GAGANDEEP S. ANAND

Senior Staff Scientist \diamond ganand@stsci.edu \diamond gsanand.github.io

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

M.S./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, LATEX, 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

55 Refereed Publications (10 as first author, 1 as primary mentor)

3 Papers Under Review (as co-author)

4 Instrument Science Reports (3 as first author)

3900 + Citations (470 + as first author), h-index = 25

G. S. Anand 1/10

HONORS/AWARDS

George and Mona Elmore Award for Research in Astronomy	ADCC Foundation, 2020	
IPAC/Caltech Visiting Graduate Fellowship	ARCS Foundation, 2020 IPAC/Caltech, 2020 Keck Observatory, 2017 Vassar College, 2015	
W. M. Keck Observatory Visiting Scholarship Departmental Honors in Astronomy		
GRANT MONEY		
HST Cycle 32, GO–17809 – \$59,832 to G. S. Anand (as STScI Grant PI)	HST, 2025	
HST Cycle 32, GO–17712 – $41,000$ for G. S. Anand	HST, 2025	
JWST Cycle 2, GO-3055 $-$ \$243,826 to G. S. An and (as STScI Grant PI)	JWST, 2023	
JWST Cycle 2, GO-2875— $$50,000$ for G. S. Anand	JWST, 2023	
JWST Cycle 1, GO-1685— \$75,000 for G. S. An and	JWST, 2022	
OBSERVING TIME		
JWST Cycle 4, GO-7113 (Co-I), 300 Survey Targets, PI R. Tully	JWST, 2025	
JWST Cycle 4, GO-7034 (Co-PI), 43.0 hours, PIs R. Tully and G. S.	Anand JWST, 2025	
HST Cycle 32, GO-17911 (Co-I), 8 orbits, PI S. Li	HST, 2024	
HST Cycle 32, GO-17809 (Co-I), 48 orbits, PI D. Thilker	HST, 2024	
HST Cycle 32, GO-17743 (Co-I), 28 orbits, PI A. Riess	HST, 2024	
HST Cycle 32, GO-17712 (Co-I), 8 orbits, PI A. Benitez-Llambay	HST, 2024	
JWST Cycle 3, GO-5989 (Co-I), 29.7 hours, PI J. Jensen	JWST, 2024	
HST Cycle 31, GO-17502 (Co-I), 169 orbits, PI D. Thilker	HST, 2023	
HST Cycle 31, GO-17520 (Co-I), 33 orbits, PI L. Breuval	HST, 2023	
JWST Cycle 2, GO-3707 (Co-I), 148.8 hours, PI A. Leroy	JWST, 2023	
JWST Cycle 2, GO-3055 (Co-I), $46.8\ hours,\ PI\ R.\ Tully$	JWST, 2023	
SELECT MEDIA COVERAGE		
The Hubble Tension Is Becoming a Hubble Crisis JWST Further Deepens the Biggest Controversy in Cosmology JWST Affirms Universe's Expansion Rate, Puzzle Persists JWST Reveals Networks of Gas and Dust in Nearby Galaxies Peekaboo! Tiny, Hidden Galaxy Provides a Peek Into the Past Investigating A Made-to-Measure Galaxy Astronomers Map Distances to 56,000 Galaxies A Waterfall of Stars ARCS Scholar Awards	Scientific American, 2025 Quanta Magazine, 2024 NASA/JWST, 2024 NASA/JWST, 2025 NASA/Hubble, 2022 ESA/Hubble, 2022 University of Hawaii, 2026 University of Hawaii, 2020 University of Hawaii, 2020	

G. S. Anand 2/10

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 (5+ papers), July 2018-Present

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

Sept. 2014 –May 2015

Astronomy Academic Intern

Vassar College

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

FIRST AUTHOR PUBLICATIONS

The TRGB-SBF Project. II. Resolving the Virgo Cluster with JWST Anand, G. S., Tully, R. B., Cohen, Y., et al., 2025, ApJ

The TRGB-SBF Project. I. A Tip of the Red Giant Branch Distance to the Fornax Cluster with JWST

Anand, G. S., Tully, R. B., Cohen, Y., et al., 2024, ApJ

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., 2024, 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

G. S. Anand 3/10

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

PUBLICATIONS AS PRIMARY MENTOR

Tip of the Red Giant Branch Distances with JWST. II. I-band Measurements in a Sample of Hosts of 10 SN Ia Match HST Cepheids

