

GAGANDEEP S. ANAND

Staff Scientist ◇ ganand@stsci.edu ◇ gsanand.github.io

CURRENT POSITION

Staff Scientist II, Science Support

Aug. 2021 – Present

Employed at the Space Telescope Science Institute (Baltimore, MD) as a Staff Scientist working on the Advanced Camera for Surveys on the Hubble Space Telescope.

EDUCATION

Institute for Astronomy, University of Hawaii

December 2018/August 2021

MS/PhD in Astronomy

Thesis: Tip of the Red Giant Branch Distances to Nearby Galaxies

Advisor: R. Brent Tully

Boston University

May 2017

M.A. in Astronomy

Vassar College

May 2015

A.B. in Astronomy & Physics, Minor in Mathematics

PREVIOUS RESEARCH POSITIONS

Graduate Research Assistant, University of Hawaii

Aug. 2017 – Aug. 2021

Visiting Graduate Research Fellow, IPAC/Caltech

Feb. 2020 – July 2020

Visiting Scholar, W.M. Keck Observatory

July 2017 – Aug. 2017

Graduate Researcher, Boston University

July 2015 – May 2017

Summer Researcher, Colby College

May 2014 – Aug. 2014

Observatory Assistant, Vassar College

Sept. 2011 – May 2015

COMPUTATIONAL SKILLS

Operating Systems

MacOS/OS X, UNIX/Linux, Windows

Computer Languages

Python, L^AT_EX, IDL

Astronomical Software

DOLPHOT, DrizzlePac, DS9, CIAO, GALFIT, IRAF, XSPEC

Amazon Web Services

API Gateway, Amplify, EC2, IAM, Lambda, S3

Miscellaneous Software/Tools

Git, Lightroom

PUBLICATION SUMMARY

[NASA/ADS Link to All Publications](#)

43 Refereed Publications (7 as first author)

3 Papers Under Review (1 as first author)

4 Instrument Science Reports (3 as first author)

2100+ Citations (320+ as first author), h-index = 19

HONORS/AWARDS

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| George and Mona Elmore Award for Research in Astronomy | ARCS Foundation, 2020 |
| IPAC/Caltech Visiting Graduate Fellowship | IPAC/Caltech, 2020 |
| W. M. Keck Observatory Visiting Scholarship | Keck Observatory, 2017 |
| Departmental Honors in Astronomy | Vassar College, 2015 |

GRANT MONEY AWARDED

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| JWST Cycle 2, GO-3055– \$243,826 to G. Anand (STScI Grant PI) | JWST, 2023 |
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OBSERVING TIME AWARDED

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| JWST Cycle 2, GO-3707 (Co-I): A JWST Census of the Local Galaxy Population: Anchoring the Physics of the Matter Cycle, 148.8 hours, PI A. Leroy | JWST, 2023 |
| JWST Cycle 2, GO-3055 (Co-I): A TRGB Calibration of Surface Brightness Fluctuations, 46.8 hours, PI R. Tully | JWST, 2023 |
| HST Cycle 31, GO-17502 (Co-I): Resolving gas, star formation and feedback in nearby galaxies with an HST+JWST+ALMA Treasury, 169 orbits, PI D. Thilker | HST, 2023 |
| HST Cycle 31, GO-17520 (Co-I): A 1% cross-calibration of Cepheids, TRGB, and JAGB in five nearby galaxies with HST, 33 orbits, PIs L. Breuval & A. Riess | HST, 2023 |

SELECT RECENT MEDIA COVERAGE

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| JWST Deepens Mystery of Hubble Constant Tension | NASA/JWST, 2023 |
| JWST Reveals Networks of Gas and Dust in Nearby Galaxies | NASA/Hubble, 2023 |
| Peekaboo! Tiny, Hidden Galaxy Provides a Peek Into the Past | NASA/Hubble, 2022 |
| Investigating A Made-to-Measure Galaxy | ESA/Hubble, 2022 |
| Astronomers Map Distances to 56,000 Galaxies | University of Hawaii, 2022 |
| Hubble Identifies Unusual Wrinkle in Universe's Expansion | CNN, 2022 |
| Capturing All That Glitters in Galaxies With NASA's Webb | NASA/JWST, 2022 |

