

and Dr. Amy Simon-Miller. In 2005, the contents of Co-I Glenar's entire AOTF lab at GSFC were sent to NMSU as a long-term equipment loan and are being transferred to NMSU under the terms of the Stevenson-Wilder Act. Glenar's recent retirement from GSFC and transition to an NMSU researcher provides additional value to this proposal in that he will serve as a link between the NMSU proposing team and our GSFC collaborators.

Future Collaborations

Through this proposed research we will enhance our collaborations with instrument development specialists at NASA/GSFC. We will schedule regular teleconferences and annual face-to-face meetings in order to move our instrument development capabilities forward and develop specific plans for testing our AOTF point spectrometer in conjunction with the GSFC-build LDMS instrument. Specifically, we will collaborate with the following investigators at NASA:

- Dr. Amy Simon-Miller, Solar System Exploration Division, NASA/GSFC. She will provide insight into the instrumentation needs for outer solar system exploration.
- Dr. Paul Mahaffy, Chief, Atmosphere Experiment Laboratory, Solar System Exploration Division, NASA/GSFC. He will bring to bear his extensive experience in planetary mass spectrometry and organic composition measurements.
- Dr. William Brinckerhoff, Atmosphere Experiment Laboratory, Solar System Exploration Division, NASA/GSFC. He will work with our team on the testing of the modified TOF-LDMS that accommodates the AOTF.
- Dr. Marla Moore, Astrochemistry Laboratory, Solar System Exploration Division, NASA/GSFC. She will provide data on irradiated ices and access to her laboratory, where we can measure her samples with the AOTF and/or LDMS for comparison.

1.7.4 Addressing Diversity through Student Participation

The broader impact of the proposed work is in the training of human resources in STEM (science, technology, engineering, and mathematics) fields. NMSU has a minority enrollment of 53%, with 46% Hispanic students, and is therefore a Hispanic-serving institution. NMT has a minority enrollment of 35.4%. Both gender and ethnic minorities are underrepresented in STEM fields, and related to this proposal, specifically in engineering, physics and astronomy. In order to recruit a group of students that mirrors the diverse population at NMSU and NMT, as well as statewide in New Mexico, we will work closely with minority-serving programs at our respective institutions (e.g. NM Regional Alliance for Science, Engineering, and Mathematics; NM Alliance for Minority Participation, NM Space Grant Consortium) to identify best-practices for our student recruitment efforts to attract students from underrepresented groups. The NMSU and NMT students will be involved in all aspects of this project and will have the opportunity to interact with professional scientists and engineers at a NASA center, providing them with critical preparation for the workforce.

1.8 Management and Evaluation

Personnel and Research Program Management

- **Principal Investigator** – Patricia C. Hynes, is the Director of the New Mexico NASA EPSCoR Program and Director of New Mexico Space Grant Consortium.
- **Science PI** – Dr. Nancy Chanover is an Assistant Professor of Astronomy, NMSU.
- **Co-Investigator** – Dr. David Voelz is an Associate Professor of Electrical and Computer Engineering, NMSU.

- **Co-Investigator** – Dr. David Glenar is an Affiliate Professor of Astronomy at NMSU and an Emeritus Scientist in the Planetary Systems Branch at NASA/GSFC.
- **Co-Investigator** – Dr. Penelope Boston is an Associate Professor of Cave and Karst Science within the Department of Earth and Environmental Science, NMT.
- **2 Undergraduates and 3 Graduate Students** at NMSU and NMT, yet to be identified, will be supported by this research effort. All students supported by this funding will be U.S. citizens in an effort to build the technical workforce prepared to work for NASA and its contractors. New Mexico NASA EPSCoR is committed to supporting diversity and will encourage female, minorities and persons with disabilities to actively participate in the program.

Research Program Management

Science PI Chanover will oversee the technical aspects of the proposed research. She will ensure that the work plan outlined below is adhered to and will supervise the Astronomy student hired for this project. She will coordinate the communication among team members and will oversee the dissemination of the results from this research.

Co-I Voelz will supervise the laboratory work at NMSU including the AOTF spectrometer component testing, breadboard assembly and breadboard testing. He will also assist with the design and performance modeling of the system. He will supervise the EE students that will be hired through this project.

