

# Curriculum Vitae (Shardha Jogee)

## Address

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## Education

- Yale University, U.S.A – Astronomy – Ph.D. (1999), M. Phil. (1994), M. S. (1994).
- Cambridge University, England – Physics – B.A. (1992), M.A. (1995).

## Employment

- August 2019–Present: Professor in the Astronomy Department and holder of the Rex G. Baker, Jr. and McDonald Observatory Centennial Professorship, UT Austin.
- July 2015– July 2019: Department Chair, Astronomy Department, UT Austin
- 2014–2015: Department Associate Chair, Astronomy Department, UT Austin
- 2014–Present: Professor, Astronomy Department, UT Austin.
- 2009–2013: Associate Professor, Astronomy Department, UT Austin.
- 2004–2008: Assistant Professor, Astronomy Department, UT Austin.
- 2002–2004: Assistant Astronomer, Space Telescope Science Institute.<sup>1</sup>
- 1998–2002: Postdoctoral Scholar, California Institute of Technology (Caltech)

**Summary of Grant Awards:** I have been awarded ~\$3.8 M in external research and education grants over the period 2004 to 2019. Research grants account for ~\$3.1 M, of which ~\$2.6 M are from grants where I am the Principal Investigator (PI). Education and outreach grants account for ~\$0.7 M. In terms of recent awards over the past five years, I have been the PI of three NSF AAG grants (2014, 2015, 2017), two Heising-Simons Foundation grants (2018, 2019), and one NASA grant (2014) for a total of ~ \$2.2 M. For multi-institution grants, the grant amounts listed above include *only the amount awarded to my institution* with me as PI, Co-PI, or Co-I. A detailed list of grant awards is provided in Appendix A of the long version of this CV, and few select awards are listed below.

1. PI: Heising-Simons Foundation grant to honor Beatrice Tinsley’s pioneering transformational work, support graduate student research, and foster an inclusive scientific environment, 2019 (\$350,000).
2. PI: National Science Foundation Research Experience for Undergraduates (REU) grant, 2018-2021 (\$399,000): ‘*Frontier Research and Training in Astronomy for the 21st Century*’. <sup>2</sup>

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<sup>1</sup>Space Telescope Science Institute (STScI) oversees the scientific operations of NASA’s *Hubble Space Telescope* and the future James Webb Space Telescope.

<sup>2</sup><https://astronomy.utexas.edu/research/Astronomy-REU-ASSURE>

3. PI: Heising-Simons Foundation, 2018-2020 (\$75,000): *‘Advancing the Engagement and Success of Women in Astronomy’*.
4. PI: National Science Foundation Astronomy and Astrophysics Grant (AAG), 2015-2018 (\$367,772 awarded to UT Austin out of a total award of \$873,000): *‘Collaborative Research: Galaxy Growth in Different Environments from  $z=1.9$  to 3.5’*.
5. UT PI: NASA, Strategic University Research Partnerships Program, 2014 (\$75,000): *‘Galaxy Growth at  $z \sim 2 - 4$ : From Voids to Proto-Clusters.’*
6. PI: National Science Foundation Astronomy and Astrophysics Grant (AAG), 2014-2018 (\$297,613): *‘Unveiling the Assembly History of Galaxies by Dissecting their Structure, Chemical Evolution, and Stellar Populations.’*
7. PI: Norman Hackerman Advanced Research Program (NHARP) grant, 2010-2013 (\$149,000): *‘Student Support for VENGA: Understanding Galaxy Evolution in the Nearby Universe.’*
8. PI: NASA Long Term Space Astrophysics (LTSA) grant, 2003-2011 (\$558,000): *‘Structure and dynamics of local and intermediate redshift disks.’*
9. PI: National Science Foundation Astronomy and Astrophysics Grant (AAG), 2006-2011 (\$311,748): *‘Bars and their Impact on Galaxy Evolution over the Last Eight Billion Years.’*
10. Co-PI: NSF STEM Undergraduate Education award (DUE-0807140), 2008 (\$600,000): *‘Scientists for Tomorrow.’*

**Summary of Publications:** As of September 2019, my publication record includes 190 publications with 7750+ citations (including 23 papers with over 100 citations), a current citation rate of 400+ citations per year, and an h-index of 44. A detailed publication list is provided in Appendix B of the long version of this CV. In addition to scientific publications, I published two Op-Eds in the New York Times<sup>3</sup> and Dallas Morning News<sup>4</sup> as a Public voices Fellow with the OpEd Project.