Li, S., Anand, G. S., Riess, A. G., [7 authors], 2024, ApJ

CO-AUTHOR PUBLICATIONS (W/MAJOR CONTRIBUTION)

The Complete Sample of Available SNe Ia Luminosity Calibrations from the TRGB Observed with either HST or JWST

Li, S., Riess, A. G., Anand, G. S., Scolnic, D., Murakami, Y. S., Brout, D., Peterson, E. R., Submitted to ApJ

JWST Validates HST Distance Measurements: Selection of Supernova Subsample

Explains Differences in JWST Estimates of Local H_0

Riess, A. G., Scolnic, D., *Anand, G. S.*, [16 authors], 2024, *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

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

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*

CO-AUTHOR PUBLICATIONS

The TRGB-SBF Project. III. Refining the HST Surface Brightness Fluctuation Distance Scale Calibration with JWST

Jensen, J. B., Blakeslee, J. P., Cantiello, M., Cowles, M., Anand, G. S., Tully, R. B., Kourkchi, E., Raimondo, G., Submitted to ApJ

G. S. Anand 4/10

- JAGB 2.0: Improved Constraints on the J-Region Asymptotic Giant Branch-based Hubble Constant from an Expanded Sample of JWST Observations Li, S., Riess, A. G., Scolnic D., Casertano S., Anand, G. S., Submitted to ApJ
- Polycyclic Aromatic Hydrocarbon and CO(2-1) Emission at 50–150 pc Scales in 66 Nearby Galaxies Chown, R., Leroy, A., Sandstrom, K., [8 authors], *Anand, G. S.*, [30 authors], *ApJ*
- The Hubble Tension in our own Backyard: DESI and the Nearness of the Coma Cluster
 Scolnic, D., Riess, A. G., Murakami, Y. S., [7 authors], Anand, G. S., 2025, ApJ
- The Hubble Constant Anchor Galaxy NGC 4258: Metallicity and Distance from Blue Supergiants
 Kudritzki, R., Urbaneja, M. A., Bresolin, F., [3 authors], Anand, G. S., [1 author], 2024, ApJ
- 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], 2024, ApJ

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

- 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], 2024, ApJS
- using JWST Li, S., Riess, A. G., Casertano, S., Anand, G. S., Scolnic, D., Breuval, L., Huang, C. D., 2024, ApJ
- 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
- 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

G. S. Anand 5/10

- 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 μ m PAH Emission Rodriguez, J., Lee, J., Whitmore, B., Thilker, D., [11 authors], Anand, G. S., [25 authors], 2023, ApJL
- The Whisper of a Whimper of a Bang: 2400 Days of the Type Ia SN 2011fe Reveals the Decay of 55Fe

 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

G. S. Anand 6/10

- Measuring an off-Center Detonation through Infrared Line Profiles: The peculiar Type Ia Supernova SN 2020qxp/ASASSN-20jq
 Hoeflich, 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
- SN2019yvq 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 Hα 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

RESEARCH NOTES

A Sizable Discrepancy in Ground-Based JAGB Distances to Nearby Galaxies Anand, G. S., Submitted to RNAAS

G. S. Anand 7/10

Calibrating the Tully-Fisher Relation to Measure the Hubble Constant

Scolnic D., Boubel, P., Byrne, J., Riess, A. G., Anand, G. S., Submitted to RNAAS

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

COLLABORATIVE WORKSHOPS

What's Under the Hood? Towards Consensus on the Local Value of the Hubble Constant

- Participant in week-long 40 person workshop at the International Space Science Institute (Bern, Switzerland) focused on achieving consensus on the local value of the Hubble constant.

INVITED TALKS

Insights on the Hubble Tension with JWST

CERN/European Consortium for Astroparticle Theory—September 2024 LSST Dark Energy Science Collaboration—September 2024

A JWST TRGB Calibration of Surface Brightness Fluctuations

International Space Science Institute—December 2023

Cosmicflows-4: Tip of the Red Giant Branch Distances

American Museum of Natural History, New York—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

Time Dependent Sensitivity of the Advanced Camera for Surveys

Accurate Flux Calibration, Space Telescope Science Institute-October 2024

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

G. S. Anand 8/10

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

G. S. Anand 9/10

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

G. S. Anand 10/10