Dr. Benjamin Lee Davis — Curriculum Vitæ

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EDUCATION

University of Arkansas, Fayetteville, Arkansas, USA — Aug 2008 – May 2015

Doctor of Philosophy (Ph.D.) in Space & Planetary Sciences
Thesis: Logarithmic Spiral Arm Pitch Angle of Spiral Galaxies: Measurement and Relationship to Galactic Structure and Nuclear Supermassive Black Hole Mass
Advisor: Dr. Julia Kennefick
Research areas: Astrophysics, extragalactic astronomy, structure & dynamics of disk galaxies.
Cumulative GPA: 4.0000 / 4.0000 (117 credit hours)

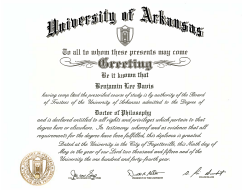
Pittsburg State University, Pittsburg, Kansas, USA — Aug 2003 – May 2008

- Bachelor of Science (B.S.) in Mathematics
- Bachelor of Science (B.S.) in Physics
- Minor in Music

Magna Cum Laude
Cumulative GPA: 3.9397 / 4.0000 (199 credit hours)

Riverton High School, Riverton, Kansas, USA — Aug 1999 – May 2003

Valedictorian & Senior Class President
Cumulative GPA: 4.0000 / 4.0000


University of Arkansas
Greeting
Be it known that
Benjamin Lee Davis
Doctor of Philosophy

Pittsburg State University
Bachelor of Science

Riverton High School
This Certifies That
Benjamin Lee Davis
Diploma

WORK EXPERIENCE

New York University Abu Dhabi — Sep 2020 – Aug 2026
Center for Astrophysics and Space Science (CASS)
CASS Fellow, Research Associate

- Served on the search committee for a postdoctoral position in galaxy formation.
- The Galena Sentinel Times: “In Our Midst – Fast Forward”

Swinburne University of Technology — Aug 2016 – Jul 2020
Centre for Astrophysics and Supercomputing
Postdoctoral Research Fellow in Galaxy Structure
Project: Reducing and analyzing galaxy images via bulge/bar/disc decompositions. I was responsible for modeling the radial distribution of optical and/or near-infrared stellar light in nearby (<200 Mpc) galaxies with an emphasis on discoveries and publications related to the (central black hole)–(host bulge) connection and/or compact massive spheroids and/or galaxies with partially depleted cores or additional nuclear components.
Supervisor: Prof. Alister Graham
Research Areas: Astrophysics, extragalactic astronomy, structure & dynamics of disk galaxies.

- Accredited Supervisor for Masters and Ph.D. Students.
  - Associate Supervisor for Ph.D. Student Nandini Sahu.
  - Associate Supervisor for Ph.D. Student Suei-Hei (Dexter) Hon.
- Served on the Ph.D. Student Review Panels for Ellert van der Velden, Jonah Gannon, Liyualem Tilahun, and Arianna Dolfi.

Arkansas Tech University, Department of Physical Sciences — Aug 2015 – May 2016
Visiting Assistant Professor of Physics

University of Arkansas, Department of Physics — Aug 2015 – Dec 2015
Visiting Assistant Professor of Physics

RESEARCH EXPERIENCE

Cosmic Explorer Consortium — May 2022 –
Member

Galaxy Formation Group, New York University Abu Dhabi — Sep 2020 – Aug 2025
Research Associate

LISA Consortium — May 2020 –
Member

ARC Centre of Excellence for Gravitational Wave Discovery (OzGrav) — Feb 2018 –
Affiliate

Arkansas Galaxy Evolution Survey, University of Arkansas — May 2015 – Aug 2015
Postdoctoral Researcher
Project: Measuring the Number of Arms in Spiral Galaxies and Relating that to Predictions of Density Wave and Swing-Amplification Theories
Supervisors: Drs. Julia and Daniel Kennefick
Research Areas: Astrophysics, extragalactic astronomy, structure & dynamics of disk galaxies.

Arkansas Galaxy Evolution Survey, University of Arkansas — Jan 2009 – May 2015
Graduate Research Assistant
Project: Logarithmic Spiral Arm Pitch Angle of Spiral Galaxies: Measurement and Relationship to Galactic Structure and Nuclear Supermassive Black Hole Mass
Supervisors: Drs. Julia and Daniel Kennefick
Research Areas: Astrophysics, extragalactic astronomy, structure & dynamics of disk galaxies.

Arkansas Center for Space and Planetary Sciences, University of Arkansas — Aug 2008 – May 2015
Graduate Student
Research Areas: Martian surface chemistry and exoplanet demographics.

Cluster Lensing and Supernova Survey with Hubble, Jet Propulsion Laboratory
Visiting Student Research Program Intern — Jun 2011 – Aug 2011
Project: Spectral Energy Distribution Fitting to Galaxy Cluster Abell 383
Supervisor: Dr. Leonidas Moustakas
Research Areas: Dark matter, galaxy clusters, Abell 383, high-redshift galaxies, gravitational lensing, spectral energy distributions.

