

Urvashi Rao Venkata

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Personal Information :

Country of Citizenship: India
Current VISA status: F1 (student)
Date of Birth: 24th November 1979

Objective

Application for the position of Assistant Scientist at the National Radio Astronomy Observatory

Research Interests

Calibration and Imaging Techniques in Radio Interferometry, Parallel and Scientific Computing.

Education

Ph.D. Physics New Mexico Institute of Mining and Technology, Socorro, NM, USA GPA: 3.96/4.0	Aug 2004 - present
M.S. Computer Science University of California, San Diego, CA, USA GPA: 3.89/4.0	Sep 2002 - Jun 2004
B.E.(Hons.) Computer Science Birla Institute of Technology and Science, Pilani, India GPA: 8.65/10.0	Aug 1997 - Jun 2002
M.Sc.(Hons.) Physics Birla Institute of Technology and Science, Pilani, India GPA: 8.65/10.0	Aug 1997 - Jun 2002

Ph.D Thesis: *"Parameterized Deconvolution for Wide-Band Radio Synthesis Imaging"*, Department of Physics, New Mexico Institute of Mining and Technology, Socorro, NM, USA, (2009, in prep).

M.S. Thesis: *"A performance model and load balancer for a Parallel Monte-Carlo Cellular Microphysiology Simulator"*, Department of Computer Science and Engineering, University of California, San Diego, June 2004.

Technical Skills

Programming languages : C, C++, Glish, Python
Environments : Unix/Linux
Packages : Matlab/Octave, CASA, ASKAPSOFT
Libraries : GNU Scientific Library (GSL), Numerical Recipes, KeLP, MPI, Python/C

Work Experience

- (1) **Predoctoral Student** (National Radio Astronomy Observatory) Jan 2008 - present
Graduate Intern (National Radio Astronomy Observatory) Aug 2007 - Dec 2007
ATNF Affiliated Student (Australia Telescope National Facility) Jun 2006 - present
Research Assistant (Dept. of Physics, NMIMT) Jul 2004 - present
Advisors : T.J.Cornwell, F.N.Owen, J.A.Eilek
Thesis Project : *Wide-Band Imaging* (a) Analysed existing multi-frequency synthesis techniques. (b) Developed a new algorithm for multi-scale deconvolution with multi-frequency synthesis imaging and frequency-dependent primary beam correction. (c) Implemented the algorithms in CASA and ASKAPSOFT, and applied it to wide-band VLA/EVLA data. (d) Studied M87 spectra.
- (2) **CASA Developer** (National Radio Astronomy Observatory, Socorro) Jul 2004 - Jul 2007
Supervisor : J.P.McMullin
Work : (a) Developed a plotting tool with interactive flagging for Tables and Measurement-Sets (b) Ported the Aips++ flagger module to Casapy
- (3) **Research Assistant** Sep 2002 - Mar 2003
(Dept. of Computer Science & Engineering, University of California, San Diego) Sep 2003 - Mar 2004
Advisor : Scott Baden
Thesis Project : *Dynamic Load Balancing for MCell-K* (a) Developed a performance model for MCell, a 3D cell microphysiology simulator. (b) Developed a predictive load balancer for MCell-K, a parallel version of MCell.
- (4) **Teaching Assistant** Apr 2003 - Jun 2003
(Dept. of Computer Science & Engineering, University of California, San Diego) Apr 2004 - Jun 2004
Supervisor : Scott Baden
Course : Introduction to High Performance and Parallel Computing
Responsibilities : Discussion sessions, office hours, grading of written and programming homework

Student Internships

- (1) **Summer Student** (National Radio Astronomy Observatory, Socorro) Jul 2003 - Sep 2003
Monte Carlo Methods for Bayesian Image Reconstruction in Radio Astronomy
- (2) **Student Visitor** (National Radio Astronomy Observatory, Socorro) Aug 2002
Study of the AIPS++ Autoflag tool, implementation of a new agent
- (3) **Research Intern** (National Centre for Radio Astrophysics, TIFR, Pune) Jan 2002 - Jun 2002
Automatic RFI Identification and Flagging (GMRT)
Numerical Solutions of Complex Antenna Gains and Polarization Leakage
- (4) **Student Trainee** (Texas Instruments Inc., Bangalore, India) Jul 2001 - Dec 2001
Code Optimization for an e-book reader prototype on the DSC21
- (5) **Summer Student** (National Centre for Radio Astrophysics, TIFR, Pune) Jun 2001 - Jul 2001
Comparative Study of Algebraic Deconvolution Algorithms

Publications

1. "*A multi-scale multi-frequency deconvolution algorithm for synthesis imaging in radio-interferometry*", U.Rau, T.J.Cornwell, (2009, in prep)
2. "*Advances in Calibration and Imaging Techniques in Radio Interferometry*", U.Rau, S.Bhatnagar, M.A.Voronkov, T.J.Cornwell, Proceedings of the IEEE, Vol.97, No.8, p-1472, August 2009
3. "*Monte-Carlo Image analysis in Radio Interferometry*", Urvashi R.V., T.J.Cornwell, Astronomical Data Analysis Software and Systems XIV ASP Conference Series, Vol. 347, p-168 2004
4. "*Solving for Polarization Leakage in Radio Interferometers Using Unpolarized Sources*", Bhatnagar S., Urvashi R.V., Nityananda R., Astronomical Data Analysis Software and Systems XII ASP Conference Series, Vol. 295, p-469 2003

