Jeffrey Gary Mangum, Ph.D.

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Employment History

2013 – · · · ·	**Editor-in-Chief,** Publications of the Astronomical Society of the Pacific (PASP)
1995 – · · · ·	**Scientist,** National Radio Astronomy Observatory
1992 – 1995	**Staff Scientist,** Submillimeter Telescope Observatory, Steward Observatory, University of Arizona
1990 – 1992	**Postdoctoral Research Fellow,** Astronomy Department, University of Texas

Education

1988 – 1990	**Ph.D., University of Virginia** in Astronomy Thesis title: *The Throes of Star Formation: A Study of the Orion–KL and DR21(OH) Molecular Clouds*
1985 – 1988	**M.A., University of Virginia** in Astronomy Thesis title: *Observations of the ^{13}C Isotopes of HC_3N: Implications for Carbon Isotope Studies in the Milky Way*
1981 – 1985	**B.A., University of California at Berkeley** in Astronomy

Skills

Core Competency	Academic research, publishing, antenna design and performance evaluation, teaching, and consultation
Languages	Reading, writing and speaking competencies for English, German (moderate)
Programming	Python, C, PHP, LaTeX, FORTRAN
Databases	MySQL.
Web Dev	HTML, CSS, JavaScript, Apache Web Server
Analysis	CASA, GILDAS, IDL, AIPS

Miscellaneous Experience

Science Management

2018 – 2022	**Commission J Chair**, United States National Committee (USNC) International Union of Radio Science (URSI)
2008 – 2014	**Community Support Programs Coordinator**, National Radio Astronomy Observatory
2003 – 2010	**ALMA Calibration Group Lead**, Atacama Large Millimeter/submillimeter Array (ALMA)
1998 – 2004	**ALMA Test Facility Director**, Atacama Large Millimeter/submillimeter Array (ALMA)
1996 – 2001	**Deputy Assistant Director for Tucson Operations**, National Radio Astronomy Observatory

Miscellaneous Experience (continued)

1996 – 2014 **Research Experience for Undergraduates (REU) Program Coordinator**, National Radio Astronomy Observatory

Academic Appointments

2012 – · · · · **Visiting Scholar in the Department of Astronomy**, University of Virginia