PEER-REVIEWED PUBLICATIONS

35) Davis, B. L.*, Ali-Dib, M.*, Zheng, Y.*, Jin, Z.*, Zhang, K., & Macciò, A. V., "Causal evidence for the primordiality of colours in trans-Neptunian objects," submitted to *Monthly Notices of the Royal Astronomical Society Letters*, June 15, 2025. *These authors contributed equally to this work and are listed alphabetically.

34) Khan, F. M., Davis, B. L., Macciò, A. V., & Holley-Bockelmann, K., "Where Have All the Little Red Dots Gone? Supermassive Black Hole Binary Dynamics and Its Impact on Galaxy Properties," *The Astrophysical Journal Letters*, **986**, L1, June 2, 2025.

33) Jin, Z., Pasquato, M.*, Davis, B. L.*, Deleu, T., Luo, Y., Cho, C., Perreault-Levasseur, L., Lemos, P., Bengio, Y., Kang, X., Macciò, A. V., & Hezaveh, Y., "Causal Discovery in Astrophysics: Unraveling Supermassive Black Hole and Galaxy Coevolution," *The Astrophysical Journal*, **979**, 212, January 28, 2025. *These authors contributed equally to this work.

32) Waterval, S., Macciò, A. V., Buck, T., Obreja, A., Cho, C., Jin, Z., Davis, B. L., Dixon, K. L., & Kang, X., "HELLO project: High-z Evolution of Large and Luminous Objects," *Monthly Notices of the Royal Astronomical Society*, **533**, 1463, August 8, 2024.

31) Davis, B. L., Graham, A. W., Soria, R., Jin, Z., Karachentsev, I. D., Karachentseva, V. E., & D'Onghia, E., "Identification of Intermediate-mass Black Hole Candidates among a Sample of Sd Galaxies," *The Astrophysical Journal*, **971**, 123, August 12, 2024.

30) Davis, B. L. & Jin, Z., "Discovery of a Planar Black Hole Mass Scaling Relation for Spiral Galaxies," *The Astrophysical Journal Letters*, **956**, L22, October 11, 2023.

29) Amaro-Seoane, P., Andrews, J., Arca Sedda, M. *et al.*, "Astrophysics with the Laser Interferometer Space Antenna," *Living Reviews in Relativity* **26**, 2, March 14, 2023.

28) Fusco, M. S., Davis, B. L., Kennefick, J., Kennefick, D., & Seigar, M. S., "Probing the low-mass end of the black hole mass function via a study of faint local spiral galaxies," *Universe*, *8*(12), 649, December 6, 2022.

27) Shields, D., Boe, B., Pfountz, C., Davis, B. L., Hartley, M., Pour Imani, H., Slade, Z., Kennefick, D., & Kennefick, J., "Spirality: A Novel Way to Measure Spiral Arm Pitch Angle," *Galaxies*, *10*(5), 100, October 17, 2022.

- Astrophysics Source Code Library – http://ascl.net/1512.015
- https://github.com/DeannaShields/Spirality

26) Hon, D. S.-H., Graham, A. W., Davis, B. L., & Marconi, A., "Disc cloaking: Establishing a lower limit to the number density of local compact massive spheroids/bulges and the potential fate of some high-z red nuggets," *Monthly Notices of the Royal Astronomical Society*, **514**, 3410, August 2022.

25) Abdeen, S., Davis, B. L., Eufrasio, R., Kennefick, D., Kennefick, J., Miller, R., Shields, D. W., Monson, E. B., Bassett, C., & O'Mara, H., "Evidence in favour of density wave theory through age gradients observed in star formation history maps and spatially-resolved stellar clusters," *Monthly Notices of the Royal Astronomical Society*, **512**, 366, May, 2022.

24) Sahu, N., Graham, A. W., & Davis, B. L., "The (Black Hole Mass)–(Spheroid Stellar Density) Relations: $M_{\rm BH}$–μ (and $M_{\rm BH}$–Σ) and $M_{\rm BH}$–ρ," *The Astrophysical Journal*, **927**, 67, March 4, 2022.

23) Graham, A, W., Soria, R., Davis, B. L., Kolehmainen, M., Maccarone, T., Miller-Jones, J., Motch, C., & Swartz, D. A., "Central X-Ray Point Sources Found to Be Abundant in Low-mass, Late-type Galaxies Predicted to Contain an Intermediate-mass Black Hole," *The Astrophysical Journal*, **923**, 246, December 28, 2021.

22) Graham, A, W., Soria, R., Ciambur, B. C., Davis, B. L., & Swartz, D. A., "Potential Black Hole Seeding of the Spiral Galaxy NGC 4424 via an Infalling Star Cluster," *The Astrophysical Journal*, **923**, 146, December 16, 2021.

