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**The 3rd China-U.S. Workshop on Radio  
Astronomy Science and Technology:  
Emerging Opportunities**

# Biographies



Green Bank, West Virginia, USA

May 19-21, 2014

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## Chinese Participants

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# Tao AN

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I am an astronomer in the Radio Science and Technology Division of the Shanghai Astronomical Observatory (SHAO). I got my PhD in 2004 in SHAO, and the title of thesis (written in Chinese) is “Radio Observational Studies of High Luminosity AGNs and the Dim Galactic Center Object SgrA\*”. Since then, I keep working in SHAO. I have been acting as the VLBI friend of Shanghai VLBI station (also named as Sheshan station) between 2004 July and 2009 December.

## My Research Interests are:

- VLBI observational study of compact objects (Blazars, CSO and GPS, radio transients)
- Galactic Center
- Ultra IR luminous galaxies (ULIRGs), starbursts
- Galaxy clusters
- Space VLBI
- Ultra low-frequency radio astronomy

## Recent publications in referred journals:

Hong Xiaoyu, Shen Zhiqiang, **An Tao**, Liu Qinghui, the Chinese Space VLBI Array team, “*The Chinese space millimeter-wavelength VLBI array - a step toward imaging the most compact astronomical objects*”, arXiv1403.5188

**An Tao**, Baan Willem A., Wang Junyi, Wang Yu, Hong Xiaoyu, “*Periodic radio variabilities in NRAO 530: a jet-disc connection?*”, 2013, MNRAS, 434, 3487

Xie Mingjie, Wang Junyi, **An Tao**, Zheng Lin, Han Xu, “*Multiple periodic oscillations in the radio light curves of NRAO 530*”, 2013, Sci. China G., 56, 1798

**Tao An**, Zsolt Paragi, Sandor Frey, Ting Xiao, Willem A. Baan, Stefanie Komossa, Kristina Gabanyi, Yonghua Xu, Xiaoyu Hong, “*The Double-Peaked Narrow-Line AGN 3C 316: jet-induced outflow?*”, 2013, MNRAS, 433, 1161

Gu Junhua, Xu Haiguang, Wang Jingying, **An Tao**, Chen Wen, “*The Application of Continuous Wavelet Transform Based Foreground Subtraction Method in 21 cm Sky Surveys*”, 2013, ApJ, 773, 38

Frey Sandor, Paragi Zsolt, Gabanyi Kristina E., **An Tao**, “*A compact radio source in the high-redshift soft gamma-ray blazar IGR J12319-0749*”, 2013, A&A, 552, A109

Wang Jingying, Xu Haiguang, **An Tao**, et al., “*Exploring the Cosmic Reionization Epoch in Frequency Space: An Improved Approach to Remove the Foreground in 21 cm Tomography*”, 2013, ApJ, 763, 90

Wu Fang, **An Tao**, Baan Willem A., Hong Xiaoyu, Stanghellini Carlo, Frey Sandor, Xu Haiguang, Wang Jingying, “*Kinematics of the compact symmetric object OQ 208 revisited*”, 2013, A&A, 550, 113

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# Wang CHEN

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I am a Researcher in Astronomy. I graduated from [University of Science and Technology of China](#) in 2003, and received Ph.D. in astrophysics from [Graduate University of Chinese Academy of Sciences](#) (OK, actually from NAOC). Now I am a research associate in [National Astronomical Observatories](#), Chinese Academy of Sciences (NAOC), and work in [Prof. JinLin Han's Research Group on Compact Objects and Diffuse Medium](#).

## **Research Interest**

- Pulsar emission properties, linear and circular polarization, emission geometry
- Wave propagation effects in pulsar magnetospheres
- Pulsar kick
- Radiation transfer in magnetized medium

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# Zhiping CHEN

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I am a professor at Hangzhou Dianzi U. and a visiting scholar at Carnegie Mellon U., where I have research interests in astronomy technology and instruments. Some work included structural and thermal analysis of SST, LAMOST, MARVELS, 40m Radio Telescope and 50m Radio Telescope. I received Ph.D. in astronomy technology and method from National Astronomical Observatories of CAS China in 2004, and visited astronomy department of Florida U from 2007 to 2008. Here are some related publications:

J. Zhang, H. Shi, and Z. Chen, Reflector Error Analysis and Correction for Large-diameter Radio Telescope. *Advancement of Astronomy*. (2013)

X. Wan, J. Ge, and Z. Chen, Development of stable monolithic wide-field Michelson interferometers, *Appl. Opt.* 50, 4105-4114 (2011)

Z. Chen, Zy. Chen, S. Yang. Thermal calculation and structure analysis of space Main Optical Telescope, *Proceedings of SPIE*, Vol 6687, 6687Y1-9 (2007).

J. Zhang, H. Shi, Z. Chen, and H. Zhang, Time Domain Wind Buffeting Response of Large-Diameter Antenna Electric Performances. *J. of App Mechatronics*, V25(1),p84-88 (2008)

Z. Chen, H. Shi, R. Li, Yao, and W. Hao. Thermal analysis and seeing improvement of LAMOST enclosure, *Proceedings of SPIE* Vol 6692, 66920Q1- 9. (2007)

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## **Jian DONG**

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Jian Dong is an antenna control engineer. His interests include telescope active surface system, software control system and OTF.

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## **Xiaoyu HONG**

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Xiaoyu Hong is the Director of Shanghai Astronomical Observatory, Chinese Academy of Sciences. Xiaoyu focuses on radio astronomy, specially studies the radio jet of AGN with VLBI. He is promoting the Shanghai 65m radio telescope project and the pre-study of Chinese Space VLBI Array project.

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## Di LI

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Dr. Li has lead many research programs, including spectroscopic and mapping projects of VLA, GBT, Arecibo, FCRAO, SWAS, Spitzer, Herschel, and SOFIA. He has pioneered several observing and data analysis techniques, including HI narrow self-absorption technique and a new inversion solution to the dust temperature distribution. These techniques lead to important measurements of star forming regions, such as the formation time scale. He is the key member of the team who first detected molecular oxygen in space and then confirmed it with Herschel. He is now leading the science definition efforts of the Five-hundred-meter Aperture Spherical radio Telescope (FAST) and also serves on the Steering Committee of Australia Telescope National Facility (ATNF).

**Li, D.**, Nan, R., & Pan, Z. 2013, “*The Five-hundred-meter Aperture Spherical radio Telescope and its Early Science Opportunites*” IAU Symposium, 291, 325

**Li, D.**, J. Kauffmann, Q. Zhang & W. Chen, “*Massive quiescent cores in Orion. IV. Their dynamic state revealed by high resolution ammonia maps*” 2013, ApJL, 768, 5L

Qian, L., **Li, D.**, & Goldsmith, P. 2012, “*<sup>13</sup>CO Cores in Taurus Molecular Cloud*”, 2012, ApJ, 760, 147

**Li, D** & Goldsmith, Paul F., “*Is the Taurus B213 Region a True Filament?: Observations of Multiple Cyanoacetylene Transitions*”, 2012, ApJ, 756, 12

Wu, Y., Liu, T., Meng, F., **Li, D.**, Qin, S. & Ju, B. 2012, “*Gas Emission in Planck cold dust clumps---A Survey of the J=1-0 Transitions of 12CO, 13CO, and C18O*”, 2012, ApJ, 756, 76

Nan, R, **Li, D.**, Jin, C., Wang, Q., Zhu, L., Zhu, W., Zhang, H., Yue, Y. & Qian, L. 2011, “*THE FIVE-HUNDRED-METER APERTURE SPHERICAL RADIO TELESCOPE (FAST) PROJECT*”, International Journal of Modern Physics D, Volume No.20, Issue No. 6 (arXiv:1105.3794)

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## Kejia LI (KJ)

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I am an experimental radio astronomer and theoretical astrophysicist. My major interests are: pulsar, pulsar timing, radiation mechanism, pulsar searching; gravitational wave detection, gravity tests, automatic control engineer, and statistical signal processing.

Here is a selected sample of my publications:

*PEACE: pulsar evaluation algorithm for candidate extraction - a software package for post-analysis processing of pulsar survey candidates* Lee, K.J., et al. 2013, MNRAS, 433, 688

*The optimal schedule for pulsar timing array observations* Lee, K. J.; et al. 2012, MNRAS, 423,2642

*Application of the Gaussian mixture model in pulsar astronomy -- pulsar classification and candidates ranking for Fermi 2FGL catalog* Lee,K. J.; et al. 2012, MNRAS, 424,2832

*Gravitational wave astronomy of single sources with a pulsar timing array* Lee,K.J.;et al. 2011, MNRAS, 414,3251

*Detecting Massive Gravitons Using Pulsar Timing Arrays* Lee, Kejia; et al. 2010, ApJ, 722.1589L

*A strong magnetic field around the supermassive black hole at the centre of the Galaxy Eatough, R.P. ...Lee, K. J., ... et al. 2013, Nature, 501, 391*

*Pulsar Timing as a Probe of Non-Einsteinian Polarizations of Gravitational Waves, Lee,K.J.; Jenet,F.A.; Price, Richard.H. 2008, ApJ, 685, 1304*

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## Qinghui LIU

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I received my B.Eng. in Electronic Engineering from the East China Engineering Institute of China in 1988, and my M.Eng. and Ph.D degrees in Systematic Control Engineering from Kagoshima University, Japan, in 2000 and 2003. From 2003 to 2009, I was a researcher at the RISE Project Office of the National Astronomical Observatory of Japan. Since 2009, I have been a professor at the Shanghai Astronomical Observatory. My research interests are in VLBI techniques and lunar and planetary sciences. I am now studying on Shanghai 65m radio wave telescope, Chinese Space VLBI project and the applications of VLBI for Chinese lunar spacecrafts.

