

Jay Christopher Howk

Assistant Professor of Physics, University of Notre Dame

Address:

Department of Physics
University of Notre Dame
Notre Dame, IN 46556

Phone: (574) 631-8594
Fax: (574) 631-5952
E-mail: jhowk@nd.edu

Education:

Ph.D. **University of Wisconsin-Madison**, Astronomy, May 1999

B.A **Hanover College**, Physics, *cum laude*, May 1994

Research Interests:

- Galaxy formation and evolution
- Multiphase interstellar medium
- Low-redshift intergalactic medium
- Light element abundances in the Universe
- Damped Lyman- α Systems
- Effects of stellar feedback

Experience:

Assistant Professor *September 2005–present*

Department of Physics
University of Notre Dame, Notre Dame, IN

Assistant Research Physicist *September 2002–August 2005*

Center for Astrophysics & Space Sciences
University of California, San Diego La Jolla, CA

Associate Research Scientist *January 2001–August 2002*

Member of the FUSE PI Team
Department of Physics & Astronomy
The Johns Hopkins University Baltimore, MD

Postdoctoral Fellow *May 1999–December 2000*

Department of Physics & Astronomy
The Johns Hopkins University Baltimore, MD

Physics Teacher *September 1993–May 1994*

Southwestern High School Hanover, IN

Refereed Publications:

1. "Origin(s) of the Highly Ionized High-Velocity Clouds Based on Their Distances," Lehner, N., & Howk, J.C. *Astrophysical Journal Letters*, submitted.
2. "The Interstellar Medium and Star Formation in Edge-On Galaxies. I. NGC 891," Yim, K., Wong, T., Howk, J.C., & van der Hulst, J.M. *Astrophysical Journal*, submitted.
3. "Wavelength Accuracy of the Keck HIRES Spectrograph and Measuring Changes in the Fine Structure Constant," Greist, K., Whitmore, J.B., Wolfe, A.M., Prochaska, J.X., Howk, J.C., & Marcy, G.W. *Astrophysical Journal*, 708, 158-170 (2010).
4. "Properties and Origin of the High-Velocity Gas Toward the Large Magellanic Cloud," Lehner, N., Stavelly-Smith, L., & Howk, J.C. *Astrophysical Journal*, 702, 940-954 (2009).
5. "Strong $z \sim 0.5$ O VI Absorption Toward PKS 0405-123: Implications for Ionization and Metallicity of the Cosmic Web," Howk, J.C., Ribaud, J.S., Lehner, N., Prochaska, J.X., Chen, H.-W. *Monthly Notices of the Royal Astronomical Society*, 396, 1875-1894 (2009)
6. "The Connection Between a Lyman Limit System, a Very Strong OVI Absorber, and Galaxies at $z \sim 0.203$," Lehner, N., Prochaska, J.X., Kobulnicky, H.A., Cooksey, K.L., Howk, J.C., Williger, G.M., & Cales, S.L. *Astrophysical Journal*, 694, 734-750 (2009)
7. "Probing feedback in protogalaxies: Multiphase gas in a DLA at $z \sim 2.4$," Lehner, N., Howk, J.C., Prochaska, J.X., & Wolfe, A.M. *Monthly Notices of the Royal Astronomical Society*, 390, 2 (2008)
8. "Simulating Anisotropic Thermal Conduction in Supernova Remnants II: Implications for the Interstellar Medium," Balsara, D.S., Bendenelli, A.J., Tilley, D.A., Massari, A.R., & Howk, J.C. *Monthly Notices of the Royal Astronomical Society*, 386, 642-656 (2008)
9. "Simulating Anisotropic Thermal Conduction in Supernova Remnants I: Numerics and the Evolution of Remnants," Balsara, D.S., Tilley, D.A., & Howk, J.C. *Monthly Notices of the Royal Astronomical Society*, 386, 627-641 (2008)
10. "The High Velocity Gas toward Messier 5: Tracing Feedback Flows in the Inner Galaxy," Zech, W.F., Lehner, W., Howk, J.C., Dixon, W.V., Brown, T.M., *Astrophysical Journal*, 679, 460-480 (2008)
11. "Metallicity and Physical Conditions in the Magellanic Bridge," Lehner, N., Howk, J.C., Keenan, F.P., Smoker, J.V., *Astrophysical Journal*, 678, 219-233 (2008)
12. "Distances to Galactic High-Velocity Clouds. I. Cohen Stream, Complex GCP, Cloud G1," B.P. Wakker, D.B. York, R. Wilhelm, J.C. Barentine, P. Richter, Z. Ivezić, and J.C. Howk, *Astrophysical Journal*, 672, 298-319 (2008)
13. "Distances to Galactic High-Velocity Clouds: Complex C," Wakker, B.P., York, D.G., Howk, J.C., Barentine, J.C., Wilhelm, R., Peletier, R.F., van Woerden, H., Beers, T.C., Ivezić, Ž., Richter, P., and Schwarz, U.J. *Astrophysical Journal*, 670, L113-L116 (2007)
14. "The UCSD/Keck Damped Ly α Abundance Database: A Decade of High-Resolution Spectroscopy," Prochaska, J.X., Wolfe, A.M., Howk, J.C., Gawiser, E., Burles, S.M., and Cooke, J. *Astrophysical Journal Supplements*, 171, 29-60 (2007)