Memos / Technical Reports

1. "*Casapy Flag tool and casa::Flagger*", U.Rau, CASA Programmers Note, 23 August 2007
2. "*Design of casa::TablePlot for Casapy*", U.Rau, CASA Programmers Note, 18 August 2007
3. "*Multi Frequency Synthesis Imaging for the EVLA : An initial investigation*", Urvashi R.V., T.J.Cornwell, S.T.Myers, EVLA Memo 101, April 2006
4. "*Monte Carlo Methods for Bayesian Image Reconstruction and Analysis in Radio Astronomy*", Urvashi R.V., T.J.Cornwell, EVLA Memo 102. February 2006
5. "*Automatic RFI identification and flagging*", Urvashi R.V., Rao, A. Pramesh, NCRA Technical Report No. R00202, October 1 2003

Talks / Presentations

2009

1. "*Feasibility of Multi-Frequency-Synthesis - for non-standard cases*", Presentation to the NRAO Algorithm Research and Development Group, 16 July 2009, Socorro, USA
2. "*Wide-Field Wide-Band Imaging in Radio Interferometry*", Talk at the ATNF Student Symposium, 16 June 2009, Sydney, AU (via audio link from Socorro)
3. "*Remote Sensing, Image Making and Radio Telescopes*", Colloquium at the New Mexico Tech Physics Department, 09 Apr 2009, Socorro, USA
4. "*Wide-Field Wide-Band Imaging with the EVLA - initial results*" Talk at the Fourth SKA Calibration and Imaging Workshop, 31 March 2009, Socorro, USA
5. "*Multi Frequency Synthesis Imaging with Wideband EVLA data*" Lunch Talk at the EVLA Advisory Committee Meeting, 19-20 March 2009, Socorro, USA

2008

1. "*Multi-Frequency Synthesis Imaging with Multi-Scale Deconvolution (EVLA, e-MERLIN)*", Talk at the Workshop on Imaging and Calibration Algorithms for EVLA, eMERLIN and ALMA, 02 December 2008, Oxford, UK (via video link from Socorro)
2. "*Multi-Frequency Synthesis Imaging with Wide-Band (E)VLA data*", Talk at the 24th Annual New Mexico Symposium, 24 October 2008, Socorro, USA

3. *"Multi-Frequency Synthesis Imaging with Multi-Scale Deconvolution"*, Invited Talk at the XXIX URSI General Assembly, 15 August 2008, Chicago, USA
4. *"Wide-Band Imaging - Algorithms and Errors"*, Talk at the Third SKA Calibration and Imaging Workshop, 09 April 2008, Perth, AU
5. *"Multi-Frequency Synthesis Imaging with the EVLA - initial results from a test observation of Cygnus-A at L-Band"*, Wednesday Lunch Talk at the NRAO-AOC, 05 March 2008, Socorro, USA
6. *"Multi-Frequency Synthesis Imaging with the EVLA"*, Tuna Lunch Talk at NRAO-CV, 29 January 2009, Charlottesville, USA

2006-2007

1. *"Multi-Frequency Synthesis Imaging with Multi-Scale deconvolution"*, Talk at the Workshop on Radio Surveys Science and Techniques, 18 April 2007, Los Alamos, USA
2. *"Multi-Frequency Synthesis Imaging with Multi-Scale deconvolution"*, Talk at the National Centre for Radio Astrophysics (TIFR), 17 November 2006, Pune, India
3. *"Multi-Frequency Synthesis Imaging with Multi-Scale deconvolution"*, Talk at the Second SKA Calibration and Imaging Workshop, 05 December 2006, Cape Town, South Africa
4. *"Multi-Frequency Synthesis Imaging with Multi-Scale deconvolution"*, Galaxy Lunch Talk at the Aistralia Telescope National Facility(ATNF), 06 June 2006, Marsfield/Sydney, AU
5. *"Wide Bandwidth Imaging: Challenges and prospects for the EVLA and beyond"* ,Talk at the URSI National Radio Science Meeting, 06 January 2006, Boulder, USA

Technical Schools Attended

- (a) Ninth Synthesis Imaging Summer School, NRAO, Socorro, (June 2004)
- (b) Introductory Astrophysics Summer School, Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, India (Summer 2000)

Academic Awards and Fellowships

- (a) NRAO Pre-Doctoral Research Assistantship (Jan 2008 - Dec 2009).
- (b) Award for Overall Best Outgoing Student, Dept of Physics, BITS, Pilani (May 2001)

Relevant Coursework

- (a) Electromagnetics(1,2), Quantum Mechanics(1,2),
Astrophysics(3,4), Advanced Radio Astronomy,
Statistical Mechanics, Advanced Dynamics
Dept. of Physics, NMIMT
- (b) Numerical Mathematics(1,2,3), Scientific Computation(1,2),
Numerical Optimization(2,3)
Dept. of Mathematics, UCSD
- (c) Algorithm Design and Analysis, Operating Systems,
Principles of Computer Architecture, Parallel Computation,
Principles of Distributed Computing
Dept. of Computer Science & Engineering, UCSD
- (d) Computational Physics, Multimedia Systems,
Computer Graphics, Geographical Information Systems,
Numerical Analysis, Operations Research
BITS-Pilani