- Media Releases: Swinburne University of Technology, Scimex, NYUAD, University of Chinese Academy of Sciences (English), & University of Chinese Academy of Sciences (Chinese).
- News Article Coverage
- Media

21) Sahu, N., Graham, A. W., & Davis, B. L., "The Morphology-dependent Black Hole–Host Galaxy Correlations: A Consequence of Physical Formation Processes," *Acta Astrophysica Taurica*, 3(1), pp. 39-43, December 2, 2021.

20) Davis, B. L. & Graham, A. W., "Refining the mass estimate for the intermediate-mass black hole candidate in NGC 3319," *Publications of the Astronomical Society of Australia*, **38**, e030, July 8, 2021.

19) Sahu, N., Graham, A. W., & Davis, B. L., "Defining the (Black Hole)–Spheroid Connection with the Discovery of Morphology-dependent Substructure in the $M_{\rm BH}$–$n_{\rm sph}$ and $M_{\rm BH}$–$R_{\rm e,sph}$ Diagrams: New Tests for Advanced Theories and Realistic Simulations," *The Astrophysical Journal*, **903(2)**, 97, November 6, 2020.

18) Abdeen, S., Kennefick, D., Kennefick, J., Miller, R., Shields, D. W., Monson, E., & Davis, B. L., "Determining the Co-Rotation Radii of Spiral Galaxies Using Spiral Arm Pitch Angle Measurements at Multiple Wavelengths," *Monthly Notices of the Royal Astronomical Society*, **496**, 1610, June 8, 2020.

17) Sahu, N., Graham, A. W., & Davis, B. L., "Revealing Hidden Substructures in the $M_{\rm BH}$–σ Diagram, and Refining the Bend in the L–σ Relation," *The Astrophysical Journal*, **887**, 10, December 10, 2019.

16) Davis, B. L., Graham, A. W., & Combes, F., "A Consistent Set of Empirical Scaling Relations for Spiral Galaxies: The $(v_{\rm max},\, M_{\rm DM})$–$(\sigma_0,\, M_{\rm BH},\, \phi)$ Relations," *The Astrophysical Journal*, **877**, 64, May 24, 2019.

15) Sahu, N., Graham, A. W., & Davis, B. L., "Black Hole Mass Scaling Relations for Early-Type Galaxies. I. $M_{\rm BH}$–$M_{*,\rm sph}$ and $M_{\rm BH}$–$M_{*,\rm gal}$," *The Astrophysical Journal*, **876**, 155, May 15, 2019.

14) Miller, R., Kennefick, D., Kennefick, J., Shameer Abdeen, M, Monson, E., Eufrasio, R. T., Shields, D. W., & Davis, B. L., "Investigating the Origins of Spiral Structure in Disk Galaxies Through a Multi-wavelength Study," *The Astrophysical Journal*, **874**, 177, April 5, 2019.

- News Article Coverage

13) Graham, A. W., Soria, R., & Davis, B. L., "Expected intermediate mass black holes in the Virgo cluster. II. Late-type galaxies," *Monthly Notices of the Royal Astronomical Society*, **484**, 814, March 21, 2019.

12) Davis, B. L., Graham, A. W., & Cameron, E., "Black Hole Mass Scaling Relations for Spiral Galaxies. I. $M_{\rm BH}$–$M_{*,\rm sph}$," *The Astrophysical Journal*, **873**, 85, March 6, 2019.

11) Davis, B. L., Graham, A. W., & Cameron, E., "Black Hole Mass Scaling Relations for Spiral Galaxies. II. $M_{\rm BH}$–$M_{*,\rm tot}$ and $M_{\rm BH}$–$M_{*,\rm disk}$," *The Astrophysical Journal*, **869**, 113, December 17, 2018.

10) Davis, B. L., Graham, A. W., & Seigar, M. S., "Updating the (Supermassive Black Hole Mass) – (Spiral Arm Pitch Angle) Relation: A Strong Correlation for Galaxies with Pseudobulges," *Monthly Notices of the Royal Astronomical Society*, **471**, 2187, October 21, 2017.

- Jul 2017, Swinburne Media Release: "Spiral Arms Allow School Children to Weigh Black Holes"
  - UK Version (MNRAS)
- News Article Coverage

9) Koliopanos, F., Ciambur, B. C., Graham, A. W., Webb, N. A., Coriat, M., Mutlu-Pakdil, B., Davis, B. L., Godet, O., Barret, D., & Seigar, M. S., "Searching for Intermediate Mass Black Holes in Dwarf Galaxies with Low Luminosity AGN: A Multiple-method Approach," *Astronomy & Astrophysics*, **Volume 601**, A20, Dec 2016.

8) Mutlu-Pakdil, B., Seigar, M. S., & Davis, B. L., "The Local Black Hole Mass Function Derived from the $M_{BH} - P$ and the $M_{BH} - n$ Relations," *The Astrophysical Journal*, **830**, 117, Oct 2016.

7) Pour-Imani, H., Kennefick, D., Kennefick, J., Davis, B. L., Shields, D. W., & Shameer Abdeen, M., "Strong Evidence for the Density-wave Theory of Spiral Structure in Disk Galaxies," in *The Astrophysical Journal Letters*, **827**, L2, Aug 2016.