15. "Highly ionized plasma in the Large Magellanic Cloud: evidence for outflows and a possible galactic wind," Lehner, N. and Howk, J.C. *Monthly Notices of the Royal Astronomical Society*, 377, 687-704 (2007)
16. "Strongly Variable $z=1.48$ Fe II and Mg II Absorption in the Spectra of $z=4.05$ GRB 060206," Hao, H., Stanek, K.Z., Dobrzycki, A., Matheson, T., Bentz, M.C., Kuraszkiewicz, J., Garnavich, P.M., Howk, J.C., Calkins, M.L., Worthey, G., Modjaz, M., and Serven, J. *Astrophysical Journal*, 659, L99-L102 (2007)
17. "'Anomalous' Optical Gamma-Ray Burst Afterglows Are Common: Two $z \sim 4$ Bursts, GRB 060206 and GRB 060210," Stanek, K.Z., Dai, X., Prieto, J.L., An, D., Garnavich, P.M., Calkins, M.L., Serven, J., Worthey, G., Hao, H., Dobrzycki, A., Howk, C., and Matheson, T. *Astrophysical Journal*, 654, L21-L24 (2007)
18. "Simulations of mixed-morphology supernova remnants with anisotropic thermal conduction," Tilley, D.A., Balsara, D.S., and Howk, J.C. *Monthly Notices of the Royal Astronomical Society*, 371, 1106-1112 (2006)
19. "The Metal-strong Damped Ly α Systems," Herbert-Fort, S., Prochaska, J.X., Dessauges-Zavadsky, M., Ellison, S.L., Howk, J.C., Wolfe, A.M., and Prochter, G.E. *Publications of the Astronomical Society of the Pacific*, 118, 1077-1097 (2006)
20. "The UCSD Radio-selected Quasar Survey for Damped Ly α Systems," Jorgenson, R.A., Wolfe, A.M., Prochaska, J.X., Lu, L., Howk, J.C., Cooke, J., Gawiser, E., and Gelino, D.M. *Astrophysical Journal*, 646, 730-741 (2006)
21. "A Method for Deriving Accurate Gas-Phase Abundances for the Multiphase Interstellar Galactic Halo," Howk, J.C., Sembach, K.R., and Savage, B.D. *Astrophysical Journal*, 637, 333-341 (2006)
22. "Cold Neutral Gas in a $z = 4.2$ Damped Ly α System: Fuel for Star Formation," Howk, J.C., Wolfe, A.M., and Prochaska, J.X. *Astrophysical Journal*, 622, L81-L84 (2005)
23. "Evidence of Correlated Titanium and Deuterium Depletion in the Galactic Interstellar Medium," Prochaska, J.X., Tripp, T.M., and Howk, J.C. *Astrophysical Journal*, 620, L39-L42 (2005)
24. "Elemental Abundances in Two High Column Density Damped Ly α Systems at $z < 1.5$," Rao, S.M., Prochaska, J.X., Howk, J.C., and Wolfe, A.M. *Astronomical Journal*, 129, 9-19 (2005)
25. "Probing the Intergalactic Medium-Galaxy Connection toward PKS 0405-123. I. Ultraviolet Spectroscopy and Metal-Line Systems," Prochaska, J.X., Chen, H.-W., Howk, J.C., Weiner, B.J., and Mulchaey, J. *Astrophysical Journal*, 617, 718-745 (2004)
26. "On the Nature of the Heat Source for Damped Ly α Systems," Wolfe, A.M., Howk, J.C., Gawiser, E., Prochaska, J.X., and Lopez, S. *Astrophysical Journal*, 615, 625-644 (2004)
27. "Small-Scale Structure of O VI Interstellar Gas in the Direction of the Globular Cluster NGC 6752," Lehner, N. and Howk, J.C. *Publications of the Astronomical Society of the Pacific*, 116, 895-902 (2004)

