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Education:

Ph.D. **University of Wisconsin-Madison**, Astronomy, May 1999
Dissertation Title: *Extraplanar Dust in Nearby Edge-on Galaxies*
Advisor: Blair D. Savage
B.A **Hanover College**, Physics, *cum laude*, May 1994

Research Interests:

- Multiphase interstellar medium
- Damped Lyman–α systems
- Galaxy formation and evolution
- Low-redshift intergalactic medium

Experience:

- **Assistant Professor** September 2005–present
  Department of Physics
  University of Notre Dame
  Notre Dame, IN

- **Assistant Research Physicist** September 2002–August 2005
  Principal Collaborator: A.M. Wolfe
  Center for Astrophysics & Space Sciences
  University of California, San Diego
  La Jolla, CA

- **Associate Research Scientist** January 2001–August 2002
  Principal Collaborator: K.R. Sembach
  Member of the FUSE PI Team
  Department of Physics & Astronomy
  The Johns Hopkins University
  Baltimore, MD

- **Postdoctoral Fellow** May 1999–December 2000
  Advisor: K.R. Sembach
  Department of Physics & Astronomy
  The Johns Hopkins University
  Baltimore, MD

• **Physics Teacher** September 1993–May 1994
Southwestern High School
Hanover, IN

Refereed Publications

1. "Properties and Origin of the High-Velocity Gas toward the Large Magellanic Cloud," N. Lehner, L. Staveley-Smith, and J.C. Howk, Astrophysical Journal 702, 940-954 (2009).

2. "The Connection Between a Lyman Limit System, a Very Strong O_{VI} Absorber, and "Strong z~0.5 O VI Absorption Toward PKS 0405-123: Implications for Ionization and Metallicity of the Cosmic Web," J.C. Howk, J.S. Ribaudo, N. Lehner, J.X. Prochaska, H.-W. Chen, Monthly Notices of the Royal Astronomical Society, 396, 1875-1894 (2009).

3. "The Connection Between a Lyman Limit System, a Very Strong O_{VI} Absorber, and Galaxies at z ~ 0.203," N. Lehner, J.X. Prochaska, H.A. Kobulnicky, K.L. Cooksey, J.C. Howk, G.M. Williger and S.L. Cales, The Astrophysical Journal 694 734-750 (2009).

4. "Probing feedback in protogalaxies: multiphase gas in DLA at z ~ 2.4," N. Lehner, J.C.Howk, J.X. Prochaska, and A.M. Wolfe, Monthly Notices of the Royal Astronomical Society 390, 2-20 (2008).

5. "The High-Velocity Gas toward Messier 5: Tracing Feedback Flows in the Inner Galaxy," W.F. Zech, N. Lehner, J.C. Howk, W.V.D. Dixon, and T.M. Brown, Astrophysical Journal 679, 460-480 (2008).

6. "Metallicity and Physical Conditions in the Magellanic Bridge," N. Lehner, J.C. Howk, F.P. Keenan, J.V. Smoker, Astrophysical Journal 678, 219-233 (2008).

7. "Simulating Anisotropic Thermal Conduction in Supernova Remnants I: Numerics and the Evolution of Remnants," D.S. Balsara, D.A. Tilley, J.C. Howk, Monthly Notices of the Royal Astronomical Society 386, 627-641 (2008).

8. "Simulating Anisotropic Thermal Conduction in Supernova Remnants II: Implications for the Interstellar Medium," D.S. Balsara, A.J. Bendenelli, D.A. Tilley, A.R. Massari and J.C. Howk, Monthly Notices of the Royal Astronomical Society 386, 642-656 (2008).

9. "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. Ivezic, and J.C. Howk, Astrophysical Journal 672, 298-319 (2008).

10. "Distances to Galactic High-Velocity Clouds. II. Complex C," B.P. Wakker, D.G. York, J.C. Howk, J.C. Barentine, R. Wilhelm, R.F. Peletier, H. van Woerden, T.C. Beers, Ž. Ivezić, P. Richter, and U.J. Schwarz, Astrophysical Journal, **670**, L113-L116 (2007).