**Summary of Talks:** I have presented over 60 invited colloquia and talks at universities and conferences (e.g., in the USA, England, France, Germany, the Netherlands, Italy, Spain, Chile, South Africa, etc) on research, STEM education, and academic leadership. A detailed list of talks is provided in Appendix C of the long version of this CV.

### Academic and Administrative Leadership Experience

- Public voices Fellow with the OpEd Project (Feb. 2020–Present)
- Member of working group set up by UT President Fennes to help UT better address Title IX and sexual misconduct issues and implement Texas Senate Bill 212 (Nov. 2019–Present)
- Member of the American Astronomical Society (AAS) Warner/Pierce Prize Committee (June 2019–Present)

<sup>3</sup><https://www.nytimes.com/2020/07/20/opinion/coronavirus-reopen-schools-economy.html?action=clickmodule=Opinionpgtype=Homepagefbclid=IwAR0FLmci9ueXJPNoAzHDFcbbp99fhnzVRfRt1W>

<sup>4</sup><https://www.dallasnews.com/opinion/commentary/2020/07/26/removing-the-name-of-a-segregationist-from-a-science-building-at-ut-austin-will-help-us-recruit-stem-scholars-of-color/>

- Member and Sub-Committee Chair of the Provost University Faculty Gender Equity Council (Oct 2018–Present)
- Selected by the Office of the Provost for the University of Texas Executive Management and Leadership Program (UTEMLP; Jan.–May 2018).
- Invited member of the Heising-Simons Foundation Physics and Astronomy Leadership Council (PALC; 2017-2020).
- Chair of the UT Austin Astronomy Department with ~200 members (July 2015 to July 2019). Milestones established include:
  - a) Growth of the UT Astronomy research program in planetary science, galaxy evolution, dark matter, cosmology, and stellar archeology through the hire and retention of 9 top-tier faculty members (40% of the faculty).
  - b) Fostering an inclusive culture of excellence and innovation and promoting a broader participation of under-represented groups in STEM through best practices, reducing bias in hires and admission, greater equity in salary and other resources, and mentoring. This led to a steep increase in the percentage of female faculty members (from 13% to 24%) and the hiring of the first African-American faculty.
  - c) Development and fundraising leadership, including (i) Launching a \$5 M campaign for the Astronomy Research Endowment (ARE) to provide permanent support for graduate students, fundraising \$1.9 M in the first year, and establishing the endowed Beatrice Tinsley Fellowship and the Harlan J. Smith Fellowship; (ii) Helping to fundraise and steward gifts (~\$10 M) for the Giant Magellan Telescope (GMT); (iii) Securing foundation support.
  - d) Funding and launching a new state-of-the-art UG research computer lab to advance our research-enhanced model of experiential education and our 21st century UG curriculum reform.
  - e) Launch, as PI, of an NSF/DOD-funded UT Astronomy summer REU program<sup>5</sup> to provide talented under-served undergraduates with 21st century STEM skills, research opportunities, and professional development.
  - f) External relations including cultivation of the McDonald Observatory and Department of Astronomy Board of Visitors with 200+ members, public engagement, alumni relations, and outreach efforts to the Texas State Legislature
- Department Associate Chair, Astronomy Department, UT Austin (2014–2015).
- Invited member of the UT College of Natural Sciences Strategic Planning Task, which worked collaboratively with the new Dean to set up a five-year strategic vision plan for the college’s future. Led the white paper on “Graduate Student Support” and co-authored the white paper on “Faculty Hiring Practices” (2012–13).
- UT representative in the Leadership Texas program for women leaders in industry, business, government, and academia (2014).
- Member of the Advisory Council for the Texas Institute for Discovery Education in Science (TIDES) (2014–2015).