- News Article Coverage

6) Davis, B. L., "Logarithmic Spiral Arm Pitch Angle of Spiral Galaxies: Measurement and Relationship to Galactic Structure and Nuclear Supermassive Black Hole Mass," *University of Arkansas, PhDT*, May 2015.

5) Davis, B. L., Kennefick, D., Kennefick, J., Westfall, K. B., Shields, D. W., Flatman, R., Hartley, M. T., Berrier, J. C., Martinsson, T. P. K., & Swaters, R. A., "A Fundamental Plane of Spiral Structure in Disk Galaxies," *The Astrophysical Journal Letters*, **802**, L13, Mar 2015.

4) Seigar, M. S., Davis, B. L., Berrier, J. C., & Kennefick, D., "Constraining Dark Matter Halo Profiles and Galaxy Formation Models Using Spiral Arm Morphology. II. Dark and Stellar Mass Concentrations from 13 Nearby Face-On Galaxies," *The Astrophysical Journal*, **795**, 90, Nov 2014.

3) Davis, B. L., Berrier, J. C., Johns, L., Shields, D. W., Hartley, M. T., Kennefick, D., Kennefick, J., Seigar, M. S., & Lacy, C. H. S., "The Black Hole Mass Function Derived from Local Spiral Galaxies," *The Astrophysical Journal*, **789**, 124, Jul 2014.

2) Berrier, J. C., Davis, B. L., Kennefick, D. Kennefick, J., Seigar, M. S., Barrows, R. S., Hartley, M. T., Shields, D. W., Bentz, M. C., & Lacy, C. H. S., "Further Evidence for a Supermassive Black Hole – Pitch Angle Relation," *The Astrophysical Journal*, **769**, 132, Jun 2013.

1) Davis, B. L., Berrier, J. C., Shields, D. W., Kennefick, J., Kennefick, D., Seigar, M. S., Lacy, C. H. S., & Puerari I., "Measurement of Galactic Logarithmic Spiral Arm Pitch Angle Using Two-Dimensional Fast Fourier Transform Decomposition," *The Astrophysical Journal Supplement Series*, **199**, 33, Apr 2012.

- Astrophysics Source Code Library – http://ascl.net/1608.015
- https://github.com/bendavis007/2DFFT

If you are viewing this CV on paper, you may access a full list of my publications from my ORCID by visiting https://orcid.org/0000-0002-4306-5950 or scanning the QR code below.

Google Scholar Link

https://scholar.google.com/citations?user=B6dH1sgAAAAJ

NASA ADS Library Links

Refereed – https://ui.adsabs.harvard.edu/public-libraries/nG-zssYWRzSOGs1CUq8MUQ

All – https://ui.adsabs.harvard.edu/public-libraries/1IplwMbdTmunVHkWfUR6XA

MAGAZINE ARTICLE

Davis, B. (2017). "How You Can Weigh Black Holes," *Australasian Science, (Volume 38 | Number 5), pp.14-16, Sept/Oct 2017.*

- Preprint - https://bendavis007.github.io/PDFs/Australasian_Science.pdf

CONFERENCES & PRESENTATIONS

47) *Cosmic Collisions Conference*, January 12–16, 2026, NYU Abu Dhabi. [LOC]

46) Davis, B. L.*, Ali-Dib, M.*, Zheng, Y.*, Jin, Z.*, Zhang, K., & Macciò, A. V., "Causal Evidence for the Primordiality of Colors in Trans-Neptunian Objects," *3rd Machine Learning for Astrophysics Workshop at ICML*, July 20, 2025, Vancouver, Canada. [Poster] *These authors contributed equally to this work and are listed alphabetically.

45) *Dancing in the Dark: When Galaxies Shape Galaxies*, June 16–20, 2025, Sexten, Italy. [SOC & LOC]

44) Jin, Z., Pasquato, M.*, Davis, B. L.*, Macciò, A. V., & Hezaveh, Y., *Causal Discovery for Galaxy Evolution*, January 2025, 245th Meeting of the American Astronomical Society – Washington, D.C.. [Dissertation Talk] *These authors contributed equally to this work.

43) Jin, Z., Pasquato, M.*, Davis, B. L.*, Macciò, A. V., & Hezaveh, Y., *Beyond Causal Discovery for Astronomy: Learning Meaningful Representations with Independent Component Analysis*, December 15, 2024, NeurIPS 2024 – Vancouver, Canada. [Poster Presentation] *These authors contributed equally to this work.