Co-I Glenar will be responsible for the optical design of the AOTF systems. He also will conduct the radiometric modeling. His recent (Dec. 2007) retirement from NASA/GSFC and his subsequent addition to the NMSU Astronomy department as an adjunct faculty member will enable him to effectively interact with all members of the proposing team, particularly the students.

Co-I Boston will provide scientific support for the astrobiology and astrochemistry efforts, including assistance with developing the testing protocols for laboratory and field campaign, providing astrobiologically relevant organism cultures and precipitated biosignature minerals for laboratory testing of the instrument at the Geomicrobiology Laboratory at NMT, and planning and managing the field site component of the field tests at three ongoing astrobiological study sites in New Mexico.

The research team, including student participants, will be closely integrated with regular communications via teleconferences and face-to-face meetings. The frequent dialog and the clear delineation of roles and responsibilities for all team members will result in an efficient, well-coordinated, productive effort.

New Mexico EPSCoR will be managed through the New Mexico EPSCoR/Space Grant lead office at New Mexico State University. **Dr. Patricia C. Hynes**, Director of New Mexico Space Grant, will also serve as the Director of NASA EPSCoR and will be responsible for the management of the NASA EPSCoR program, including interactions among collaborating institutions, NASA Field Centers, and space and aerospace related industry. The NM EPSCoR Director will work with the State of New Mexico EPSCoR Committee to facilitate interactions and coordination between these organizations. The NM EPSCoR Director will work closely with the Technical Advisory Committee (TAC) to align our research focus with NASA and New Mexico research priorities. The EPSCoR office will be responsible for contract requirements

including budgeting and reporting requirements. The New Mexico NASA EPSCoR office will also organize annual meetings for New Mexico faculty to facilitate research collaborations.

Program Evaluation

The objectives for the proposed research, as outlined in Section 1.3, will be achieved through the completion of the tasks outlined in the Work Plan (Section 1.4.3 and Table 3). Metrics that will be used to assess progress in our research include conference presentations, journal publications, and follow-on funding proposals that capitalize on the experience and knowledge gained through this program. The peer review process used in journal publications and the review of follow-on research funding proposals will serve as an external and objective means of evaluating the success of our research program.

Evaluation is a key consideration not only in the demonstration of effectiveness of the program, but also in continuous improvement and program refinement. New Mexico EPSCoR Director Dr. Patricia Hynes has conducted extensive activities in assessment. She will design and implement the evaluation plan. Evaluation data will be collected from researchers each year as part of their report to NASA EPSCoR. The evaluation will allow us to monitor our progress and document benchmarks toward achievement of program goals and objectives. The evaluation will be both formative and summative. Formative evaluation will include an annual assessment of the proposed research metrics. Formative evaluation results will be brought to the NASA EPSCoR Technical Advisory Committee (TAC) for feedback and strategies to increase program success. Annually, we will be looking for faculty and research areas which show promise for additional funding. Summative evaluation will include a comparison of pre-award and post-award data analysis. Research faculty will involve undergraduate and graduate students in their research. This will not only contribute to workforce development in NASA research areas but will encourage student retention. Students receiving \$5,000 or more in support will be tracked through first employment using the university registration systems, confirming that students are still enrolled and succeeding in their STEM degrees.

The goals and their metrics for New Mexico EPSCoR are:

Goal #1: Contribute to and promote the development of research infrastructure in New Mexico in areas of strategic importance to the NASA mission while assessing and leveraging the many existing core capabilities relative to NASA in the state.

Metric: Evidence of reordered New Mexico and/or institutional priorities

Metric: Evidence of how EPSCoR activities have furthered jurisdiction priorities.

Metric: Financial commitment from the jurisdiction, industry, and participating institutions

Goal #2: Improve the capability of New Mexico to gain support from sources outside the NASA EPSCoR program in space and aerospace related science, technology, engineering and mathematics research.

Metric: Number of follow-on grant proposals submitted and/or funded.

Goal #3: Develop partnerships between NASA research assets and New Mexico academic institutions, federal laboratories, and industry.

