

BRIANA INDAHL

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Laboratory for Atmospheric and Space Physics
1234 Innovation Drive ◊ Boulder, CO 80303

EDUCATION

University of Texas at Austin

Doctor of Philosophy

Department of Astronomy

August 2014 - May 2021

University of Wisconsin - Madison

Bachelor of Science

Double major in physics and astronomy, certificate in mathematics

September 2009 - May 2014

RESEARCH EXPERIENCE

Postdoctoral Researcher

Laboratory for Atmospheric and Space Physics

- Currently working on the the NASA funded SPRITE Cubesat mission

November 2021- Present

Advisor: Brian Fleming

Postdoctoral Researcher

UT-Austin, Department of Astronomy

- Built data processing and analysis python software package for VIRUS-P for public use

May 2021- October 2021

Advisor: Prof. Gary Hill and Prof. John Chisholm

Graduate Research Assistant

UT-Austin, Department of Astronomy

Mapping of the Gaseous Outflows of the M82 Galaxy Collected data after being awarded 26 nights of observing on the Harlan J Smith 2.7m telescope Built the most extensive and detailed map of this gaseous outflow (out 33,000 light years above the plane of the galaxy) which has been studied for over 50 years. This map helped us understand how this outflowing gas from star formation impacts the evolution of galaxies.

August 2014 - May 2021

Advisor: Prof. Gary Hill

Survey of Chemical Evolution in Nearby Galaxies

- Conducted two studies building a sample of nearby emission line galaxies from both the HETDEX Pilot Survey and the first HETDEX data release providing an unbiased sample of spectroscopically selected galaxies.
- derived a mass metallicity relation and star formation rates from both samples to show that large field, photometrically selected samples of galaxies used to derive these relations are missing populations of galaxies due to selection effects.
- These surveys serve as a pilot program for future work with the sample of over 1 million local galaxies without pre-selection in the larger HETDEX survey.

Astronomical Instrumentation Work

- Streamlined the data taking and analysis of CCD detectors. This process was used to characterize the 160 detectors in two different instruments (VIRUS and LRS2) in an automated way.
- Built a database of data on all optical components in 156 spectrographs. Used database to simulate variations in performance of all units
- Performed system level analysis to determine the success of the novel specification strategy for the major components procured for the massively multiplexed VIRUS instrument

- Served as the lead in data processing and analysis during the commissioning for LRS2 during first light of the instrument
- designed the fiber feed mapping for the integral field spectrograph VIRUS2

LRS2 Reduction Pipeline

- Wrote a pipeline to manage and reduce data for LRS2 that is shared with the astronomy community
- Set up the pipeline to run on the Texas Advanced Computing Center's supercomputers

Undergraduate Research Assistant

University of Wisconsin - Madison, Department of Astronomy

March 2012 - July 2014

Advisor: Dr. Marsha Wolf

- Worked on near-infrared detector characterization for the Robert Stobie Spectrograph-Near Infrared Arm being built by The University of Wisconsin-Madison for the Southern African Large Telescope.

Undergraduate Research Assistant

Cerro Tololo Inter-American Observatory REU Program

January 2013 - March 2013

Advisor: Dr. Peter Pessev

- Research completing the first comprehensive search for carbon rich asymptotic giant branch stars in Milky Way globular clusters.

FIRST-AUTHOR PUBLICATIONS

- **Indahl**, B. L., Zeimann, G., Hill, G. J., et al., *HETDEX [OIII] Emitters I: A spectroscopically selected low-redshift population of low-mass, low-metallicity galaxies*, 2021, *The Astrophysical Journal (ApJ)*, 916, 11
- **Indahl**, B. L., Zeimann, G., Hill, G. J., et al., *HETDEX Pilot Survey. VI. [O III] Emitters and Expectations for a Local Sample of Star-forming Galaxies in HETDEX*, 2019, *ApJ*, 883, 114
- **Indahl**, B. L., Hill, G. J., Zeimann, G., et al., *VIRUS: comparison of lab characterization with on-sky performance for multiple spectrograph units*, 2018, *Proceedings of the Society of Photographic Instrumentation Engineers (Proc. SPIE) Ground-based and Airborne Instrumentation for Astronomy VII*, 10702, 1070281
- **Indahl**, B. L., Hill, G. J., Drory, N., et al., *VIRUS characterization development and results from first batches of delivered units*, 2016, *Proc. SPIE*, 9908, 990880