More details see:

[http://sourcedb.cas.cn/sourcedb\\_shao\\_cas/zw/zjrck/200907/t20090723\\_2160277.html](http://sourcedb.cas.cn/sourcedb_shao_cas/zw/zjrck/200907/t20090723_2160277.html)

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## Zhi-Qiang SHEN

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**Dr. Zhiqiang Shen** is an observational radio astronomer at Shanghai Astronomical Observatory with expertise on VLBI technique and its application in astrophysics. His main research interests include: Investigation of the super-massive black hole at the Galactic Centre with radio observations as well as numerical simulations; (Space-)VLBI study of the central parsec region of Active Galactic Nuclei (AGN); High-resolution VLBI imaging of masers (e.g., methanol masers); VLBI astrometry of pulsars. Dr. Shen currently serves as project scientist for the Shanghai 65-meter Radio Telescope; and he has been actively involved in the proposal for Chinese Space VLBI Array since 2009.

Recent publications:

Yan Z., Shen Z.-Q., Yuan J.-P., Wang N., Rottmann H., Alef W. *"Very long baseline interferometry astrometry of PSR B1257+12, a pulsar with a planetary system"*, 2013, MNRAS, 433, p.162-169

Gan C.-G., Chen X., Shen Z.-Q., Xu Y., Ju B.-G. *"A Search for 95 GHz Class I Methanol Masers in Molecular Outflows"*, 2013, ApJ, 763:2(21pp)

Lu R.-S., Shen Z.-Q., Krichbaum T. P., Iguchi S., Lee, S.-S., Zensus J. A. *"The parsec-scale jet of PKS 1749+096"*, 2012, A&Ap, 544:A89 (22pp)

Huang L., Shen, Z.-Q., Gao F. *"Constraining the Flaring Region of Sagittarius A\* by 1.3 mm VLBI Measurements"*, 2012, ApJ, 745:L20 (5pp)

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## Sheng-Cai SHI

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Sheng-Cai Shi is a Senior Scientist at Purple Mountain Observatory where he works on the development of new instrumentation for radio astronomy, and the Director of Kay Lab of Radio Astronomy of Chinese Academy of Sciences. His research interests include superconducting device physics, THz detectors and receivers, Gaussian optics, and THz systems and applications. Here are a few papers of recent interest:

Jing Li, M. Takeda, Z. Wang, S.C. Shi, and J. Yang, “*Low-noise 0.5 THz all-NbN Superconductor-Insulator-Superconductor mixer for submillimeter wave astronomy*,” Appl. Phys. Lett., 92 (2008), 222504.

W. Zhang, P. Khosropanah, J. R. Gao, T. Bansal, T. M. Klapwijk, W. Miao, and S. C. Shi, “*Noise temperature and beam pattern of an NbN hot electron bolometer mixer at 5.25 THz*,” J. Appl. Phys., 108 (2010), 093102.

Y. Ren, J. N. Hovenier, M. Cui, D. J. Hayton, J. R. Gao, T. M. Klapwijk, S. C. Shi, T-Y. Kao, Q. Hu, and J. L. Reno, “*Frequency locking of single-mode 3.5-THz quantum cascade lasers using a gas cell*,” Appl. Phys. Lett., 100 (2012), 041111.

W. Miao, W. Zhang, J.Q. Zhong, S.C. Shi, Y. Delorme, R. Lefevre, A. Feret, and T. Vacelet, “*Non-uniform absorption of terahertz radiation on superconducting hot electron bolometer microbridges*,” Appl. Phys. Lett., 104 (2014), 052605.

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## **Jinqing WANG (Oliver)**

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Jinqing Wang is an engineer at the Sheshan VLBI station.

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## Junzhi WANG

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**Dr. Junzhi Wang** is an observational radio astronomer at Shanghai Astronomical Observatory. His main research interests include: star formation in the Milky Way and nearby galaxies, ISM, radio observations of AGNs and their feedbacks to the host galaxies, and Mega-masers.

Recent publications:

**Wang, J.**, Zhang, Z., Gao, Y., 2013, RAA, “*High resolution observations of the 6 cm  $H_2CO$  maser in NGC 6240*”

**Wang, J.**, Zhang, J., Shi, Y., Zhang, Z., 2013, ApJ, 778, L38, “*A SiO 2-1 Survey toward Gas-rich Active Galaxies*”

Li, J., **Wang, J.**, Gu, Q., Zheng, X., 2013, A&A, 555A, 18, “*Distribution of HNC O 5<sub>05</sub>-4<sub>04</sub> in massive star-forming regions*”

Li, J., **Wang, J.**, Gu, Q., Zhang, Z., Zheng, X., 2012, ApJ, 745, 47, “*Large-scale Kinematics, Astrochemistry, and Magnetic Field Studies of Massive Star-forming Regions through  $HC_3N$ , HNC, and  $C_2H$  Mappings*”

**Wang, J.**, Zhang, Z., Shi, Y., 2011, MNRAS, 416, L21. “*CS 5-4 survey toward nearby IR bright galaxies*”

Jiang, X., **Wang, J.**, Gu, Q., 2011, MNRAS, 418, 1753, “*Dense molecular gas in nearby gas-rich active galaxies*”

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## Na WANG (Nina)

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Na Wang is the Director of Xinjiang Astronomical Observatory. She is an astronomer, and her research interests are on pulsar observational features, including pulsar timing, pulsar nulling and scintillation studies. Recent years she also works on propelling QTT project, as well as conceptual design and key technology study.

### **Publications**

1. Wang N., *Xinjiang Qitai 110m radio telescope*, 2014, Science China (G), Accepted
2. Wang N. et al., *Daily observations of interstellar scintillation in PSR B0329+54*, 2008, MNRAS, 385, 1393-1401
3. Wang N. et al., *Pulsar nulling and mode changing*, 2007, MNRAS, 377, 1383-1392
4. Wang N. et al., *13 years of timing of PSR B1259-63*, 2004, MNRAS, 315, 599-606
5. Wang N. et al., *Pulsar timing at Urumqi Astronomical Observatory: system and results*, 2001, MNRAS, 328, 855-866

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## Zhong WANG

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I have worked with the IRAC group at CfA for many years, but am now on leave to work on the Chinese Academy of Sciences' South America Center for Astronomy (CASSACA) in Santiago, Chile. My research interests are mostly in observational infrared and radio astronomy specializing in interactions and evolution of nearby galaxies. I am interested in exploratory studies of possible Chinese-funded telescope facilities in the Southern Hemisphere. Several recent research papers include:

*Expanding the Horizon of Molecular Gas Surveys of the Nearby Universe*, Wang, Z. et al. 2012, in *Molecular Gas, Dust and Star Formation in Galaxies*, Proc. of IAU Symp. 292, ed. T. Wang & J. Ott.

*Unveiling the Physical Properties and Kinematics of Molecular Gas in the Antennae Galaxies (NGC4038/39)*, Ueda, J., Wang, Z. et al. 2012, *Ap.J.* 745, 65

*SEDs: The Spitzer Extended Deep Survey. Survey Design, Photometry, and Deep IRAC Source Counts*, by Ashby, M. L. N., Huang, J.-S., Wang, Z. et al. 2013, *ApJ*, 769, 80

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## Yajun WU

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I am an engineer at SHAO, my major work is coding for FPGA in the backend system, meanwhile taking some research in VLBI technology. As a member of the CDAS group, I have been responsible for the FPGA part of this project. Now I am testing the DIBAS (Digital backend for pulsar and spectral line), constructing the observational software, and processing the data (converting MBFITS, Doppler tracking).

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## Li XIAO

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I'm an observational radio astronomer. I have interests in Galactic radio continuum and HI survey, interstellar medium, magnetic field, supernova remnants, HI supershells. Recently I also do some extragalactic HI study using ALFALFA data. Here are my recent papers of interest:

Xiao L. & Zhu M., "*GSH 90-28-17: a possible old supernova remnant*", 2014, MNRAS, 438, 1081

Xiao L. & Zhu M., "*Radio perspectives on the Monoceros SNR G205.5+0.5*", 2012, A&A, 545, 86

Xiao L., Sun X. H., Han J. L. Reich W., et al., "*Sino-German 6cm polarization survey of the Galactic Plane, III gl:60-122* ", 2011, A&A, 529, 15

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## Qian XU

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I am a mechanical engineer at the Xinjiang Astronomical Observatory, working on the 110m radio telescope (QTT) project. Now my research focuses on antenna structure concept design.