28. "Hubble Space Telescope Imaging of Extraplanar Dust Structures in the Edge-On Spiral NGC 4217," Thompson, T.W.J., Howk, J.C., and Savage, B.D. *Astronomical Journal*, 128, 662-673 (2004)
29. "Cooling in Coronal Gas in the M82 Starburst Superwind," Hoopes, C.G., Heckman, T.M., Strickland, D.K., and Howk, J.C. *Astrophysical Journal*, 596, L175-L178 (2003)
30. "On the Origin of the High-Ionization Intermediate-Velocity Gas toward HD 14434," Knauth, D.C., Howk, J.C., Sembach, K.R., Lauroesch, J.T., and Meyer, D.M. *Astrophysical Journal*, 592, 964-974 (2003)
31. "Oxygen Gas-Phase Abundance Revisited," André, M.K., Oliveira, C.M., Howk, J.C., Ferlet, R., Désert, J.-M., Hébrard, G., Lacour, S., Lecavelier des Étangs, A., Vidal-Madjar, A., and Moos, H.W. *Astrophysical Journal*, 591, 1000-1012 (2003)
32. "Probing O VI Emission in the Halos of Edge-on Spiral Galaxies," Otte, B., Murphy, E.M., Howk, J.C., Wang, Q.D., Oegerle, W.R., and Sembach, K.R. *Astrophysical Journal*, 591, 821-826 (2003)
33. "H₂ absorption in a dense interstellar filament in the Milky Way halo," Richter, P., Sembach, K.R., and Howk, J.C. *Astronomy & Astrophysics*, 405, 1013-1023 (2003)
34. "The elemental abundance pattern in a galaxy at $z = 2.626$," Prochaska, J.X., Howk, J.C., and Wolfe, A.M. *Nature*, 423, 57-59 (2003)
35. "Interstellar Deuterium, Nitrogen, and Oxygen Abundances toward GD 246, WD 2331-475, HZ 21, and Lanning 23: Results from the FUSE Mission," Oliveira, C.M., Hébrard, G., Howk, J.C., Kruk, J.W., Chayer, P., and Moos, H.W. *Astrophysical Journal*, 587, 235-255 (2003)
36. "Far-Ultraviolet and H α Spectroscopy of SNR 0057-7226 in the Small Magellanic Cloud H II Region N66," Danforth, C.W., Sankrit, R., Blair, W.P., Howk, J.C., and Chu, Y.-H. *Astrophysical Journal*, 586, 1179-1190 (2003)
37. "Highly Ionized Gas in the Galactic Halo: A FUSE Survey of O VI Absorption toward 22 Halo Stars," Zsargó, J., Sembach, K.R., Howk, J.C., and Savage, B.D. *Astrophysical Journal*, 586, 1019-1049 (2003)
38. "Ionized Gas in the First 10 Kiloparsecs of the Interstellar Galactic Halo," Howk, J.C., Sembach, K.R., and Savage, B.D. *Astrophysical Journal*, 586, 249-267 (2003)
39. "Origins of the Highly Ionized Gas along the Line of Sight toward HD 116852," Fox, A.J., Savage, B.D., Sembach, K.R., Fabian, D., Richter, P., Meyer, D.M., Lauroesch, J., and Howk, J.C. *Astrophysical Journal*, 582, 793-809 (2003)
40. "An Atlas of Galactic OB Spectra Observed with the Far Ultraviolet Spectroscopic Explorer," Pellerin, A., Fullerton, A.W., Robert, C., Howk, J.C., Hutchings, J.B., Walborn, N.R., Bianchi, L., Crowther, P.A., and Sonneborn, G. *Astrophysical Journal Supplements*, 143, 159-200 (2002)
41. "Far-Ultraviolet Spectroscopic Explorer Observations of Degree-Scale Variations in Galactic Halo OVI," Howk, J.C., Savage, B.D., Sembach, K.R., and Hoopes, C.G. *Astrophysical Journal*, 572, 264-275 (2002)