OUTREACH ACTIVITIES

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| ESA/Hubble Picture of the Week Series | 2019–Present |
| Institute for Astronomy, Misc. Outreach Activities | 2017–2021 |
| Boston University Astronomy Open Nights | 2015–2017 |
| Vassar College Astronomy Open Nights | 2011–2015 |

PROFESSIONAL MEMBERSHIPS

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| American Astronomical Society, Full Member | 2021–Present |
| American Astronomical Society, Junior Member | September 2016–2021 |

PROFESSIONAL SERVICE

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| Referee | Astrophysical Journal (4+ papers), July 2018–Present |
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TEACHING EXPERIENCE

Department of Astronomy

Teaching Fellow

Sept. 2015 –May 2017

Boston University

- Astronomy 203- Principles of Astronomy II (Spring 2017)
- Astronomy 109- Cosmology (Fall 2015/Fall 2016)
- Astronomy 105- Alien Worlds (Spring 2016)

Department of Physics & Astronomy

Astronomy Academic Intern

Sept. 2014 –May 2015

Vassar College

- Astronomy 105- Stars, Galaxies, & Cosmology (Spring 2015)
- Astronomy 101- Solar System Astronomy (Fall 2014)

INSTRUMENT SCIENCE REPORTS

The ACS/WFC Focus-Diverse ePSF Webtool

Anand, G. S., Grogin, N., Anderson, J., Cohen, Y., & Bellini, A., [Instrument Science Report, ACS, 2023-06](#)

Systematic Effects in ACS/WFC Absolute Gain Measurements

Anand, G. S., Grogin, N., Anderson, J., & Ryon J., [Instrument Science Report, ACS, 2023-02](#)

Improved Absolute Astrometry for ACS and WFC3 Data Products

Mack, J., Hack, W., Burger, M., White, R. L., Bajaj, V., Avila, R. J., **Anand, G. S.**, de la Pena, M., [Instrument Science Report, ACS, 2022-03](#)

Revisiting ACS/WFC Sky Backgrounds

Anand, G. S., Grogin, N., & Anderson, J., [Instrument Science Report, ACS, 2022-01](#)

FIRST AUTHOR PUBLICATIONS

Tip of the Red Giant Branch Distances with JWST: An Absolute Calibration in NGC 4258 and First Applications to Type Ia Supernova Hosts

Anand, G. S., Riess, A. G., Wenlong, Y., et al., *Submitted to ApJ*

Comparing Tip of the Red Giant Branch Distance Scales: An Independent Reduction of the Carnegie-Chicago Hubble Program and the Value of the Hubble Constant

Anand, G. S., Tully, R. B., Rizzi, L., Riess, A. G., & Yuan, W., 2022, [ApJ](#)

The Extragalactic Distance Database: The Color-Magnitude Diagrams and Tip of the Red Giant Branch Distances Catalog

Anand, G. S., Rizzi, L., Tully, R. B., et al., 2021, [AJ](#)

Distances to PHANGS Galaxies: New Tip of the Red Giant Branch Measurements and Adopted Distances

Anand, G. S., Lee, J., Van Dyk, S., et al., 2021, [MNRAS](#)

Peculiar Velocities of Galaxies Just Beyond the Local Group

Anand, G. S., Tully, R. B., Rizzi, L., Shaya, E., & Karachentsev, I. D., 2019, [ApJ](#)

The Distance and Motion of the Maffei Group

Anand, G. S., Tully, R. B., Rizzi, L., & Karachentsev, I. D., 2019, [ApJL](#)

A Robust Tip of the Red Giant Branch Distance to the Fireworks Galaxy (NGC 6946)

Anand, G. S., Rizzi, L., & Tully, R. B., 2018, [AJ](#)

The Distance to the Galaxy Coma P

Anand, G. S., Tully, R. B., Karachentsev, I. D., Makarov, D. I., Makarova, L.; Rizzi, L.; Shaya, E. J., 2018, [ApJL](#)

CO-AUTHOR PUBLICATIONS

JWST Observations Reject Unrecognized Crowding of Cepheid Photometry as an Explanation for the Hubble Tension at 8σ Confidence