Metric: Extent to which collaborations with New Mexico agencies, industry, research and academic institutions and with NASA have evolved.

Goal #4: Contribute to New Mexico's overall research infrastructure, science and technology capabilities, higher education, and/or economic development.

Metric: Number of articles submitted to and/or published in refereed journals

Metric: Number of talks, presentations or abstracts at professional meetings

Metric: Number of patents awarded

Metric: Number and gender/ethnicity of students participating in the program research. We will track student persistence through to degree completion and beyond graduation.

Goal #5: Work in close coordination with the New Mexico Space Grant Consortium (NMSGC) to improve the environment for science, mathematics, engineering, and technology education in New Mexico.

Metric: Increased number and quality of interactions between researchers and New Mexico Space Grant Consortium

Tracking of Program Progress

Program progress and the potential for achieving self-sufficiency beyond the award period of the research capabilities developed under this grant will be assessed using the metrics discussed above. If the goals of the proposed research and of the New Mexico EPSCoR program are achieved, then the likelihood for securing future funding for this research is high. The potential for the proposed research area to continue to grow in importance in future aerospace fields will be assessed by the evaluation and monitoring of NASA's planning documents, funded proposals, and calls for new research efforts throughout the award period. Trends indicating the importance of the development of astrobiological instrumentation will be noted and we will respond accordingly in our efforts to secure follow-on funding toward the end of the award period.

Continuity

This proposed NASA EPSCoR project will facilitate the involvement of our student participants in future employment and internship opportunities that are relevant to NASA. Our undergraduate student participants will be encouraged to seek future fellowships and awards from the New Mexico Space Grant Consortium, NASA's Undergraduate Student Researcher Program, and eventually, to apply to graduate school in a NASA-related field (e.g. physics, astronomy, engineering). Our graduate student participants, who will have developed close contacts with scientists at NASA/GSFC, will be well-positioned to apply for the NASA Graduate Student Researchers Program and ultimately the NASA Postdoctoral Program. Our proposed research will thereby provide a direct pipeline for involving young scientists and engineers – from the undergraduate to postdoctoral level – in NASA-related research that will ultimately result in the development of human resources.

There are multiple avenues for future funding that will be pursued at the end of the NASA EPSCoR award period. Within NASA, there are several instrumentation development programs (e.g. the Planetary Instrumentation Definition and Development Program, the Mars Instrument Development Project, and the Astrobiology Science and Technology Instrument Development Program) whose goals are the development of instrument technology that shows promise for use in scientific investigations on future planetary missions. Within the National Science Foundation, the Major Research Instrumentation program is an appropriate source of funding for further development of instrumentation. Any of these programs would be logical sources of funding to sustain the efforts developed through the NASA EPSCoR program.

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Sutter, B., J. B. Dalton, S. A. Ewing, R. Amundson, and C. P. McKay (2007). Terrestrial analogs for interpretation of infrared spectra from the Martian surface and subsurface: Sulfate, nitrate, carbonate, and phyllosilicate-bearing Atacama Desert soils. *J. Geophys. Res.* **112**, G04S10, doi:10.1029/2006JG000313.

3 Biographical Sketches

3.1 Principal Investigator

NANCY J. CHANOVER

Department of Astronomy
New Mexico State University
Box 30001 / MSC 4500
Las Cruces, NM 88003-0001

(575) 646-2567 (voice)
(575) 646-1602 (fax)
nchanove@nmsu.edu

PROFESSIONAL PREPARATION:

Wellesley College	Physics	B.A., June 1991
New Mexico State University	Astronomy	M.S., Nov. 1994
New Mexico State University	Astronomy	Ph.D., May 1997
NASA/Goddard Space Flight Center	planetary science	May 1997 – August 1998

APPOINTMENTS:

College Asst. Professor: New Mexico State Univ.: Aug. 1998 – Aug. 2000, Aug. 2002- present
Tombaugh Scholar: New Mexico State University: Aug. 2000 – Aug. 2002
National Research Council Research Fellow: NASA/Goddard Space Flight Center, 1997-1998
Graduate Research Assistant: New Mexico State University, 1991-1997

