

## Patrick M. Treuthardt, Ph.D.

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CONTACT INFORMATION	North Carolina Museum of Natural Sciences 11 West Jones Street Raleigh, NC 27601, U.S.A.	<i>Phone:</i> (+1) 919 707 9278 <i>E-mail:</i> <a href="mailto:patrick.treuthardt@naturalsciences.org">patrick.treuthardt@naturalsciences.org</a> <i>Website:</i> <a href="http://treuthardt.github.io">treuthardt.github.io</a>
EDUCATION	2007	<b>Ph.D., Physics with Astronomy specialization</b> Supervised by Professor Ronald J. Buta University of Alabama, Tuscaloosa, Alabama
	2000	<b>M.S., Physics with Astronomy specialization</b> University of Alabama, Tuscaloosa, Alabama
	1998	<b>B.S., Physics with an option in Astrophysics</b> Awarded with Honors New Mexico Institute of Mining and Technology, Socorro, New Mexico
	1996	<b>A.G.S.</b> Awarded Magna Cum Laude Macomb Community College, Clinton Township, Michigan
SUMMARIZED EXPERIENCE	North Carolina Museum of Natural Sciences, Raleigh, North Carolina Present – 2013	<b>Assistant Head, Astronomy &amp; Astrophysics Research Lab</b>
	Appalachian State University, Boone, North Carolina 2021, 2020, 2013	<b>Guest Lecturer</b>
	Osher Lifelong Learning Institute – NCSU, Raleigh, North Carolina 2019 – 2015	<b>Instructor</b>
	University of Arkansas at Little Rock, Little Rock, Arkansas 2015 – 2010 2013 – 2010 2013 – 2012 2012 – 2009	<b>Part-time Lecturer</b> <b>Affiliate Graduate Faculty</b> <b>Visiting Research Associate</b> <b>Postdoctoral Research Fellow</b>
	Secondary Affiliation: Arkansas Center for Space and Planetary Sciences, University of Arkansas at Fayetteville 2012 – 2009	<b>Graduate Student Mentor</b>
	North Carolina State University, Raleigh, North Carolina 2014	<b>Temporary Instructor</b>
	University of Oulu, Oulu, Finland 2008 2007, 2003, 2002	<b>Visiting Researcher</b> <b>Visiting Student</b>
	University of Alabama, Tuscaloosa, Alabama 2008 2007 – 1999 2005 – 1998	<b>Intern</b> <b>Graduate Research Assistant</b> <b>Graduate Teaching Assistant</b>
	Kitt Peak National Observatory, Tucson, Arizona 2006, 2004	<b>Visiting Observer</b>
	Observatoire de Haute-Provence, St. Michel l'Observatoire, France 2004	<b>Visiting Observer</b>

Refer to the following pages for detailed experience.

2020

- Hewitt, I. B. & **Treuthardt, P.** *Comparison of Galaxy Spiral Arm Pitch Angle Measurements Using Manual and Automated Techniques*, Monthly Notices of the Royal Astronomical Society, 493, 3854-3865.
  - **In the top 5% of all research outputs ever tracked** by Altmetric.
  - Press coverage including: Breitbart, Discover Magazine, Heritage Daily, Science Daily, SciTechDaily, Space Daily, UPI, etc.

2018

- Seigar, M. S., Harrington, A., & **Treuthardt, P.** *Determination of resonance locations in NGC 613 from morphological arguments*, Monthly Notices of the Royal Astronomical Society, 481, 5394-5400.
- Mutlu Pakdil, B., Seigar, M., Hewitt, I., **Treuthardt, P.**, Berrier, J., & Koval, L. *The Illustris Simulation: Supermassive Black Hole – Galaxy Connection Beyond the Bulge*, Monthly Notices of the Royal Astronomical Society, 474, 2594-2606.

2017

- Mutlu Pakdil, B., Mangedarage, M., Seigar, M. S., & **Treuthardt, P.** *A photometric study of the peculiar and potentially double ringed, non-barred galaxy: PGC 1000714*, Monthly Notices of the Royal Astronomical Society, 466, 355-368.
  - **In the top 5% of all research outputs ever tracked** by Altmetric.
  - Press coverage including: Astronomy Magazine, CBC News, CNN, CTV News, Daily Mail, Engadget, Fox News, Gizmodo, IFLScience.com, The Independent, International Business Times, International Business Times UK, MPR News, Sci-News.com, Science Daily, SciWorks Radio, Tech Times, WFAE 90.7, Space.com, Wired UK, etc.