Riess, A. G., **Anand, G. S.**, Yuan, W., Casertano, S., Dolphin, A., Macri, L., Breuval, L., Scolnic, D., Perrin, M., & Anderson, R., *Submitted to ApJL*

Reconnaissance of the J-region Asymptotic Giant Branch in Five Nearby Galaxies using JWST

Li, S., Riess, A. G., Casertano, S., **Anand, G. S.**, Scolnic, D., Breuval, L., Huang, C. D., *Submitted to ApJ*

Crowded No More: The Accuracy of the Hubble Constant Tested with High Resolution Observations of Cepheids by JWST

Riess, A. G., **Anand, G. S.**, Yuan, W., Casertano, S., Dolphin, A., Macri, L., Breuval, L., Scolnic, D., Perrin, M., & Anderson, R., 2023, [ApJL](#)

Standardized Luminosity of the Tip of the Red Giant Branch Utilizing Multiple Fields in NGC 4258 and the CATs Algorithm

Li, S., Riess, A. G., Scolnic, D., **Anand, G. S.**, Wu, J., Casertano, S., Yuan, W., Beaton, R., & Anderson, R. I., 2023, [ApJ](#)

CATS: The Hubble Constant from Standardized TRGB and Type Ia Supernovae

Scolnic, D., Riess, A. G., Wu, J., Li, S., **Anand, G. S.**, Beaton, R., Casertano, S., Anderson, R., Dhawan, S., Ke, X., 2023, [ApJ](#)

Comparative Analysis of TRGBs (CATs) from Unsupervised, Multi-Halo-Field Measurements: Contrast is Key

Wu, J., Scolnic, D., Riess, A. G., **Anand, G. S.**, Beaton, R., Casertano, S., Ke, X., & Li, S., 2023, [ApJ](#)

A Possible Dwarf Galaxy Satellite-of-Satellite Problem in Λ CDM

Müller, O., Heesters, N., Jerjen, H., **Anand, G. S.**, & Revaz, Y., 2023, [A&A](#)

Serendipitous Nebular-phase JWST Imaging of SN Ia 2021aefx:

Testing the Confinement of 56-Co Decay Energy

Mayker Chen, N., Tucker, M., Hoyer, N., [5 authors], **Anand, G. S.**, [19 authors], 2023, [ApJL](#)

A Nearby Isolated Dwarf: Star Formation and Structure of ESO 006-001

Makarova, L. N., Tully, R. B., **Anand, G. S.**, Lambert, T. S., Sharina, M. E., Koribalski, B. S., & Kraan-Korteweg, R. C., 2023, [ApJ](#)

The PHANGS-JWST Treasury Survey: Star Formation, Feedback, and Dust Physics at High Angular resolution in Nearby Galaxies

Lee, J. C., Sandstrom, K. M., Leroy, A. K., Thilker, D. A., Schinnerer, E., [6 authors], **Anand, G. S.**, [65 authors], 2023, [ApJL](#)