RECENT PROFESSIONAL SERVICE:

National Science Foundation Planetary Astronomy Review Panel (2002)
Hubble Space Telescope Time Allocation Committee (2003)
NASA Planetary Atmospheres Review Panel (2004)
NASA Outer Planets Research Program Review Panel (2005)
IRTF Time Allocation Committee (2003-2004)
NASA Cassini Data Analysis Program Review Panel (2007)
Reviewer for journals *Geophys. Rev. Let.*, *Icarus*, *Journal of Geophys. Res.* (ongoing)

PUBLICATIONS:

1. Anderson, C. M, E. F. Young, N. J. Chanover, and C. P. McKay (2008). HST spectral imaging of Titan's haze and methane profile between 0.6 and 1.0 μm during the 2000 opposition. *Icarus*, in press.
2. Goldman, B., M. C. Cushing, M. S. Marley, E. Artigau, K. S. Baliyan, V. J. S. Bejar, J. A. Caballero, N. Chanover, M. Connelley, R. Doyon, T. Forveille, S. Ganesh, C. R. Gelino, H. B. Hammel, J. Holtzman, S. Joshi, U. C. Joshi, S. K. Leggett, M. C. Liu, E. L. Martin, V. Mohan, D. Nadeau, R. Sagar, and D. Stephens (2008). CLOUDS search for variability in brown dwarf atmospheres. Infrared spectroscopic time series of L/T transition brown dwarfs. *Astron. Astrophys.* in press
3. Simon-Miller, A. A., N. J. Chanover, G. S. Orton, M. Sussman, I. G. Tsavaris, and E. Karkoschka (2006). Jupiter's White Oval turns red. *Icarus* **185**, 558-562.
4. Slanger, T. G, D. L. Huestis, P. C. Cosby, and N. J. Chanover. (2006). The Venus nightglow: Ground-based observations and chemical mechanisms. *Icarus* **182**, 1-9.

5. Kahre, M. A., J. R. Murphy, N. J. Chanover, J. L. Africano, L. C. Roberts, Jr., and P. W. Kervin (2005). Observing the Martian surface albedo pattern: Comparing the AEOS and TES data sets. *Icarus* **179**, 55-62.
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3.2 Co-Investigators

DAVID G. VOELZ, Associate Professor; Paul W. and Valerie Klipsch Professor
The Klipsch School of Electrical and Computer Engineering
Box 30001, Dept. 3-O, New Mexico State University (NMSU), Las Cruces, NM 88003
Phone: (505) 646-3471, email: davvoelz@nmsu.edu

Degrees: Ph.D. in Electrical Engineering, University of Illinois, May 1987
M.S. in Electrical Engineering, University of Illinois, 1983
B.S. in Electrical Engineering, New Mexico State University, May 1981

Experience: Dr. Voelz joined the faculty at the NMSU Klipsch School of Electrical and Computer Engineering in the Fall of 2001. His current research involves spectral/ polarization sensing and imaging, laser beam control and beam shaping, adaptive optics, and free space laser communications. He has authored or coauthored more than 25 refereed journal articles and over 75 proceedings papers and reports. For his work he has received the Giller Award, the highest technical achievement award for the Air Force Research Laboratory, two Air Force Citations for advanced technology, the Engineering Excellence Award presented by the Optical Society of America, and the Bromilow Award for research excellence within the College of Engineering at NMSU. The courses he teaches at NMSU include Lasers and Applications; Optical Sources, Detectors, and Radiometry; Fourier Optics; Optical System Design; and AC Circuits. Prior to NMSU, Dr. Voelz worked at the Air Force Research Laboratory (Albuquerque, NM) for 15 years on laser imaging, beam projection and wave front sensing applications.

Professional Affiliations: Society of Photo-Instrumentation Engineers, SPIE (Fellow); Optical Society of America, OSA; The Institute of Electrical and Electronics Engineers, IEEE.

