

# BECKY NEVIN

COSMIC AI Postdoctoral Research Fellow  
Fermilab National Accelerator Laboratory

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## EDUCATION

Ph.D. in Astrophysics, University of Colorado	June 2019
Doctoral Thesis supervised by Julie Comerford: “ <i>Kinematic Signatures of Galaxy Evolution: The Energetics of AGN Outflows and the Accurate Identification of Merging Galaxies</i> ”	
M.S. in Astrophysics, University of Colorado	Nov 2015
B.A. in Astrophysics, Whitman College	May 2013

## SKILLS

<b>Statistics</b>	Causal inference, Bayesian probability, MCMC sampling, uncertainty quantification, simulation-based inference, likelihood-based inference
<b>Software Dev</b>	Python, Unix/Linux, SQL, git, GitHub workflows, cloud computing, Docker, Kubernetes, high performance computing, parallelization, Jax
<b>Data science &amp; Machine learning</b>	Scikit-learn, Pandas, Jupyter ecosystem, supervised and unsupervised machine learning techniques, model validation, data visualization
<b>Deep learning</b>	UQ, ensembles, evidential regression, computer vision
<b>Astrophysical</b>	Astrophysical imaging and spectroscopy, segmentation, coordinate systems, designing pipelines for imaging reduction and analysis, radiative transfer and cosmological simulations, creating mock images and spectroscopy

## RESEARCH EXPERIENCE

<b>Deepskies Lab Postdoctoral Research Fellow</b>   Fermilab	2022 - present
Uncertainty quantification, hierarchical Bayesian inference, and simulation based inference, software development	
<b>Postdoctoral Research Fellow</b>   Harvard & Smithsonian CfA	2019 - 2022
Multiwavelength Galaxy Evolution, Galaxy Simulations, and <i>Chandra</i> HRC	
<b>Graduate Research Assistant</b>   University of Colorado	2013 - 2019
Simulated Galaxy Imaging and Kinematics and AGN Outflows	
<b>Undergraduate Research Assistant</b>   Harvard CfA	2012
Recoiling Supermassive Black Holes	
<b>Undergraduate Research Assistant</b>   Whitman College	2011 - 2012

STUDENTS SUPERVISED

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Aimee Schechter, 2019 - present, University of Colorado Graduate Student  
Rohan Venkat, 2023 - 2024, Fermilab/UChicago  
Sideena Grace, 2020, Banneker Institute Student (now at MIT)

REFEREED PUBLICATIONS

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[21] “DeepUQ: Assessing the aleatoric uncertainties from two deep learning methods”  
**Nevin, R.**, Ciprijanovic, A., Nord, B., 2024, ML4PS Workshop at NeurIPS 2024

[20] “DeepBench: A simulation package for physical benchmarking data”  
Voetberg, M., Livaudais, A., **Nevin, B.**, Paul, O., Nord, B., 2023, JOSS, submitted

[19] “*The first quiescent galaxies in TNG300*”  
Hartley, A. I., Nelson, E. J., Suess, K. A., Garcia, A. M., Park, M., Hernquist, L., Bezanson, R., **Nevin, R.**, Pillepich, A., Schechter, A. L., Terrazas, B. A., Torrey, P., Wellons, S., Whitaker, K. E., Williams, C. C., 2023, MNRAS, 522, 3138

[18] “*A declining major merger fraction with redshift in the local Universe from the largest-yet catalogue of major and minor mergers in SDSS*”  
**Nevin, R.**, Blecha, L., Comerford, J., Simon, J., Terrazas, B. A., Barrows, R. S., Vázquez-Mata, J. A., 2023, MNRAS, 522, 1

[17] “*SDSS-IV MaNGA: The Incidence of Major Mergers in type I and II AGN Host Galaxies in the DR15 sample*”  
Hernández-Toledo, H. M., Cortes-Suárez, E., Vázquez-Mata, J. A., **Nevin, R.**, Ávila-Reese, V., Ibarra-Medel, H., Negrete, C. A., 2023, MNRAS, 523, 4164

[16] “*A Catalog of 71 Coronal Line Galaxies in MaNGA: [Ne V] Is an Effective AGN Tracer*”  
Negus, J., Comerford, J. M., Müller-Sánchez, F., Revalski, M., Riffel, R. A., Bundy, K., **Nevin, R.**, Rembold, S. B., 2023, ApJ, 945, 127

[15] “*Towards a More Complete Optical Census of Active Galactic Nuclei, Via Spatially-Resolved Spectroscopy*”  
Comerford, J. M., Negus, J., Barrows, R. S., Wylezalek, D., Greene, J. E., Müller-Sánchez, F., **Nevin, R.**, 2022, ApJ, 927, 23

[14] “*Spatially resolved star formation and inside-out quenching in the TNG50 simulation and 3D-HST observations*”