11. "Metallicity and Physical Conditions in the Magellanic Bridge," N. Lehner, J.C. Howk, F.P. Keenan, J.V. Smoker, Astrophysical Journal, submitted (2007).

12. "The UCSD/Keck Damped Ly-alpha Abundance Database: A Decade of High-Resolution Spectroscopy," Jason X. Prochaska, Arthur M. Wolfe, J. Christopher Howk, Eric Gawiser, Scott M. Burles, and Jeff Cooke, Astrophys. Journal Supplement 171, 29 (2007).

13. "Highly Ionized Plasma in the Large Magellanic Cloud: Evidence for Outflows and a Possible Galactic Wind," N. Lehner and J.C. Howk, Monthly Notices of the Royal Astronomical Society 377, 687 (2007).

14. "Strongly Variable z=1.48 Fe II and Mg II Absorption in the Spectra of z=4.05 GRB 060206," H. Hao, K.Z. Stanek, A. Dobrzycki, T. Matheson, M.C. Bentz, J. Kuraszkiewicz, P.M. Garnavich, J.C. Howk, M.L. Calkins, G. Worthey, M.Modjaz, J. Serven, Astrophysical Journal 659, L99-102 (2007).

15. " 'Anomalous' Optical Gamma-Ray Burst Afterglows Are Common: Two z ~ 4 Bursts, GRB 060206 and GRB 060210," K.Z. Stanek, X. Dai, J.L Prieto D. An, P.M. Garnavich, M.L. Calkins, J. Serven, G. Worthey, H. Hao, A. Dobrzycki, C. Howk, and T. Matheson, Astrophysical Journal Letters 654, 21-24 (2007).

16. "Simulations of Mixed Morphology Supernova Remnants with Anisotropic Thermal Conduction ," David A. Tilley, Dinshaw S. Balsara, and J. Christopher Howk, *MNRAS*, vol. 371, 1106-1112 (2006).

17. "The Metal-Strong Damped Lyman-α Systems," Stephane Herbert-Fort, Jason X. Prochaska, Miroslava Dessauges- Zavadsky, Sara L. Ellison, J. Chris Howk, Arthur M. Wolfe, and Gabriel E. Prochter, *PASP*, vol. 118, 1077-1097 (2006).

18. "The UCSD Radio-selected Quasar Survey for Damped Ly-α Systems," Regina A. Jorgenson, Arthur M. Wolfe, Jason X. Prochaska, Limin Lu, J. Christopher Howk, Jeff Cooke, Eric Gawiser, and Dawn M. Gelino, *ApJ*, 646, 730-741 (2006).

19. "A Method for Deriving Accurate Gas-Phase Abundances for the Multiphase Interstellar Galactic Halo," J.C. Howk, K.R. Sembach, and B.D. Savage, *ApJ*, 637, 333-341 (2006).

20. "Cold Neutral Gas in a z = 4.2 Damped Lyman-α System: The Fuel for Star Formation," J.C. Howk, J.C., A.M. Wolfe, and J.X. Prochaska, *ApJL*, 622, L81 (2005).

21. "Evidence of Correlated Titanium and Deuterium Depletion in the Galactic Interstellar Medium," J.X. Prochaska, T.M. Tripp, and J.C. Howk, *ApJL*, 620, L39 (2005).

22. "Elemental Abundances in Two High Column Density Damped Lyman-α Systems at z < 1.5," S.M. Rao, J.X. Prochaska, J.C. Howk, and A.M. Wolfe, *AJ*, 129, 9 (2005).

23. "Probing the Intergalactic Medium-Galaxy Connection Toward PKS 0405-123 I: Ultraviolet Spectroscopy and Metal-Line Systems," J.X. Prochaska, H.-W. Chen, J.C. Howk, B. Weiner, and J. Mulchaey, *ApJ*, 617, 718 (2004).