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## Ye XU

*Purple Mountain Observatory, CAS, China*  
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I am a radio astronomer. I have research interests in the Galactic structure and star formation.

### **Publications:**

*The Distance to the Perseus Spiral Arm in the Milky Way*, Xu, Y., Reid, M. J., Zheng, X. W., Menten, K. M., 2006, *Science*, 311, 54

*Trigonometric Parallaxes of Massive Star Forming Regions: III. G59.7+0.1 and W 51 IRS2* Y. Xu, M. J. Reid, K. M. Menten, et al. 2009, *ApJ*, 693, 413

*Trigonometric Parallaxes of Massive Star-forming Regions. VIII. G12.89+0.49, G15.03-0.68 (M17), and G27.36-0.16* Xu, Y., Moscadelli, L., Reid, M. J. et al. 2011, *ApJ*, 733, 25

*On the Nature of the Local Spiral Arm of the Milky Way*, Xu, Y., Li, J. J., Reid, M. J. et al. 2013, *ApJ*, in press

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## Yihua YAN

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Dr. Yihua Yan is presently Professor and Chief Scientist of Solar Radio Research (1999-), Director of CAS Key Laboratory of Solar Activity (2008-) and Director of Solar Physics Division (2011-), National Astronomical Observatories, Chinese Academy of Sciences. He also serves as Vice President of IAU Division E: Sun and heliosphere (2012-2015), China National Representative to Commission J of URSI (2004-), Chairman of the Sun & Heliospheric Physics Committee of Chinese Astronomical Society (2006-2014), and Chairman of Radio Astronomy Committee of Chinese Institute of Electronics (2007-2015). His research interests include solar coronal magnetic field reconstruction, solar radio bursts and their associations with solar flares and CMEs, data processing for aperture synthesis, astronomical methods and instrumentation. He is currently the PI of the Chinese Spectral Radioheliograph (CSRH). He also promotes the Chinese space solar physics programs.

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## Zhen YAN

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I'm working as an assistant professor in Shanghai astronomical observatory now. My primary research interests are pulsar astrophysics and techniques about the pulsar observation. I measured the model-independent astrometry parameters of some millisecond pulsar with VLBA and EVN, including the pulsar with planet system - PSR B1257+12. The first time Chinese VLBI Networks (CVN) pulsar observation data was successfully correlated with the DiFX software correlator installed on my computer. Further pulsar astrometry measurements with CVN are being carried out. We also did all-day monitoring on PSR B0329+54 for over 20 days with Nanshan 25-m telescope in Urumqi to study the modulation effects of the refractive interstellar scintillation (ISS) on the diffractive ISS. I'm now planning to search for some new pulsars and do pulsar timing observation on some know pulsar with the new-built 65m radio telescope in Shanghai.

### ARTICLES:

Zhen Yan, Zhi-qiang Shen, Jian-ping Yuan et al., *VLBI astrometry of two millisecond pulsars*, Proceedings of IAU Symposium 291, 20-24 August 2012

YAN Zhen, SHEN Zhi-qiang, YUAN Jian-ping. 2011, *The Progress on Correlating Pulsar VLBI Observation Data with Software*, PROGRESS IN ASTRONOMY, 29, 309

Yan Zhen, Shen Zhi-qiang et al. 2013, *VLBI Astrometry of the Pulsar with a Planetary System - PSR~B1257+12*, MNRAS

Wang, N., Yan, Z., Manchester, R. N. et al. 2008, *Daily Observations of Interstellar Scintillation in PSR B0329+54*, MNRAS, 385, 1393

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## Rai YUEN

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My major research focuses on radio observations and theoretical (analytical and numerical) studies in pulsar astrophysics, particularly in the electrodynamics and magnetosphere of pulsars. I am interested in the time-dependent events, such as drifting subpulses, nulling, mode-changing and the variability in spin-down rates, which serve as windows to expose the magnetospheric behaviour. Another stream of my research involves constructing physical model for non-corotating pulsar magnetospheres, and its implications of different rotation states on abrupt changes observed with some pulsars. A few papers of interests are:

D. B. Melrose and R. Yuen, “*Non-Corotating Models for Pulsar Magnetospheres*”, 2014 MNRAS, Vol 437, 262 – 272

R. Yuen, R. N. Manchester, M. Burgay, F. Camilo, M. Kramer, D. B. Melrose, and I. H. Stairs, “*Changes in Polarization Position Angle Across the Eclipse in the Double Pulsar System*”, 2012 ApJL, Vol 752, L32 - L36

D. B. Melrose and R. Yuen, “*Obliquely Rotating Pulsars: Screening of the Inductive Electric Field*”, 2012 ApJ, Vol 745, 169 – 177

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## Jiangshui ZHANG

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Dr. Jiangshui Zhang works in Guangzhou University, China. Interest fields include observation studies of celestial masers, molecular clouds and star formations, AGNs.

### **Representative publications**

Zhang, J.S., Li, D. & Wang, J.Z., *Expectations of maser studies with FAST*, 2012, IAUS287, 350

Zhang, J.S., Henkel, C., Guo, Q. & Wang, J., *Radio properties of H<sub>2</sub>O maser host galaxies*, 2012, A&A, 538, A152

Zhang, J.S., Henkel, C., Guo, Q., Wang, H.G. & Fan, J.H., *On the nuclear obscuration of H<sub>2</sub>O maser galaxies*, 2010, ApJ, 708, 1528

Zhang, J.S. & Fan, J.H., *Chandra observation of H<sub>2</sub>O megamaser galaxy Mrk1210*, 2009, Sci. Chin. G, 52, 960

Zhang, J.S., Henkel, C., Kadler, M., Greenhill, L.J., Nagar, N., Wilson, A.S. & Braatz, J.A., *Extragalactic H<sub>2</sub>O masers and X-ray absorbing column densities*, 2006, A&A, 450, 933

Zhang, J.S., Henkel, C., Mauersberger, R., Chin, Y.-N., Menten, K.M., Tieftrunk, A.R. & Belloche, A., *The interaction of young stars with their molecular environment*, 2007, A&A, 465, 887

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## **Xiuzhong ZHANG**

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I am doing research in the field of Radio Astronomical Technology at SHAO. My main researches are digital backend system and VLBI correlator. In last several years, I am interesting in VLBI2010 system and study on that.

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## Jianfeng ZHOU

*Center for Astrophysics, Tsinghua University, China*  
[zhoujf@tsinghua.edu.cn](mailto:zhoujf@tsinghua.edu.cn)



I am a faculty member at the Center for Astrophysics, Tsinghua University. My research interests mainly focus on imaging and image reconstruction techniques. At present, I am involving in two astronomical projects. One is the Hard X-ray Modulation Telescope (HXMT), in which I will develop image deconvolution software packages for the telescope. Another is the STEP (Search for Terrestrial Exo-Planets), where I will do something about micro-pixel accuracy centroid displacement estimation and detector calibration. In addition, I attempt to investigate a possible technique called Stellar Synthetic Aperture Radar (SSAR).

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## U.S Participants

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## Ronald J. ALLEN (Ron)

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<http://www.stsci.edu/~rjallen/>



Ron Allen is presently Adjunct Professor and Principal Research Scientist in the Physics and Astronomy Department of the Johns Hopkins University, as well as Research Astronomer at the Space Telescope Science Institute in Baltimore. He did his undergraduate work in Physics (B.A. Hons. 1962) at the University of Saskatchewan in Canada, and received his PhD in Physics from M.I.T in 1967. Ron then spent two years as a Postdoctoral Fellow in the radio astronomy group at the Paris-Meudon Observatory, and in 1969 he joined the research staff at the Kapteyn Laboratory in Groningen, the Netherlands, to work with the newly-commissioned Westerbork Synthesis Radio Telescope. He was appointed to the faculty of the astronomy department at Groningen University as assistant Lecturer in Radio Astronomy in 1972 and promoted to Professor in 1980. In 1982 Ron served for 3 years as Chairman of the Astronomy Department and Dean of the Subfaculty of Astronomy at Groningen University. In 1985 he went to the University of Illinois in Champaign-Urbana as Professor of Astronomy and Head of Department. Ron moved to STScI as a Full Astronomer in 1989 and has held various management positions in the Institute. His current professional interests include spiral structure and the physics of the interstellar medium in galaxies, as well as applications of Fourier methods to Optics. His publications in the research literature include 18 invited review papers (first author on 16), more than 100 papers in refereed journals (first author on 33), and more than 66 papers in conferences and the popular press (first author on 24). His main research interest at present is the study of 18-cm OH emission as a tracer for the large-scale distribution of "CO-Dark H<sub>2</sub>" in the Galactic ISM.

