

Sarah Salviander, Ph.D.

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CURRENT POSITION	Co-Founder and CEO, 6DS Ministries Consulting Astrophysicist, LFIA	
RESEARCH INTERESTS	Observational study of quasars and supermassive black holes Confluence of modern science and the Christian religion	
EDUCATION	University of Texas at Austin , Austin, Texas USA Ph.D., Astrophysics, August 2008 Dissertation: "Demographics and Evolution of Supermassive Black Holes in Quasars and Galaxies" M.A., Astrophysics, May 2004 Thesis: "The Black Hole - Bulge Relationship for QSOs in the SDSS DR1" Eastern Oregon University , La Grande, Oregon USA B.A., Physics, Minor in Mathematics, June 2001	
ACADEMIC WORK EXPERIENCE	Department of Astronomy University of Texas at Austin , Austin, Texas USA <i>Research Fellow</i> Quasars, active galaxies, supermassive black holes. <i>Graduate Student</i> Ph.D. research, Ph.D. and Masters level coursework and research projects. Department of Physics Southwestern University , Georgetown, Texas USA <i>Adjunct Professor</i> Stars, Galaxies, and Cosmology; Fundamentals of Physics I & II Laboratory; Elementary Modern Physics Center for Astrophysics and Space Sciences University of California at San Diego , San Diego, California USA <i>NSF REU Fellow</i> Topic: "Measuring the Deuterium to Hydrogen Abundance Ratio in QSO Spectra"	2008 - 2017 2001 - 2008 2008 - 2015 1999, 2000
ORGANIZATIONS	American Astronomical Society American Physical Society International Astronomical Union	
HONORS AND AWARDS	Fred T. Goetting Jr. Memorial Endowed Presidential Scholarship Outstanding Physics Student Award, Eastern Oregon University Ralph Badgley Memorial Scholarship in Science and Mathematics Esther Badgley Scholarship for Women in Physics Oregon Space Grant Program Scholarship in Science Sigma Pi Sigma National Physics Honor Society	

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- Salviander, S., Shields, G. A., & Bottorff, M. 2016. "Broad Line Widths as Indicators of Black Hole Mass in AGN," *Astrophysical Journal*, submitted
- Salviander, S., Shields, G. A., & Bonning, E. W. 2015. "The Black Hole Mass - Galaxy Luminosity Relationship for Sloan Digital Sky Survey Quasars," *Astrophysical Journal*, 799, 173
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- Salviander, S. & Shields, G. A. 2013. "The Black Hole Mass - Stellar Velocity Dispersion Relationship for Quasars in the SDSS DR7," *Astrophysical Journal*, 764, 82
- Smith, K. L., Shields, G. A., Salviander, S., Stevens, A. C., & Rosario, D. J. 2011. "Double-peaked Narrow-line Active Galactic Nuclei. II. The Case of Equal Peaks," *Astrophysical Journal*, 752, 63
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- Smith, K. L., Shields, G. A., Bonning, E. W., McMullen, C. C., Salviander, S. 2010. "A Search for Binary Active Galactic Nuclei: Double-peaked [O III] AGNs in the Sloan Digital Sky Survey" *Astrophysical Journal*, 716, 866
- Rosario, D. J., Shields, G. A., Taylor, G. B., Salviander, S., & Smith, K. L. 2010. "The Jet-driven Outflow in the Radio Galaxy SDSS J1517+3353: Implications for Double-peaked Narrow-line Active Galactic Nucleus" *Astrophysical Journal*, 716, 131
- Shields, G. A., Rosario, D. J., Smith, K. L., Bonning, E. W., Salviander, S., Kalirai, J. S., Strickler, R., Ramirez-Ruiz, E., Dutton, A. A., Treu, T., Marshall, P. J. 2009. "The Quasar SDSS J105041.35 + 345631.3: Black Hole Recoil or Extreme Double-Peaked Emitter?" *Astrophysical Journal*, 707, 936
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- Salviander, S., Shields, G. A., Gebhardt, K., Bernardi, M., Hyde, J. B. 2008. "In Search of the Highest Velocity Dispersion Galaxies" *Astrophysical Journal*, 687, 828
- Bonning, E. W., Shields, G. A., Salviander, S. 2007. "Recoiling Black Holes in Quasars" *Astrophysical Journal*, 666, L13
- Salviander, S., Shields, G. A., Gebhardt, K., Bonning, E. W. 2007. "The Black Hole - Bulge Relationship for QSOs in the Sloan Digital Sky Survey Data Release 3" *Astrophysical Journal*, 662, 131
- Bonning, E. W., Shields, G. A., Salviander, S., Cheng, L., Gebhardt, K. 2006. "Accretion Disk Temperatures and Continuum Colors in QSOs" *Astrophysical Journal*, 659, 211
- Bonning, E. W., Shields, G. A., Salviander, S., McLure, R. J. 2004. "QSO Narrow [O III] Line Width and Host Galaxy Luminosity" *Astrophysical Journal*, 626, 89
- Salviander, S., Shields, G. A., Gebhardt, K., & Bonning, E. W. 2006. "The black hole mass galaxy bulge relationship for QSOs in the SDSS DR3" *New Astronomy Reviews*, 50, 803
- Shields, G. A., Salviander, S., & Bonning, E. W. 2006. "Evolution of the black hole Bulge relationship in QSOs" *New Astronomy Reviews*, 50, 809
- Shields, G. A., Gebhardt, K., Salviander, S., Wills, B. J., Yuan, J. Xie, B. Dietrich, M. 2003. "The Black Hole-Bulge Relationship in QSOs" *Astrophysical Journal*, 583, 124