42. "The UCSD HIRES/Keck I Damped Ly α Abundance Database. III. An Empirical Study of Photoionization in the Damped Ly α System toward GB 1759+7539," Prochaska, J.X., Howk, J.C., O'Meara, J.M., Tytler, D., Wolfe, A.M., Kirkman, D., Lubin, D., and Suzuki, N. *Astrophysical Journal*, 571, 693-711 (2002)
43. "Erratum: ``FUSE Observations of Atomic Abundances and Molecular Hydrogen in the Leading Arm of the Magellanic Stream",," Sembach, K.R., Howk, J.C., Savage, B.D., and Shull, J.M. *Astronomical Journal*, 123, 3488-3488 (2002)
44. "Deuterium Abundance toward WD 0621-376: Results from the FUSE Mission," Lehner, N., Gry, C., Sembach, K.R., Hébrard, G., Chayer, P., Moos, H.W., Howk, J.C., and Désert, J.-M. *Astrophysical Journal Supplements*, 140, 81-89 (2002)
45. "Deuterium Abundance toward G191-B2B: Results from the FUSE Mission," Lemoine, M., and 21 colleagues *Astrophysical Journal Supplements*, 140, 67-80 (2002)
46. "Interstellar Deuterium, Nitrogen, and Oxygen Abundances toward BD +28°4211: Results from the FUSE Mission," Sonneborn, G., André, M., Oliveira, C., Hébrard, G., Howk, J.C., Tripp, T.M., Chayer, P., Friedman, S.D., Kruk, J.W., Jenkins, E.B., Lemoine, M., Moos, H.W., Oegerle, W.R., Sembach, K.R., and Vidal-Madjar, A. *Astrophysical Journal Supplements*, 140, 51-66 (2002)
47. "Deuterium and Oxygen toward Feige 110: Results from the FUSE Mission," Friedman, S.D., Howk, J.C., Chayer, P., Tripp, T.M., Hébrard, G., André, M., Oliveira, C., Jenkins, E.B., Moos, H.W., Oegerle, W.R., Sonneborn, G., Lamontagne, R., Sembach, K.R., and Vidal-Madjar, A. *Astrophysical Journal Supplements*, 140, 37-49 (2002)
48. "Abundances of Deuterium, Nitrogen, and Oxygen toward HZ 43A: Results from the FUSE Mission," Kruk, J.W., Howk, J.C., André, M., Moos, H.W., Oegerle, W.R., Oliveira, C., Sembach, K.R., Chayer, P., Linsky, J.L., Wood, B.E., Ferlet, R., Hébrard, G., Lemoine, M., Vidal-Madjar, A., and Sonneborn, G. *Astrophysical Journal Supplements*, 140, 19-36 (2002)
49. "Abundances of Deuterium, Nitrogen, and Oxygen in the Local Interstellar Medium: Overview of First Results from the FUSE Mission," Moos, H.W., and 35 colleagues *Astrophysical Journal Supplements*, 140, 3-17 (2002)
50. "A Far Ultraviolet Spectroscopic Explorer Survey of Interstellar O VI Absorption in the Small Magellanic Cloud," Hoopes, C.G., Sembach, K.R., Howk, J.C., Savage, B.D., and Fullerton, A.W. *Astrophysical Journal*, 569, 233-244 (2002)
51. "The Global Content, Distribution, and Kinematics of Interstellar O VI in the Large Magellanic Cloud," Howk, J.C., Sembach, K.R., Savage, B.D., Massa, D., Friedman, S.D., and Fullerton, A.W. *Astrophysical Journal*, 569, 214-232 (2002)
52. "An Atlas of Far Ultraviolet Spectroscopic Explorer Sight Lines toward the Magellanic Clouds," Danforth, C.W., Howk, J.C., Fullerton, A.W., Blair, W.P., and Sembach, K.R. *Astrophysical Journal Supplements*, 139, 81-189 (2002)
53. "Far-Ultraviolet Spectroscopy of the Intergalactic and Interstellar Absorption toward 3C 273," Sembach, K.R., Howk, J.C., Savage, B.D., Shull, J.M., and Oegerle, W.R. *Astrophysical Journal*, 561, 573-599 (2001)