- PHANGS-JWST First Results: The Dust Filament Network of NGC 628 and its Relation to Star Formation Activity**
Thilker, D. A., Lee, J. C., Deger, S., [24 authors], *Anand, G. S.*, [11 authors], 2023, [ApJL](#)
- PHANGS-JWST First Results: Stellar Feedback-Driven Excitation and Dissociation of Molecular Gas in the Starburst Ring of NGC 1365?**
Liu, D., Schinnerer, E., Cao, Y., Leroy, A., [24 authors], *Anand, G. S.*, [12 authors], 2023, [ApJL](#)
- PHANGS-JWST First Results: A statistical view on bubble evolution in NGC628**
Watkins, E. J., Barnes, A., [11 authors], *Anand, G. S.*, [38 authors], 2022, [ApJL](#)
- PHANGS-JWST First Results: Dust Embedded Star Clusters in NGC 7496 Selected via 3.3 μm PAH Emission**
Rodriguez, J., Lee, J., Whitmore, B., Thilker, D., [11 authors], *Anand, G. S.*, [25 authors], 2023, [ApJL](#)
- Peekaboo: The Extremely Metal Poor Dwarf Galaxy HIPASS J1131-31**
Karachentsev, I. D., Makarova, L. N., Koribalski, B. S., *Anand, G. S.*, Tully, R. B., & Kniazev, A. Y., 2023, [MNRAS](#)
- The Whisper of a Whimper of a Bang: 2400 Days of the Type Ia SN 2011fe Reveals the Decay of ^{55}Fe**
Tucker, M. A., Shappee, B. J., Kochanek, C.S., Stanek, K.Z., Ashall, C., *Anand, G. S.*, & Garnavich, P., 2022, [MNRAS](#)
- Cosmicflows-4**
Tully, R. B., Kourkchi, E., Courtois, H. M., *Anand, G. S.*, [13 authors], 2022, [ApJ](#)
- PHANGS: Constraining Star Formation Timescales Using the Spatial Correlations of Star Clusters and Giant Molecular Clouds**
Turner, Jordan A., Dale, Daniel A., Lilly, James, [4 authors], *Anand, G. S.*, [17 authors], 2022, [MNRAS](#)
- A Comprehensive Measurement of the Local Value of the Hubble Constant with 1 km/s/Mpc Uncertainty from the Hubble Space Telescope and the SH0ES Team**
Riess, A. G., Yuan, W., Macri, L. M., [5 authors], *Anand, G. S.*, [9 authors] 2022, [ApJL](#)
- Around the Spindle Galaxy: The Dark Halo Mass of NGC 3115**
Karachentsev, I. D., Makarova, L. N., *Anand, G. S.*, & Tully, R. B., 2022, [AJ](#)
- PNLF Distances for 19 Galaxies Observed by PHANGS-MUSE**
Scheuermann, F., Kreckel, K. *Anand, G. S.*, [3 authors], Van Dyk, S. D., [11 authors], 2022, [A&A](#)
- The PHANGS-MUSE survey. Probing the chemo-dynamical evolution of disc galaxies**
Emsellem, E., Schinnerer, E., Santoro, F., [18 authors], *Anand, G. S.*, [26 authors], 2022, [A&A](#)
- KK 242, A Faint Companion to the Isolated Scd Galaxy NGC 6503**
Karachentsev, I. D., Cannon, J. M., Fuson, J., Inoue, J. L., Tully, R. B., *Anand, G. S.*, & Kaisin, S. S., 2022, [AJ](#)
- Late-Onset Circumstellar Medium Interactions are Rare: An Unbiased GALEX View of Type Ia Supernovae**
Dubay, L., Tucker, M., Do, A., Shappee, B., *Anand, G. S.*, 2022, [ApJ](#)