42) Davis, B. L., "*Causmology*: Causal Discovery for Galaxy Evolution," *Deciphering the Cosmic Code for Galaxy Formation*, December 9–13, 2024, Puerto Varas, Chile. [Oral Contribution]

- Poster

41) *Variable Sources in Galaxies Workshop*, February 6–7, 2024, NYU Abu Dhabi. [Attendee]

40) Davis, B. L. & Jin, Z., "Discovery of a Planar Black Hole Mass Scaling Relation for Spiral Galaxies," *243RD MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY*, Jan 2024. [Research Contributed Presentation]

39) Pasquato, M., Jin, Z., Lemos, P., Davis, B. L., & Macciò, A. V., "*Causa prima*: cosmology meets causal discovery for the first time," *NeurIPS 2023 Workshop on Machine Learning and the Physical Sciences*, Dec 2023. [Poster Presentation]

- Poster
- Video

38) Jin, Z. & Davis, B. L., "Discovering Black Hole Mass Scaling Relations with Symbolic Regression," *NeurIPS 2023 Workshop on Machine Learning and the Physical Sciences*, Dec 2023. [Poster Presentation]

- Poster

37) Davis, B. L., "Using a Novel Black Hole Mass Scaling Relation to Identify Intermediate-mass Black Hole Candidates in Spiral Galaxies," *IMBH 2023: The Dawn of a Revolutionary Era*, Dec 2023. [Contributed Talk]

36) Davis, B. L. & Jin, Z., "A Planar Black Hole Mass Relation," *ASTROINFORMATICS-2023 CONFERENCE*, Oct 2023. [Contributed Talk]

- Video

35) Jin, Z., Davis, B. L., & Macciò, A. V., "Discovering black hole mass scaling relations with Symbolic Regression," *ASTROINFORMATICS-2023 CONFERENCE*, Oct 2023. [Contributed Talk]

- Video

34) Davis, B. L., "Galactic Vivisection: Toward an Improved Understanding of Galaxy Coevolution with their Massive Central Black Holes," Colloquium Speaker at the *University of New South Wales's School of Physics*, Mar 2023. [Invited Talk]

33) Davis, B. L., "Galactic Vivisection," *CAP^3/CSS "Brown Bag" Seminar*, Feb 2023. [Seminar Talk]

32) *Timescales in Astrophysics Conference*, January 16–20, 2023, NYU Abu Dhabi. [LOC]

31) Davis, B. L., "Ultracompact Dwarf Galaxies: sowing black holes and growing bulges via minor mergers," *Origin, growth and feedback of black holes in dwarf galaxies*, Sep 2022. [Contributed Talk]

30) Davis, B. L., Sahu, N., & Graham, A. W., "(Galaxy Morphology)–dependent (Supermassive Black Hole)–(Host Bulge/Galaxy) Correlations," *From Stars to Galaxies II: Connecting our understanding of star and galaxy formation*, Jun 2022. [Contributed Talk]

- E-proceedings
- Abstract
- Photo
- Slides
- Video

29) Davis, B. L., "Abundant Intermediate-mass Black Holes in Low-mass, Late-type Galaxies: Black Hole Mass Scaling Relations, X-ray Point Sources, and Seeding of Bulgeless Galaxies," *Intermediate-mass Black Holes: New Science from Stellar Evolution to Cosmology*, Apr 2022. [Research Contributed Presentation]

28) Davis, B. L., "Identifying Intermediate-mass Black Hole Candidates via the Combined Predictions of Multiple Black Hole Mass Scaling Relations," *AAS 239 Winter Meeting*, Jan 2022 (canceled due to the COVID-19 pandemic). [Research Contributed Presentation]

27) Sahu, N., Graham, A. W., & Davis, B. L., "The Morphology-dependent Black Hole–Host Galaxy Correlations: A Consequence of Physical Formation Processes," *Acta Astrophysica Taurica*, 3(1), pp. 39-43, December 2, 2021. [Research Contributed Presentation]

26) Davis, B. L., "The Latest Black Hole Mass Scaling Relations: Revealing Morphology Dependence, Substructure, and Implications for the Coevolution of Black Holes with their Host Galaxies," *CAP*^{3} *Seminar Series*, Oct 2020. [Seminar Talk]

25) Davis, B. L., "Title TBD," Seminar Speaker at the *International Centre for Radio Astronomy Research at the University of Western Australia*, Mar 2020 (canceled due to the COVID-19 pandemic). [Invited Talk]

24) Davis, B. L., Sahu, N., and Graham, A. W., "Substructure in black hole scaling diagrams and implications for the coevolution of black holes and galaxies," *Proceedings of the International Astronomical Union, Volume 15, Symposium S359: Galaxy Evolution and Feedback across Different Environments*, Mar 2020, pp. 37 - 39. [Poster Presentation]

- Poster
- Proceedings (Preprint)

23) Davis, B. L., "Black Hole Mass Scaling Relations," Seminar Speaker at the *Center for Astro, Particle, and Planetary Physics at New York University Abu Dhabi*, Feb 2020. [Invited Talk]

22) Davis, B. L., "Beethoven and the Voyager Golden Records," *Melbourne Chamber Orchestra's Beethoven Gala Dinner*, Oct 2019. [Invited Talk]

21) Davis, B. L. & Graham, A. W., "The Latest Black Hole Mass Scaling Relations," *Feedback and its Role in Galaxy Formation*, Jun 2019. [Contributed Talk]

