

GAGANDEEP S. ANAND

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RECENT EMPLOYMENT

Senior Staff Scientist
Staff Scientist II

Apr. 2024 – Present
Aug. 2021 – Apr. 2024

Employed at the Space Telescope Science Institute (Baltimore, MD) as a Senior Staff Scientist working as a member of the Advanced Camera for Surveys team 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](#)

46 Refereed Publications (8 as first author)

2 Paper Under Review (as co-author)

4 Instrument Science Reports (3 as first author)

2500+ Citations (360+ as first author), h-index = 20

HONORS/AWARDS

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

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

JWST Cycle 3, GO-5989 (Co-I): The JWST SBF Coma Cluster Survey: Building an Alternative Precision Distance Ladder for Cosmology, 29.7 hours, PI J. Jensen	JWST, 2024
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

JWST Affirms Universe's Expansion Rate, Puzzle Persists	NASA/JWST 2024
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

OUTREACH ACTIVITIES

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

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

PROFESSIONAL SERVICE

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., Yuan, W., et al., [In Press at 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

**Small Magellanic Cloud Cepheids Observed with the Hubble Space Telescope
Provide a New Anchor for the SH0ES Distance Ladder**

Breuval, L., Riess, A. G., Casertano, S., [5 authors], Anand, G. S., [1 authors], *Submitted to ApJ*

PHANGS-JWST: Data Processing Pipeline and First Full Public Data Release

Williams, T. G., Lee, J. C., Larson, K. L., [10 authors], Anand, G. S., [42 authors], *Submitted to ApJS*

**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*

**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., 2024, *ApJL*

**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**
Hoefflich, 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., Valley, P. J., Kochanek, C. S., Huber, M. E., *Anand, G. S.*, Keane, J. V., Hsiao, E. Y., Holm, 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?**
Müeller, 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