Susan Hoban, Ph. D.
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Education

1989, Ph. D., Astronomy, University of Maryland
1986, M.S., Physics, University of Maryland
1983, B.S., Astronomy (*cum Laude*), University of Maryland

Professional Employment History

1996 – present, Senior Research Scientist,
Joint Center for Earth Systems Technology
University of Maryland, Baltimore County
1993 – 96, Hughes STX, Research Scientist
1991 – 93, Universities Space Research Association
1989 – 91, National Research Council

University Courses Taught

2011& 12: ***UMBC*** *HONR 300: Robots in Society*, a writing-intensive course investigating technical and social aspects of robotics.

2011 & 12: ***Bradley University****: BIO 570*, Remote Sensing for Earth Science, an introduction to remote sensing for educators [Part I: Fundamentals of Remote Sensing; Part II: Remote Sensing Research].

2010: ***Bradley University*** *MST 670:* Teaching Science using Robotics - a course for educators to introduce them to using robotics as an instrument to teach science, technology, engineering and math (STEM).

2005-07: ***UMBC*** *SCI 510:* Fundamentals of Lunar Robotics - a course for educators to introduce them to using robotics as an instrument to teach science, technology, engineering and math (STEM).

1993 - 99: University of Maryland College Park

ASTR 100: General Astronomy, a survey course for undergraduates

ASTR 360: Solar System Astronomy--a study of the formation and evolution of the planets, satellites and small bodies in the Solar System

1992, 1996: Univ. of Maryland Univ. College

100: General Astronomy, a survey course for undergraduates

ASTR 380: Life in the Universe - a study of the astronomical and technological considerations and implications of searching for life in the universe.

Teacher Education

2008-present: Over 30 workshops in engineering education and robotics, reaching over 1,000 educators, as part of the NASA's BEST Students project (Hoban, PI).

2008 - Project Lead the Way, "STEM Enhancement in Lunar Exploration"

2007, 2008 – STEM Seminars at Space Exploration Educators Conference (Houston, 2007, 08), National Council of Teachers of Mathematics conference (Atlanta, 2007)

2008, 2007 – National Science Teachers Association (Omaha 2007; Boston 2008), "Moon Math" and "Mapping the Moon; Simulating LOLA in the Classroom"

2004, University of Maryland Baltimore County, Urban Teacher Education, "Principles of Remote Exploration"

2003, 2005, Summer Teacher Institute of the New Mexico Adventures in Super Computing Challenge, "Introduction to VTIE for Inquiry-based Learning" and "Measurement Analysis"

2003-05, 2007 Astronomy Institute, sponsored by NASA Solar Terrestrial Probes and Living With a Star Programs and Green Bank National Radio Astronomy Observatory, "Introduction VTIE for Inquiry-based Learning" and "Measurement Analysis"

1994, Maryland Space Grant Consortium, "Introduction to the Internet for K-12 Educators"

Program Management

Worked with several NASA Program Executives to manage technology development programs for science and education applications. Duties include drafting solicitations, managing budgets (and coordinating annual conferences.

2007 – present: Team Lead for *NASA's BEST Students,* Agency-wide

2006 – present: Planetary Data System Education Coordinator for College Student Investigators

1998 – 2008: Learning Technologies Project NASA Office of Education

2000 – 2008: Applied Information Systems Research Project NASA Science Mission Directorate, 4 solicitation cycles

1993 – 98: NASA Digital Library Technology NASA Aeronautics Enterprise

Relevant Professional Activities

Have managed several groups in the areas of Educational Technology and Information Science. Duties include personnel management, reporting to NASA, and financial responsibilities.

2008 – present: STEM Advisory Council, Anne Arundel County Public Schools

2011 –present: Maryland Out of School Time (MOST) Network Advisor

2001 – 2008, Information Science & Educational Technology Faculty Group Leader University of Maryland Baltimore County, Goddard Earth Science & Technology Center

1999 – 2000, Director (Acting) USRA Center of Excellence in Space Data and Information Science @ NASA GSFC

1998 -99, Associate Director (Acting) USRA Center of Excellence in Space Data and Information Science @ NASA GSFC

Grant Funding

2007 – present PI, "NASA's BEST Students (Beginning Engineering, Science and Technology)," NASA, 2007-09, $213,292; 2009-11, $958,451; 2011-2013, $627,043; 2013-14: $257,000 Running total, $2.2M. Development and subsequent deployment of engineering education curriculum guides for grades K-8; development and implementation of professional development modules to train formal and informal educators in the use of the *NASA's BEST Activity Guides*.