24. "On the Nature of the Heat Source for Damped Lyα Systems," A.M. Wolfe, J.C. Howk, E. Gawiser, J.X. Prochaska, and S. Lopez, *ApJ*, 615, 625 (2004).

25. "Small-Scale Structure of O VI Interstellar Gas in the Direction of the Globular Cluster NGC 6752," N. Lehner and J.C. Howk, *PASP*, 116, 895 (2004).

26. "Hubble Space Telescope Imaging of Extraplanar Dust Structures in the Edge-On Spiral NGC 4217," T.W.J. Thompson, J.C. Howk, and B.D. Savage, *AJ*, 128, 662 (2004).

27. "Cooling in Coronal Gas in the M82 Starburst Superwind," C.G. Hoopes, T.M. Heckman, D.K. Strickland, and J.C. Howk, *ApJL*, 586, L175 (2003).

28. "On the Origin of the High-Ionization Intermediate-Velocity Gas Toward HD 14434," D.C. Knauth, J.C. Howk, K.R. Sembach, J.T. Lauroesch, and D.M. Meyer, *ApJ*, 592, 964 (2003).

29. "Oxygen Gas Phase Abundance Revisited," M.K. Andre, et al. [10 authors including J.C. Howk] *ApJ*, 591, 1000 (2003).

30. "Probing O VI Emission in the Halos of Edge-on Spiral Galaxies," B. Otte, E.M. Murphy, J.C. Howk, et al., *ApJ*, 591, 821 (2003).

31. "H2 Absorption in a Dense Interstellar Filament in the Milky Way Halo," P. Richter, K.R. Sembach, and J.C. Howk, A&A, 405, 1013 (2003).

32. "The elemental abundance pattern in a galaxy at z=2.626," J.X. Prochaska, J.X., J.C. Howk, and A.M. Wolfe, *Nature*, 423, 57 (2003).

33. "Interstellar Deuterium, Nitrogen, and Oxygen Abundances Toward GD 246, WD2331475, HZ 21, and Lan 23: Results from the FUSE Mission," C. Oliveira, G. Hebrard, J.C. Howk, J.W. Kruk, P. Chayer, and H.W. Moos, *ApJ*, 587, 235 (2003).

34. "Far-Ultraviolet and H_ Spectroscopy of SNR 0057 - 7226 in the SMC H II Region N66," C.D. Danforth, R. Sankrit, W.P. Blair, J.C. Howk, and Y.-H. Chu, *ApJ*, 586, 1179 (2003).

35. "Highly-Ionized Gas in the Galactic Halo: A FUSE Survey of O VI Absorption Toward 22 Halo Stars," J. Zsargo, K.R. Sembach, J.C. Howk, and B.D. Savage, *ApJ*, 586, 1019 (2003).

36. "Ionized Gas in the First 10 kpc of the Interstellar Galactic Halo," J.D. Howk, K.R. Sembach, and B.D. Savage, *ApJ*, 586, 249 (2003).

37. "Origins of the Highly Ionized Gas along the Line of Sight towards HD 116852," A.J. Fox, B.D. Savage, K.R. Sembach, D. Fabian, P. Richter, D.M. Meyer, J. Lauroesch, and J.C. Howk, *ApJ*, 582, 793 (2003).

38. "An Atlas of Galactic OB Spectra Observed with the Far Ultraviolet Spectroscopic Explorer," A. Pellerin, A.W. Fullerton, C. Robert, J.C. Howk, J.B. Hutchings, N.R. Walborn, L. Bianchi, P.A. Crowther, and G. Sonneborn, *ApJ*S, 143, 159 (2002).

39. "FUSE Observations of Degree-Scale Variations in Galactic Halo O VI," J.C. Howk, B.D. Savage, and K.R. Sembach, *ApJ*, 572, 264 (2002).

