescope, VIRUS-P Instrument. 6 nights. Primary target: LSB Spiral UGC 8839	<i>April 2021</i>
McDonald Observatory, 2.7m Harlan J. Smith Telescope, VIRUS-P Instrument. 6 nights. Primary targets: LSB Spirals UGC12709, UGC2017, UGC2259, UGC4179, UGC731, LEDA138324, and LEDA33959	<i>December 2020</i>
McDonald Observatory, 2.7m Harlan J. Smith Telescope, VIRUS-P Instrument. 9 nights. Primary target: LSB Spiral UGC11820	<i>August 2020</i>

POSTERS AND PRESENTATIONS

Poster “Rotation Curves of Low Surface Brightness Spirals.” American Astronomical Society 239 th meeting (Salt Lake City, UT). [ADS]	<i>January 2022*</i>
Poster “The Environment of a Low Surface Brightness Starburst.” American Astronomical Society 239 th meeting (Salt Lake City, UT). [ADS]	<i>January 2022*</i>
Talk “It’s (on) the bee’s knees! The effect of local habitat and time on pollen foraging efficiency of <i>Bombus impatiens</i> .” Council on Undergraduate Research 2021 REU Symposium (Remote).	<i>October 25, 2021</i>
Poster “Hot Dust in Low Surface Brightness Spirals.” Mount Holyoke Physics Summer Research Poster Session (South Hadley, MA).	<i>October 8, 2021</i>
Talk “It’s (on) the bee’s knees! The effect of local habitat and time on pollen foraging efficiency of <i>Bombus impatiens</i> .” Blandy Experimental Farm Summer Research Symposium (Boyce, VA).	<i>July 28, 2021</i>

TEACHING AND MENTORSHIP

Fimbel Maker and Innovation Lab <i>Lab Consultant, Supervisors Shani Mensing and Kris Camp, Professor Kathy Aidala</i> <ul style="list-style-type: none">• Mentors students and faculty who are using the 8,000-foot Makerspace for independent projects and coursework.• Runs workshops for students and staff.• Certified to teach the use of Adobe Illustrator for laser cutting and CAD software for 3D design; certified to teach and supervise laser cutting, 3D printing, vinyl cutting, soldering, Arduino, and various woodshop tools.	<i>August 2019 – Present</i>
Peer-Led Undergraduate Mentoring System mentor, Departments of Biology and Physics <i>Ecology, Professor Martha Hoopes</i> <ul style="list-style-type: none">• Creates weekly worksheets.	<i>Fall 2021</i>

- Hosts semiweekly student discussion sessions.
- Assists weekly laboratories to teach data analysis and field ecology skills.

Calculus-based Physics: Mechanics, Professor Kathy Aidala

Fall 2020

- Created weekly worksheets.
- Hosted semiweekly student discussion and help sessions.

Teaching Assistant, Departments of Astronomy and Physics

Intermediate Astrophysics: Stars and Galaxies, Professor Jason Young

Spring 2021

- Ran weekly discussion sessions to answer student questions.
- Graded problem sets.

Solar Systems, Professor Jason Young

Spring 2020

- Ran bi-weekly discussion sessions to answer student questions.
- Graded quizzes and problem sets.

Physics: Mechanics, Professor Kerstin Nordstrom and Casey Lee-Trimble

Fall 2020

- Assisted setting up and running laboratories to teach students the fundamentals of mechanics.

LEADERSHIP

Varsity Coxswain, Mount Holyoke Rowing and Berkeley High Crew.

September 2014 - Present

First varsity coxswain and primary mentor of novice athletes and coxswains since August 2019, competing rower and coxswain since September 2014. Recently competed (and earned an automatic qualifier for 2022) at the Head of the Charles and New England Rowing Championship Regattas.

Diversity and Inclusion Chair, Student-Athlete Advisory Committee.

January 2019 - Present

Diversity and Inclusion Chair for SAAC and the student representative for Mount Holyoke Athletics in the 2020 and 2021 calendar years. Representative of the rowing team since 2019. Interviewed for NBC News features on bills surrounding transgender student-athletes in June 2021 and January 2022. [[Video](#)]

Chair and Co-founder, Mount Holyoke Athlete Empowerment Coalition.

February 2020 - Present

Chair and co-founder of a student-run group for first generation student-athletes and student-athletes of color at Mount Holyoke College.

Astronomy Department Liaison

August 2021 - Present

Point person for connecting with and supporting incoming and prospective students in astronomy.

Founding Member, Sunrise Movement South Hadley.

October 2019 - Present

Founding member of a new hub with the national 10,000-member Sunrise Movement, building an “army of young people to stop climate change and create millions of new jobs in the process.”

Panel Host, *A Most Beautiful Thing* panel

April 6, 2021

Selected to host a virtual 100+ person panel. Interviewed award-winning filmmaker and Olympic rower Mary Mazzio, as well as Arshay Cooper, author of *A Most Beautiful Thing*.

Communications Committee, Pioneer Valley Mini Maker Faire.

*November 2019 – April 2020**

Member of the communications and outreach committee to organize the 2020 Pioneer Valley Mini Maker Faire hosted by Mount Holyoke College in April 2020.

Keynote Speaker at Stanford University

July 17, 2018

Selected as keynote speaker for the Stanford University Hollyhock Fellowship’s conference about equity in education and my own experiences as a student activist.

HONORS

Best Undergraduate Research Presentation at the UVA Blandy Summer Research Symposium.	<i>July 2021</i>
Bennett Prize for undergraduate excellence in physics by the Mount Holyoke Physics Department.	<i>May 2020</i>
NEWMAC Academic All-Conference Team of student-athletes with the highest GPAs. (x2)	<i>May 2020, 2021</i>
NEWMAC All-Conference Sportsmanship Team for one person per sport.	<i>April 2019</i>
Tuition Exchange Award and Mary Lyon Scholarship: Awarded two annual merit-based scholarships from Mount Holyoke College. \$41,000 annually for four years.	<i>2018 –2022</i>
Selected Arangetram Soloist: Selected for an Arangetram (solo classical South Indian dance performance) after 10 years of training and performance with “Kalanjali: Dances of India.”	<i>July 2018</i>
Kalpna Mistry Award for academic achievement and activist work in Berkeley	<i>June 2018</i>

COMPETENCIES

Relevant Coursework: Observational Techniques · Cosmology · Galactic Astrophysics · Stellar Astrophysics · Astrophysics I: Stars and Galaxies · Planetary Science · Icy Worlds · Solar Systems · Electromagnetism · Math Methods in Physics · Multivariable Calculus

Computer-based: Python · R · IRAF · CASA · MathStudio · LaTeX · Fusion 360 · Linux · MacOS · Windows · Microsoft Office Suite · Adobe Creative Cloud Suite

Language: English, native · Tamil, intermediate written and read, intermediate beginner spoken · French, intermediate · Spanish, beginner

**Cancelled due to the COVID-19 pandemic.*