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## Loren ANDERSON

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My main interests lie in Galaxy-wide massive star formation and Galactic structure. I am part of the HII Region Discovery Survey, a GBT and Arecibo X-band recombination line survey of nearly 500 previously unknown Galactic HII regions (<http://arxiv.org/abs/1103.5085>, <http://arxiv.org/abs/1209.4848>). For this work I have identified targets using mid-infrared data, most recently from the WISE satellite. Our radio technique relies on stacking seven recombination lines that are observed simultaneously. The spectroscopic observations allow us to derive kinematic distances, and thus to trace Galactic structure. I recently completed a catalog of 8000 objects with mid-infrared morphologies from WISE suggestive of HII regions; we hope to follow up these objects with radio observations. My other interests lie in understanding the warm interstellar medium and its connection to massive star formation, far-infrared observations of massive star formation regions (<http://arxiv.org/abs/1203.5721>), massive star formation at extreme Galactic radii, the HII region luminosity function, and Galactic metallicity at radio and far-infrared wavelengths.

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## Tim BASTIAN

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Tim is the Head of Observatory Science Operations at NRAO. His research interests are in Solar/stellar radiophysics and heliophysics. He also works on planning and development of the Frequency Agile Solar Radio telescope (FASR).

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## **Anthony BEASLEY (Tony)**

*NRAO – Charlottesville, VA*  
[tbeasley@nrao.edu](mailto:tbeasley@nrao.edu)



Tony Beasley is the Director of the National Radio Astronomy Observatory. Tony's career has focused on the design, construction, operation, and management of major scientific research facilities. In 2000, Tony became the Project Manager for the Combined Array for Research in Millimeter-wave Astronomy (CARMA), a University-based millimeter array in eastern California funded by the National Science Foundation (NSF). In September 2004 he became the ALMA Project Manager in the Joint ALMA Observatory in Santiago, Chile. During his tenure as ALMA Project Manager, Beasley led the ALMA construction project through multiple international reviews and a major re-baselining effort that ultimately led to National Science Board approval of a 40% funding increment. Prior to his appointment as NRAO Director, he served for more than four years as Chief Operations Officer and Project Manager for the National Ecological Observatory Network (NEON), a continental-scale observatory designed to provide scientists with 30 years of ecological data on the impacts of climate change, land use change, and invasive species on natural resources and biodiversity. His scientific interests include non-thermal stellar radio emission, Very Long Baseline Interferometry (VLBI) techniques, radio supernovae, and astrometry of stellar/interstellar masers.

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## Carla BEAUDET

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Carla Beaudet is the RFI engineer for the Green Bank Facility. Her professional interests are RFI monitoring, testing and mitigation techniques, as well as antenna feed characterization up to 115 GHz.

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## James BRAATZ (Jim)

*NRAO – Charlottesville, VA*

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Jim works with the North American ALMA Science Center, supporting ALMA operations. He also supports development and operations of the Green Bank Telescope. Jim's research interests include masers, AGNs, galaxy evolution, cosmology, and molecular line studies in galactic nuclei. He is the PI of the Megamaser Cosmology Project (MCP), a multi-year effort that is measuring the Hubble constant using geometric measurements of distances to galaxies. The MCP also measures masses of supermassive black holes with high precision. Jim is the scientific advisor to SHAO student Feng Gao.

The MCP web page:

<https://safe.nrao.edu/wiki/bin/view/Main/MegamaserCosmologyProject>

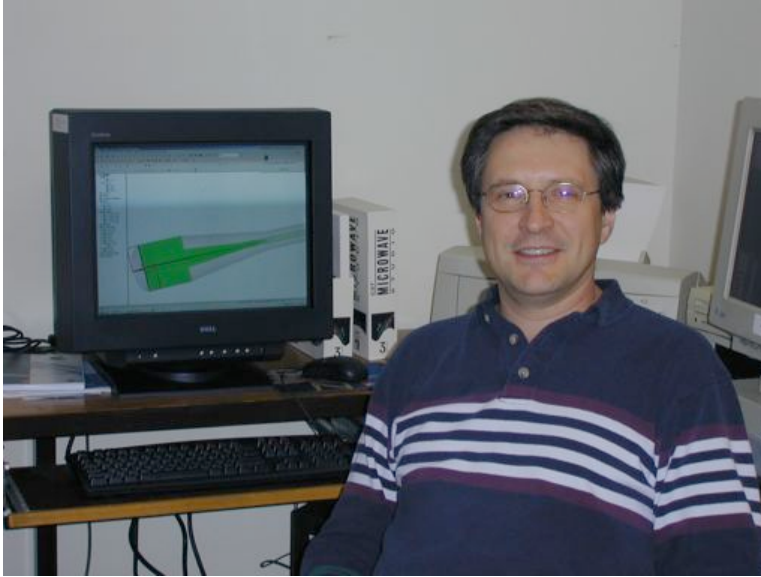
Recent publications:

- “Measuring the Hubble constant with observations of water-vapor megamasers”, Braatz et al., 2013, IAUS, 289, 255 ([link](#))
- “The Megamaser Cosmology Project. V. An Angular-diameter Distance to NGC 6264 at 140 Mpc”, Kuo, Braatz et al., 2013, ApJ, 767, 155 ([link](#))
- “The Megamaser Cosmology Project. IV. A Direct Measurement of the Hubble Constant from UGC 3789”, Reid, Braatz, et al., 2013, ApJ, 767, 154 ([link](#))
- “The Megamaser Cosmology Project. III. Accurate Masses of Seven Supermassive Black Holes in Active Galaxies with Circumnuclear Megamaser Disks”, Kuo, Braatz et al., 2011, ApJ, 727, 20 ([link](#))

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## Richard BRADLEY (Rich)

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Rich is a research engineer in the Central Development Lab at NRAO. His research interests are:

- Scientific instrumentation
- Low noise electronics
- Antenna design
- Signal processing
- Galaxy dynamics
- Cosmology
- Particle physics

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## Robert DICKMAN (Bob)

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Bob is the Interim Director, NRAO Central Development Laboratory, and Head, NRAO New Initiatives Office, Scientist at NRAO in Charlottesville

You can find his CV and biography here:

<http://www.nrao.edu/~rdickman/Webpage/cv.pdf>

<http://www.nrao.edu/~rdickman/Webpage/bio.pdf>

Selected research interests (recent/current work in **bold**):

- **Molecular cloud masses and stability**<sup>1</sup>
- Molecular cloud turbulence and observational diagnostics<sup>2</sup>
- Isotope fractionation in the dense ISM<sup>3</sup>
- Molecular clouds and small-scale structure<sup>4</sup>
- **Dark matter and extended gravitation**<sup>5</sup>

Notes:

<sup>1</sup> R. L. Dickman, Ph.D. Thesis, Columbia University (1976);

<http://adsabs.harvard.edu/abs/1978ApJS...37..407D>,

<http://adsabs.harvard.edu/abs/1986ApJ...309..326D>,

<http://adsabs.harvard.edu/abs/1983ApJ...271..143D>,

<http://www.nrao.edu/~rdickman/Webpage/cb4.pdf>

<sup>2</sup> <http://adsabs.harvard.edu/abs/1985ApJ...295..479D>,

<http://adsabs.harvard.edu/abs/1985ApJ...295..466K>,

<http://adsabs.harvard.edu/abs/1984ApJ...286..255K>

<sup>3</sup> <http://adsabs.harvard.edu/abs/1979ApJ...234..100D>

<sup>4</sup> <http://adsabs.harvard.edu/abs/1992ApJ...400..203D>,

<http://adsabs.harvard.edu/abs/1989ApJ...341..293T>

<sup>5</sup> <http://www.nrao.edu/~rdickman/Webpage/testingMOND.pdf>

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## Steve DURAND

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Steven Durand holds a Master of Science in Electrical Engineering from New Mexico State University and a Bachelor of Arts in Chemistry from Eastern Washington University. In 1999, he became a member of the technical staff at the National Radio Astronomy Observatory (NRAO) in Socorro, New Mexico, USA. During the EVLA project, he helped design the fiber optic system that is being used for the IF, LO and MCB systems. He currently holds the position of Electronics Division Head at NRAO Socorro New Mexico where he directs the development and maintenance of the electronics for the EVLA and the VLBA. He has published a number of papers on optical digital transmission systems, photovoltaic power systems and hybrid power systems.

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## Dennis M. EGAN

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Dennis Egan is the Mechanical Division Head at NRAO, Green Bank. He is responsible for all mechanical design and development of mechanical systems at Green Bank. He is also the NRAO Central Instrument Shop Supervisor. Dennis's interests include mechanical design, materials, corrosion, failure analysis, and troubleshooting. He is particularly interested in the track behavior of heavy telescopes.