CO-AUTHOR PUBLICATIONS

- Hill, G. J., Lee, H., et al., *The HETDEX Instrumentation: Hobby-Eberly Telescope Wide-field Upgrade and VIRUS*, 2021, *ApJ*, 162, 298
- Good, J. M., Hill, G. J., Lee, H., et al., *VIRUS2: Interfaces to the 2.7 m Harlan J Smith Telescope*, 2020, *Proc. SPIE*, 11447, 114478Z
- Hill, G. J., Lee, H., Vattiat, B. L., et al., *VIRUS2: a next generation replicated integral field spectrograph with wide field and broad wavelength coverage*, 2020, *Proc. SPIE*, 11447, 1144716
- Vattiat, B. L., Hill, G. J., Ramsey, J., et al., *Mechanical design of the VIRUS2 instrument*, 2020, *Proc. SPIE*, 11447, 114478W
- Punsly, B., Hill, G. J., Marziani, P., et al., *The Energetics of Launching the Most Powerful Jets in Quasars: A Study of 3C 82*, 2020, *ApJ*, 898, 169
- Saxena, A., Röttgering, H. J. A., Duncan, K. J., et al., *The nature of faint radio galaxies at high redshifts*, 2019, *Monthly Notices of the Royal Astronomical Society (MNRAS)*, 489, 5053
- Yi, W., Vivek, M., Brandt, W. N., et al., *Broad Absorption Line Disappearance/Emergence in Multiple Ions in a Weak Emission-line Quasar*, 2019, *Astrophysical Journal Letter*, 870, L25

- Davis, B. D., Ciardullo, R., Jacoby, G. H., Feldmeier, J. J., & **Indahl**, B. L., *The True Luminosities of Planetary Nebulae in M31's Bulge: Massive Central Stars from an Old Stellar Population*, 2018, ApJ, 863, 189
- Hill, G. J., Kelz, A., Lee, H., et al., *VIRUS: status and performance of the massively replicated fiber integral field spectrograph for the upgraded Hobby-Eberly Telescope*, 2018, Proc. SPIE, 10702, 107021K
- Mosby, G., **Indahl**, B., Eggen, N., et al., *Optimization and performance of the Robert Stobie Spectrograph Near-InfraRed detector system*, 2018, Journal of Astronomical Telescopes, Instruments, and Systems (JATIS), 4, 014001
- Chonis, T. S., Hill, G. J., Lee, H., et al., *LRS2: design, assembly, testing, and commissioning of the second-generation low-resolution spectrograph for the Hobby-Eberly Telescope*, 2016, Proc. SPIE, 9908, 99084C
- Tuttle, S. E., Hill, G. J., Vattiat, B. L., et al., *VIRUS early installation and commissioning*, 2016, Proc. SPIE, 9908, 99081I
- Hill, G. J., Tuttle, S. E., Vattiat, B. L., et al., *VIRUS: first deployment of the massively replicated fiber integral field spectrograph for the upgraded Hobby-Eberly Telescope*, 2016, Proc. SPIE, 9908, 99081H
- Wolf, M. J., Mulligan, M. P., Smith, M. P., et al., *Project status of the Robert Stobie spectrograph near infrared instrument (RSS-NIR) for SALT*, 2014, Proc. SPIE, 9147, 91470B
- Wolf, M. J., Thielman, D. J., Mosby, G., et al., *Performance characterization of the near infrared detector system for RSS-NIR on SALT*, 2012, Proc. SPIE, 8453, 845327

AWARDS AND FELLOWSHIPS

- David Alan Benfield Fellowship - Awarded to an outstanding senior graduate student (2019)
- National Science Foundation Graduate Research Fellowship Program Honorable Mention (2016)
- National Science Foundation Graduate Research Fellowship Program Honorable Mention (2015)
- Graduate School Diversity Mentoring Fellowship (2014)
- Lowell Doherty Award for Excellence in Astronomy (2014) - Awarded on professor recommendation by the UW-Madison Astronomy Department to one graduating senior for exceptional performance in astronomical research and in the classroom as an Astronomy-Physics major
- National Science Foundation Graduate Research Fellowship Program Honorable Mention (2014)
- Fay Ajzenberg-Selove Scholarship (2013) - Awarded annually by the UW-Madison Physics Department to an outstanding women majoring in Physics or Astrophysics.
- Hilldale Undergraduate/Faculty Research Fellowship (2013)
- Wisconsin Space Grant Consortium Undergraduate Research Award (2013)