2015

- Sierra, A., Seigar, M. S., **Treuthardt, P.**, & Puerari, I., *Determination of Resonance Locations in Barred Spiral Galaxies Using Multiband Photometry*, Monthly Notices of the Royal Astronomical Society, 450, 1799-1811.

2014

- Al-Baidhany, I., Seigar, M., **Treuthardt, P.**, Sierra, A., Davis, B., Kennefick, D., Kennefick, J., Lacy, C., Toma, Z. A., & Jabbar, W. *A Study of the Relation between the Spiral Arm Pitch Angle and the Kinetic Energy of Random Motions of the Host Spiral Galaxies*, Journal of the Arkansas Academy of Science, Vol. 68, 25-36.

2012

- **Treuthardt, P.**, Seigar, M. S., Sierra, A. D., Al-Baidhany, I., Salo, H., Kennefick, D., Kennefick, J. & Lacy, C. H. S., *On the Link Between Central Black Holes, Bar Dynamics, and Dark Matter Halos in Spiral Galaxies*, Monthly Notices of the Royal Astronomical Society, 423, 3118-3133.

2009

- **Treuthardt, P.**, Salo, H., & Buta, R., *Dynamical Simulations of NGC 2523 and NGC 4245*, The Astronomical Journal, 137, 19-33.

2008

- **Treuthardt, P.**, Salo, H., Rautiainen, P., & Buta, R., *The Bar Pattern Speed of NGC 1433 Estimated Via Sticky-Particle Simulations*, The Astronomical Journal, 136, 300-311.

2007

- **Treuthardt, P.**, Buta, R., Salo, H., & Laurikainen, E., *The Kinematically Measured Pattern Speeds of NGC 2523 and NGC 4245*, The Astronomical Journal, 134, 1195-1205.

2004

- Keel, W. C., Holberg, J. B., & **Treuthardt, P.**, *Far-Ultraviolet Spectroscopy of Star-Forming Regions in Nearby Galaxies: Stellar Populations and Abundance Indicators*, The Astronomical Journal, 128, 211-223.

2000

- Buta, R., **Treuthardt, P. M.**, Byrd, G. G., & Crocker, D. A., *Circumnuclear Star Formation in the Early-Type Resonance Ring Barred Spiral Galaxy NGC 1326*, The Astronomical Journal, 120, 1289-1305.

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BOOKS

2014

- *Structure and Dynamics of Disk Galaxies*. Proceedings of a Conference held 12-16 August 2013 at the Winthrop Rockefeller Institute, Petit Jean Mountain, Arkansas, USA. Edited by M. S. Seigar and **P. Treuthardt**. ASP Conference Proceedings, Vol. 480. San Francisco: Astronomical Society of the Pacific.

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SOFTWARE

Present – 2019

- *P2DFFT*. Hewitt, I. B. & **Treuthardt, P.** <https://doi.org/10.5281/zenodo.3165700>.

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CITIZEN SCIENCE  
PROJECTS

Present – 2019

- *Spiral Graph*. **Treuthardt, P.**, Hewitt, I. B., Scott, A., Dasanaik, N., Ehrlich, E., Lamb, E., & Wilkinson, T. <https://www.zooniverse.org/projects/astro-lab-ncmns/spiral-graph>.

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CONFERENCE  
PRESENTATIONS

2020

- **Treuthardt, P.**, Hewitt, I., & Scott, A. *Spiral Graph Citizen Science Data for Determining the Pitch Angles of Spiral Galaxies*, American Astronomical Society Meeting 235, #167.09.

2019

- **Treuthardt, P.**, Scott, A., & Hewitt, I. B. *Searching for Intermediate Mass Black Holes in Spiral Galaxies Using Pitch Angles Gathered by Citizen Scientists*, North Carolina Astronomers' Meeting 2019.
- **Treuthardt, P.**, Scott, A., & Hewitt, I. B. *Searching for Intermediate Mass Black Holes in Spiral Galaxies Using Pitch Angles Gathered by Citizen Scientists*, American Astronomical Society Meeting 234, #202.03.
- **Treuthardt, P.**, Scott, A., & Hewitt, I. *Searching for Intermediate Mass Black Holes in Spiral Galaxies Using Pitch Angles Gathered by Citizen Scientists*, Citizen Science Association Conference 2019.