54. "Observations of O VI Emission from the Diffuse Interstellar Medium," Shelton, R.L., and 24 colleagues *Astrophysical Journal*, 560, 730-741 (2001)
55. "Spectroscopic Classification of 42 Large Magellanic Cloud OB Stars: Selection of Probes for the Hot Gaseous Halo of the Large Magellanic Cloud," Jaxon, E.G., Guerrero, M.A., Howk, J.C., Walborn, N.R., Chu, Y.-H., and Wakker, B.P. *Publications of the Astronomical Society of the Pacific*, 113, 1130-1139 (2001)
56. "Far Ultraviolet Spectroscopic Explorer Observations of a Supernova Remnant in the Line of Sight to HD 5980 in the Small Magellanic Cloud," Hoopes, C.G., Sembach, K.R., Howk, J.C., and Blair, W.P. *Astrophysical Journal*, 558, L35-L38 (2001)
57. "Ionization Properties and Elemental Abundances in Damped Ly α Systems," Vladilo, G., Centuri3n, M., Bonifacio, P., and Howk, J.C. *Astrophysical Journal*, 557, 1007-1020 (2001)
58. "STIS and GHRS Observations of Warm and Hot Gas Overlying the Scutum Supershell (GS 018-04+44)," Savage, B.D., Sembach, K.R., and Howk, J.C. *Astrophysical Journal*, 547, 907-921 (2001)
59. "FUSE Observations of Atomic Abundances and Molecular Hydrogen in the Leading Arm of the Magellanic Stream," Sembach, K.R., Howk, J.C., Savage, B.D., and Shull, J.M. *Astronomical Journal*, 121, 992-1002 (2001)
60. "Empirical Verification of the Fe II Oscillator Strengths in the FUSE Bandpass," Howk, J.C., Sembach, K.R., Roth, K.C., and Kruk, J.W. *Astrophysical Journal*, 544, 867-880 (2000)
61. "The Abundance of Interstellar Boron," Howk, J.C., Sembach, K.R., and Savage, B.D. *Astrophysical Journal*, 543, 278-283 (2000)
62. "No Diffuse H₂ in the Metal-deficient Galaxy I ZW 18," Vidal-Madjar, A., Kunth, D., Lecavelier des Etangs, A., Lequeux, J., Andr3, M., BenJaffel, L., Ferlet, R., H3brard, G., Howk, J.C., Kruk, J.W., Lemoine, M., Moos, H.W., Roth, K.C., Sonneborn, G., and York, D.G. *Astrophysical Journal*, 538, L77-L80 (2000)
63. "Far Ultraviolet Spectroscopic Explorer Observations of Interstellar Gas toward the Large Magellanic Cloud Star SK -67 $^{\circ}$ 05," Friedman, S.D., Howk, J.C., Andersson, B.-G., Sembach, K.R., Ake, T.B., Roth, K., Sahnou, D.J., Savage, B.D., York, D.G., Sonneborn, G., Vidal-Madjar, A., and Wilkinson, E. *Astrophysical Journal*, 538, L39-L42 (2000)
64. "Stagnation and Infall of Dense Clumps in the Stellar Wind of τ Scorpii," Howk, J.C., Cassinelli, J.P., Bjorkman, J.E., and Lamers, H.J.G.L.M. *Astrophysical Journal*, 534, 348-358 (2000)
65. "Background and Scattered-Light Subtraction in the High-Resolution Echelle Modes of the Space Telescope Imaging Spectrograph," Howk, J.C. and Sembach, K.R. *Astronomical Journal*, 119, 2481-2497 (2000)
66. "An Empirical Test of the Mg II λ 1240 Doublet Branching Ratio and Oscillator Strength," Sofia, U.J., Fabian, D., and Howk, J.C. *Astrophysical Journal*, 531, 384-390 (2000)