40. "The UCSD HIRES/Keck I Damped Lyα Abundance Database. III. An Empirical Study of Photoionization in the Damped Lyα System Toward GB1759+7539," J.X. Prochaska, J.C. Howk, J.M. O'Meara, D. Tytler, A.M. Wolfe, D. Kirkman, D. Lubin, and N. Suzuki, *ApJ*, 571, 693 (2002).

41. "Abundances of Deuterium, Oxygen, and Nitrogen in the Local Interstellar Medium: First Results from the Far Ultraviolet Spectroscopic Explorer," H.W. Moos et al. [35 authors including J.C. Howk] 2002, *ApJ*S, 140, 3

42. "Interstellar Deuterium, Nitrogen, and Oxygen Abundances Toward HZ 43A: Results from the Far Ultraviolet Spectroscopic Explorer (FUSE) Mission," J.W. Kruk, J.C. Howk, et al. *ApJ*S, 140, 19 (2002).

43. "Deuterium and Oxygen Toward Feige 110: Results from the Far Ultraviolet Spectroscopic Explorer (FUSE) Mission," S.D. Friedman, J.C. Howk, et al., *ApJ*S, 140, 37 (2002).

44. "Interstellar Deuterium, Nitrogen, and Oxygen Abundances Toward BD +28 4211: Results from the Far Ultraviolet Spectroscopic Explorer (FUSE) Mission," G. Sonneborn, et al. [25 authors including J.C. Howk] *ApJ*S, 140, 51 (2002).

45. "Deuterium Abundance Toward G191-B2B: Results from the Far Ultraviolet Spectroscopic Explorer (FUSE) Mission," M. Lemoine et al. [22 authors including J.C. Howk] *ApJ*S, 140, 67 (2002).

46. "Deuterium Toward the White Dwarf WD 0621 -376: Results from the Far Ultraviolet Spectroscopic Explorer (FUSE) Mission," N. Lehner, C. Gry, K.R. Sembach, G. Hébrard, P. Chayer, H.W. Moos, J.C. Howk, and J.-M. Désert, *ApJ*S, 140, 81 (2002).

47. "An Atlas of FUSE Sight Lines Toward the Magellanic Clouds," C.W. Danforth, J.C. Howk, A.W. Fullerton, W.P. Blair, and K.R. Sembach, *ApJ*S, 139, 81 (2002).

48. "The Global Content, Distribution, and Kinematics of Interstellar O VI in the Large Magellanic Cloud," J.C. Howk, K.R. Sembach, B.D. Savage, D. Massa, S.D. Friedman, and A.W. Fullerton, *ApJ*, 569, 214 (2002).

49. "A FUSE Survey of Interstellar O VI in the Small Magellanic Cloud," C.G. Hoopes, K.R. Sembach, J.C. Howk, B.D. Savage, and A.W. Fullerton, *ApJ*, 569, 233 (2002).

50. "Far Ultraviolet Spectroscopic Explorer Observations of Intergalactic and Interstellar Absorption Toward 3C273," K.R. Sembach, J.C. Howk, B.D. Savage, and J.M. Shull, *ApJ*, 561, 573 (2002).

51. "Observations of O VI Emission from the Diffuse Interstellar Medium," R.L. Shelton, et al. [25 authors including J.C. Howk] *ApJ*, 560, 730 (2001).

52. "Far Ultraviolet Spectroscopic Explorer Observations of a Supernova Remnant in the Line of Sight to HD 5980 in the Small Magellanic Cloud," C.G. Hoopes, K.R. Sembach, J.C. Howk, and W.P. Blair, *ApJL*, 558, L35 (2001).

53. "Spectroscopic Classification of 42 LMC OB Stars: Selection of Probes for the Hot Gaseous Halo of the LMC," E.G. Jaxon, M.A. Guerrero, J.C. Howk, N.R. Walborn, Y.H. Chu, and B.P. Wakker, *PASP*, 113, 1130 (2001).