Nelson, E. J., Tacchella, S., Diemer, B., Leja, J., Hernquist, L., Whitaker, K. E., Weinberger, R., Pillepich, A., Nelson, D., Terrazas, B. A., **Nevin, R.**, Brammer, G. B., Burkhart, B., Cochrane, R. K., van Dokkum, P., Johnson, B. D., Marinacci, F., Mowla, L., Pakmor, R., Skelton, R. E., Speagle, J., Springel, V., Torrey, P., Vogelsberger, M. & Wuyts, S., 2021, MNRAS, 2068

[13] “*Evidence of Wind Signatures in the Gas Velocity Profiles of Red Geysers*”

Roy, N., Bundy, K., **Nevin, R.**, Belfiore, F., Yan, R., Campbell, S., Riffel, R. A., Riffel, R., Bershad, M., Westfall, K., Drory, N. & Zhang, K., 2021, ApJ, 913, 33

[12] “*Accurate Identification of Galaxy Mergers with Stellar Kinematics*”

**Nevin, R.**, Blecha, L., Comerford, J., Greene, J. E., Law, D. R., Stark, D. V., Westfall, K. B., Vázquez-Mata, J. A., Smethurst, R., Argudo-Fernández, M., Brownstein, J. R., Drory, N., 2021, ApJ, 912, 45

[11] “*A Catalog of 406 AGNs in MaNGA: A Connection between Radio-mode AGNs and Star Formation Quenching*”

Comerford, J., Negus, J., Müller-Sánchez, F., Eracleous, M., Wylezalek, D., Storchi-Bergmann, T., Greene, J. E., Barrows, R. S., **Nevin, R.**, Roy, M., Stemo, A., 2020, ApJ, 901

[10] “*A Second Look at 12 Candidate Dual AGNs using BAYMAX*”

Foord, A., Gültekin, K., **Nevin, R.**, Comerford, J., Hodges-Kluck, E., Barrows, R., Goulding, A. & Greene, J., 2020, ApJ, 892, 29

[9] “*The Sixteenth Data Release of the Sloan Digital Sky Surveys: First Release from the APOGEE-2 Southern Survey and Full Release of eBOSS Spectra*”

The SDSS-IV Collaboration, **Nevin, R.**, 2019, ApJS, 249, 3

[8] “*Accurate Identifications of Galaxy Mergers with Imaging*”

**Nevin, R.**, Blecha, L., Comerford, J. & Greene, J., 2018, ApJ, 872, 76

[7] “*The Origin of Double-Peaked Narrow Lines in Active Galactic Nuclei IV: Association with Galaxy Mergers*”

Comerford, J., **Nevin, R.**, Stemo, A., Müller-Sánchez, F., Barrows, R., Cooper, M. & Newman, J., 2018, ApJ, 867, 66

[6] “*Two Separate Outflows in the Dual Supermassive Black Hole System NGC 6240*”

Müller-Sánchez, F., **Nevin, R.**, Comerford, J., Davies, R., Privon, G. & Treister, E., 2018, Nature, 556, 345

[5] “*The Origin of Double-Peaked Narrow Lines in Active Galactic Nuclei III: Feedback from Biconical AGN Outflows*”

**Nevin, R.**, Comerford, J., Müller-Sánchez, F., Barrows, R. & Cooper, M., 2018, MNRAS, 473, 2160

[4] “*An Active Galactic Nucleus Caught in the Act of Turning Off and On*”

Comerford, J., Barrows, R., Müller-Sánchez, F., **Nevin, R.**, Greene, J., Pooley, D., Stern, D. & Harrison, F., 2017, ApJ, 849, 102

[3] “*The Origin of Double-Peaked Narrow Lines in Active Galactic Nuclei II: Kinematic Classifications for the Population at  $z < 0.1$* ”

**Nevin, R.**, Comerford, J., Müller-Sánchez, F., Barrows, R. & Cooper, M., 2016, ApJ, 832, 67

[2] “*The Origin of Double-Peaked Narrow Lines in Active Galactic Nuclei I: Very Large Array Detections of Dual AGNs and AGN Outflows*”

Müller-Sánchez, F., Comerford, J., **Nevin, R.**, Barrows, R., Cooper, M. & Greene, J., 2015, ApJ, 813, 2

[1] “*Calibrating and Stabilizing Spectropolarimeters with Charge Shuffling and Daytime Sky Measurements*”

Harrington, D., Kuhn, J. & **Nevin, R.**, 2015, Astronomy & Astrophysics, 578, 126

#### OTHER PUBLICATIONS

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[4] “*Preparing an Inclusive Astronomy Community through Effective Professional Development*” McConnell, N, ... **Nevin, R.**, ..., 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, APC white paper

[3] “*The Early Career Perspective on the Coming Decade, Astrophysics Career Paths, and the Decadal Survey Process*” Moravec, E., ... **Nevin, R.**, ..., 2019, Astro2020: Decadal Survey on Astronomy and Astrophysics, APC white paper