Recent publications include:

Dennis Egan, "Track creep: experience, modeling efforts, and consequences of work done at the 100 meter Green Bank Telescope", Proceedings of SPIE Vol. 8336, 83360M (2011)

Robert Anderson, Arthur Symmes, Dennis Egan, "Replacement of the Green Bank Telescope azimuth track", Proceedings of SPIE Vol. 7012, 701237 (2008)

Arthur Symmes, Robert Anderson, Dennis Egan, "Improving the service life of the 100-meter Green Bank Telescope azimuth track", Proceedings of SPIE Vol. 7012, 701238 (2008)

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## Alyson FORD

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Alyson is the Lead Scientist for the NRAO 140ft Telescope in Green Bank, which is currently operating as the Green Bank Earth Station for the RadioAstron satellite. Her research interests include galaxy structure and dynamics, and in particular, quantifying low-level star formation and the gas content of nearby elliptical galaxies, the stellar populations and gas structure of dwarf galaxies, and the distribution and kinematics of neutral hydrogen in the Milky Way.

Select publications:

Discovery of a Gas-Rich Companion to the Extremely Metal Poor Galaxy DDO 68  
Cannon et al., 2014, ApJL, accepted  
<http://adsabs.harvard.edu/abs/2014arXiv1404.3540C>

Direct Detection of Young Stars in Nearby Elliptical Galaxies  
Ford & Bregman, 2013, ApJ, 770, 137  
<http://adsabs.harvard.edu/abs/2013ApJ...770..137F>

The Parkes Galactic All-Sky Survey. II. Stray Radiation Correction and Second Data Release  
Kalberla et al., 2010, A&A, 521, A17  
<http://adsabs.harvard.edu/abs/2010A%26A...521A..17K>

The Milky Way Disk-Halo Transition in HI: Properties of the Cloud Population  
Ford, Lockman & McClure-Griffiths, 2010, ApJ, 722, 367  
<http://adsabs.harvard.edu/abs/2010ApJ...722..367F>

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## John FORD

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John Ford is the Electronics Division Head at the National Radio Astronomy Observatory in Green Bank, West Virginia. John's interests are in computer architecture, signal processing, and pulsar research, and in telescope motion controls and instrumentation.

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## David FRAYER

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David Frayer is a GBT scientist specializing in the high frequency (3-4mm) spectral line receivers and instrumentation for the GBT. David received his Ph.D. from the University of Virginia. He carried out postdoctoral positions at the University of Toronto and the Caltech Owens Valley Millimeter Array and was a research scientist at the Spitzer Science Center and the NASA Herschel Science Center before joining NRAO in 2009. David's research interests focuses on Galaxy Evolution, in particular on the molecular gas and dust properties of luminous infrared galaxies in the local and distant Universe.

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## Feng GAO

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I'm a Grote Reber pre-doctoral fellow at NRAO in Charlottesville, working with Dr. Fred Lo and Dr. Jim Braatz on the Megamaser Cosmology Project for my Ph.D. thesis. Originally I was a graduate student at SHAO, supervised by Dr. Zhi-Qiang Shen in his VLBI group. My research is mainly focused on studying the inner part of the AGN and the SMBH at its center, by using the radio interferometry technique. I'll get my Ph.D. degree from SHAO, expected in the summer of 2015.

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## Martha HAYNES

*Cornell University – Ithaca, NY*  
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Martha Haynes is the Goldwin Smith Professor of Astronomy at Cornell University and the co-PI of the Arecibo Legacy Fast ALFA (ALFALFA) extragalactic survey which has surveyed 7000 square degrees of the HI sky out to  $z \sim 0.06$ . She has extensive experience in the design and execution of major HI and optical surveys of local galaxies to explore the influence of large scale structure on galaxy evolution, to make measurements of local cosmological including the HI mass, velocity and correlation functions and the bias parameter and to map the local peculiar velocity field. Currently, she also serves as the deputy director of the CCAT project to build a 25 meter submillimeter telescope at 5600 meters elevation in the Atacama region of Chile.

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## Carl HEILES

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My interests involve the diffuse interstellar gas---ionized, atomic, and molecular. Arecibo's GALFA survey, with its unique combination of high angular resolution and sensitivity, reveals the gas to be amazingly transitory, anisotropic, magnetic, and turbulent. China's new radio telescopes are essential for pursuing these aspects in sky coverage, sensitivity, and resolution. The important areas for progress include...

- Extending the GALFA HI survey, primarily in sky coverage but also in quality.
- Measuring the physical conditions and magnetic fields in diffuse interstellar gas using the 21-cm line in emission and absorption.
- Measuring the molecular composition of translucent molecular clouds using essential molecular lines, mainly OH, HCO<sup>+</sup>, and CO, in emission and absorption.

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## **Fredrick JENET (Rick)**

*University of Texas at Brownsville*  
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Dr. Jenet's research and research related activities are creating the field of low-frequency gravitational wave astronomy using pulsar timing techniques. He is a co-founder of the North American Nanohertz Observatory for GRAVitational Waves (NANOGrav), an organization dedicated to the study of low-frequency gravitational waves. Dr. Jenet also created the Arecibo Remote Command Center (ARCC) program which is an integrated research and education program designed to get students involved in science research early in their careers. Through the ARCC program, he has been training students to use the Arecibo observatory to search for and observe exotic stars known as radio pulsars.

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## Kenneth KELLERMANN (Ken)

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Kenneth Kellermann is a Senior Scientist at the National Radio Astronomy Observatory where he works on the study of radio galaxies, quasars and cosmology, and on the development of new instrumentation for radio astronomy. As part of the MOJAVE (<http://www.physics.purdue.edu/~mlister/MOJAVE/>) program, he uses the VLBA to study the kinematics of AGN jets. With the VLA, he also continues his long time research radio source surveys and populations with recent emphasis on the nature of radio emission from radio loud and radio quiet quasars. In addition he does research on the history of radio astronomy. Kellermann also holds an appointment as an Outside Scientific Member of the German Max Planck Society and is a Research Professor of Astronomy at the University of Virginia. Dr. Kellermann received his S.B. degree in Physics from M.I.T. in 1959 and his Ph. D. in Physics and Astronomy from Caltech in 1963 where he is a Distinguished Caltech Alumnus. He is currently a member of the United States National Academies Committee on Radio Frequencies, the US National Committees for URSI and for the IAU where he is the Vice Chair, and he is a member of the RadioAstron International Science Committee.

Recent publications:

K. Kellermann, The Discovery of Quasars, <http://arxiv.org/abs/1304.3627>

J. Condon et al., AGN and Starburst Radio Emission from Optically Selected QSOs, <http://arxiv.org/abs/1303.3448>

J. Condon et al. Resolving the Radio Source Background: Deeper Understanding Through Confusion, <http://arxiv.org/abs/1207.2439>

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## Matt LISTER

*Purdue University – West Lafayette, IN*  
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Matthew Lister is a professor in the department of physics of astronomy at Purdue University, where he heads up a research group that studies relativistic jets associated with active galactic nuclei. He is the P.I. of the MOJAVE program ([www.astro.purdue.edu/MOJAVE](http://www.astro.purdue.edu/MOJAVE)), a VLBA key project to investigate the evolution of jetted outflows in AGN (<http://adsabs.harvard.edu/abs/2013AJ...146..120L>) and their connection with high-energy flaring properties (<http://adsabs.harvard.edu/abs/2011ApJ...742...27L>). His research program also includes multiwavelength studies of kpc-scale AGN jets with the VLA, HST, and Chandra (<http://adsabs.harvard.edu/abs/2011ApJ...730...92H>, <http://adsabs.harvard.edu/abs/2012ApJ...748...81K>). He is a past member of the Japanese space-VLBI observing program AGN survey team, and currently a participant in the AGN survey key project of the Russian Radioastron space-VLBI mission ([www.asc.rssi.ru/radioastron](http://www.asc.rssi.ru/radioastron)).

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## **K.Y. LO (Fred)**

*NRAO – Charlottesville, VA*

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Fred is Distinguished Astronomer and Director Emeritus at NRAO. He was educated at MIT, receiving both his undergraduate and graduate degrees in Physics there. Afterwards, he held research and teaching positions at Caltech, UC Berkeley, and the University of Illinois where he became Chair of the Astronomy Department. In 1997, he went to Taiwan to direct the newly formed Institute of Astronomy and Astrophysics in the Academia Sinica in Taipei, where he oversaw the construction of two fully equipped antennas for the Submillimeter Array in a partnership with the Harvard-Smithsonian Center for Astrophysics. He also initiated an effort in experimental Cosmology there. Dr. Lo's range of research interests include: the compact radio source which arises from the super-massive black hole at the Galactic Center; intergalactic hydrogen and dwarf galaxies; starburst galaxies; high redshift galaxies; and mega-masers and their applications to measuring the black hole mass of Active Galactic Nuclei and to determining the Hubble Constant to high accuracy for a constraint on the nature of Dark Energy.