2018

- Hewitt, I. & **Treuthardt, P.** *A Comparison of Galaxy Spiral Arm Pitch Angle Measurements Using Manual and Automated Techniques*, IAU General Assembly, Meeting #30.
- Hewitt, I. & **Treuthardt, P.** *A Comparison of Galaxy Spiral Arm Pitch Angle Measurements Using Manual and Automated Techniques*, American Astronomical Society Meeting 231, #248.04.

2017

- Seigar, M., Mutlu-Pakdil, B., Mangedarage, M., & **Treuthardt, P.** *The Nonbarred Double-Ringed Galaxy, PGC 1000714*, American Astronomical Society Meeting 229, #145.19.
- Mutlu-Pakdil, B., Seigar, M., Davis, B., **Treuthardt, P.**, & Berrier, J. *Testing SMBH scaling relations using cosmological simulations and optical/near-IR imaging data*, American Astronomical Society Meeting 229, #107.01.

2015

- **Treuthardt, P.**, & Grouchy, R. *A Further Examination of Manifold Theory*, IAU General Assembly, Meeting #29, id.2257756.

2014

- **Treuthardt, P.**, Beauchemin, R., & De Los Reyes, M. *The Dust Lane Curvature in a Sample of Galactic Bars*, American Astronomical Society Meeting 223, #453.12.
- Al-Baidhany, I., Seigar, M., **Treuthardt, P. M.**, Sierra, A., Davis, B. N., Kennefick, D., Kennefick, J. D., & Lacy, C. H. *A Study of Supermassive Black Holes and the Properties of Their Host Galaxies*, American Astronomical Society Meeting 223, #453.09.
- Sierra, A., Seigar, M., **Treuthardt, P. M.**, & Puerari, I. *Determination of Resonance Locations in Spiral Galaxies using Multi-band Photometry*, American Astronomical Society Meeting 223, #309.02.

2013

- **Treuthardt, P.**, Seigar, M. S., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S. *NGC 3124: A Resonance Ring Disk Galaxy with a Skewed Bar*, Structure and Dynamics of Disk Galaxies.
- Sierra, A., Seigar, M. S., **Treuthardt, P.**, & Puerari, I. *Determination of Resonance Locations in NGC 4145 Using Multiband Photometry*, Structure and Dynamics of Disk Galaxies.

2012

- **Treuthardt, P. M.**, Seigar, M., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S. *Dynamical Models Of NGC 3124: A Galaxy With An Apparent Counter-Winding Bar-Spiral Hybrid*, International Astronomical Union Special Session #3.
- **Treuthardt, P. M.**, Seigar, M., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S. *Dynamical Models Of NGC 3124: A Galaxy With An Apparent Counter-Winding Bar-Spiral Hybrid*, American Astronomical Society Meeting 220, #433.02.
- Sierra, A., Seigar, M. S., **Treuthardt, P.**, Mears, T., & Puerari, I. *Determination of Resonance Locations in a Sample of Barred Spiral Galaxies*, American Astronomical Society Meeting 220, #433.04.
- Ahdulla Akhlite Al-Baidhany, I., Seigar, M. S., **Treuthardt, P.**, Kennefick, D., Kennefick, J., Lacy, C. H. S., & Davis, B. *A Comparison of Four Methods for Measuring Supermassive Black Hole Masses*, American Astronomical Society Meeting 220, #433.06.
- **Treuthardt, P.**, Seigar, M. S., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S. *Dynamical Models of NGC 3124: A Galaxy with an Apparent Counter-Winding Bar-Spiral Hybrid*, Cyberinfrastructure Day at the University of Arkansas at Little Rock.
- **Treuthardt, P.**, Seigar, M. S., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S. *Dynamical Models of NGC 3124: A Galaxy with an Apparent Counter-Winding Bar-Spiral Hybrid*, MidAmerican Regional Astrophysics Conference.
- Al-Baidhany, I., Seigar, M. S., **Treuthardt, P.**, Kennefick, D., Kennefick, J., Lacy, C. H. S., & Davis, B. *A Comparison of Methods for Measuring Supermassive Black Holes*, American Astronomical Society Meeting 219, #346.07.
- **Treuthardt, P.**, Seigar, M., Kennefick, D., Kennefick, J., & Lacy, C. H. S., *The Apparent Counter-Winding Bar-Spiral Hybrid of NGC 3124*, American Astronomical Society Meeting 219, #346.18.