- PAPERS IN PROGRESS
- Salviander, S. & Shields, G. A. 2017. "The Black Hole Mass - Galaxy Luminosity Relationship at $z = 1.4$ "
- Salviander, S. & Shields, G. A., & Wills, B. J. 2017. "Flux Indicators for the Broad Line Region in Quasars"
- Salviander, S. & Shields, G. A., & Robertson, P. 2017. "Sulfur Abundances in Cluster Galaxies"
- PROCEEDINGS EDITOR
- Salviander, S., Green, J., & Pawlik, A. 2011. "New Horizons in Astronomy, Proceedings of the Frank N. Bash Symposium 2011," held October 9-11, 2011. Austin, Texas, USA. Edited by S. Salviander, J. Green, and A. Pawlik. Published online at *Proceedings of Science*
- CONFERENCE PRESENTATIONS
- Salviander, S. & Shields, G. A. 2012. "Evolution of the Black Hole Mass - Galaxy Bulge Relationship for QSOs in the SDSS DR7," to appear in the 219th *Bulletin of the American Astronomical Society*.
- Shields, G. A., & Salviander, S. 2009. "The Black Hole - Bulge Relationship for AGN at High Redshift," *Proceedings of "Galaxy Evolution: Emerging Insights and Future Challenges,"* 419, 392, Austin, TX November, 2008
- Smith, K., Shields, G. A., Rosario, D. J., Bonning, E. W., Salviander, S., Kalirai, J. S., Strickler, R., Ramirez-Ruiz, E., Dutton, A. A., Treu, T., Marshall, P. J. 2010, 215th *Bulletin of the American Astronomical Society*. #433.08.
- Salviander, S., Shields, G. A., Gebhardt, K., Bernardi, M. 2007. "In Search of the Highest Velocity Dispersion Galaxies" 210th *Bulletin of the American Astronomical Society*. #114.07.
- Worhatch, Randi R., Shields, G., Salviander, S. 2007. "Fe Abundance and Fe II Emission in Quasars" 210th *Bulletin of the American Astronomical Society*. #02.20.
- Shields, G. A.; Bonning, E. W.; Salviander, S. 2007. "Quasars with a Kick – Black Hole Recoil in Quasars" To appear in: *Black Holes. Poster Papers from the Space Telescope Science Institute Symposium, Baltimore, MD April, 2007*, Ed. by Mario Livio and Anton Koekemoer
- Salviander, S., Shields, G. A., Gebhardt, K., Bernardi, M. 2007. "In Search of the Highest Velocity Dispersion Galaxies in the Universe" 209th *Bulletin of the American Astronomical Society*. #04.12.
- Bonning, Erin W., Shields, G. A., Salviander, S., Cheng, L., Gebhardt, K. 2006. "Accretion Disk Temperatures and Continuum Colors in QSOs" 209th *Bulletin of the American Astronomical Society*. #34.05.
- Salviander, S., Shields, G. A., Gebhardt, K., Bonning, E. W. 2006. "The Black Hole - Bulge Relationship for QSOs in the SDSS DR3" *Physics and Astrophysics of Supermassive Black-Holes*, Santa Fe, NM July 2006.
- Salviander, S., Shields, G. A., Gebhardt, K., Bonning, E. W. 2006. "The black hole mass galaxy bulge relationship for QSOs in the SDSS DR3" *Proceedings of "QSO Hosts: Evolution and Environment," August, 2005 in Leiden, Netherlands, New Astronomy Reviews, Volume 50, Issue 9-10.* p. 803-805
- Shields, G. A., Salviander, S., Bonning, E. W. 2006. "Evolution of the black hole Bulge relationship in QSOs" *Proceedings of "QSO Hosts: Evolution and Environment," August, 2005 in Leiden, Netherlands, New Astronomy Reviews, Volume 50, Issue 9-10.* p. 809-813
- Salviander, S., Shields, G. A., Gebhardt, K., Bonning, E. W. 2005. "The Black Hole - Bulge Relationship for QSOs in the SDSS DR3" *New Horizons in Astronomy: Frank N. Bash Symposium ASP Conference Series, Vol. 352.* p. 277
- Salviander, S., Shields, G. A., Gebhardt, K. 2004. "The Black Hole Mass - Galaxy Bulge Relationship for QSOs in the SDSS DR3" *The Ninth Texas-Mexico Conference on Astrophysics, Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias) Vol. 23.* Ed. by S. Torres-Peimbert & G. MacAlpine. p. 122-123