2010 – present, Co-I, "Rockets as Systems: A Problem-based Learning Professional Development Opportunity for Middle and High School STEM Educators," NASA, $61,816. Development and implementation of professional development modules to train educators in the use of computer probeware for STEM investigations; STELLA modeling software, modeling rocket motion as an example; and the *NASA's BEST Activity Guides*, rocket examples.

2009-present, Co-I, "NASA Earth & Space: Online 'Missions' for High School Learners with Accompanying Electronic Professional Development for Educators," NASA, $1,493,445. Development and deployment of course modules for high school in the form of Earth and Space missions; Development and deployment of professional development for high school educators on the Earth & Space missions.

2008-09, Co-I, "Maryland Summer Center for Lunar Robotics," MSDE, $45,000. Two-week summer camp for gifted and talented middle school students, wherein the students design and implement an end-to-end search and discovery mission using LEGO robotics kits.

2007 – present, PI, "NASA's Planetary Data System, College Student Investigators," $780,000 (ongoing, $130,000 annually). Education Program for NASA's Planetary Data System: undergraduate interns are supported to conduct scientific research using data from NASA's Planetary Data System.

2007-08, Co-PI, "PLTW Fundamentals of Lunar Exploration," NASA, $305,933. Infuse the Fundamentals of Lunar Exploration curriculum into Project Lead the Way's Aerospace Engineering and Gateway to Technology courses.

2005-08, Co-I, "Earth+," NASA, $157,006. Develop and test a sonification tool that enables students who have vision impairments to experience NASA data using sound.

2005-06, PI, "Fundamentals of Lunar Exploration," NASA, $334,577. Develop and deploy a series of learning modules that use a robotic search and discovery mission as a vehicle for STEM instruction.

2003, PI, "US-Ireland Cooperative Workshop: Educating with Virtual Experience (EVE 2003) Maynooth, Ireland, Fall 2003," $25,020. Develop and implement an international workshop on using "virtual experience" as an instructional tool.

2001-03, PI, "Virtual Telescopes in Education," NSF, $484,083. Develop and deploy software to assist the instruction of astronomy.