- The PHANGS-HST Survey: Physics at High Angular resolution in Nearby Galaxies with the Hubble Space Telescope**
Lee, Janice C., Whitmore, Bradley C., Thilker, David A., Deger, Sinan, Larson, Kirsten L., Ubeda, Leonardo, **Anand, G. S.**, [10 authors], White, R. L., [36 authors], 2022, [ApJS](#)
- Measuring an off-Center Detonation through Infrared Line Profiles: The peculiar Type Ia Supernova SN 2020qxp/ASASSN-20jq**
Hoeftlich, P., Ashall, C., Bose, S., [4 authors], **Anand, G. S.**, [12 authors], 2021, [ApJ](#)
- PHANGS–ALMA: Arcsecond CO(2–1) Imaging of Nearby Star-Forming Galaxies**
Leroy, A., Schinnerer, E., Hughes, A., [16 authors], **Anand, G. S.**, [52 authors], 2021, [ApJS](#)
- SN2019yvv Does Not Conform to SN Ia Explosion Models**
Tucker, M. A., Ashall, C., Shappee, B. J., Vallely, P. J., Kochanek, C. S., Huber, M. E., **Anand, G. S.**, Keane, J. V., Hsiao, E. Y., Holoien, T. W. S., 2021, [ApJ](#)
- PHANGS-ALMA Data Processing and Pipeline**
Leroy, A., Hughes, A., Liu, D., [16 authors], **Anand, G. S.**, [47 authors], 2021, [ApJS](#)
- The Cepheid Distance to the Narrow-Line Seyfert 1 Galaxy NGC 4051**
Yuan, W., Macri, L., Peterson, B. M., Riess, A. G., Fausnaugh, M. M., Hoffman, S. L., **Anand, G. S.**, [11 authors], 2021, [ApJ](#)
- The Distance and Mass of the NGC 253 Galaxy Group**
Karachentsev, I. D., Tully, R. B., **Anand, G. S.**, Rizzi, L., Shaya, E. J., 2021, [AJ](#)
- The Electron-capture Origin of Supernova 2018zd**
Hiramatsu, D., Howell, D. A., Van Dyk, S. D., [19 authors], **Anand, G. S.**, [7 authors], 2021, [Nature Astronomy](#)
- The Properties of Dwarf Spheroidal Galaxies in the Cen A Group: Stellar Populations, Internal Dynamics, and a Heart-Shaped H α Ring?**
Müller, O., Fahrion, K., Rejkuba, M., Hilker, M., Lelli, F., Lutz, K., Pawlowski, M. S., Coccato, L., **Anand, G. S.**, & Jerjen, H., 2020, [A&A](#)
- Distance and Mass of the M104 (Sombrero) Group**
Karachentsev, I. D., Makarova, L. N., Tully, R. B.; **Anand, G. S.**; Rizzi, L., Shaya, E. J., 2020, [A&A](#)
- KKH 22, The First Dwarf Spheroidal Satellite of IC 342**
Karachentsev, I. D., Makarova, L. N., Tully, R. B.; **Anand, G. S.**; Rizzi, L., Shaya, E. J., Afanasiev, V. L., 2020, [A&A](#)
- Cosmicflows-4: The Calibration of Optical and Infrared Tully-Fisher Relations**
Kourkchi, E.; Tully, R. B., **Anand, G. S.**, Courtois, H. M., Dupuy, A., Neill, J. D., Rizzi, L., Seibert, M., 2020, [ApJ](#)
- Does Gravity Fall Down? Evidence for Gravitational-wave Deflection along the Line of Sight to GW170817**
Rubin, D., Szapudi, I., Shappee, B. J., **Anand, G. S.**, 2020, [ApJL](#)
- The High-Redshift Clusters Occupied by Bent Radio AGN (COBRA) Survey**
Paterno-Mahler, R., Blanton, E. L., Ashby, M. L. N., Brodwin, M., Wing, J. D., Decker, B., Golden-Marx, E., & **Anand, G. S.**, 2017, [ApJ](#)

INVITED TALKS

Cosmicflows-4: Tip of the Red Giant Branch Distances

American Museum of Natural History, New York, NY- September 2021

Herzberg Astronomy and Astrophysics Research Centre, NRC Canada- April 2021

UMass Amherst Galaxy Lunch Talk, Amherst, MA- March 2021

PHANGS-HST: New Tip of the Red Giant Branch Distances

IPAC Colloquium, Pasadena, CA- July 2020

CONTRIBUTED TALKS

Tip of the Red Giant Branch Distances to Nearby Galaxies

Caltech Tea Talk- June 2020

Visiting Scholars Talk, W.M. Keck Observatory- August 2017

Peculiar Velocities of Galaxies Just Beyond the Local Group

Constrained Local Universe Simulations 2019 Meeting, University of Lyon- September 2019

Exploring the Structural Evolution of Massive Quiescent Galaxies

Keck Northeast Astronomy Consortium- November 2014

Colby Undergraduate Summer Research Retreat- July 2014

Observations and Analysis of Orbital Period Changes in Contact Binaries

Keck Northeast Astronomy Consortium- October 2013

CONFERENCE POSTERS

PHANGS-HST: New Tip of the Red Giant Branch Distances

236th Meeting of the American Astronomical Society- June 2020

The Extragalactic Distance Database: Color-Magnitude Diagrams and Tip of the Red Giant Branch Distances

235th Meeting of the American Astronomical Society- January 2020

Tip of the Red Giant Branch Distances to Nearby Galaxies

Stars: Birth and Death, GMT Community Science Meeting- September 2018

The 21st Century HR Diagram, Space Telescope Science Institute- April 2018

Chandra Observation of the WAT Radio Source/ICM Interaction in Abell 623

229th Meeting of the American Astronomical Society- January 2017

Chandra Science for the Next Decade, Harvard-Smithsonian Center for Astrophysics- August 2016

Observations and Analysis of Orbital Period Changes in Contact Binaries

Vassar Undergraduate Research Summer Institute- July 2013