- PowerPoint Slides
- Meeting Report

20) Davis, B. L. & Graham, A. W., "The Latest Black Hole Mass Scaling Relations," *Supermassive Black Holes: Environment and Evolution*, Jun 2019. [Contributed Talk]

- PowerPoint Slides

19) Davis, B. L., Graham, A. W., Sahu, N., & Cameron, E., "Black Hole Mass Scaling Relations," *American Astronomical Society Meeting Abstracts, Vol. 221, 206.02*, Jun 2019. [Contributed Talk]

- PowerPoint Slides

18) Davis, B. L., "Black Hole Mass Scaling Relations for Spiral Galaxies," *Astrophysics Colloquium: The University of Melbourne*, Sep 2018. [Seminar Talk]

- PowerPoint Slides

17) Davis, B. L., "Black Hole Mass Scaling Relations for Spiral Galaxies Determined from Pitch Angles and Multicomponent Structural Decompositions," *ASA 2018 Annual Scientific Meeting*, Jun 2018. [Poster Presentation]

- Video (starts at 1:25:55)
- Poster

16) Davis, B. L., "Black Hole Mass Scaling Relations for Spiral Galaxies Determined from Pitch Angles and Multicomponent Structural Decompositions," *Galactic Rings: Signposts of Secular Evolution in Disk Galaxies*, May 2018. [Contributed Talk]

- Video (starts at 3:49:30)
- PowerPoint Slides

15) Davis, B. L., "Black Hole Mass Scaling Relations for Spiral Galaxies," *California Institute of Technology, Astronomy Tea Talks*, Jan 2018. [Seminar Talk]

14) Davis, B. L., "Updating the (Supermassive Black Hole Mass) – (Spiral Arm Pitch Angle) Relation: A Strong Correlation for Galaxies with Pseudobulges," *National Astronomical Observatories, Chinese Academy of Sciences, Colloquium*, Oct 2017. [Seminar Talk]

13) Davis, B. L., "Updating the (Supermassive Black Hole Mass) – (Spiral Arm Pitch Angle) Relation: A Strong Correlation for Galaxies with Pseudobulges," *ASA 2017 Annual Scientific Meeting*, Jul 2017. [Contributed Talk]

12) Davis, B. L., "Spiral Arm Pitch Angle: Measurement and Relationship to Spiral Galaxy Structure and Supermassive Black Hole Mass," *ANITA Workshop 2017*, Feb 2017. [Contributed Talk]

11) Davis, B. L., "Spiral Arm Pitch Angle: Measurement and Relationship to Spiral Galaxy Structure and Supermassive Black Hole Mass," *Swinburne University of Technology, Centre for Astrophysics and Supercomputing, Colloquia Series*, Dec 2016. [Seminar Talk]

10) Davis, B. L., "A Fundamental Plane of Spiral Structure in Disk Galaxies," *A Lowell Observatory Workshop: The Formation and Evolution of Exponential Disks in Galaxies*, Oct 2014. [Poster Presentation]

- Poster

9) Davis, B. L., "The Black Hole Mass Function Derived from Local Spiral Galaxies," *Friday Scientific Lunch Talk at NOAO-Tucson*, Nov 2013. [Seminar Talk]

8) Davis, B. L., Berrier, J. C., Johns, L., Shields, D. W., Kennefick, D., Kennefick, J., Seigar, M. S., & Lacy, C. H. S., "The Black Hole Mass Function Derived from Local Spiral Galaxies," *Structure and Dynamics of Disk Galaxies, ASP Conference Series, Vol. 480, 2014, p. 204*, Aug 2013. [Contributed Talk]

7) Davis, B. L., "Logarithmic Spiral Arm Pitch Angle of Late-Type Galaxies: Measurement and Relationship to Galactic Nuclear Supermassive Black Hole Mass," *American Astronomical Society Meeting Abstracts, Vol. 221, 206.02*, Jan 2013. [Contributed Talk]

6) Davis, B. L., Berrier, J. C., Johns, L., Shields, D. W., Kennefick, D., Kennefick, J., Seigar, M. S., Lacy, & C. H. S, "The Local Black Hole Mass Function Derived from Spiral Galaxies," *American Astronomical Society Meeting Abstracts, Vol. 220, 430.08*, Jun 2012. [Poster Presentation]

5) Davis, B. L., Berrier, J. C., Johns, L., Shields, D. W., Kennefick, D., Kennefick, J., Seigar, M. S., Lacy, & C. H. S, "The Local Black Hole Mass Function Derived from Spiral Galaxies," *42nd Annual Mid-American Regional Astrophysics Conference*, Apr 2012. [Contributed Talk]

4) Davis, B. L., Berrier, J. C., Shields, D. W., Kennefick, J., Kennefick, D., Seigar, M. S., Lacy, C. H. S., & Puerari, I., "Measurement of Galactic Logarithmic Spiral Arm Pitch Angle Using Two-Dimensional Fast Fourier Transform Decomposition," *American Astronomical Society Meeting Abstracts, Vol. 219, 246.01*, Jan 2012. [Poster Presentation]