2011

- **Treuthardt, P.**, Seigar, M., Sierra, A., Al-Baidhany, I., Salo, H., Kennefick, D., Kennefick, J., & Lacy, C. H. S., *On the Link Between Central Black Holes, Bar Dynamics, and Dark Matter Halos in Spiral Galaxies*, Galaxy Formation.

- **Treuthardt, P.**, Seigar, M. S., Sierra, A. D., & Al-Baidhany, I. *On the Link Between Central Black Holes, Bar Dynamics, and Dark Matter Halos in Spiral Galaxies*, MidAmerican Regional Astrophysics Conference.
- Sierra, A., Seigar, M. S., **Treuthardt, P.**, & Puerari, I. *Determination of Resonance Locations in Barred Spiral CGS Galaxies*, MidAmerican Regional Astrophysics Conference.
- Sierra, A., Seigar, M. S., **Treuthardt, P.**, & Puerari, I. *Determination of Resonance Locations in the Barred Spiral Galaxy, NGC 613*, American Astronomical Society Meeting 217, #246.15.
- Ahdualla Akhlite Al-Baidhany, I., Seigar, M. S., **Treuthardt, P.**, Davis, B., Kennefick, D., Kennefick, J., Lacy, C. H. S., & Bentz, M. *A Comparison of Two Independent Techniques for Measuring Supermassive Black Hole Masses*, American Astronomical Society Meeting 217, #246.09.

2010

- **Treuthardt, P.**, Seigar, M., & Salo, H. *Pattern Speed Estimates of Barred Galaxies from CING: A Connection Between Central Dark Halo Concentration and SMBH Mass?*, Dynamics and Evolution of Disc Galaxies.
- Seigar, M. S., Kennefick, D., Kennefick, J., Lacy, C. H. S., Berrier, J. C., **Treuthardt, P.**, Al-Baidhany, I. A., Barrows, R. S., Davis, B., Hughes, J. A., Schilling, A., Shields, D. W., & Sierra, A. D. *The Arkansas Galaxy Evolution Survey: Supermassive Black Holes in the Universe*, International Astronomical Union Symposium #267.

2008

- **Treuthardt, P.**, Buta, R., Salo, H., & Laurikainen, E., *The Kinematically Measured Pattern Speeds of NGC 2523 and NGC 4245*, A National Meeting of Finnish ESO Scientists and Students.

2007

- **Treuthardt, P. M.**, *The Kinematics and Dynamics of Three Resonance Ring Barred Spiral Galaxies*, American Astronomical Society Meeting 211, #69.05.

2006

- **Treuthardt, P.** & Buta, R., *The Kinematically Measured Pattern Speeds of NGC 2523 and NGC 4245*, International Astronomical Union Symposium #235.

2005

- **Treuthardt, P. M.**, Buta, R. J., & Salo, H., *A Dynamical Study of Resonances in Disk Galaxies*, American Astronomical Society Meeting 206, #13.04.

2001

- **Treuthardt, P.**, Keel, W. C., Holberg, J., & Steidel, C., *FUSE Spectra of Nearby Star-Forming Regions and Comparison to High-Redshift Galaxies*, American Astronomical Society Meeting 199, #55.03.

1999

- Buta, R., **Treuthardt, P.**, Crocker, D. A., & Byrd, G. G., *An HST Study of Star Formation in the Nuclear Ring of NGC 1326*, American Astronomical Society Meeting 195, #104.04.

POPULAR  
PUBLICATIONS

2020

- **Treuthardt, P.**, Hewitt, I. B., & Sharma, P., *The Fundamentals of Galaxies*, Online Learning Modules.

2017

- **Treuthardt, P.**, *The Great American Eclipse*, North Carolina Naturalist, Vol. 25, Num. 3, 9.
- **Treuthardt, P.**, *Introducing a New and Extremely Rare Galaxy*, North Carolina Naturalist, Vol. 25, Num. 1, 6.

2016

- **Treuthardt, P.**, *Topic of upcoming event: Searching for life beyond Earth*, The News & Observer, SciTech, (17 Jan).

2015

- **Treuthardt, P.**, *Inside NC Science: Ancient supernova shrouded in mystery*, The News & Observer, SciTech, (3 May).

2014

- **Treuthardt, P.**, *Black holes continue to fascinate masses*, The News & Observer, Health & Science Newsletter, (14 Dec).

2013

- **Treuthardt, P.**, *A Spiral Galaxy with a Twist*, NatureSearch Newsletter, Issue 3.