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## Felix J. LOCKMAN (Jay)

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My research interests include Milky Way structure and evolution, the gaseous halos of spiral galaxies, and related topics. Recently I have been working on 21cm HI observations of gas clouds accreting onto the Milky Way <http://adsabs.harvard.edu/abs/2008ApJ...679L..21L>, and the very faint HI emission detected in the Local Group between the galaxies M31 and M33 <http://adsabs.harvard.edu/abs/2012AJ....144...52L>. Colleagues and I have been studying a population of HI clouds that occupies the disk-halo transition in the inner Milky Way and apparently arises from processes associated with large-scale star formation in the disk, through a mechanism that is not well understood.

<http://adsabs.harvard.edu/abs/2002ApJ...580L..47L>,  
<http://adsabs.harvard.edu/abs/2010ApJ...722..367F>

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## Duncan LORIMER (Dunc)

*West Virginia University – Morgantown, WV*  
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I received a PhD in radio astronomy in 1994 from the University of Manchester at Jodrell Bank. Since then I have worked at MPIfR in Bonn and at the Arecibo observatory. My interests are radio pulsars and fast transients. In 2004/5, with long-time colleague Michael Kramer at MPIfR, I co-wrote "Handbook of Pulsar Astronomy" (Cambridge University Press).

Recent publications:

- [2013MNRAS.436L...5L](#) "On the detectability of extragalactic fast radio transients"
- [2012ApJ...758..141L](#) "Radio and X-Ray Observations of the Intermittent Pulsar J1832+0029"
- [2007Sci...318..777L](#) "A Bright Millisecond Radio Burst of Extragalactic Origin"

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## Rusen LU

*MIT Haystack Observatory*  
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I am currently a postdoctoral associate at MIT Haystack Observatory. My research interests are centered around high angular resolution, multi-wavelength studies of active galactic nuclei, supermassive black holes, the center of the Milky Way, and stellar masers.

Recent publications:

Lu, R.-S., Broderick, A. E., Baron, F., Monnier, J. D., Fish, V. L., Doeleman, S. S., & Pankratius, V., “Imaging the Supermassive Black Hole Shadow and Jet Base of M87 with the Event Horizon Telescope”, 2014, ApJ, in press (arXiv:1404.7095)

Lu, R.-S., Krichbaum, T.P., Eckart, A., König, S., Kunneriath, D., Witzel, G., Witzel, A., & Zensus, J. A., “Multiwavelength VLBI observations of Sagittarius A\*”, 2011, A&A, 525, 76

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## Jintao LUO

*NRAO – Charlottesville, VA*  
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Jintao is working as a research associate with Scott Ransom, mainly on pulsar instrumentation. His research interests include the pulsar backend and the pulsar search & process software. As a doctor graduated from Shanghai Astronomical Observatory (SHAO), jointly with Joint Institute for VLBI in Europe (JIVE), he keeps an interest in VLBI techniques as well.

In JIVE, he developed the delay & phase module for the UniBoard based VLBI correlator. This module has been integrated into the correlator. Fringes were successfully produced with this correlator in the long baseline observations.

In NRAO he worked in the China-US DIBAS project, contributing to the development of pulsar mode firmware on RoachBoard.

Now he is busy with accelerating the pulsar search software, PRESTO, with the Nvidia GPU. Two versions of this GPU software have been released, which could be found in [https://github.com/jintaoluo/presto\\_on\\_gpu](https://github.com/jintaoluo/presto_on_gpu). As a best result from the test, the GPU version is about 40 times faster than the CPU version.

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## Ronald MADDALENA (Ron)

*NRAO – Green Bank, WV*  
[rmaddale@nrao.edu](mailto:rmaddale@nrao.edu)



Dr. Ron Maddalena is the Head of GBT Science Operations. The overall objective of the Observatory Science Operations (OSO) is to provide the research community an easy-to-use, uniform set of services for all the NRAO instruments. He is also an active member of the support staff which helps observers use the GBT as well as helps the staff develop the hardware, the tools, and the documentation that facilitate research efforts.

Ron received his B.A. (1980) and Ph.D. (1985) from Columbia University and has worked for the observatory in Green Bank ever since. He was support scientist for the NRAO 140-ft telescope until 1996. In particular, during that time, he was the project manager and scientist for the UniPOPS data analysis system. Since 1996 he has been supporting various GBT construction and support efforts. For example, he led the design efforts for the Holography system that has been used successfully to set the GBT surface. He was the project manager, designer, and developer of the CLEO software system that is used by staff and observers to interact with all aspects of the GBT hardware. He was project scientist for commissioning the GBT as well as for other projects such as the various GBT data analysis systems. He was the first Head of Science Operations for the Green Bank Telescope from 2006-2009. He works with the RFI group in Green Bank on mitigation. He continues to develop the meteorological models and algorithms that create the weather forecasts that are the basis of the daily schedules created by the GBT's Dynamical Scheduling System.

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## Maura McLAUGHLIN

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Maura is an Associate Professor of Physics and Astronomy at West Virginia University. Most of her research involves studying pulsars and using them for fundamental physics applications, in particular the detection of gravitational waves through pulsar timing as part of the NANOGrav (North American Nanohertz Observatory for Gravitational Waves) collaboration. This project involves pulsar searching and timing observations with the GBT and Arecibo. She is also interested in searches for radio transients and characterizing intermittent pulsars to better understand pulsar emission mechanisms. Finally, she is one of the co-founders of the Pulsar Search Collaboratory, which has involved over 2000 high-school students in 18 states in pulsar searches with the GBT.

Some papers:

<http://adsabs.harvard.edu/abs/2013CQGra..30v4008M>

<http://adsabs.harvard.edu/abs/2013ApJ...776..104M>

<http://adsabs.harvard.edu/abs/2013ApJ...768...85R>

<http://adsabs.harvard.edu/abs/2012ApJ...753...96E>

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## **Anthony MINTER (Toney)**

*NRAO – Green Bank, WV*  
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Toney Minter is the Head of Green Bank Telescope Operations. He provides day-to-day oversight of the operations of the GBT to ensure it provides maximum scientific output. His duties range from overseeing the instrumentation on the GBT through scheduling the telescope and overseeing the support staff.

Minter received his B.S. from Virginia Polytechnic Institute and State University and his Ph.D. from the University of Iowa. He came to NRAO as a Jansky Fellow in 1995 and became part of the NRAO scientific staff in 1996.

Minter's research interests include interstellar turbulence and galactic HI.

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## James MORAN (Jim)

*Harvard University and Smithsonian Astrophysical Observatory — Cambridge, MA*  
[jmoran@cfa.harvard.edu](mailto:jmoran@cfa.harvard.edu)



*Ham radio station, Tsinghua University, Beijing, April 2008*

Jim Moran is the Donald H. Menzel Professor of Astrophysics at Harvard University and a senior radio astronomer at the Smithsonian Astrophysical Observatory (SAO), where he has spent his entire career. He also holds a position as Concurrent Professor of Astronomy at Nanjing University (unless it has been revoked) and previously served as chair of the Harvard Department of Astronomy and associate director of SAO. Moran did his undergraduate work at the University of Notre Dame and received his PhD from MIT in 1968. He received the AAS Newton Lacy Pierce Prize, was the joint recipient of the 1971 Rumford Medal of the American Academy of Arts and Science for his role in the development of VLBI, and was the 1996 NRAO Jansky Lecturer. He is a member of the US National Academy of Sciences and the American Academy of Arts and Sciences. Moran was also the director of the Submillimeter Array on Mauna Kea during its construction. He is a coauthor of a widely used reference book, *Interferometry and Synthesis in Radio Astronomy*, which is being revised for a third edition. He welcomes suggestions for this revision from attendees.

Moran currently works on masers in AGN and on Sgr A\* with VLBI techniques. He has collaborated with Zheng-Xing Wu from Nanjing University on maser projects since 1981. He was the co-thesis supervisor of Zhi-Qiang (Eric) Shen.

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## Matthew MORGAN (Matt)

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Matt Morgan received his B.S. degree in electrical engineering from the University of Virginia in 1999, and the M.S. and Ph.D. degrees from the California Institute of Technology in 2001 and 2003, respectively, where he conducted research in the development of Monolithic Millimeter-wave Integrated Circuits (MMICs) and MMIC-based receiver components for atmospheric radiometers and deep-space communications. He has authored over 40 papers and has two patents in the areas of MMIC design, millimeter-wave system integration, and high-frequency packaging techniques. As a Scientist and Research Engineer at the NRAO Central Development Lab (CDL) in Charlottesville, VA, Matt is involved in the design and development of low-noise receivers, components, and novel concepts for radio astronomy instrumentation in the cm-wave, mm-wave, and submm-wave frequency ranges. He was Project Engineer for the K-Band Focal Plane Array on the Green Bank Telescope, and is currently the head of CDL's Integrated Receiver Development Program.