3) Davis, B. L., "Measurement of Galactic Logarithmic Spiral Arm Pitch Angle Using Two-Dimensional Fast Fourier Transform Decomposition," *Annual Mid-American Regional Astrophysics Conference*, Apr 2011. [Contributed Talk]

2) Davis, B. L., Berlanga Medina, J. E., Shields, D. W., Kennefick, J., Kennefick, D., Berrier, J., Seigar, M. S., Lacy, C. H. S., & AGES, "Investigating the Clustering and Color of Galaxies in the COMBO-17 Chandra Deep Field South Survey and Possible Effects on Spiral Arm Pitch Angle," *Bulletin of the American Astronomical Society, Vol. 42, American Astronomical Society Meeting Abstracts #215, 435.17*, Jan 2010. [Poster Presentation]

1) Davis, B. L., Chevrier, V. F., Altheide, T. S., & Swaffar, C., "Reflectance Spectra of Low-Temperature Chloride and Perchlorate Hydrates and Their Relevance to the Martian Surface," *Lunar and Planetary Institute Science Conference Abstracts, Vol. 40, 1387*, Mar 2009. [Contributed Talk]

TEACHING EXPERIENCE

Galaxy Formation New York University Abu Dhabi — Sep 2020 – Aug 2025
Guest Lecturer

General Physics II Arkansas Tech University — Jan 2016 – May 2016
Visiting Assistant Professor of Physics

Introduction to Physical Science, Arkansas Tech University — Aug 2015 – May 2016
Visiting Assistant Professor of Physics

Physical Science Laboratory, Arkansas Tech University — Aug 2015 – May 2016
Visiting Assistant Professor of Physics

Physics Laboratory I, Arkansas Tech University — Aug 2015 – May 2016
Visiting Assistant Professor of Physics

Physics Laboratory II, Arkansas Tech University — Aug 2015 – May 2016
Visiting Assistant Professor of Physics

University Physics I, University of Arkansas — Aug 2015 – Dec 2015
Visiting Assistant Professor of Physics

Private Violin Lessons, taught from my home in Goshen, AR — 2013 – 2014
4 students, weekly lessons

Survey of the Universe, University of Arkansas — Aug 2013 – Dec 2014
Teaching Assistant

Survey of the Universe Laboratory, University of Arkansas — Aug 2012 – Aug 2013
Instructor

College Physics II Drill, University of Arkansas — Jan 2012 – May 2012
Instructor

University Physics I Laboratory, University of Arkansas — Aug 2008 – Dec 2008
Instructor

Astronomy Laboratory, Pittsburg State University — Jan 2006 – May 2008
Teaching Assistant

AWARDED OBSERVING TIME

Three Nights — Nov 2013
WIYN 3.5-m Telescope, pODI
For observation of AGN with spiral galaxy hosts at intermediate redshift.

- University of Arkansas News: "Physicists Awarded Telescope Time at Kitt Peak National Observatory"

ACADEMIC HONORS & AWARDS

2nd Place in the Physics Division of the "Abstract to Contract" Fifth Annual Graduate Student Research Symposium — Feb 2012
University of Arkansas Graduate School
For placing in a poster presentation competition amongst other physics graduate students at the University of Arkansas.

- University of Arkansas News: "Winners Announced for From Abstract to Contract: Graduate Student Research Competition"

1st Place in the Physical Science Division of the "Abstract to Contract" Third Annual Graduate Student Research Symposium — Feb 2010
University of Arkansas Graduate School
For winning a poster presentation competition amongst other physical science graduate students at the University of Arkansas.

Honorable Mention for the Chambliss Astronomy Achievement Student Award — Jan 2010
215th American Astronomical Society (AAS) Meeting
For recognition of exemplary research by undergraduate and graduate students who present at one of the poster sessions at the meetings of the AAS.

Mendenhall Top Senior Math Student — May 2008
Pittsburg State University Department of Mathematics
For having the highest GPA among the graduating mathematics seniors.

Kansas Governor's Scholar — May 2003
Kansas State Department of Education
The Governor's Scholars program honors the top academic one percent of Kansas high school seniors.

Kansas Honor Scholar — Oct 2002
University of Kansas Alumni Association
A distinction for high school seniors who demonstrate a consistent record of superior academic achievement merits recognition as outstanding in the State of Kansas.

FELLOWSHIPS, SCHOLARSHIPS, & GRANTS

Center for Astrophysics and Space Science Fellowship — 2020 – 2025
New York University Abu Dhabi

International Astronomical Union (IAU) Symposia Travel Grant — Nov 2019
IAU Symposium 359: Galaxy Evolution and Feedback Across Different Environments (GALFEED)
€1000 travel grant to attend the GALFEED conference at Bento Gonçalves, RS, Brazil, March 2-6, 2020.