SCIENCE  
COMMUNICATION

Present – 2013

- Solar observing **Host**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *International Sun-Day* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Astronomy Days* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina

2021

- *Make It Count Monday* **Interview**  
North Carolina State University, Raleigh, North Carolina
- The Moon **Speaker**  
Horton Middle School, Pittsboro, North Carolina
- *Skype-a-Scientist* **Speaker**  
Bel Air High School, Bel Air, Maryland

2020

- CBS 17 News **Interview**  
Raleigh, North Carolina
- *Skype-a-Scientist* **Speaker**  
Pacific Crest Middle School, Bend, Oregon
- *Spiral Graph: A Citizen Science Project with a Twist* **Speaker**  
Grand Strand Amateur Astronomy Club, Myrtle Beach, South Carolina
- *SkySimplified* podcast **Interview**  
SkySimplified.com, Raleigh, North Carolina
- *Updates from Spiral Graph, the Astronomy Citizen Science project with a Twist* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Into the Zooniverse, Volume 2* **Interview**  
Adler Planetarium, Chicago, Illinois
- *From Science Fiction to Science Fact* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina



- *World Science Academy Citizen Science Summer 2020* **Speaker**  
World Science Festival, New York, New York
- *Celebrating the Hubble Space Telescope's 30th Anniversary* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Citizen Science while Stargazing with Astronomy Mag and SciStarter* **Speaker**  
SciStarter.org, Tempe, Arizona
- *Can You Help Us Study Spiral Galaxies?* **Interview**  
Supercluster.com, New York, New York
- *Spiral Graph: A Citizen Science Project with a Twist* **Speaker**  
The Triad Starfest, Jamestown, North Carolina
- *Shedding Some Light on Black Holes* **Speaker**  
Rotary Club of Raleigh, Raleigh, North Carolina
- *Searching for Intermediate Mass Black Holes in Spiral Galaxies with the Help of Citizen Scientists* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina

2019

- *Teen Science Cafe: Ask an Astronomer* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Finally Friday: Mars Attacks!* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Press Briefing: Searching for Intermediate Mass Black Holes in Spiral Galaxies with Citizen Scientists* **Speaker**  
American Astronomical Society Meeting 234, St. Louis, Missouri
- *Astronomers Need a (Steady) Hand Tracing Spiral Galaxies to Find Black Holes* **Interview**  
Space.com, New York, New York
- *Scientists ask the public to help search for a rare breed of black hole* **Interview**  
Astronomy.com, Waukesha, Wisconsin
- *Scientists ask the public to help search for a rare breed of black hole* **Interview**  
InsideScience.org, College Park, Maryland
- *Searching for Intermediate Mass Black Holes in Spiral Galaxies with the Help of Citizen Scientists* **Speaker**  
Raleigh Astronomy Club, Raleigh, North Carolina
- *Black Holes* **Speaker**  
Rotary Club of the Capital City, Raleigh, North Carolina
- *Live From the International Space Station Viewing Party* **Panel Member**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Solar Observing: Transit of Mercury* **Host**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Finally Friday: Bill & Ted's Excellent Adventure* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Astronomical photobombs and the trouble with SpaceX's Starlink* **Interview**  
NewAtlas.com
- *Searching for Intermediate Mass Black Holes in Spiral Galaxies with Citizen Scientists* **Speaker**  
North Carolina Astronomers' Meeting, Jamestown, North Carolina

2018

- *Finally Friday: Star Trek II: The Wrath of Khan* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *The Milky Way - Our Home Galaxy* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *The Milky Way* **Speaker**  
North Carolina State University – iMOM, Raleigh, North Carolina
- *SciChat: Galaxies* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina

2017

- *Teen Science Cafe: Getting Serious about the Sun* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- Galaxy Presentation **Speaker**  
Holly Springs High School, Holly Springs, North Carolina
- *Wrap-Up: The Great American Eclipse* **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Lifelong Adventure: Solar Eclipse Adventure* **Trip Co-Leader**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- Eclipse Presentation **Speaker**  
Atria Southpoint Walk, Durham, North Carolina
- Careers in Astronomy **Speaker**  
Clayton Middle School, Clayton, North Carolina
- *Astronomy on Tap Triangle* **Speaker**  
Fullsteam Brewery, Durham, North Carolina
- Facebook Live: TRAPPIST-1 Discussion **Speaker**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina
- *Discovering a New Galaxy* **Interview**  
UNC-TV, Research Triangle Park, North Carolina
- Discovery of PGC 1000714 **Speaker**  
Univ. of Denver - Ricks Center for Gifted Children, Denver, Colorado
- *Burcin's Galaxy, The Universe And Sort-Of Time Travel* **Interview**  
SciWorks Radio, Winston-Salem, North Carolina
- *NC Astrophysicist Helps Find New Type of Galaxy* **Interview**  
WFAE, Charlotte, North Carolina
- *Ultra-rare galaxy could be 'one of a kind'* **Interview**  
CNN, Atlanta, Georgia
- *The Arlene Bynon Show* **Interview**  
SiriusXM's *Canada Talks*, Toronto, Canada
- *PGC 1000714: The rare galaxy 'nobody has ever seen before'* **Interview**  
CTV's *Your Morning*, Toronto, Canada
- *Explained by the Author: Burcin's Galaxy* **Presenter**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina

2016

- *Science Cafe: Star Trek: The Golden Anniversary* **Panelist**  
The Daily Planet Cafe, Raleigh, North Carolina
- *Raleigh event will celebrate 50th anniversary of Star Trek* **Interview**  
The News & Observer, Raleigh, North Carolina
- *Ask a Scientist: How do black holes make ripples in space?* **Interview**  
The News & Observer, Raleigh, North Carolina



<ul style="list-style-type: none"> <li>• <i>Science Cafe: The Sun: Common and Uncommon Events</i> The Daily Planet Cafe, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>Careers in Astronomy</i> Cary Academy, Cary, North Carolina</li> </ul>	Panelist
<ul style="list-style-type: none"> <li>• <i>Science in the Movies: Space on the Silver Screen</i> North Carolina State University</li> </ul>	Panelist
<ul style="list-style-type: none"> <li>• <i>Life in the Universe</i> Rotary Club of the Capital City, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>The Science of The Martian</i> North Carolina Museum of Natural Sciences, Raleigh, North Carolina</li> </ul>	Panelist
2015	
<ul style="list-style-type: none"> <li>• <i>Neutrino Day</i> North Carolina Museum of Natural Sciences, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• WRAL-TV Raleigh, North Carolina</li> </ul>	Interview
<ul style="list-style-type: none"> <li>• Astronomy Club Raleigh Charter High School, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• Science Seminar Durham Technical Community College, Durham, North Carolina</li> </ul>	Speaker
2014	
<ul style="list-style-type: none"> <li>• <i>Science Cafe</i> The Daily Planet Cafe, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>Mystery Roach</i> (radio program) WKNC, Raleigh, North Carolina</li> </ul>	Guest
<ul style="list-style-type: none"> <li>• <i>Bring Your Child to Work Day</i> Siemens, Cary, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>STEM Expo</i> Appalachian State University, Boone, North Carolina</li> </ul>	Presenter
2013	
<ul style="list-style-type: none"> <li>• <i>Astronomy</i> Fred A. Olds Elementary School, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>International Observe the Moon Night</i> North Carolina Museum of Natural Sciences, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• Colloquium for Astronomy Department North Carolina State University, Raleigh, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• Colloquium for Astronomy Department University of North Carolina, Chapel Hill, North Carolina</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• Non-Traditional Career Paths for Physics Graduate Students University of North Carolina, Chapel Hill, North Carolina</li> </ul>	Speaker
2012	
<ul style="list-style-type: none"> <li>• <i>Young Adult Summer Program</i> Roosevelt Thompson Library, Little Rock, Arkansas</li> </ul>	Speaker
<ul style="list-style-type: none"> <li>• <i>Central Arkansas Regional Science and Engineering Fair</i> University of Arkansas at Little Rock, Little Rock, Arkansas</li> </ul>	Judge
2010	
<ul style="list-style-type: none"> <li>• Society of Physics Students University of Arkansas at Little Rock, Little Rock, Arkansas</li> </ul>	Speaker

2008

- Colloquium for Astronomy Division, Dept. of Physical Sciences  
University of Oulu, Oulu, Finland **Speaker**
- Colloquium for Astronomy Department  
University of Alabama, Tuscaloosa, Alabama **Speaker**

2005

- *Astronomy*  
Rock Quarry Elementary School, Tuscaloosa, Alabama **Speaker**

RESEARCH  
EXPERIENCE

Present – 2013

**Assistant Head, Astronomy & Astrophysics Research Lab**  
North Carolina Museum of Natural Sciences, Raleigh, North Carolina

- Conduct ongoing research into the morphology and dynamics of disk galaxies.
- Led the development of *Spiral Graph*, an online citizen science project dedicated to measuring the pitch angle of spiral arms in galaxies.