Recent Publications:

- V. Thilak, D. G. Voelz; C. D. Creusere, "Polarization-based index of refraction and reflection angle estimation for remote sensing applications," *Appl. Opt.*, v.46, no.30, p.7527-7536, 2007.
- X. Xiao and D. Voelz, "Wave optics simulation approach for partial spatially coherent beams," *Opt. Express* 14, 6986-6992, 2006.
- D. K. Borah, D. Voelz, and S. Basu, "Maximum-likelihood estimation of a laser system pointing parameters by use of return photon counts," *Appl. Opt.* 45, 2504-2509, 2006.
- C. Ting, D. G. Voelz, and M. K. Giles, "Effectiveness of High-Order Adaptive Optics in Ground-Based Stellar Interferometry," *Opt. Eng.* 45(2), 2006.
- M. T. Gruneisen, R. C. Dymale, J. R. Rotgé, D. G. Voelz, and M. Deramo, "Wavelength-agile telescope system with diffractive wavefront control and acousto-optic spectral filter," *Opt. Eng.*, 44, 104204, 2005.
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- J. Rha, D. G. Voelz, and M. K. Giles, "Reconfigurable Shack-Hartmann wavefront sensor," *Opt. Eng.* 43, 251-256, 2004.

VITAE: DAVID ALAN GLENAR

EDUCATION

Ph.D., Astronomy, Penn State University, 1981
M.S., Physics, Penn State University, 1977
B.A., Physics, Magna Cum Laude, State University of N. Y. at Geneseo, 1975

PRESENT POSITIONS

Planetary Systems Laboratory, Code 690 (Emeritus) NASA Goddard Space Flight Center (GSFC) Greenbelt MD 20771 Tel: (301) 286-3354 e-mail: David.a.Glenar@nasa.gov	Affiliate Faculty, Dept. of Astronomy New Mexico State University Las Cruces, NM 88003-0001 Tel: (575) 646-5990 e-mail: dglenar@verizon.net
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SCIENTIFIC AND ACADEMIC EXPERIENCE

- **2008- :** Emeritus, GSFC Planetary Systems Laboratory
- **1997-2007:** Planetary Scientist, GSFC Planetary Systems Laboratory
- **1995-1997:** Senior Engineer, GSFC Optics Branch
- **1991-1995:** Head - Remote Sensing Section, GSFC Photonics Branch
- **1987-1991:** Astrophysicist, GSFC Planetary Systems Branch
- **1981-1987:** Assistant Professor of Physics & Astronomy at Colgate University
- **1977-1981:** PhD Student at Penn State University
- **1975-1977:** Research assistant at Penn State University Ionosphere Research Laboratory

RECENT PROFESSIONAL DUTIES AND AFFILIATIONS (2000 -)

- NASA Infrared Telescope Facility (IRTF), Time Allocation Committee (TAC), 2007-2009.
- Member, American Astronomical Society, Division for Planetary Science (DPS)
- Advisor and dissertation committee member for J. Benson, University of Toledo. Defense: Sept. 14 2006, PhD thesis: "Properties of Water Ice Clouds over Major Martian Volcanoes Observed by MOC".
- Frequent referee for planetary science journals (*Icarus*, *J. Geophys. Res.*, *Planet. Space Sci.*)
- NASA Review Panels (2000-continuing): NASA Planetary Atmospheres, Planetary Astronomy, Astrobiology; Planetary Instrument Definition & Development
- Mars Reconnaissance Orbiter '05, Technical, Management, Cost and Outreach (TMCO) downselect review team, Sept. '01.

REFEREED PUBLICATIONS (LAST 5 YEARS)