67. "The Multiphase Halo of NGC 891: WIYN H α and BVI Imaging," Howk, J.C. and Savage, B.D. *Astronomical Journal*, 119, 644-667 (2000)
68. "Modeling the Warm Ionized Interstellar Medium and Its Impact on Elemental Abundance Studies," Sembach, K.R., Howk, J.C., Ryans, R.S.I., and Keenan, F.P. *Astrophysical Journal*, 528, 310-324 (2000)
69. "Accretion of low-metallicity gas by the Milky Way," Wakker, B.P., Howk, J.C., Savage, B.D., van Woerden, H., Tufte, S.L., Schwarz, U.J., Benjamin, R., Reynolds, R.J., Peletier, R.F., and Kalberla, P.M.W. *Nature*, 402, 388-390 (1999)
70. "Abundances and Physical Conditions in the Warm Neutral Medium toward μ Columbae," Howk, J.C., Savage, B.D., and Fabian, D. *Astrophysical Journal*, 525, 253-293 (1999)
71. "Ionized Gas in Damped Lyman- α Systems and Its Effects on Elemental Abundance Studies," Howk, J.C. and Sembach, K.R. *Astrophysical Journal*, 523, L141-L144 (1999)
72. "Dust in the Ionized Medium of the Galaxy: GHRS Measurements of AL III and S III," Howk, J.C. and Savage, B.D. *Astrophysical Journal*, 517, 746-766 (1999)
73. "A Search for Extraplanar Dust in Nearby Edge-on Spirals," Howk, J.C. and Savage, B.D. *Astronomical Journal*, 117, 2077-2101 (1999)
74. "Echelle Spectroscopy of Interstellar Absorption toward μ Columbae with the Goddard High Resolution Spectrograph," Brandt, J.C., and 19 colleagues *Astronomical Journal*, 117, 400-409 (1999)
75. "Extraplanar Dust in Spiral Galaxies: Observations and Implications," Howk, J.C. *Ap&SS*, 269, 293-300 (1999)
76. "Coronal C⁺³ in the Large Magellanic Cloud: Evidence for a Hot Halo," Wakker, B., Howk, J.C., Chu, Y.-H., Bomans, D., and Points, S.D. *Astrophysical Journal*, 499, L87-91 (1998)
77. "A Search for Optical Afterglow from GRB 970828," Groot, P.J., and 24 colleagues *Astrophysical Journal*, 493, L27-30 (1998)
78. "Extraplanar Dust in the Edge-On Spiral NGC 891," Howk, J.C. and Savage, B.D. *Astronomical Journal*, 114, 2463-2478 (1997)
79. "The Distance to Two Neutral Hydrogen Clouds: The High-Velocity Complex A and the Low-Latitude Intermediate-Velocity Cloud," Wakker, B., Howk, C., Schwarz, U., van Woerden, H., Beers, T., Wilhelm, R., Kalberla, P., and Danly, L. *Astrophysical Journal*, 473, 834-848 (1996)

Seminars and Talks:

1. "Using the Gas Phase of the Universe to Constrain New Physics," Colloquium, The Catholic University of America, Physics Dept., November 4, 2009
2. "On the importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Colloquium, Indiana University, Astronomy Dept., October 15, 2009
3. "On the importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Colloquium, University of Wyoming, Dept. of Physics & Astronomy, February 27, 2009
4. Invited *provocateur* for the Interstellar Medium session of NASA's Future Directions in Ultraviolet Spectroscopy, Annapolis, MD, October 20-22, 2008
5. "The Evolution of Galaxies and Their Metals," JINA Seminar, Michigan State University, Physics and Astronomy Department, October 6, 2008
6. "On the importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Astrophysics Seminar, Univ. of Notre Dame, September 16, 2008
7. "Extraplanar Dust in Spiral Galaxies: Tracing Outflows in the Disk-Halo Interface," Invited review at 'The Role of Disk-Halo Interaction in Galaxy Evolution: Outflow vs Infall' conference, Espinho, Portugal, August 18-22, 2008
8. "Thick Disk Star Formation in Spiral Galaxies?," Talk at 'Formation and Evolution of Star Clusters and Associations' workshop, University of Toledo, June 7, 2008
9. "Are Highly Ionized High Velocity Clouds Extragalactic?," Talk at 'Galaxy Formation and Evolution as Revealed by Cosmic Gas' conference, University of California, Irvine, April 17-19, 2008.
10. "Gas Phase Physics and the Evolution of Galaxies," Colloquium, Western Michigan University, Physics Department, February 4, 2008
11. "Gas Phase Physics and the Evolution of Galaxies," Colloquium, Department of Physics and Astronomy, University of Louisville, Kentucky, September 7, 2007
12. "Gas Phase Physics and the Evolution of Galaxies" Colloquium, University of Nevada Las Vegas, Physics Department, December 1, 2006
13. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Toledo, Physics & Astronomy Department, November 2, 2006
14. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Illinois, Astronomy Department, September 12, 2006
15. "Interstellar Thick Disks," Colloquium, University of California at Santa Cruz, Astronomy Department, March 8, 2006
16. "NASA's Ultraviolet Spectrographs: Science and Atomic Data Needs," Invited Talk, NASA Laboratory Astrophysics Workshop, University of Nevada, Las Vegas, February 13-16, 2006
17. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Minnesota, Astronomy Department, February 3, 2006
18. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, The Ohio State University, Astronomy Department, November 3, 2005
19. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University