2013 – 2012

**Visiting Research Associate**

University of Arkansas at Little Rock, Little Rock, Arkansas

- Investigated the skewness of galaxy bars through simulation modeling in conjunction with photometric and kinematic data.

2012 – 2009

**Postdoctoral Research Fellow**

Supervised by Associate Dean, Marc S. Seigar

University of Arkansas at Little Rock, Little Rock, Arkansas

Secondary Affiliation: Arkansas Center for Space and Planetary Sciences  
University of Arkansas, Fayetteville, Arkansas

- Developed detailed numerical models of the gaseous and stellar components of an unusual barred spiral galaxy.
- Developed numerical models of the gaseous component of 40 barred spiral galaxies in order to compare observational and theoretical parameters.
- Collaborated in the development of a pipeline script to process and analyze digital multi-waveband images of galaxies.

2008

**Visiting Researcher**

Supervised by Professor Heikki Salo

University of Oulu, Oulu, Finland

- Collaborated in the development of numerical models of the gaseous and stellar components of 23 barred spiral galaxies in order to compare observational and theoretical parameters.

2007 – 1999

**Graduate Research Assistant**

University of Alabama, Tuscaloosa, Alabama

- Processed and analyzed digital 1D stellar spectra.
- Processed and analyzed digital near-infrared images of galaxies.
- Used digital images and 2D spectra of galaxies, in conjunction with a sophisticated numerical simulation code, to compare observational and theoretical parameters.
- Developed IDL software for analysis of images, spectra, and simulation models.
- Analyzed digital images and spectra of nearby starburst galaxies to determine the source of escaping Lyman- $\alpha$  radiation.

- Processed and analyzed digital images of galaxies to derive structural parameters for a statistical study.

2007, 2003, 2002

**Visiting Student**  
University of Oulu, Oulu, Finland

- Collaborated in the development of numerical models of the gaseous and stellar components of two ringed barred spiral galaxies in order to compare observational and theoretical parameters.
- Collaborated in the development of custom IDL software for analysis of galaxy simulation results and comparison with observed morphology and kinematics.
- Trained in the use of a proprietary Fortran numerical simulation program to model the gaseous and stellar components of spiral galaxies in order to compare observational and theoretical parameters.

2006, 2004

**Visiting Observer**  
Kitt Peak National Observatory, Tucson, Arizona

- 2006: Granted 2 nights of observing time by NOAO and obtained long slit spectra of 2 galaxies using the Ritchey-Chretien Focus Spectrograph on the 4 meter telescope.
- 2004: Granted 3 nights of observing time by NOAO and obtained near-infrared images of 9 galaxies using the FLAMINGOS instrument on the 2.1 meter telescope.

2004

**Visiting Observer**  
Observatoire de Haute-Provence, St. Michel l'Observatoire, France

- Granted 4 nights of observing time by the Institut National des Sciences de l'Univers and obtained 2D spectra of 6 galaxies using a Fabry-Perot interferometer on the 1.93 meter telescope.

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## TEACHING EXPERIENCE

2021, 2020, 2013

**Guest Lecturer**  
Appalachian State University, Boone, North Carolina

- Developed and presented a lectures for an undergraduate level astrobiology classes.

2019 – 2015

**Instructor**  
Osher Lifelong Learning Institute – NCSU, Raleigh, North Carolina

- Developed lectures and taught adult education classes on various topics in astronomy.

2015 – 2010

**Part-Time Lecturer**  
University of Arkansas at Little Rock, Little Rock, Arkansas

- Instructor for a classroom-based and online *Introduction to Astronomy* lecture.
- Instructor for an online *Introduction to Astronomy* laboratory

2014

**Temporary Instructor**  
North Carolina State University, Raleigh, North Carolina

- Developed and administered an upper level undergraduate astrophysics course titled *Stars and Galaxies*.

2013 – 2010

**Affiliate Graduate Faculty**  
University of Arkansas at Little Rock, Little Rock, Arkansas

- Member of Dissertation Examination Committees for two Astronomy graduate students.
- Substitute instructor for the graduate/senior-undergraduate level *Classical Mechanics* course.