[2] “*This Father’s Day is One of the Longest Days in the History of the Earth - Here’s Why*” **Nevin, R.**, 2015, Universe Today

[1] “*Going Above & Beyond: A Cross-Disciplinary Planetarium Program*” Rehnberg, M. & **Nevin, R.**, 2016, AAS Education Task Force White Paper

#### SUPERCOMPUTING ALLOCATIONS

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**Co-PI of XSEDE Supercomputer Allocation, NSF** 2018  
Allocated 1242000 CPU-hours

**PI of JANUS/Summit Supercomputer Allocation, University of Colorado** 2015  
Allocated 200000 CPU-hours

#### OBSERVING EXPERIENCE

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**PI of six successful Apache Point Observatory Proposals** 2014 - 2016  
Dual Imaging Spectrograph, 3.5m ARC Telescope  
Observed 34.5 half nights

**Co-PI of MDM Observatory (Kitt Peak) Research** 2012

Observed five nights

## TEACHING EXPERIENCE

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**Instructor of Record, ASTR-1000** 2017

University of Colorado

Developed and taught a 25 student course. Designed inquiry-based activities.

**Professional Development Program (PDP)** 2016

Institute for Scientists & Engineer Educators, University of California

Developed an inquiry-based exoplanet lab for first generation college students.

**Teaching Assistant** 2013 - 2014

University of Colorado

Taught lab courses (30 students) and assisted with interactive learning techniques for the large introductory classes.

**Undergraduate Teaching Assistant and Tutor** 2011 - 2013

Whitman College

Guided student telescope labs and indoor physics tutorials, led community outreach telescope nights, and gave planetarium shows to local schools

## PROFESSIONAL DEVELOPMENT AND SERVICE

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IDEA Sustainability Subcommittee, CfA 2020 - 2022

CfA director hiring committee, CfA 2021

Postdoc Council Member, CfA 2019 - 2021

Coursera Machine Learning 2019 - 2021

Datacamp Data Science Courses in Python 2019 - 2021

Astro 2020 Decadal Survey Position Paper Coauthor 2018-2019

Referee, MNRAS, ApJ, A&A 2018 - present

Statistical Learning, Stanford Online 2018 - present

Mentorship Training, University of Colorado 2018

Rethinking Scientific Presentations: The Assertion-Evidence Approach 2018

Running Singularity Containers on SDSC's Comet Supercomputer 2018

Managing Research Workflows with Singularity Containers 2018

Software Carpentry Workshop, Research Computing 2017

Science Writing Course, University of Colorado 2016

Elected Comps I Committee Member, University of Colorado 2015

Astrostatistics Summer School, Penn State 2015

Faculty Hiring Committee Member, University of Colorado 2014

## PRESS COVERAGE

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**Supermassive Black Hole Documentary Film** 2018 - 2022

Writing and narrating an educational movie about supermassive black holes and galaxy mergers in partnership with the Fiske Planetarium.

**SDSS Press Conference**

Jan 2019

Took part in a press release and press conference at the 233rd AAS meeting, [release text](#) is available on the SDSS website.

**PhD Comics**

2016

Research group featured in *Supermassive Black Holes Explained* (<http://www.phdcomics.com/comics.php?f=1864>)

**OUTREACH & COMMUNICATION**

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**Created paper summaries and comic overlays for the Deepskies group**

2022 - present

Assisted research group members in creating concise and accessible paper summaries and associated art - check them out on [linkedin](#) or [twitter](#)

**Lunch Break: Conversations with Scientists in Industry**

2020 - 2021

Organized a weekly lunch series at the CfA that welcomes astrophysicists who are working in industry to share their career journey [[youtube](#)].

**Science Speak-Easy: Science Communication Workshop**

2018 - 2019

Organized and facilitated an annual workshop for graduate students and postdocs at University of Colorado on giving public and scientific talks.

**The Science of Sci Fi**

2017 - 2019

Developed and ran this talk series at Fiske Planetarium, aimed at engaging the public with popular sci fi works.

My talk: *Zombie Pathology: A Survival Guide for Pandemics in the 21st Century*

**Science and Society**

2014 - 2019

Ran this talk series at Fiske Planetarium, helped graduate students and postdocs develop talks

My talks: *It Came from Space! The Solar System's Ultimate Weapon and How we Hope to Stop it*, *Galactic Getaways: Life from a Different Perspective*

**Promoting an Inclusive Community in Astronomy (PICA)**

2013 - 2019

Organized and led discussions of this graduate-student run diversity group

**Astronomy on Tap: Colorado**

2016 - 2017

My talks: *Gravitational Waves*, *The Dino's Demise*

**Science Writer**

2013 - 2017

Wrote for the blog *Cosmic Conversations*, communicated a wide range of popular science topics

**ComSciCon**

2015

Attended this science communication conference preparing today's scientists to better communicate their science to a broader audience

**Earth Explorers**

2014 - 2015

Worked with a group of underserved middle schoolers in Longmont, CO to develop a movie about black holes