Postdoctoral Fellowship — 2016 – 2020
Swinburne University of Technology

Research Infrastructure Program — 2014
Arkansas Space Grant Consortium
Project: The Host Galaxies of Active Galactic Nuclei at Moderate Redshifts

Graduate Fellowship Program 2013
Arkansas Space Grant Consortium

Scholarship Program 2011
Arkansas Space Grant Consortium
Project: An Investigation of the Evolution of Spiral Galaxies Using N-Body Simulations and the Possible Effects of Dark Matter Concentration and Galaxy Environment.

Doctoral Academy Fellowship 2008 – 2012
University of Arkansas Graduate School
Supplemental fellowship from the graduate school to the top ≈40 incoming doctoral students as determined by GRE/GMAT scores.

PROFESSIONAL MEMBERSHIPS

American Astronomical Society – International Affiliate (Active), The New York Academy of Sciences – Member (Active), American Association for the Advancement of Science (Inactive), Society of Physics Students (Inactive), KME (Inactive), ΦΚΦ (Inactive)

CAMPUS ACTIVITIES

University Symphony Orchestra, University of Arkansas Aug 2009 – May 2016
Violin (Section I, Concertmaster, Section II Principal), Viola (Principal)

Southeast Kansas Symphony Orchestra, Pittsburg State University Aug 2003 – May 2008
Violin (Section I, Concertmaster, Section II), Viola (Principal)

The PSU Chamber Orchestra, Pittsburg State University Aug 2003 – May 2008
Violin (Section I, Concertmaster, Section II), Viola (Principal)

OTHER WORK EXPERIENCE

Arkansas Philharmonic Orchestra, Bentonville, Arkansas, USA May 2009 – May 2016
Section Violin I

Litigation Resource Group, LLC, Fort Smith, Arkansas, USA Jul 2012 – Feb 2013
Videographer/Accident Reconstruction Consultant

North Arkansas Symphony Orchestra, Fayetteville, Arkansas, USA Nov 2006 – Apr 2008
Section Violin I & II

Sentinel Times, Galena, Kansas, USA Jun 2000 – Jun 2008
Junior Editor/Mail & Delivery Services

Old Riverton Store, Riverton, Kansas, USA Jun 1998 – Jun 2008
Clerk/Salesman/Food Service/Horticulturist

Freelance Musician Jun 1996 –
Violinist/Violist

- National Broadway Tours: *South Pacific* & *West Side Story*
- *Ad hoc* string quartets for weddings and events

LANGUAGES

English: Native language

CITIZENSHIP

US Citizen; Born in Joplin, Missouri, USA

SKILLS, INTERESTS, & EXPERTISE

Typing Proficiency: 67 WPM (285 CPM) with 100% accuracy

TEX, LATEX, XETEX, MATLAB, Mathematica, R, Adobe Creative Cloud, IRAF, DS9, Gimp, Supermongo, Microsoft Office Suite, PC/Mac/Unix/Linux OS, Google Analytics, Google Lighthouse, Google Search Console, Semrush, Fortran, C++, IDL, HTML, Google Analytics, Python, MPI, Machine Learning, SQL, HPC, Problem Solving, Data Science, Data Engineering, Data Analysis, Observing, Classical Music, Music Performance, Oration, Teaching, Logarithmic Spiral Arm Pitch Angle, Multicomponent Galaxy Decomposition, Telescopes, Black Holes, Data Reduction, Galaxy Evolution, Astronomy, Astrophysics, Active Galactic Nuclei, Galaxy Structure, Galaxy Dynamics, Quasars, Galaxy Clusters, Dark Matter, Galaxy Formation, Space & Planetary Sciences, Martian Surface Chemistry, Golf, Tennis, Baseball, Basketball, Violin, Viola, Guitar, Bass, Piano, Ukulele, Saxophone, Singing, SCUBA Diving, Carpentry, Woodworking, Games (Card, Board, & Video), etc.

REFERENCES

Dr. Andrea Valerio Macciò (CASS Principal Investigator)
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Dr. Joel Berrier (Ph.D. Associate Supervisor)
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Bruner Hall of Science
2401 11th Avenue
Kearney, Nebraska 68849, USA
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Dr. Marc Seigar (Ph.D. Committee Member)
Dean and Professor of Physics and Astronomy
College of Natural Sciences and Mathematics at the University of Toledo
2801 W. Bancroft Street
2246 Wolfe Hall, Mail Stop 620
Toledo, Ohio 43606, USA
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Dr. Selim Giray (Violin/Viola Instructor & Conductor)
Associate Professor of Music and Director of Orchestral Studies
The University of Mississippi, Department of Music
350 University Avenue
University, MS 38677, USA
sgiray@olemiss.edu ● +1 (662) 915-1258

Steven Byess (Conductor)
Arkansas Philharmonic Orchestra
sbyess@stevenbyess.com

Dr. Julio Gea-Banacloche (Physics Department Chair)
Professor
University of Arkansas, Department of Physics
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Fayetteville, Arkansas 72701, USA
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ONLINE

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