- 2007 Benson, J. L., D. A. Glenar, P. B. James and M. J. Wolff. Properties of Mars aphelion volcano clouds from MGS MOC and TES measurements, *Icarus* (submitted).
- 2007 Bonev, B. P., G. B. Hansen, D. A. Glenar, P. B. James and J. E. Bjorkman. Albedo models for the perennial south polar cap on Mars: Implications for the stability of the cap under near-perihelion global dust storm conditions, *Planet. Space Sci.* doi: 10.1016/j.pss.2007.08.003.
- 2005 Temma, T., N. J. Chanover, A. A. Simon-Miller, D. A. Glenar, J. J. Hillman and D. Kuehn. Vertical structure modeling of Saturnian equatorial region using high spectral resolution imaging, *Icarus* **175**, 464-489.
- 2005 Glenar, D. A., G. Hansen, G. Bjoraker, M. D. Smith and J. Pearl, D. Blaney. Bright region radiative properties within the Mars south polar cap (Ls=231) from near-infrared spectroscopic imaging, *Icarus* **174**, 600-603.
- 2004 Anderson, C. M., N. J. Chanover, C. P. McKay, P. Rannou, D. A. Glenar and J. J. Hillman. Titan's haze structure in 1999 from spatially-resolved narrowband imaging surrounding the 0.94 mm methane window, *Geophys. Res. Lett.*, **31**, L17S06, doi:10.1029/2004GL019857.
- 2003 Chanover, N. J., C. M. Anderson, C. P. McKay, P. Rannou, D. A. Glenar, J. J. Hillman and W. E. Blass. Probing Titan's Lower Atmosphere with Acousto-Optic Tuning, *Icarus* **163**, 150-163.

PENELOPE J. BOSTON

Earth & Environmental. Sci. Dept., New Mexico Tech
801 Leroy Place, Socorro, NM, 87801

Voice: (505) 835-5657; FAX: (505) 835-6436; Cell (303) 579-4775

Email: pboston@nmt.edu and pboston@complex.org

Current Appointments:

2002 – Present. Director of Cave and Karst Studies Program, Assoc. Prof., Earth & Environmental Sci. Dept., New Mexico Inst. Mining & Tech., Socorro, NM.

2002 – Present, Associate Director, National Cave & Karst Research Institute, Carlsbad, NM

1988 - Present. Director of Research for Complex Systems Research, Inc., Boulder, CO.

Formal Education:

PhD – 1985. Environmental, Population, Organismic Biology Dept., University of Colorado and the National Center for Atmospheric Research, Boulder, CO. Microbiology and atmospheric chemistry.

MS – 1981 University of Colorado, Boulder, CO. Microbiology.

BS – 1979 University of Colorado, Boulder, CO. Microbiology, geology, and psychology.

1975 Florida Atlantic Univ., Boca Raton, FL. Biology & philosophy. Faculty Scholar accelerated program.

Recent Professional Activities:

- COMPLEX Panel, National Academy of Sciences, 2006 – Present
- AME (Association of Mars Explorers) – President, 2006-2008
- Mars Architecture Review Panel, National Academy of Sciences, Jan. – May, 2006
- Biohazard/Planetary Protection Focus Team. Johnson Space Center, 2004.
- Senior Editor, Astrobiology Journal, 2003-present. Editorial board, 2001-2003.
- NASA Institute for Advanced Concepts Fellow – May, 2000.

Selected Relevant Publications:

Boston, P.J., Hose, L.D., Northup, D.E., and Spilde, M.N. 2006. The microbial communities of sulfur caves: A newly appreciated geologically driven system on Earth and potential model for Mars. *Karst Geomorphology, Hydrology, & Geochemistry*, Geological Soc. Amer. Special Paper 404. Pp. 331-344.

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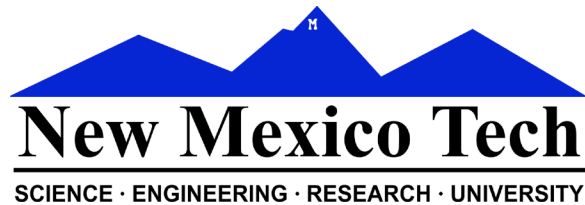
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5.3 Penelope Boston



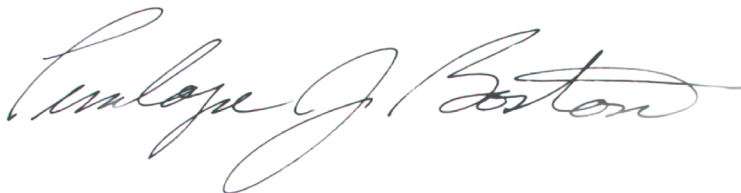
March 6, 2008

Drs. Nancy Chanover & Patricia Hynes
Box 30001/MSC 4500
New Mexico State University
Las Cruces, NM 88003-0001

Dear Drs. Patricia Hynes and Nancy Chanover,

I acknowledge that I am identified by name as a Co-Investigator on the investigation entitled "Infrared Instrument Development for In-Situ Organic Detection," which you are submitting to the NASA Research Announcement NNH08ZNE001C, and that I intend to carry out all responsibilities identified for me in this proposal. I understand that the extent and justification of my participation as stated in this proposal will be considered during peer review in determining in part the merits of this proposal.