2005 – 2012 **Research Professor of Astronomy**, University of Virginia

References

Available on Request

Selected Research Publications

Full publications list (excluding some technical memos) available via SciX

1. E. Behrens, **J. G. Mangum**, M. Bouvier, C. Eibensteiner, and S. Viti, "Testing the Physical Parameter Constraining Power of HCN and HNC with Neural Networks," *ApJ*, vol. 998, no. 2, p. 274, Feb. 2026. DOI: 10.3847/1538-4357/ae3567. arXiv: 2601.13305 [astro-ph.GA].
2. Y. L. Shirley, **J. G. Mangum**, D. Narayanan, and J. Di Francesco, "How to Use Thermal Dust Continuum Emission to Measure the Physical Properties of Dusty Astrophysical Objects," *PASP*, vol. 138, no. 4, p. 043 001, Apr. 2026. DOI: 10.1088/1538-3873/ae4270. arXiv: 2601.10989 [astro-ph.GA].
3. M. Bouvier, S. Viti, **J. G. Mangum**, *et al.*, "Complex organic molecules towards the central molecular zone of NGC 253," *A&A*, vol. 698, A261, Jun. 2025. DOI: 10.1051/0004-6361/202554420. arXiv: 2504.19631 [astro-ph.GA].
4. S. del Palacio, C. Yang, S. Aalto, *et al.*, "Millimeter emission from supermassive black hole coronae," *A&A*, vol. 701, A41, Sep. 2025. DOI: 10.1051/0004-6361/202554936. arXiv: 2504.07762 [astro-ph.HE].
5. Y. Gong, C. Henkel, C. T. Bop, *et al.*, "Shock-induced $HCNH^+$ abundance enhancement in the heart of the starburst galaxy NGC 253 unveiled by ALCHEMI," *A&A*, vol. 696, A31, Apr. 2025. DOI: 10.1051/0004-6361/202452835.
6. K. .-. Huang, E. Behrens, M. Bouvier, S. Viti, **J. G. Mangum**, and C. Eibensteiner, "Investigating the chemical link between H_2CO and CH_3OH within the central molecular zone of NGC 253," *A&A*, vol. 699, A70, Jul. 2025. DOI: 10.1051/0004-6361/202554156. arXiv: 2505.16255 [astro-ph.GA].
7. C. F. Wethers, S. Aalto, S. del Palacio, *et al.*, "The detection of a large-scale ionised outflow in the local CON galaxy Zw049.057," *A&A*, vol. 704, A195, Dec. 2025. DOI: 10.1051/0004-6361/202453013.
8. E. Behrens, **J. G. Mangum**, S. Viti, *et al.*, "Neural Network Constraints on the Cosmic-Ray Ionization Rate and Other Physical Conditions in NGC 253 with ALCHEMI Measurements of HCN and HNC," *ApJ*, vol. 977, no. 1, p. 38, Dec. 2024. DOI: 10.3847/1538-4357/ad85db. arXiv: 2409.13821 [astro-ph.GA].
9. K. Tanaka, **J. G. Mangum**, S. Viti, *et al.*, "Volume Density Structure of the Central Molecular Zone NGC 253 through ALCHEMI Excitation Analysis," *ApJ*, vol. 961, no. 1, p. 18, Jan. 2024. DOI: 10.3847/1538-4357/ad0e64. arXiv: 2311.12106 [astro-ph.GA].
10. E. Behrens, **J. G. Mangum**, J. Holdship, *et al.*, "Tracing Interstellar Heating: An ALCHEMI Measurement of the HCN Isomers in NGC 253," *ApJ*, vol. 939, no. 2, p. 119, Nov. 2022. DOI: 10.3847/1538-4357/ac91ce. arXiv: 2209.06244 [astro-ph.GA].

11 J. Holdship, **J. G. Mangum**, S. Viti, *et al.*, "Energizing Star Formation: The Cosmic-Ray Ionization Rate in NGC 253 Derived from ALCHEMI Measurements of H_3O^+ and SO," *ApJ*, vol. 931, no. 2, p. 89, Jun. 2022. DOI: 10.3847/1538-4357/ac6753. arXiv: 2204.03668 [astro-ph.GA].

12 N. Falstad, S. Aalto, S. König, *et al.*, "CON-quest. Searching for the most obscured galaxy nuclei," *A&A*, vol. 649, A105, May 2021. DOI: 10.1051/0004-6361/202039291. arXiv: 2102.13563 [astro-ph.GA].

13 S. Martín, **J. G. Mangum**, N. Harada, *et al.*, "ALCHEMI, an ALMA Comprehensive High-resolution Extragalactic Molecular Inventory. Survey presentation and first results from the ACA array," *A&A*, vol. 656, A46, Dec. 2021. DOI: 10.1051/0004-6361/202141567. arXiv: 2109.08638 [astro-ph.GA].

14 S. Aalto, S. Muller, S. König, *et al.*, "The hidden heart of the luminous infrared galaxy IC 860. I. A molecular inflow feeding opaque, extreme nuclear activity," *A&A*, vol. 627, A147, Jul. 2019. DOI: 10.1051/0004-6361/201935480. arXiv: 1905.07275 [astro-ph.GA].

15 **J. G. Mangum**, A. G. Ginsburg, C. Henkel, K. M. Menten, S. Aalto, and P. van der Werf, "Fire in the Heart: A Characterization of the High Kinetic Temperatures and Heating Sources in the Nucleus of NGC 253," *ApJ*, vol. 871, no. 2, p. 170, Feb. 2019. DOI: 10.3847/1538-4357/aafa15. arXiv: 1812.09219 [astro-ph.GA].

16 ALMA Partnership, C. L. Brogan, L. M. Pérez, *et al.*, "The 2014 ALMA Long Baseline Campaign: First Results from High Angular Resolution Observations toward the HL Tau Region," *ApJL*, vol. 808, no. 1, L3, p. L3, Jul. 2015. DOI: 10.1088/2041-8205/808/1/L3. arXiv: 1503.02649 [astro-ph.SR].