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## Karen O'NEIL

*NRAO – Green Bank, WV*  
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Dr. Karen O'Neil is the Green Bank Site Director for the National Radio Astronomy Observatory's site in Green Bank, West Virginia. There she oversees the running and development of the Robert C. Byrd Green Bank Telescope (GBT), the world's largest fully steerable telescope. In addition, the Green Bank site hosts both a range of other telescopes, from 20' – 140' in diameter and a wide variety of developmental and educational activities, all of which are under Dr. O'Neil's direction.

Dr. O'Neil received her Ph.D. from the University of Oregon in Physics, with a specialty in Astrophysics. In addition to her work at the NRAO, she has also worked as a professor of physics at the University of Oregon. She was also a staff astronomer at the National Ionosphere and Astronomy Center's Arecibo Observatory in Arecibo, Puerto Rico where she worked on the commissioning and testing of a wide variety of instruments and software for the 300m telescope.

Dr. O'Neil's research focus is on the formation and evolution of low surface brightness galaxies – objects with total mass and light equal to that of the 'normal' spiral galaxy population, yet which are more diffuse than can readily be explained through normal galaxy formation and evolution theories. Dr. O'Neil's research is to understand the properties of these enigmatic systems and to use our understanding of the evolutionary processes within the galaxies.

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## D.J. PISANO

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My research involves studying how galaxies form and evolve. I do this through radio observations of the neutral hydrogen in and around galaxies and radio continuum observations of star formation in nearby galaxies. Over the past few years I have been using the GBT to conduct a census of the HI surrounding nearby galaxies. This work has revealed numerous new low column density features around the galaxies, some of which may be associated with cold accretion flows (<http://adsabs.harvard.edu/abs/2014AJ....147...48P>). We have also done extremely deep, high resolution mapping of the HI filament between M31 and M33 in an attempt to better understand its origin (<http://adsabs.harvard.edu/abs/2013Natur.497..224W>). To better understand how the HI content of galaxies has evolved over the past four billion years, I am part of the CHILES collaboration observing the COSMOS field from  $z=0$  to 0.4 over 1000 hours (<http://adsabs.harvard.edu/abs/2013ApJ...770L..29F>). Finally, I am studying local analogs of the high redshift luminous compact blue galaxies, using HI and radio continuum observations with the GBT and the VLA to determine how long these galaxies can continue to form stars and what their evolutionary fate will be.

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## Richard PRESTAGE

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I am a Scientist working on the operations and continued development of the Green Bank Telescope, and a member of the NRAO New Initiatives Office. I have research interests in the areas of telescope control systems, telescope measurement and performance, instrumentation, and RFI mitigation. For example, I am currently Project Scientist for the GBT main drives servo upgrade, and am exploring methods for data flagging for wind-induced errors in telescope tracking.

Some papers / reports of interest include:

"Out-Of-Focus Holography at the Green Bank Telescope", B. Nikolic, R. M. Prestage, D. S. Balser, C. J. Chandler, R. E. Hills, *Astronomy and Astrophysics* 465:685, 2007  
<http://arxiv.org/abs/astroph/0612249>;

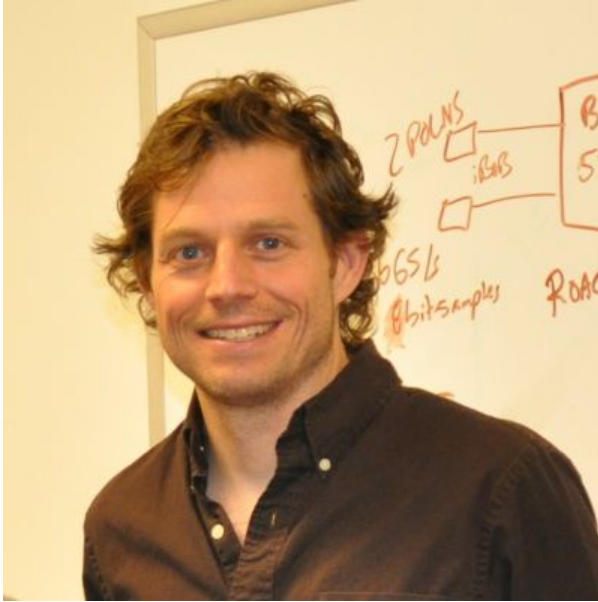
"The Green Bank Telescope", Richard M. Prestage, Kim T. Constantikes, Todd R. Hunter, Lee J. King, Richard J. Lacasse, Felix J. Lockman, and Roger D. Norrod, *Proceedings of the IEEE* Vol. 97, No. 8, August 2009  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=05109717>

"Tracking Performance of the GBT", PTCS Project Note 71.1,  
<http://www.local.gb.nrao.edu/ptcs/ptcspn/ptcspn71/ptcspn71.pdf>

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## Scott RANSOM

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Scott is a tenured astronomer with the National Radio Astronomy Observatory (NRAO) in Charlottesville, VA where he studies all things “pulsar”. He is also a Research Professor with the Astronomy Department at the University of Virginia where he has several graduate students and teaches the occasional graduate class. He works on a wide variety of projects involving finding, timing, and exploiting pulsars of various types, using data from many different instruments and at energies from radio waves to gamma-rays. His main focus is on searching for exotic pulsar systems, such as millisecond pulsars and binaries. Once these pulsars are identified, he uses them as tools to probe a variety of basic physics, including tests of General Relativity, the emission (and hopefully soon the direct detection) of gravitational waves (as part of the NANOGrav collaboration), and the physics of matter at supra-nuclear densities. Much of his time is spent working on the state-of-the-art signal-processing instrumentation, high-performance computing and software that pulsar astronomy requires.

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## Jonathan ROMNEY (Jon)

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Jonathan Romney has been a member of the NRAO scientific staff since 1983. His scientific interests center on AGN jets, Galactic structure, the interstellar and intergalactic medium, and planetary orbits.

Jon came to NRAO to build the VLBA, and led the group that designed and built the original VLBA correlator, a large FX system that was radical and unique for its time. Immediately following completion of the VLBA, he went on to develop the instrument into a major ground support element for the Japanese VSOP Space VLBI mission.

Jon began agitating for an upgrade of the VLBA in 1999, with a series of discussions on the scientific requirements. A technical concept, exploiting modern digital signal processing and recording technology, was specified in 2000. Beginning in 2004, he led two separate demonstration projects on the application of the VLBA to precision angular position measurements of NASA spacecraft. Since 2006, when funding became available for a VLBA Sensitivity Upgrade based on the previous study, Jon has served as an informal leader of that effort, which finally is demonstrably complete in 2014.

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## **Anish ROSHI**

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Anish is currently a staff scientist at NRAO Charlottesville and Green Bank. He did his doctorate from the National Centre for Radio Astrophysics, Tata Institute of Fundamental Research (TIFR), Pune, India. Since then, he has worked as a member of the faculty at TIFR, Pune and Raman Research Institute, Bangalore, India. His primary interests are galactic interstellar medium and star formation. He has also been actively involved in radio astronomy instrumentation work. Currently, he is part of the Phased Array Feed and Spectrometer development projects at NRAO.

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## Siraprapa SANPA-ARSA (Tuck)

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Tuck is a graduate student at the University of Virginia, working with Scott Ransom. She expects her Ph.D. in 2015. Her research interests are focused on studies of pulsars discovered by PALFA (Pulsar survey by Arecibo L-band Feed Array).

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## Scott SCHNEE

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Scott works with the North American ALMA Science Center, where his main responsibility is coordinating reduction of early science data. His research interests include the study of low-mass star forming regions, nearby molecular clouds, dense cores, and protostars. He observes primarily in the millimeter and sub-millimeter, using both single-dish telescopes and interferometric arrays.

Recent publications:

- 1) "Synthetic Observations of the Evolution of Starless Cores in a Molecular Cloud Simulation: Comparisons with JCMT Data and Predictions for ALMA", Mairs et al., 2014, *ApJ*, 783, 60
- 2) "Abundant cyanopolyynes as a probe of infall in the Serpens South cluster-forming region", Friesen et al., 2013, *MNRAS*, 436, 1513
- 3) "Correlating Infall with Deuterium Fractionation in Dense Cores", Schnee et al., 2013, *ApJ*, 777, 121
- 4) "CARMA Observations of Protostellar Outflows in NGC 1333", Plunkett et al., *ApJ*, 774, 22
- 5) "Earliest Stages of Protocluster Formation: Substructure and Kinematics of Starless Cores in Orion", Lee et al., 2013, *ApJ*, 772, 100

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## Ethan SCHREIER

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Dr. Ethan J. Schreier is President and Chief Executive Officer of Associated Universities, Incorporated (AUI), and Adjunct Professor in the Department of Physics and Astronomy at The Johns Hopkins University in Baltimore. Dr. Schreier attended the City University of New York and received his Ph.D. in Physics from the Massachusetts Institute of Technology.