ACCEPTED OBSERVING PROPOSALS AND OBSERVING EXPERIENCE

- 2017-2019: PI of a 19.5 hour program using LRS2 on the Hobby Eberly Telescope at McDonald Observatory. Awarded from guaranteed time from being part of the LRS2 commissioning team.
- 2015-2017: PI of 4 McDonald Observatory proposals. Awarded total of 26 nights on the 2.7m Harlan J. Smith Telescope at McDonald Observatory
- 2015: Observed for 7 nights on the 4m Mayall Telescope at Kitt Peak National Observatory

- 2013: Observed for 2 nights on the SMARTS 0.9m at Cerro Tololo Inter-American Observatory

CONFERENCES AND WORKSHOPS ATTENDED

- 2020 Society of Photographic Instrumentation Engineers (SPIE): Astronomical Telescopes and Instrumentation Meeting (remote)
- Scipy 2019 workshops: Modern Time Series Analysis, Bayesian Data Science: Probabilistic Programming, Deep Learning Fundamentals, Getting Started with Tensorflow
- 2018 Scientific Python (Scipy) Conference - attended workshops on neural networks, tensorflow, and time series analysis
- 2018 Society of Photographic Instrumentation Engineers (SPIE): Astronomical Telescopes and Instrumentation Meeting
- 2017 Institute for Scientist and Engineer Educators Professional Development Program
- 2017 Women in Astronomy Conference
- 2017 230th American Astronomical Society Meeting
- 2017 Institute for Science and Engineer Educators Professional Development Program
- 2016 Society of Photographic Instrumentation Engineers (SPIE): Astronomical Telescopes and Instrumentation Meeting (awarded travel funding)
- 2014 224th American Astronomical Society Meeting
- 2013 Dunlap Institute: Introduction to Astronomical Instrumentation Summer School (awarded full travel and registration funding)

PROFESSIONAL SERVICES

- Invited Seminar Speaker - MPE** Dec. 2020
Invited to give a seminar talk at The Max Planck Institute for Extraterrestrial Physics (MPE)
- Twice Invited Speaker at Astronomy on Tap - ATX** Aug. 2017, Oct. 2016
Invited to give a public talk on my research
- Invited Speaker at the Summer Board of Visitors Meeting** July 2017
Invited graduate student speaker for the summer BoV meeting
- Bashfest Reception Planning** June 2017
Booked the venue and caterer for UT-Austin's Bashfest
- LRS2 Reduction Pipeline Tutorial at Penn State University** May 2017
Invited to give a tutorial on my LRS2 pipeline to the Penn State Astronomy Department
- Elected Graduate Recruiting Officer** August 2016 - May 2017
Organized the graduate prospective students visit.
- LRS2 and VIRUS Commissioning Runs at the Hobby Eberly Telescope** August 2015 - Present
Helped with commissioning the instruments LRS2 and VIRUS for the Hobby Eberly Telescope over several trips.

STUDENT MENTORING

- HETDEX Classification Undergraduate Group** 2019
Lead a group of undergraduates in classifying thousands detections of objects in the HETDEX survey in order to build a training set of objects
- Yaswant Devarakonda - Undergraduate Student** March 2017 - August 2017
Mentored this student is reducing his VIRUS-P data and python programming.
- Adolfo (Andrew) Cancino - Undergraduate TAURUS Student** June 2017 - August 2017
Graduate student mentor during the TAURUS program
- VIRUS Undergraduate Student** June 2015 - August 2015
Mentored an astronomy undergraduate summer student and trained her in data analysis and detector characterization for VIRUS detectors

TEACHING AND OUTREACH

- Introduce a Girl to Engineering and STEM Festival** February 2016+2017+2018+2019
Volunteer and co organizer of the AWARE astronomy booth
- Designed and Taught Inquiry Activity** June 2017
As part of the Institute for Scientist and Engineer Educators Professional Development Program I designed and taught an inquiry activity for a group of undergraduate students with a team of four astronomers.
- TAURUS Student Trip to McDonald Observatory** June 2017 - August 2017
Organized a trip for TAURUS students to visit McDonald Observatory and trained them to use the 2.7 meter telescope for 3 nights.
- Volunteer at JWST Exhibit at Superbowl Live** February 2017
Volunteered to talk to people that visited the JWST full scale model exhibit at the Superbowl Live event in Houston, TX.
- EXES Teacher Meeting** December 2015
Gave a talk about Dark Energy to local grade school teachers.
- Represented NASA Wisconsin Science Festival** September 2013
Taught kids about NASA and astronomy
- Wonder of Physics** February 2010
Volunteered to run physics demos for kids and their families