of Wisconsin, Astronomy Department, October 18, 2005

20. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, New Mexico State University, Astronomy Department, April 15, 2005

Selected Talks Prior to 2005:

21. "Extraplanar Dust in External Galaxies: Cold Gas in the Thick Disk," invited talk at 'Extraplanar Gas' conference, ASTRON, The Netherlands, June 7-11, 2004
22. "Absorption Line Studies of Milky Way Halo Gas," invited review for topical session "Gaseous Galaxy Halos and Edges of Disk Galaxies" at the 200th AAS meeting, Albuquerque, NM, June 2002

Professional Activities:

- Served as a member of the Science & Technology Advisory Committee for the Large Binocular Telescope project (Sept. 2009 - present).
- Served as an external thesis committee member/reader for A. Ritchey's defense in the Dept. of Physics & Astronomy at the University of Toledo (July 2009).
- Served as an external reader (reviewer) for Christopher Thom's thesis "The Galactic High-Velocity Gas Clouds" at Swinburne University (Australia).
- Served as reviewer for proposals to NASA's Galaxy Evolution Explorer (GALEX) mission (2009)
- Served as a reviewer for proposals to NASA's Hubble Space Telescope (2004 and 2008).
- Served as a reviewer for NASA's Astronomy and Physics Research and Analysis proposal solicitation in the area of laboratory astrophysics (2007).
- Served as a reviewer for NASA's Astrophysics Theory Program (2007).
- Since 2005 served as a reviewer for nine papers published in the *Astrophysical Journal*, the *Astronomical Journal*, and *Astronomy & Astrophysics*.
- Served as a member of the HORUS team, which submitted a proposal for a ~\$670M space mission to NASA in response to a solicited call for proposals. HORUS (High Orbit Ultraviolet-visible Satellite) is a mission concept for a 2.4-m replacement for the Hubble Space Telescope designed to study the origins of the elements and of cosmic structure, the composition of extrasolar planetary atmospheres, and other large science goals.
- Served as reviewer for NASA's Astrophysical Data Program and Long Term Space Astrophysics grants (2003)

Thesis Advisees and Postgraduate-Scholar Sponsorship

- Currently advising physics students J. Ribaldo, & K. Rueff in their graduate thesis work.
- Former students: W. Zech (Ph.D., 2010).
- Sponsored N. Lehner as a postdoctoral scholar at the University of Notre Dame (2005-2006) and as a Research Assistant Professor (2006-present).

Undergraduate Advising

- Served as class advisor for class of 2010 physics majors.
- Sponsored six undergraduate students in research activities (2005-2009).

Departmental Service

- Spring 2008 - Fall 2009: Chair of the graduate recruitment committee.
- Spring/Fall 2009: Member of the strategic planning committee.
- Spring/Fall 2009: Member of the undergraduate curriculum committee.
- Fall 2007 - Fall 2008: Member of committee to guide construction of O'Neill Longitude Sundial (under the direction of Vice President of the University, J. Affleck-Graves)
- Fall 2005 - Fall 2007: Member of the graduate recruitment committee.

Professional Memberships

- American Astronomical Society