List of Publications

Refereed Papers

1. Baum, S. and S. Hoban., 1986, "A search for the millimeter-wave transitions of CO^+ in Comet P/Halley," Icarus 647, 515.
2. M. A'Hearn, S. Hoban, P. Birch, C. Bowers, R. Martin and D. Klinglesmith., 1986, "CN jets in P/Halley," Nature 324, 649 <cover photo>
3. Hoban, S. and S. Baum, 1987, "A VLA search for continuum emission in comet P/Halley," Icarus 70, 264.
4. Hoban, S., N.H. Samarasinha, M.F. A'Hearn and D.A. Klinglesmith, 1988, "An investigation into periodicities in the morphology of CN jets in comet P/Halley," A. & A. 195, 331
5. Hoban, S., M.F. A'Hearn, P.V. Birch and R. Martin. 1989, "Spatial structure in the color of the dust coma of comet P/Halley," Icarus 79, 145.
6. Briley, M.M., R.A. Bell, S. Hoban and R.J. Dickens, 1990, "An analysis of G-band strengths in NGC 6397 and M55 red giants," Ap. J. 359, 307.
7. Hoban, S., D.C. Reuter, M.J. Mumma and A.D. Storrs, 1991, "Molecular hydrogen in the vicinity of NGC 7538 IRS 1 and IRS 2: temperature and ortho-to-para ratio," Ap. J. 370, 228.
8. Hoban, S., M. Mumma, D. Reuter, M. DiSanti, R.R. Joyce and A. Storrs, "Tentative identification of methanol as the progenitor of the 3.52-micron emission feature in several comets," Icarus 93, 122.
9. Klavetter and S. Hoban, 1992, "Imaging the 3.4-micron emission feature in comet Levy (1990c)," Icarus 95 , 60
10. Reuter, D., S. Hoban and M. Mumma, 1992, "A search for formaldehyde in several comets," Icarus 95, 329
11. Hoban, S., 1993, "Serendipitous images of methanol in comet Levy (1990XX)," Icarus 104, 151.
12. Davies, J.K., M.J. Mumma, D.C. Reuter, S. Hoban, H.A. Weaver, P.J. Puxley, and S.L. Lumsden, 1993, "The 32.-3.6 micron spectrum of comet P/Swift-Tuttle," M.N.R.A.S. 265, 1022.
13. Hoban, S., D.C. Reuter, M.A. DiSanti, M.J. Mumma, and R. Elston, 1993, "Infrared Observations of comet P/Swift-Tuttle," 1993, Icarus 105, 548
14. Hoban, S., M. desJardins, N. Farrell, P. Rathod, J. Sachs, S. Sansare, Y. Yesha, J. Keating, B. Busschots, J. Means, G. Clark, L. Mayo, and W. Smith, 2002. Virtual Telescopes in Education, Journal of Digital Interactivity, 2, No. 4, http://jodi.ecs.soton.ac.uk/Articles/v02/i04/Hoban/
15. Mayo, L., A.E. Schweitzer, G. Clark, S. Hoban and T.T. Melsheimer, 2002. Global Telescopes in Education, BAAS, 34 No. 4, 1193.
16. Hoban, S., J. Keating, J. Sachs, D. Laughlin and Y. Yesha, Science Investigation System for Telescopes in Education Research, Proceedings of the IEEE 36th Hawaii International Conference on System Sciences 2003 (HICSS36), IEEE Computer Society, Los Alamitos, CA, 2003. <Nominated for Best Paper.>
17. Gayol, Y., O. Boubsil, & S. Hoban (2005). Information technology fluency of science teachers in the United States: A case study analysis. Proceedings of the International Council for Open Learning and Distance Education (ICDE). New Delhi: India, November 19-24

Invited reviews

1. Lutz, B. L and S. Hoban. 1992. "A review of Comets in the Post-Halley Era," Origins of Life and Evolution of the Biosphere , 22: 321.
2. Davies, C., S. Hoban and B. Penhoet. 1999. "Moving Pictures: How Satellites, the Internet, and International Environmental Law Can Help Promote Sustainable Development," Stetson Law Review, Vol. XXVIII, pp.1091 -1153.
3. Hoban, S. 2009. "Mission to Mars," *A World of Science*, **7** No. 2, pp. 2 – 10.

Unrefereed contributions

Information Science

1. H. Burrows, S. Hoban, R. Harberts and N. Lal. 1998. Framework for Scientific Communication in Earth and Space Science, in Christine S. Nielsen and Joseph R. Herkert, eds., "Proceedings, 1998 Socioeconomic Dimensions of Electronic Publishing Workshop: Meeting the Needs of the Engineering and Science Communities," Piscataway, N.J.: Institute of Electrical and Electronics Engineers.

Science Education

1. Reuter, D.C., S. Hoban, and E.E. Roettger. 1993, "A Resource List for Science Teachers," (Printed and distributed through NASA Goddard Space Flight Center)
2. Hoban, S. M. Blum and N. Farrell "LEARNERS Initiative: Approaches to infusing information technology into the classroom," 2001. Contributed paper in Space Education for the New Millennium, Toulouse, France, Oct. 3 - 5, 2001.
3. Mayo, L., A.E. Schweitzer, G. Clark, S. Hoban and T.T. Melsheimer. "Global Telescopes in Education," 2002. BAAS, 34 No. 4, 1193
4. Cook, L. and S. Hoban. 2013. "Does a Science, Technology, Engineering, and Mathematics (STEM) Master's Degree Make Sense for K-8 Educators?" Conference proceedings, Association for Science Teacher Education 2013, Paper 10169, Charleston, SC, January 9-12, 2013.