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<sup>5</sup><https://astronomy.utexas.edu/research/Astronomy-REU-ASSURE>

- Astronomy Undergraduate Advisor, Astronomy Graduate Studies Committee (GSC) Chair, Member of Astronomy Faculty Search Committees, and lead of federally-funded STEM outreach programs (2005–Present).
- Served on scientific advisory panels for federal funding agencies (e.g., NASA, NSF) and time allocation panels for international research facilities. Referee for top-tier journals, including the *Astrophysical Journal* (ApJ), *Astrophysical Journal Letters* (ApJL), *Astronomy & Astrophysics* (A&A), and *Monthly Notices of the Royal Astronomical Society* (MNRAS) (2005–Present).
- Lead for core scientific investigations in five large international science collaborations, which conducted some of the largest or deepest galaxy surveys at the time (e.g., GEMS, STAGES, ACS Treasury survey of Coma, GOODS NICMOS Survey, SHELA/HETDEX) (2002–Present).
- Instrument scientist at the Space Telescope Science (STScI) Institute for NASA’s Advanced Camera for Surveys (ACS) on the Hubble Space Telescope in 2002. As team leader for the Phase II proposal process for ACS, I led a team of 12 tenured and tenure-track scientists to design and optimize the scientific programs for ACS on Hubble (2002–2004).
- Core member of the STScI home team that designed the Hubble Ultra Deep Field (HUDF), the deepest optical image ever made of the Universe, and presented it to the media through scientific panels (2002–2004).
- Member of the International Astronomical Union (IAU) Commission 28 on Galaxies (2009–2013).
- Member of the Nominating Committee, American Astronomical Society (AAS), Division of Dynamical Astronomy (2010–2011).
- Member of the ALMA North American Science Advisory Committee (2007–2010).
- Member of the Giant Magellan Telescope (GMT) science working group (2008–2009).

**Research Program:** My research addresses central questions on the evolution of galaxies as a function of cosmic epoch, mass, and environment. How do galaxies grow their stars, black holes, and dark matter halos across cosmic time and vastly different environments? What is the role played by theoretically predicted growth modes, such as violent mergers of galaxies and slower more ‘quiescent’ modes (e.g., gas accretion along cosmological filaments and secular evolution driven by bars)? How do galaxy clusters – some of the largest bound structures in the Universe – form? I am a member of the following international science collaborations, which have conducted some of the largest or deepest galaxy surveys to date. Within these collaborations, my research group has led a large number of papers on the structure, merger, and assembly history of galaxies.

- Galaxy Evolution from Morphology and SEDs (GEMS).<sup>6</sup>
- Great Observatories Origins Deep Survey (GOODS).<sup>7</sup>

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<sup>6</sup><http://www.mpia.de/GEMS/gems.htm>

<sup>7</sup><http://www.stsci.edu/science/goods/>

- Hubble ACS Ultra Deep Field (HUDF)
- Space Telescope A901/902 Galaxy Evolution Survey (STAGES).<sup>8</sup>
- HST ACS Treasury Survey of the Coma Cluster.<sup>9</sup>
- GOODS-NICMOS Survey (GNS) of Massive Galaxies at  $z \sim 2$ .
- The VIRUS-P Exploration of Nearby Galaxies (VENGA)
- SHELA-HETDEX study of galaxy evolution as a function of time ( $z \sim 2 - 4$ ) and environment using 0.8 million massive galaxies, 6 large photometric surveys (DECam ugriz, NEWFIRM K-band, Spitzer IRAC, Herschel-SPIRE, XMM X-ray) and the ongoing HETDEX spectroscopic survey.

**Selected Research highlights:** Some key results from my group include: (a) While earlier work suggested a dearth of barred galaxies at early epochs, we were the first to demonstrate that strong stellar bars are common in massive disk galaxies over the last eight billion years, a period long enough for bars to drive significant secular evolution of galaxies (Jogee et al. 2004); (b) We showed that contrary to common lore, only at most 30% of the cosmic star formation rate density can be assigned to visible major mergers over half of the age of the Universe. We also set the first empirical constraints on the minor merger rate of galaxies over that epoch (Jogee et al. 2009); (c) We found that when the Universe was merely a few billion years old, the majority ( $> 60\%$ ) of massive galaxies were disk-dominated and over a third were ultra-compact (Weinzirl, Jogee et al. 2011). This result poses key challenges to current theoretical models. (d) Using a sample of massive galaxies from SHELA/HETDEX that is an order of magnitude larger than other studies to date, we have explored the relationship between active black holes and star formation (Florez, Jogee, Sherman et al. 2020), the quenched fraction of galaxies (Sherman, Jogee, Florez et al. 2020b), and the stellar mass function (Sherman, Jogee, Florez et al. 2020a)  $1.5 < z < 3.5$ . Comparisons with five different theoretical models show severe challenges in our current understanding of the physics of galaxy evolution and its sub-grid implementation.