- 2012 – 2009 **Graduate Student Mentor**  
University of Arkansas at Little Rock, Little Rock, Arkansas
- Assisted with instructing, overseeing, and directing the dissertation research of two Astronomy graduate students.
- 2008 **Intern**  
University of Alabama, Tuscaloosa, Alabama
- Responsible for grading assignments and exams for the graduate/senior-undergraduate level *Theoretical Astrophysics* course.
  - Responsible for grading assignment for the undergraduate level *Astronomy Beyond the Solar System* course.
- 2005 – 1998 **Graduate Teaching Assistant**  
University of Alabama, Tuscaloosa, Alabama
- Instructor for a classroom-based *Introduction to Astronomy* laboratory.

#### GRANTS AND AWARDS

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- 2019
- *FAMOUS* Travel Grant  
American Astronomical Society
- 2018
- *State of North Carolina Internship Program* funding  
NC Council for Women & Youth Involvement
  - *International Travel Grant*  
American Astronomical Society
- 2015
- *International Travel Grant*  
American Astronomical Society
- 2013
- *State of North Carolina Internship Program* funding  
NC Council for Women & Youth Involvement
- 2012
- *International Travel Grant*  
American Astronomical Society
- 2011
- *International Travel Grant*  
American Astronomical Society
- 2006
- 2 nights, RC Spectrograph, 4-meter telescope  
Kitt Peak National Observatory
- 2005
- *Outstanding Teaching by a Graduate Student*  
University of Alabama

- 2004
- 3 nights, FLAMINGOS, 2.1-meter telescope  
Kitt Peak National Observatory
  - 4 nights, Fabry-Perot interferometer, 1.9-m telescope  
Observatoire de Haute-Provence
  - *Conference and Research Fund*  
University of Alabama
- 2003
- *Conference and Research Fund*  
University of Alabama
- 1998 – 1996
- *Competitive Scholarship*  
New Mexico Institute of Mining and Technology

## SERVICE

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- Ongoing
- *Astronomy and Astrophysics* **Manuscript Referee**
  - *Astronomy and Computing* **Manuscript Referee**
  - *Monthly Notices of Royal Astronomical Society* **Manuscript Referee**
  - *National High School Journal of Science* **Manuscript Referee**
  - Various undergraduate students **Mentor**
  - Various Astronomy & Astrophysics Research Lab volunteers/interns **Supervisor**
- 2020
- NC Space Grant Graduate Research Fellowship Program **Proposal Reviewer**
- 2019
- NC Space Grant Graduate Research Fellowship Program **Proposal Reviewer**
- 2018
- NASA Postdoctoral Program **Review Panelist**
  - Western Governors University **Astronomy Exam Beta Tester**
- 2017
- NASA Postdoctoral Program **Review Panelist**
  - Western Governors University **Astronomy Exam Beta Tester**
- 2014
- NASA Astrophysical Data Analysis Program **Proposal Reviewer**
  - Department of Physics & Astronomy  
University of Arkansas at Little Rock **Dissertation Committee Member**  
(Amber Sierra)
  - Department of Physics & Astronomy  
University of Arkansas at Little Rock **Dissertation Committee Member**  
(Ismaeel Al-Baidhany)
- 2013
- *Structure and Dynamics of Disk Galaxies* **Sci. Organizing Committee Member**  
Petit Jean Mountain, Arkansas
  - *Structure and Dynamics of Disk Galaxies* **Session Chair**  
Petit Jean Mountain, Arkansas

2012

- *Galaxy Evolution Through Secular Processes* session 10  
IAU XXVIII General Assembly **IAU SpS3 Chair**
- *20th Annual Arkansas Space Grant Consortium Symposium*  
Morrilton, Arkansas **Session Chair**

2010

- *94th Annual Meeting of The Arkansas Academy of Science*  
Little Rock, Arkansas **Session Chair**
- *94th Annual Meeting of The Arkansas Academy of Science*  
Little Rock, Arkansas **Presentation Judge**

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SPECIAL SKILLS

Proficient

- Atom
- Emacs
- German language
- Git/GitHub
- HTML
- IDL
- IRAF
- Keynote
- LaTeX
- Linux OS
- Mac OS
- Microsoft Office Suite
- OpenOffice Suite
- Public speaking
- Python
- Teaching
- Windows OS

Experienced

- C/C++
- LabVIEW
- Pascal
- Unix shell scripting
- Use of large telescopes and supporting software for near-IR imaging and both 1D and 2D spectroscopy
- Writing competitive proposals for telescope observing time