

GOPAL NARAYANAN's Curriculum Vitae

Five College Radio Astronomy Observatory
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RESEARCH INTERESTS

Astrophysics: Low Mass and High Mass Star Formation, Detection of In-fall Signatures, Episodic Outflow Phenomena, Triggered Star Formation, Protostellar Accretion Disks, Molecular Clouds, Theoretical Radiative Transfer Models.

Instrumentation: mm and Submm SIS Waveguide Receivers, focal plane arrays, Tuned SIS junctions, Low Noise Amplifiers, high frequency multipliers for LO systems, micromachining of terahertz waveguide components, Acousto Optic Spectrometers, Correlators, Microwave Holography.

EDUCATION

Nov., 1997: Ph. D. in Astronomy

University of Arizona, Tucson, AZ.

Advisor: Chris Walker

Dissertation: "*A Study of the Dynamical Signatures of Star Formation*"

June 1990: M.S. in Electrical Engineering

California Institute of Technology, Pasadena, CA.

June 1989: B.S. in Electronics and Communication Engineering

Anna University, Madras, India.

EMPLOYMENT

December 1997 - current: Postdoctoral Research Associate, Five College Radio Astronomy Observatory (FCRAO), University of Massachusetts, Amherst.

Jan 1992 - Nov. 1997: Graduate Research Assistant, Steward Observatory, University of Arizona, Tucson, AZ

Aug 1995 - May 1996: Graduate Teaching Assistant, Steward Observatory, University of Arizona, Tucson, AZ

Sep 1990 - Oct 1991: Graduate Research Assistant, Dept of Astronomy, California Institute of Technology, Pasadena, CA

June 1990 - Sep 1990: Research Engineer, Owens Valley Radio Observatory, Big Pine, CA

Sep 1989 - June 1990: Graduate Teaching Assistant, Dept of Electrical Engineering, California Institute of Technology, Pasadena, CA

AWARDS AND HONORS

- University of Arizona Dean's Fellowship (1996-1997)
- Flintridge Foundation Fellowship (1993 - 1995)
- Anna University Academic Gold Medal (1989)
- Tamilnadu State Government Merit Scholarship (1985- 1989)

PROFESSIONAL SOCIETIES

American Astronomical Society

Institute of Electrical and Electronics Engineers

TEACHING EXPERIENCE

- Advisor for a graduate student PhD thesis at the University of Massachusetts.
- Designed and taught two semesters of a freshman astronomy laboratory course (Ay101L) at the University of Arizona. I designed six new experiments, several of which were used by other teachers of the same course in subsequent semesters.
- At the University of Arizona, I advised and guided two undergraduate senior theses in the construction and use of a Student Radio Telescope, a 12-foot satellite dish that we refurbished for radio astronomy. In addition, I have had several undergraduate students working with me on instrumentation projects at the University of Arizona.
- As a college senior and chairman of the IEEE student branch, I taught several courses in programming languages for underclassmen.

SERVICE ACTIVITIES

- Co-organizer of an Astronomy Lunch talk at UMass.
- Served as referee for Time Allocation Committees for FCRAO observing proposals.
- System administrator duties for a cluster of FCRAO linux machines, including the observatory server machine.
- Wrote data conversion programs for observer use at FCRAO.
- Official Open Source Developer for the Debian linux operating system

COMPUTING EXPERIENCE

Programming Languages: FORTRAN, C, Perl, Pascal, BASIC, DCL, C shell, Tcl/Tk.

Operating Systems: Linux, Solaris, SunOS, HP-UX, ConvexOS, VMS, Win95/NT, DOS.

Astronomical Software: Gildas, SPA, Unipops, MIRIAD, AIPS, IRAF.

Engineering Software: AutoCad, OrCad, Tango, Touchstone, SURFCAM, Microwave Design System (MDS), High Frequency Structure Simulator (HFSS), Analog Design System (ADS).

PUBLICATIONS

1. G. Narayanan, N. R. Erickson, and R. M. Grosslein, 1999, "Low Cost Direct Machining of Terahertz Waveguide Structures", Proceedings of the 10th International Symposium on Space Terahertz Technology, ed. T. Crowe, U. of Virginia, pp 519 – 529
2. G. Narayanan and C. K. Walker, 1998, "A Parameterized Study of the Detection of Infall in Protostellar Systems", the Astrophysical Journal, 508, 780.
3. G. Narayanan, C. K. Walker, and H. D. Buckley, 1998, "The Blue-Bulge Infall Signature Towards IRAS 16293-2422", the Astrophysical Journal, 496, 292.
4. G. Narayanan, C. K. Walker, H. Knoepfle, and J. Capara, 1998, "Design Of Mixer Elements For the HHT 345 Ghz Heterodyne Array Receiver", 9th International Symposium on Space Terahertz Technology, ed. R. McGrath, Jet Propulsion Laboratory.

5. C. K. Walker, G. Narayanan, A. Hungerford, T. Bloomstein, S. Palmacci, M. Stern, J. Curtin, J., 1998, "Laser Micromachining of Silicon: A New Technique for Fabricating TeraHertz Imaging Arrays", *Astronomical Telescopes and Instrumentation*, SPIE Symposium, Kona, Hawaii, in press.
6. C. K. Walker, G. Narayanan, T. M. Bloomstein, "Laser Micromachining of Silicon: A New Technique for Fabricating Terahertz Waveguide Components", 1997, 8th International Symposium on Space Terahertz Technology, eds. Blundell and Tong, Harvard University.
7. C. K. Walker, G. Narayanan, H. Knoepfle, A. Hungerford, J. Capara, T. Bloomstein, T., Palmacci, S., Stern, M., Curtin, J., 1997, "Laser Micromachining of Silicon: A New Technique for Fabricating High Quality TeraHertz Waveguide Components", *Proceedings of the Fifth International Workshop on TeraHertz Electronics*, eds. Gundlach and Carter, Grenoble, France.
8. A. Biscaya, G. H. Rieke, G. Narayanan, K. Luhman, 1997, "First Tone CO Variability in Young Stellar Objects", *the Astrophysical Journal*, 491, 359.
9. G. Narayanan, H. Butner, J. McMullin, D. Muders, et. al., "Comet C/1995 O1 (Hale-Bopp)", 1997, IAUC, 6591.
10. G. Narayanan, and C. K. Walker, 1996, "Evidence for Multiple Outbursts in the Cepheus A Molecular Outflow", *Astrophysical Journal*, 466, 844.
11. G. Narayanan, and C. K. Walker, 1995, "Multiple Outbursts in the Cepheus A Molecular Outflow", in IAU Symposium 170, "CO: Twenty Five Years of Millimeter-Wave Spectroscopy".
12. C. K. Walker, G. Narayanan, and A. P. Boss, 1994. "Spectroscopic Signatures of Infall in Young Protostellar Systems", *Astrophysical Journal*, 431, 767.
13. W. L. Peters, J. G. Mangum, R. N. Martin, J. W. M. Baars, and G. Narayanan, 1994, "Holographic Measurement and Setting of the Submillimeter Telescope Reflector Surface", *Bull. Amer. Astron. Soc.*, 185, 08.06.
14. C. K. Walker, G. Narayanan, T. H. Büttegenbach, J. E. Carstrom, J. Keene, and T. G. Phillips, 1993. "The Detection of [CI] in Molecular Outflows Associated with Young Stellar Objects", *Astrophysical Journal*, 415, 672.
15. S. Padin, B. Arend, G. Narayanan, 1992. "A Wideband SSB Mixer Using High Frequency Operational Amplifiers", *Microwave Journal*, March 1992, 131.