

# John F. Wu

Bloomberg Center for Physics and Astronomy, Room 366  
Johns Hopkins University  
3400 N. Charles Street  
Baltimore, MD 21218

jfwu@jhu.edu  
github.com/jwuphysics  
+1 908 410 0317

## Education

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### Rutgers, The State University of New Jersey

*Ph.D., Physics and Astronomy*

Insights on galaxy evolution from studies of the multiphase interstellar medium

**Piscataway, NJ**

*Sept 2013–Oct 2019*

### Carnegie Mellon University

*B.Sc., Physics/Astrophysics, MCS Honors*

**Pittsburgh, PA**

*Sept 2009–May 2013*

## Professional Experience

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### Johns Hopkins University

Postdoctoral fellow, advised by Josh Peek

**Baltimore, MD**

*Sept 2019–present*

### Rutgers, The State University of New Jersey

Graduate research assistant, advised by Andrew Baker

- Investigated how galaxies evolve in massive clusters by observing their star formation, cold gas, and dust properties.
- Studied the multi-phase interstellar media of extreme, UV-selected starbursting galaxies in the local Universe.
- Trained supervised deep neural networks to predict metallicities of nearby galaxies using only optical imaging.

**Piscataway, NJ**

*July 2013–Aug 2019*

Teaching assistant

- Instructed lab sections for *Physics 343: Observational radio astronomy*.
- Graded assignments for *Physics 342: Principles of astrophysics*.

*Jan 2015–May 2015*

### McWilliams Center for Cosmology, Carnegie Mellon University

Undergraduate research assistant, advised by Rachel Mandelbaum

- Characterized galaxies in rich clusters by using Sloan Digital Sky Survey observations.

**Pittsburgh, PA**

*July 2012–May 2013*

### Carnegie Mellon University CyLab

Research intern

- Developed and tested robust facial recognition software.
- Created a proof of concept image manipulation tool for artificial aging.

**Pittsburgh, PA**

*May 2011–Aug 2011*

## Refereed Publications (including submissions)

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- [4] “The Star-Forming Interstellar Medium of Lyman Break Galaxy Analogs,”  
**Wu, J. F.**, Baker, A. J., Heckman, T. M., Hicks, E. K. S., Lutz, D., Tacconi, L. J., 2019, *ApJ*, submitted.
- [3] “Using convolutional neural networks to predict galaxy metallicity from three-color images,”  
**Wu, J. F.** & Boada, S., 2019, *MNRAS*, 484, 4683. [ADS]
- [2] “Herschel and ALMA Observations of Massive SZE-selected Clusters,”  
**Wu, J. F.**, Aguirre, P., Baker, A. J., Devlin, M. J., Hilton, M., Hughes, J. P., Infante, L., Lindner R. R., Sifón, C., 2018, *ApJ*, 853, 195. [ADS]
- [1] “Galaxy Candidates at  $z \sim 10$  in Archival Data from the Brightest of Reionizing Galaxies (BORG[z8]) Survey,”  
Bernard, S. R., Carrasco, D., Trenti, M., Oesch, P. A., **Wu, J. F.**, Bradley, L. D., Schmidt, K. B., Bouwens, R. J., Calvi, V., Mason, C. A., Stiavelli, M., Treu, T., 2016, *ApJ*, 827, 76. [ADS]

## Conference Abstracts and Unrefereed Publications

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- [7] "Gas and galaxy evolution in extreme  $z \sim 1$  clusters and extreme  $z \sim 0.2$  starbursts "  
**Wu, J. F.** 2019, *AAS Meeting 233*, 230.03D. [ADS]
- [6] "Probing the Evolution of Galaxies by Stacking Stellar Mass Selected Samples "  
Howard, M., Baker, A. J., **Wu, J. F.**, *AAS Meeting 233*, 145.08. [ADS]
- [5] "Using Convolutional Neural Networks to predict Galaxy Metallicity from Three-Color Images "  
Boada, S. & **Wu, J. F.**, *AAS Meeting 233*, 144.30. [ADS]
- [4] "Herschel And ALMA Observations Of The ISM In Massive High-Redshift Galaxy Clusters "  
**Wu, J. F.** et al. 2017, *Galaxy Evolution Across Time*, 51. [ADS]
- [3] "Characterizing and Cataloguing Star-Forming Galaxies in Preparation for the LADUMA Survey"  
Perez, M. J., Baker, A. J., **Wu, J. F.** 2017. *AAS Meeting 229*, 347.30. [ADS]
- [2] "LADUMA: Looking at the Distant Universe with the MeerKAT Array,"  
Blyth, S. et al. 2016, *Proceedings of MeerKAT Science: On the Pathway to the SKA*, 4. [ADS]
- [1] "Investigating star formation properties of galaxies in massive clusters with Herschel and ALMA,"  
**Wu, J. F.** et al. 2016, *AAS Meeting 227*, 202.02. [ADS]