Astronomy

1. "Ion morphology in comet P/Halley," 1986, BAAS 18, 803. S. Hoban, M. A'Hearn, P. Birch, R. Martin, M. Candy and D. Klinglesmith.
2. "Comet P/Halley CN jets - the direction of the rotation axis," 1986, BAAS 18, 826. M. A'Hearn, N. Samarasinha, S. Hoban and D. Klinglesmith.
3. "Properties of tail rays in comet Halley," 1987, BAAS 19, 887. S. Hoban and M. A'Hearn.
4. "Periodicities in the morphology of gaseous jets in comet Halley," 1987, BAAS 19, 866. M. A'Hearn, S. Hoban, N. Samarasinha and D. Klinglesmith.
5. "A VLA search for 2-cm continuum emission in comet P/Halley," 1987, Proceedings of the Cometary Radio Astronomy Workshop No. 17, Greenbank, WV, eds. Wm. Irvine et al., p.31. S. Hoban and S. Baum.
6. "A search for CO+ in comet Halley at millimeter wavelengths," 1987, Proceedings of the Cometary Radio Astronomy Workshop No. 17, Greenbank, WV, eds. Wm. Irvine et al., p. 77. S. Baum and S. Hoban.
7. "Gaseous jets in P/Halley," 1987, ESLAB Symp. Exploration of Halley's Comet, ESA SP-250, 483. M. A'Hearn, S. Hoban, P. Birch, C. Bowers, R. Martin and D. Klinglesmith.
8. "Ion morphology in the inner tail of comet P/Halley," 1987, ESLAB Symp. Exploration of Halley's Comet, ESA SP-250, 505. S. Hoban, M.F. A'Hearn, P. Birch, M. Candy, R. Martin and D. Klinglesmith.
9. "CN jets of comet P/Halley - Rotational properties," 1987, ESLAB Symp. Exploration of Halley's Comet, ESA SP-250, 487. N. Samarasinha, M.F. A'Hearn, S. Hoban and D. Klinglesmith.
10. "The rotational period of comet Halley as determined from CN jets," presented at the Symp. on the Similarities and Diversity of Comets, Brussels, Belgium, April 1987. N. Samarasinha, S. Hoban, M.F. A'Hearn and D. Klinglesmith.
11. "Spatial color variations in the dust coma of comet P/Halley," 1988, BAAS 20, 826. S. Hoban and M. A'Hearn.
12. "The relationship between the gas and dust in the jets of comet Halley," presented at Comets in the Post-Halley Era, Bamberg, FRG, April 1989. S. Hoban and M.F. A'Hearn.
13. "Inhomogeneities in the pre-solar nebula: clues from comet Halley," presented at the Centennial Scientific Meeting of the Astronomical Society of the Pacific: The Evolution of Planetary Systems, Berkeley, CA, June 1989. S. Hoban.
14. "Infrared observations of comet P/Brorsen-Metcalf with the Kitt Peak Cryogenic grating array spectrometer

(CRSP)," 1989, BAAS 21, 938, S. Hoban, M. Mumma, A. Storrs, D. Reuter, D. Glenar, F. Espenak, H. Weaver and H. Larson.

15. "Infrared spectral and spatial mapping of NGC 7538 IRS 1 and IRS 2," presented at Protostars and Planets III, Tucson, AZ, March 1990. S. Hoban, M. Mumma, D. Reuter and R. Joyce.

16. "Infrared spectroscopy of comets P/Brorsen-Metcalf (1989o), Okazaki-Levy-Rudenko (1989r), Austin (1989c1) and Levy (1990c)," 1990, BAAS 22, 1096. S. Hoban, M. Mumma, M. DiSanti, D. Reuter, F. Espenak and A. Storrs.

17. "A search for CO emission in comet Austin (1989c1)," 1990, BAAS 22, 1094. M. DiSanti, M. Mumma, S. Hoban, D. Reuter, F. Espenak, J. Lacy and R. Parmar.

18. "Searching for formaldehyde in comets at infrared wavelengths," 1991, BAAS 23, 1162. S. Hoban, D.C. Reuter and M.J. Mumma.

19. "Observational evidence for heterogeneity of cometary nuclei: the ratio of methanol-to-formaldehyde as an indicator of cometary origins," 1991, BAAS 23, 1167. M.J. Mumma, D.C. Reuter, S. Hoban and M.A. DiSanti.

<u>Popular</u>

Irish Pubs Across America, 1994. (Printed and distributed through Irish Imagineers).