54. "Ionization Corrections and Elemental Abundances in Damped Ly-α Systems," G. Vladilo, M. Centurion, P. Bonifacio, and J.C. Howk , *ApJ*, 557, 1007 (2001).

55. "FUSE Observations of Molecular Hydrogen in the Leading Arm of the Magellanic Stream," K.R. Sembach, J.C. Howk, B.D. Savage, and J.M. Shull, *AJ*, 121, 992 (2001).

56. "STIS and GHRS Observations of Warm and Hot Gas Overlying the Scutum Supershell (GS 018-04+44)," B.D. Savage, K.R. Sembach, and J.C. Howk, *ApJ*, 547, 907 (2001).

57. "Empirical Verification of the Fe II Oscillator Strengths in the FUSE Bandpass," J.C. Howk, K.R. Sembach, K.C. Roth, and J.W. Kruk, *ApJ*, 544, 867 (2000).

58. "The Abundance of Interstellar Boron," J.C. Howk, K.R. Sembach, and B.D. Savage, *ApJ*, 543, 278 (2000).

59. "FUSE Observations of Interstellar Gas Towards the LMC Star Sk-67 05," S.D. Friedman, J.C. Howk, et al., *ApJL*, 538, L35 (2000).

60. "No Diffuse H2 in the Metal Deficient Galaxy I Zw 18," A. Vidal-Madjar, et al. [15 authors including J.C. Howk] *ApJL*, 538, L77 (2000).

61. "Background and Scattered Light Subtraction in the High-Resolution Echelle Modes of the Space Telescope Imaging Spectrograph," J.C. Howk and K.R. Sembach, *AJ*, 119, 2481 (2000).

62. "Infalling Material in the Stellar Wind of τ Scorpii," J.C. Howk, J.P. Cassinelli, J.E. Bjorkman, and H.J.G.L.M. Lamers, *ApJ*, 534, 348 (2000).

63. "An Empirical Test of the Mg II λ1240 Doublet Branching Ratio and Oscillator Strength," U.J. Sofia, D. Fabian, and J.C. Howk, *ApJ*, 531, 384 (2000).

64. "The Multiphase Halo of NGC 891: WIYN Hα and BVI Imaging," J.C. Howk and B.D. Savage, *AJ*, 119, 644 (2000).

65. "Modeling the Warm Ionized Interstellar Medium and Its Impact on Elemental Abundance Studies," K.R. Sembach, J.C. Howk, R.S.I. Ryans, and F.P. Keenan, *ApJ*, 528, 310 (2000).

66. "Extraplanar Dust in Spiral Galaxies: Observations and Implications," J.C. Howk, ApSS, 269/270, 293, 1999 (Toward a New Millennium in Galaxy Morphology, eds. D.L. Block, I. Puerari, A. Stockton & D. Ferreira).

67. "Observational Evidence for the Accretion of Low-Metallicity Gas onto the Milky Way," B.P. Wakker, J.C. Howk, B.D. Savage, S.L. Tufte, R.J. Reynolds, R. Benjamin, H. van Woerden, U.J. Schwarz, R.F. Peletier, and P.M.W. Kalberla, *Nature*, 402, 388 (1999).

68. "Abundances and Physical Conditions in the Interstellar Gas Towards μ Columbae," J.C. Howk, B.D. Savage, and D. Fabian, *ApJ*, 525, 253 (1999).

69. "Ionized Gas in Damped Lyman-α Systems and Its Effects on Elemental Abundance Studies," J.C. Howk and K.R. Sembach, *ApJL*, 523, L141 (1999).

70. "Dust in the Ionized Medium of the Galaxy: GHRS Measurements of Al III and S III," J.C. Howk and B.D. Savage, *ApJ*, 517, 746 (1999).

71. "A Search for Extraplanar Dust in Nearby Edge-On Spirals," J.C. Howk and B.D. Savage, *AJ*, 117, 2077 (1999).