## Other Experience

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### USAID Research & Innovation Fellow

**Cape Town, South Africa**

Improving the LADUMA Pipeline Using MeerKAT Early Science Data

*Sept 2016–Nov 2016*

- *Worked with S. Blyth (UCT) and B. Frank (SARAO) to analyze simulated MeerKAT data using ARCADE (African Research Cloud).*
- *Developed a pipeline to test and benchmark source-finding software.*
- *Attended the Visualization in Astronomy and 3GC4: HI Fidelity conferences.*
- *Followed up in Aug 2018 by working with B. Frank on continuum subtraction with MeerKAT commissioning data using IDIA high-performance computing facilities.*

### Vatican Observatory Summer School

**Castel Gandolfo, Italy**

VOSS: *Galaxies, Near and Far, Young and Old*

*June 2014*

- *Completed projects with Michele Trenti (Melbourne), Jacqueline van Gorkom (Columbia), and Chris Carilli (NRAO), the first of which led to an ApJ publication.*

### NRAO Synthesis Imaging Workshop

**Socorro, NM**

National Radio Astronomy Observatory 14th Synthesis Imaging Workshop

*May 2014*

- *Reduced ALMA data using Common Astronomy Software Applications (CASA).*

## Honors and Awards

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**Robert A. Schommer Prize**, *Rutgers*

*April 2018*

*Best astronomy paper by a graduate student*

**University and Louis Bevier Fellowship Honorable Mention**, *Rutgers*

*April 2018*

**International Travel Grant**, *American Astronomical Society*

*Mar 2017*

**TA/GA Professional Development Fund**, *Rutgers*

*June 2016–June 2018*

*Travel support*

**Special Study Award**, *Rutgers*

*Mar 2014*

**Claud Lovelace Fellowship**, *Rutgers*

*Sept 2013–June 2014*

<b>Senior Leadership Recognition, Carnegie Mellon</b>	May 2013
<b>Mellon College of Science College Honors, Carnegie Mellon</b>	May 2013

## Seminars and Conference Talks/Posters

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<b>Johns Hopkins University (JHU), CAS Wine &amp; Cheese Seminar</b>	Oct 2019
<b>Galaxy Evolution in a New Era of HI Surveys (MIAPP), Invited deep learning tutorial</b>	Aug 2019
<b>Nine Billion Years of Neutral Gas Evolution (ESO), Contributed talk</b>	July 2019
<b>Rutgers Statistics, Foundations of Probability Seminar</b>	Apr 2019
<b>American Astronomical Society (AAS) 233rd meeting, Dissertation talk</b>	Jan 2019
<b>Center for Computational Astrophysics (CCA), Galaxies Group Meeting</b>	Dec 2018
<b>Princeton Astronomy, Galread Seminar</b>	Dec 2018
<b>Princeton Astronomy, Data Science/COMPASS Seminar</b>	Nov 2018
<b>University of Cape Town (UCT) Astronomy, Seminar</b>	Aug 2018
<b>Galaxy Evolution Across Time (ENS), Contributed poster</b>	June 2017
<b>Princeton-Rutgers 3rd annual extragalactic science day, Contributed talk</b>	May 2016
<b>American Astronomical Society (AAS) 227th meeting, Contributed talk</b>	Jan 2016
<b>Australian Astronomical Observatory (AAO), Seminar</b>	Dec 2015

## Leadership, Service, and Outreach

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<b>Co-leader, Rutgers Gaia Data Release 2 Hackathon</b>	May 2018
<b>SIGMA-P, Seminar In Graduate Mentoring in Astronomy and Physics</b>	Apr 2018
<b>Co-leader, SPS/RAS Astro Hack Sessions</b>	Mar–Apr 2018
<b>Invited Plenary Talk, Friends of Rutgers Astronomy</b> <i>Studying Galaxy Clusters with Herschel, ALMA, and SALT</i>	Sep 2017
<b>Guest Lecturer, Physics 343: Observational radio astronomy</b>	2017, 2019
<b>Guest Lecturer, Byrne Seminar: The Poetry of Astronomy</b>	Feb 2016
<b>TAC member, SALT 2015-2 Rutgers Time Allocation Committee</b>	Sep 2015
<b>LOC member, SKA Pathfinders HI Science Coordination Committee (PHISCC)</b>	Mar 2015
<b>Organizer, Student Seminars in Physics and Astronomy at Rutgers (SSPAR)</b>	Oct 2014–May 2015
<b>Vice President, Rutgers Physics Graduate Student Organization (GSO)</b>	Sep 2014–May 2015
<b>Webmaster, Rutgers Physics GSO and SSPAR</b>	Sep 2014–May 2017
<b>Public Talk, Rutgers Astronomical Society</b> <i>Anisotropies in the Cosmic Microwave Background: B-modes and Inflation</i>	Mar 2014
<b>DELTA-P, Developing Educational Leaders among TAs in Physics</b>	Dec 2013