17 ALMA Partnership, E. B. Fomalont, C. Vlahakis, *et al.*, "The 2014 ALMA Long Baseline Campaign: An Overview," *ApJL*, vol. 808, no. 1, L1, p. L1, Jul. 2015. DOI: 10.1088/2041-8205/808/1/L1. arXiv: 1504.04877 [astro-ph.IM].

18 ALMA Partnership, T. R. Hunter, R. Kneissl, *et al.*, "The 2014 ALMA Long Baseline Campaign: Observations of Asteroid 3 Juno at 60 Kilometer Resolution," *ApJL*, vol. 808, no. 1, L2, p. L2, Jul. 2015. DOI: 10.1088/2041-8205/808/1/L2. arXiv: 1503.02650 [astro-ph.EP].

19 ALMA Partnership, C. Vlahakis, T. R. Hunter, *et al.*, "The 2014 ALMA Long Baseline Campaign: Observations of the Strongly Lensed Submillimeter Galaxy HATLAS J090311.6+003906 at z = 3.042," *ApJL*, vol. 808, no. 1, L4, p. L4, Jul. 2015. DOI: 10.1088/2041-8205/808/1/L4. arXiv: 1503.02652 [astro-ph.GA].

20 **J. G. Mangum** and Y. L. Shirley, "How to Calculate Molecular Column Density," *PASP*, vol. 127, no. 949, p. 266, Mar. 2015. DOI: 10.1086/680323. arXiv: 1501.01703 [astro-ph.IM].

21 **J. G. Mangum** and P. Wallace, "Atmospheric Refractive Electromagnetic Wave Bending and Propagation Delay," *PASP*, vol. 127, no. 947, p. 74, Jan. 2015. DOI: 10.1086/679582. arXiv: 1411.1617 [astro-ph.IM].

22 A. Greve and **J. Mangum**, "Mechanical Measurements of the ALMA Prototype Antennas," *IAPM*, vol. 50, no. 2, pp. 66–80, Apr. 2008. DOI: 10.1109/MAP.2008.4562258. arXiv: 0710.5629 [astro-ph].

23 **J. G. Mangum**, D. T. Emerson, and E. W. Greisen, "The On The Fly imaging technique," *A&A*, vol. 474, no. 2, pp. 679–687, Nov. 2007. DOI: 10.1051/0004-6361:20077811. arXiv: 0709.0553 [astro-ph].

24 R. Snel, **J. Mangum**, and J. Baars, "Study of the Dynamics of Large Reflector Antennas with Accelerometers," *IAPM*, vol. 49, no. 4, pp. 84–101, Aug. 2007. DOI: 10.1109/MAP.2007.4385600. arXiv: 0710.4254 [astro-ph].

25 **J. G. Mangum**, J. W. M. Baars, A. Greve, *et al.*, "Evaluation of the ALMA Prototype Antennas," *PASP*, vol. 118, no. 847, pp. 1257–1301, Sep. 2006. DOI: 10.1086/508298. arXiv: astro-ph/0609329 [astro-ph].

26 J. W. M. Baars, R. N. Martin, **J. G. Mangum**, J. P. McMullin, and W. L. Peters, "The Heinrich Hertz Telescope and the Submillimeter Telescope Observatory," *PASP*, vol. 111, no. 759, pp. 627–646, May 1999. DOI: 10.1086/316365.

27 **J. G. Mangum** and A. Wootten, "Discovery of 14NH3 (3,3) Maser Emission in the Interstellar Medium," *ApJL*, vol. 428, p. L33, Jun. 1994. DOI: 10.1086/187386.

28 **J. G. Mangum**, "Main Beam Efficiency Measurements of the Caltech Submillimeter Observatory," *PASP*, vol. 105, p. 117, Jan. 1993. DOI: 10.1086/133134.

29 **J. G. Mangum** and A. Wootten, "Formaldehyde as a Probe of Physical Conditions in Dense Molecular Clouds," *ApJS*, vol. 89, p. 123, Nov. 1993. DOI: 10.1086/191841.

30 **J. G. Mangum**, "The Throes of Star Formation: a Study of the Orion-KL and DR21(OH) Molecular Clouds.," Ph.D. dissertation, University of Virginia, Jan. 1990.