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January 31, 2015

NRAO Headquarters
520 Edgemont Road
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To the members of the selection committee:

I am applying for the job of Associate Scientist at the North American ALMA Science Center in Charlottesville, Virginia. My curriculum vitae, the names of three references, and summaries of my past research, technical experience, and future research plans are enclosed for your review. Given my strong history of research, considerable radio and millimeter observing experience, and my work on diversity initiatives, I would appreciate your consideration for this position. As a member of the observatory staff, I will continue to lead cutting-edge research projects that highlight the capabilities of NRAO instruments. I will support the operations of NRAO facilities, provide guidance and energy for planning the future of the observatory, and continue to work to create a strong and diverse community of future radio astronomers.

I have more than a hundred hours of PI experience observing with NRAO facilities, and I have been leading PI projects at the GBT, VLA, and ALMA since 2010. My work has resulted in the detection and characterization of a widespread, hot component of molecular gas in the Galactic center using the GBT (Mills et al. 2013a), and a new high-resolution survey of Galactic center gas using the resident shared-risk capabilities of the VLA which has discovered widespread maser activity, and is yielding the first high-resolution temperature maps of Galactic center gas (Mills et al. 2014, Mills et al. submitted). Currently, I am using ALMA to continue to explore the sub-parsec physical conditions of Galactic center gas clouds: I have 30 hours of PI and Co-I projects in 4 ALMA bands to constrain the excitation of the gas around our Galaxy's central black hole. I am also expanding my research in new directions with a 75 hour PI project on the GBT to measure search for extremely hot gas in the unresolved centers of other nearby galaxies. My work is highly cited, and I have been invited to give colloquia, to attend conferences, and to give an invited review of Galactic center gas observations.

As a Scientist at the NRAO, I will exploit the new ultra-high-resolution capabilities of ALMA by conducting parsec-scale studies of the gas in the nuclei of more extreme galaxies up to 3 Mpc away. I will lead comparisons of these sources to surveys of our own Galactic center, including a 500 hour ATCA survey of Galactic center, of which I am co-PI. Together, these projects will yield the best constraints to date on the universality of physical conditions in galactic nuclei and their impact on star formation in these extreme environments, and will continue to push the limits of what is possible with current NRAO facilities

I possess a versatile skill set for working in an observatory that spans observing, data calibration, maintaining long-distance collaborations, and contributing to the planning of future facilities. I have many years of experience observing, calibrating, imaging and analyzing radio-frequency data, particularly high-frequency (above 20 GHz) spectral-line data, from both single dish and interferometric facilities. At millimeter and submillimeter wavelengths, in addition to my ALMA projects I have experience calibrating single dish data from the APEX telescope. I am also an avid and experienced user of CASA, which I have been employing since 2012 to calibrate and image radio and millimeter data. I work to share my technical and observing experience with the community by assisting with Synthesis Imaging and Data Reduction workshops.

I have built research partnerships with collaborators in the US, Germany, Taiwan, Sweden, and the Netherlands. I began working actively with collaborators across the US as a graduate student, and maintained these research relationships and initiated new ones while conducting last year of my thesis research in Germany. I continue to work closely with multiple international collaborators on papers and proposals. During this past summer, I supervised 4 undergraduate research students, all of whom have applied to graduate school and 3 of whom intend to continue radio astronomy work. I am continuing to meet regularly with these students to continue their research and papers, and I look forward to having them as colleagues in the future.

I actively participate in observatory initiatives including the VLA Sky Survey and Next Generation VLA planning for the future of NRAO. I led a white paper for Galactic center community for the VLASS, and co-led a white paper on a high-frequency survey of the Galactic plane, a key first step toward the future of an expanded VLA at these wavelengths. I am involved in planning and scientific working groups for the NGVLA, and was invited to participate on the scientific organizing committee for a workshop to discuss this initiative at the January 2015 meeting of the AAS. I have also taken a major role in software planning: my involvement in a project to identify the current limitations of data visualization tools has led to a partnership with researchers at the University of Utah to tackle ‘big data’ challenges presented by facilities such as ALMA.

I am also taking a leadership role in broadening the group of astronomers who are the future of the radio astronomy community. At the 2014 Synthesis Imaging Workshop I designed and ran a well-attended panel on careers and diversity in radio astronomy. I am currently the local coordinator of the National Astronomy Consortium summer student program in Socorro, a program that supports increasing the representation of underrepresented minority students in STEM fields. I oversee a cohort of summer students and lead supplemental mentoring activities for these students that continue after the summer.

I am excited about the opportunity to continue to be a part of NRAO, and I believe that my research and technical skills would be an asset to the organization. Through my research that both pushes and highlights the capabilities of NRAO facilities, my involvement in initiatives for the future of the observatory, and my leadership in diversity initiatives, I have demonstrated a commitment to maintaining the excellence of NRAO that will continue as a member of the observatory staff. Thank you for your consideration.

Sincerely,

Dr. Elisabeth A.C. Mills