AUI manages the National Radio Astronomy Observatory for the National Science Foundation, and is the North American Executive for the international Atacama Large

Millimeter/submillimeter Array (ALMA) under construction in northern Chile. ALMA, the largest ground based astronomy project in the world, started early science in 2011 and will be completed in 2014. AUI is also participating in CCAT, a university-run 25-meter submillimeter telescope planned to be adjacent to ALMA; AUI will lead the construction and operation of CCAT in Chile. AUI is also a partner in managing the Virtual Astronomical Observatory, a joint NSF - NASA funded project to provide common access to most existing astronomy data archives, greatly expanding their utility.

Prior to joining AUI in 2001, Dr. Schreier spent 20 years as a tenured astronomer at the Space Telescope Science Institute in Baltimore, which conducts the science program of the Hubble Space Telescope. He held several senior management positions including Chief Data and Operations Scientist and Associate Director for Operations. He previously had been a senior scientist at the Harvard-Smithsonian Center for Astrophysics.

Dr. Schreier's research has focused on the study of X-ray emission from neutron stars, black holes, and active galaxies. He was a core member of the group that discovered the first black holes, and later he led the group that discovered X-ray emission from AGN jets. He has served on numerous national and international advisory committees involving science operations and data systems, has been active in science outreach efforts, and has been instrumental in coordinating astronomy data systems. He played a leadership role in the establishment and governance of the US Virtual Astronomical Observatory. He currently serves on the AUI, ALMA, CCAT and VAO Boards, and has participated in planning efforts for the Square Kilometer Array.

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## William SHILLUE (Bill)

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Bill is a Research Engineer at NRAO Central Development Laboratory in Charlottesville, VA. He is currently the group leader for the NRAO Phased Array research and development program. Previously he held the following positions at NRAO:

- ALMA Backend group leader for the Photonics group at NRAO, Charlottesville
- Millimeter-wave receiver development engineer at NRAO in Tucson, AZ
- Front end and optics design for Space VLBI Earth Station at NRAO, Green Bank, WV

W. Shillue et al, “A high-precision tunable millimeter-wave photonic LO reference for the ALMA telescope,” IEEE Microwave Theory and Techniques Symposium, Seattle, June, 2013, 10.1109/MWSYM.2013.6697660

Shen, P.; Gomes, N.J.; Shillue, W.P.; Albanna, S.; “The Temporal Drift Due to Polarization Noise in a Photonic Phase Reference Distribution System,” Journal of Lightwave Technology, Volume 26, Issue 15, Aug.1, 2008, pp. 2754 - 2763

Cliche, J.-F.; Shillue, B.; “Precision timing control for radioastronomy: maintaining femtosecond synchronization in the Atacama Large Millimeter Array,” IEEE Control Systems Magazine, Vol. 26, Issue 1, Feb 2006, pp. 19—26

Radford, S.; Reiland, G.; Shillue, B., “Site Test Interferometer,” Publications of the Astronomical Society of the Pacific, Vol. 108, pp. 441-445, 1996

Wu, T.K.; Shillue, W.P., “Dichroic design for the orbiting VLBI earth station antenna,” IEE Proceedings – Microwaves, Antennas and Propagation, Vol. 141, June 1994, pp. 181 -184

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## Sivasankaran SRIKANTH (Sri)

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I am a Research Engineer at the Central Development Lab (CDL), NRAO in Charlottesville, working in the areas of electromagnetics and optics. Design and development of passive components such as antenna feeds and polarizers is my primary responsibility. Other areas of my interest are antenna analysis, design of quasi-optics etc. I was actively involved in the optics analysis of the Green Bank Telescope (GBT). Jay Lockman, Richard Fisher and I were involved in a measurement, selectively illuminating one-quarter of the 300-foot telescope, simulating an offset parabola. This experiment demonstrated the reduction in far-out sidelobes, and was valuable in the choice of the offset geometry for the GBT [1]. Most of the feeds on the VLBA, all the feeds on the GBT and all the cassegrain feeds on the EVLA were designed and developed by me. At the low end on the EVLA, the feeds have a 2:1 bandwidth ratio. The development of a broad-band phase shifter [2], led to the waveguide band wide receivers for bands above 8 GHz on the EVLA. More recently I have been involved in the development of orthomode transducers and design of optics for some ALMA bands. The development efforts have yielded not only broader bandwidths but also simpler mechanical designs resulting in lower cost of manufacturing. One of my research goals is to develop corrugated feed horns and polarizers approaching 3:1 bandwidth ratio.

A. I. Boothroyd, K. Blagrove, F. J. Lockman, P. G. Martin, D. P. Goncalves and S. Srikanth, "Accurate Galactic 21-cm HI Observations with the NRAO Green Bank Telescope," *Astronomical instrumentation section of Astronomy and Astrophysics*, vol. 536, December 2011.

S. Srikanth, "A Wideband Corrugated Rectangular Waveguide Phase Shifter for Cryogenically-Cooled Receivers," *IEEE Trans. Microwave and Guided Wave Letters*, vol. 7, no. 6, pp. 150-152, June 1997.

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## Gerrit VERSCHUUR

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I am a radio astronomer whose primary research interest is the study of interstellar neutral hydrogen. I was a pioneer in the measurement of the interstellar magnetic field using the 21-cm Zeeman effect technique. I am the author of 8 books on science for the general reader including three on the subject of radio astronomy and together with Ken Kellermann co-edited two well-known textbooks entitled Galactic and Extragalactic Radio Astronomy. At present I am working on a new edition of *The Invisible Universe: The Story of Radio Astronomy* and hope to include a great deal of information to be learned at the China-US workshop. My current research centers on high-resolution galactic HI studies of structures observed by PLANCK and WMAP.

### Recent Publications:

High Galactic Latitude Interstellar Neutral Hydrogen Structure and Associated (WMAP) High-Frequency Continuum Emission. *Astrophysical Journal*, 2007, 671,

On the Apparent Associations between Interstellar Neutral Hydrogen Structure and (WMAP) High Frequency Continuum Emission. *Astrophysical Journal*, 2010, 711, 1208

Interacting Galactic Neutral Hydrogen Filaments and Associated High-Frequency Continuum Emission. *Astrophysical Journal*, 2013, 768, 181

High Resolution Observations and the Physics of High-Velocity Cloud A0. *Astrophysical Journal*, 2013, 766, 113

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## Galen WATTS

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Galen is an RF engineer with the Microwave Group in Green Bank and the RF Engineer for the RadioAstron Green Bank Earth Station.

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## Sander WEINREB (Sandy)

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Sander Weinreb is presently a Principal Scientist at JPL and a Sr. Faculty Associate at Caltech. He received the B.S.E.E. and Ph.D. degrees from M.I.T. in 1958 and 1963 respectively. Most of his career has been in the administration or development of instrumentation in radio astronomy. From 1966 to 1988 he led the Electronic Division of National Radio Astronomy Observatory where he was responsible for the design of all electronics for the Very Large Array and all other telescopes operated by the observatory. In 1989 he joined the central research laboratory of Martin Marietta where he led the millimeter-wave integrated circuit design and test group until 1996. He has had interim teaching positions at UC Berkeley, U. of Virginia, and U. of Massachusetts before joining JPL and Caltech in 1999.

Dr. Weinreb's major accomplishments are the introduction of digital correlation techniques into radio astronomy, the discovery of the first cosmic molecular spectral line (OH) and the introduction of cryogenic transistor amplifiers to radio astronomy for which he received the IEEE MTT 2013 Microwave Pioneer Award. He also received the 2014 American Astronomical Society Award for his early work on digital correlators and current work on low noise receivers. He has over 150 publications, has served on many review and visiting committees, is a Life Fellow of the IEEE, and was the recipient of the both the 2008 Reber Medal and the 2010 Jansky Award for innovative lifetime contributions to radio astronomy. His current research activities are in the areas of cryogenic low noise amplifiers and decade bandwidth antenna feeds.

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## Steven WHITE (Steve)

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Steve is a microwave engineer at Green Bank. He leads the microwave group and focuses his efforts on developing and maintaining the front end systems for the GBT.

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## Paulette WOODY

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Paulette is the administrator of the National Radio Quiet Zone (<http://www.gb.nrao.edu/nrqz/nrqz.shtml>), a +13,000 square mile area in WV, VA and MD, encompassing the Naval Information Operations Command at Sugar Grove and the National Radio Astronomy Observatory (NRAO) at Green Bank, both in West Virginia. She is with NRAO, and in her capacity as Quiet Zone Administrator, she reviews all license applications for fixed Government and non-Government radio systems within the Quiet Zone to insure compatibility with the mission of the Green Bank facility. Paulette also serves as liaison between applicants and the Sugar Grove spectrum coordinator. Before joining the NRAO, she served in the Land Mobile Radio business for +18 years, involved in FCC licensing of commercial and public safety accounts, among other duties. Paulette is a native of West Virginia.

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## Alwyn WOOTTEN (AI)

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AI is the North American ALMA Project Scientist.

His research interests include molecular clouds, star formation, the structure and chemistry of the ISM in galaxies, and shells of evolved stars.