72. "Echelle Spectroscopy of Interstellar Absorption Toward μ Columbae with the Goddard High Resolution Spectrograph," J.C. Brandt, et al. [21 authors including J.C. Howk] *AJ*, 117, 400 (1999).

73. "Coronal C^{+3} in the Large Magellanic Cloud: Evidence for a Hot Halo," B. Wakker, J.C. Howk, Y.-H. Chu, D. Bomans, and S. Points, *ApJL*, 499, L87 (1998).

74. "A Search for Optical Afterglow from GRB 970828," P.J. Groot, et al. [21 authors including J.C. Howk], *ApJL*, 493, L27 (1998).

75. "Extraplanar Dust in the Edge-On Spiral NGC 891," J.C. Howk and B.D. Savage, *AJ*, 114, 2463 (1997).

76. "The Distance to Two Hydrogen Clouds: the High-Velocity Complex A and the Low-Latitude Intermediate-Velocity Cloud," B. Wakker, C. Howk, U. Schwarz, H. van Woerden, T. Beers, R. Wilhelm, P. Kalberla, and L. Danly, *ApJ*, 473, 834 (1996).

Seminars and Talks

1. "On the Importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Colloquium, Indiana University, Department of Physics and Astronomy, Bloomington, Indiana, October 13, 2009.
2. "On the Importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Colloquium, Department of Physics and Astronomy, University of Wyoming, Laramie, Wyoming, February 27, 2009.
3. Gave the talk "Interstellar Medium," and served as invited provocateur for the Interstellar Medium session of NASA's Future Directions in Ultraviolet Spectroscopy, Annapolis, Maryland, October 20-22, 2008.
4. "The Evolution of Galaxies and Their Metals," JINA Seminar, Michigan State University, Physics and Astronomy Department, East Lansing, October 6, 2008.
5. "On the Importance of Outflows and Infall in Spiral Galaxies: Interstellar Dust as a Probe of Galaxy Assembly," Astrophysics Seminar, University of Notre Dame, September 16, 2008.

6. "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.

7. "Thick Disk Star Formation in Spiral Galaxies?" contributed talk at 'Formation and Evolution of Star Clusters and Associations' workshop, University of Toledo, Ohio, June 7, 2008.

8. "Are Highly Ionized High Velocity Clouds Extragalactic?" Invited Talk at the conference "Galaxy Formation and Evolution as Revealed by Cosmic Gas," University of California, Irvine, April 17-19, 2008.

9. "Gas Phase Physics and the Evolution of Galaxies," Invited Talk, Department of Physics and Astronomy, University of Louisville, Kentucky, September 7, 2007

10. "Gas Phase Physics and the Evolution of Galaxies," Colloquium, University of Nevada-Las Vegas, Department of Physics, December 1, 2006

11. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Toledo, Physics and Astronomy Department, November 2, 2006

12. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Illinois, Astronomy Department, September 12, 2006

13. "Interstellar Thick Disks," Colloquium, University of California at Santa Cruz, Astronomy Department, March 8, 2006

14. "NASA's Ultraviolet Spectrographs: Science and Atomic Data Needs," Invited Talk, NASA Laboratory Astrophysics Workshop, University of Nevada, Las Vegas, February 13-16, 2006

15. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Minnesota, Astronomy Department, February 3, 2006

16. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, The Ohio State University, Astronomy Department, November 3, 2005

17. "Studying the Cosmic Evolution of Galaxies Through Their Gas," Colloquium, University of Wisconsin, Astronomy Department, October 18, 2005

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

Selected Works in Preparation

1. "Cold Neutral Gas in Damped Lyman-a Systems," **J.C. Howk**, A.M. Wolfe, J.X. Prochaska, and M. Dessuages-Zavadsky.

2. "Ionized Gas in the First 10 kpc of the Interstellar Galactic Halo. II," **J.C. Howk**, K.R. Sembach, and B.D. Savage.