Sincerely,



Penelope J. Boston, PhD
Director, Cave and Karst Studies Program
Assoc. Prof. Earth and Environmental Sciences Dept.
&
Associate Director
National Cave and Karst Research Institute, Carlsbad, NM

Earth & Environmental Science
01 Leroy Place, MSEC 208
Socorro, New Mexico 87801



geos@nmt.edu
www.ees.nmt.edu
(575) 835-5634
fax: (575) 835-6436

March 10, 2008

Ms. Pat Hynes
MSC SG
New Mexico State University
PO Box 30001
Las Cruces, NM 88003-0001

RE: Proposal Title: Infrared instrument development for in-situ organic detection
Principal Investigator: Penelope J. Boston

Dear Ms Hynes:

On behalf of the principal investigator Penelope J. Boston, of our Earth & Environmental Science Department, the enclosed is being submitted for the referenced proposal.

The enclosed represents the intent of New Mexico Institute of Mining and Technology (NMIMT) to enter into a sub-recipient agreement with the University of New Mexico to perform the scope of work described in the proposal. NMIMT is committed to support the efforts in this proposal with the necessary assets to perform such work. The R&ED Cave and Karst Program will provide in-kind cost share match.

If you have any technical questions regarding this project, please contact Dr. Boston at (505) 835-5657 or by e-mailing pboston@nmt.edu. Administrative, contract or budgetary questions may be directed to Norene Boykin (505) 835-5545 or by e-mailing nboykin@admin.nmt.edu.

Sincerely,

Lonnie Marquez
Vice President of Administration and Finance

Enclosure.

VITA: PATRICA C. HYNES, NEW MEXICO ESPCOR DIRECTOR

Affiliation:	New Mexico State University	
Education:	B.S. NMSU English	1969
	M.S. NMSU Higher Education Management	1992
	Ph.D. NMSU Business Administration	1998
Appointments:		
Director	New Mexico Space Grant Consortium (NMSGC)	1998-present
Director	New Mexico NASA EPSCoR	2007-present
Co-Chair	NSF Advancing Leaders Program	2005-present
Co-Chair	Int'l Symposium for Personal & Commercial Spaceflight	2005-present
Member	President's Commission on the Status of Women	2004- present
Chair	NMSU Leadership Planning	2006-present
Director	Center for Aerospace Science, Engineering And Technology Education	2001
Chair	National Space Grant Strategic Planning Committee 50 states, plus Puerto Rico and District of Columbia national strategic planning process including NASA headquarters personnel.	2002
Chair	NSF ADVANCE Research Committee at NMSU	2002- present
Member	NSF ADVANCE Steering Committee at NMSU	2002- present
Chair	NMSU Roles Subcommittee of Roles & Rewards	2003
Executive Director	NMSU Space Development Foundation	2006- present
Elected Offices:		
Treasurer	National Space Grant Foundation	2006-present
Treasurer	National Space Grant Alliance – 501C4 Corporation	2002-2004
Treasurer	Southwest Space Task Force	2002-2004
Board Member	National Space Grant Alliance - current Board member 501 C-4 corporation created to advance the National Space Grant College and Fellowship program.	2002-present
Board Member	National Space Grant Executive Committee 6 member board to enable network of 52 programs across the nation.	2002-2004
Programs Created and Managed:		
Management of New Mexico Space Grant Consortium statewide Scholarship and Fellowship Program Summer Internship Program America View Program Remote Sensing Program Research Enhancement Program Microgravity Research Program NMSU Teaching Academy Science, Engineering, and Technology Education Program (SETE) Gaining Retention and Achievement for Students Program (GRASP) International Symposium for Personal and Commercial Spaceflight (ISPCS) New Mexico NASA EPSCoR		