### Academic and Teaching Awards

- College of Natural Science Teaching Excellence Award, UT Austin (2012)
- Board of Visitors Teaching Excellence Award, UT Austin (2011)
- American Association of University Women Educational Fellowship (1996)
- Amelia Earhart Fellowship, Zonta International (1996)
- Yale University J. F. Enders Research Fellowship, Yale University (1995)
- Sigma Xi Grants-in-Aid of Research, Sigma Xi Society (1995)
- Yale University J. F. Enders Research Fellowship, Yale University (1995)
- Garfinkel Prize, Yale University (1992)
- Elected to status of Fellow, Cambridge University, England (1990-1992)
- Full academic scholarship in Physics, Cambridge University, England (1989-1992)

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<sup>8</sup>[www.nottingham.ac.uk/ppzmeg/stages](http://www.nottingham.ac.uk/ppzmeg/stages)

<sup>9</sup>[astronomy.swin.edu.au/coma/](http://astronomy.swin.edu.au/coma/)

**Selected Outreach Activities:** A detailed list of courses taught and outreach activities is provided in Appendix D of the CV. Below are a few selected activities:

- Co-authored textbook aimed at Ph.D. students (*‘Physics of Active Galactic Nuclei at all Scales’*), Lecture Notes in Physics, Vol. 693, Eds. D. Alloin, R. Johnson, & P. Lira (Springer: Berlin Heidelberg)
- As a Public voices Fellow with the OpEd Project, I published two Op-Eds in the New York Times<sup>10</sup> and Dallas Morning News<sup>11</sup>
- Voice America one hour radio interview<sup>12</sup> highlighting UT Astronomy, academic leadership, and my journey as a female astronomer (2016)
- Interview (in English and French) with Exception Magazine on Astronomy research and being a female astrophysicist (2018)<sup>13</sup>
- Invited to lead a feature video for “The Universe” exhibit hall in the new Perot Museum of Science in Dallas, Texas, to encourage students to pursue STEM careers (2012–Present)
- Presentation of the education and research mission of the Astronomy program to the State of Texas Legislative Staff, including staff from Governor Abbott’s office, the Senate Higher Education Committee, the Senate Finance Committee, and the House Appropriations Committee (2016)
- Used a UT Award for Instructional Innovation Techniques along with funding from NASA and NSF, to develop the *Galaxies and Cosmos Explorer Tool (GCET)*<sup>14</sup>, an online tool to actively engage undergraduate students, high school students, and the general public in ‘surfing’ through large galaxy surveys conducted with NASA’s *Hubble Space Telescope* and exploring galaxies through cosmic time.
- Invited talk on “Cosmic Explorations, Interdisciplinary Partnerships, and STEM Education”, National Association of Women Business Owners (2017)
- Presentation of Astronomy program milestones and research highlights to the Astronomy program Board of Visitors (with 200+ members) twice a year (2016 to 2019).

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<sup>10</sup><https://www.nytimes.com/2020/07/20/opinion/coronavirus-reopen-schools-economy.html?action=clickmodule=Opinionpgtype=Homepagefbclid=IwAR0FLmci9ueXJPN0AzHDFcbbp99fhzVRfRt1W>

<sup>11</sup><https://www.dallasnews.com/opinion/commentary/2020/07/26/removing-the-name-of-a-segregationist-from-a-science-building-at-ut-austin-will-help-us-recruit-stem-scholars-of-color/>

<sup>12</sup>[www.voiceamerica.com/episode/93888](http://www.voiceamerica.com/episode/93888)

<sup>13</sup><http://www.as.utexas.edu/~sj/epo/Exception-Poncini-Interview-2018.pdf>

<sup>14</sup><http://www.as.utexas.edu/gcet/>