Bonning, E. W., Shields, G. A., Salviander, S., McLure, R. J. 2004. "QSO Host Galaxy Luminosity and [O III] Line Width as a Surrogate for Stellar Velocity Distribution" *The Ninth Texas-Mexico Conference on Astrophysics, Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias) Vol. 23*. Ed. by S. Torres-Peimbert & G. MacAlpine. p. 109-110

Salviander, S., Shields, G. A., Gebhardt, K. 2004. "The Black Hole Mass - Galaxy Bulge Relationship for QSOs in the SDSS DR1" *204th Bulletin of the American Astronomical Society. #60.05*.

Bonning, E.W., Shields, G. A., Salviander, S., McLure, R. J. 2004. "QSO Narrow [O III] Line Width and Host Galaxy Luminosity" *204th Bulletin of the American Astronomical Society. #60.11*.

Salviander, S., Shields, G. A., Gebhardt, K. 2004. "The Black Hole - Galaxy Bulge Relationship for QSOs in the SDSS DR1" *203rd Bulletin of the American Astronomical Society. #78.09*.

Shields, G.A., Gebhardt, K., Salviander, S., Wills, B. J., Yuan, J. Xie, B. Dietrich, M. 2003. "The Black Hole-Bulge Relationship in QSOs" *Galaxy Evolution: Theory & Observations Revista Mexicana de Astronomía y Astrofísica (Serie de Conferencias) Vol. 17*. Ed. by Vladimir Avila-Reese, Claudio Firmani, Carlos S. Frenk & Christine Allen. p. 242-242

Salviander, S., Shields, G. A., Gebhardt, K. 2002. "Narrow Emission Lines as Surrogates for σ_* in Low- to Moderate-z QSOs" *200th Bulletin of the American Astronomical Society. #114.05*.

Shields, G.A., Gebhardt, K., Salviander, S., Wills, B. J., Yuan, J. Xie, B. Dietrich, M. 2002. "QSO Emission Lines and the Black Hole - Galaxy Bulge Relation" *200th Bulletin of the American Astronomical Society. #17.05*.

PRESS RELEASES

May 29, 2007, "Astronomers Search for Quasars with a 'Kick'"

McDonald Observatory Press Release:

<http://mcdonaldobservatory.org/news/releases/2007/0529.html>

Astronomy Magazine online article:

<http://www.astronomy.com/news/2007/05/black-holes-spin-rates>