## Accepted Telescope Proposals and Observing

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### Very Large Array (VLA)

Col, <i>A high-resolution multi-frequency map of PKS0326-288 [...] (19A-433)</i>	2019A
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### Anglo-Australian Telescope (AAT)

Col, <i>Redshifts in the LADUMA Field to <math>z \sim 0.6</math> (N0331)</i>	2017B
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- Awarded five nights of AAT/AAOmega to continue campaign of measuring redshifts in the LADUMA field.

Col, <i>Redshifts in the LADUMA Field to <math>z \sim 0.6</math></i> (N0334)	2015B
<ul style="list-style-type: none"> <li>Awarded four nights of AAT/AAOmega time to measure galaxy redshifts in preparation for studying neutral hydrogen with the LADUMA survey.</li> <li>Observed at the AAT and detected <math>\sim 1600</math> galaxy redshifts.</li> </ul>	
<b>Atacama Large Millimeter/submillimeter Array (ALMA)</b>	
PI, <i>Star formation and the turbulent ISM of LBG analogs</i> (2019.1.01423.S)	Cycle 7
Col, <i>ALMA Lensing Cluster Survey</i> (2018.1.00035.L)	Cycles 6 – 7
Col, <i>Galaxies in (and behind) two massive high-redshift clusters</i> (2013.1.01358.S)	Cycle 2
<ul style="list-style-type: none"> <li>Obtained Band 6 (230 GHz) mosaic observations to study atomic carbon and molecular CO emission of cluster galaxies, and also to study the dust continuum emission of cluster and background galaxies.</li> <li>Reduced data using the NAASC computing facilities at NRAO in Charlottesville.</li> </ul>	
<b>Southern African Large Telescope (SALT)</b>	
Col, <i>Preparing for LADUMA: SALT Redshift Measurements</i> (2017-1-MLT-014)	2017-1 – present
<ul style="list-style-type: none"> <li>Awarded 40770 seconds of P1 (high priority) time to continue measuring redshifts in LADUMA field.</li> <li>Continuation of 2016-2-SCI-051.</li> </ul>	
Col, <i>Preparing for LADUMA: SALT Redshift Measurements</i> (2016-2-SCI-051)	2016-2
<ul style="list-style-type: none"> <li>Awarded 73616 seconds of observing time for pilot project to measure galaxy redshifts at <math>0.6 &lt; z &lt; 1.1</math>.</li> </ul>	
PI, <i>Fabry-Pérot imaging of two massive galaxy clusters</i> (2016-1-SCI-040)	2016-1
<ul style="list-style-type: none"> <li>Continuation of 2015-2-SCI-052 (awarded an additional 14000 seconds of P1 time).</li> </ul>	
PI, <i>Fabry-Pérot imaging of two massive galaxy clusters</i> (2015-2-SCI-052)	2015-2
<ul style="list-style-type: none"> <li>Continuation of the 2015-1 DDT proposal (awarded 14000 seconds of P1 time).</li> </ul>	
PI, <i>SALT Fabry-Pérot imaging of two massive galaxy clusters</i> (DDT)	2015-1
<ul style="list-style-type: none"> <li>Awarded 5600 seconds of P2 (medium priority) Rutgers discretionary time to pilot a blind Fabry-Pérot search for [OII] emitting galaxies in two massive, <math>z \sim 1</math> clusters.</li> </ul>	

## Skills

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**Programming:** Python, MATLAB/Octave, IDL, SQL, HTML5/CSS, bash, L<sup>A</sup>T<sub>E</sub>X

**Software:** SciPy/matplotlib/pandas/seaborn, AstroPy, scikit-learn, fastai/Pytorch, Source Extractor, Miriad, CASA/MPICASA, Slurm, Docker, Singularity

**Data reduction:** ALMA, MeerKAT, SALT Fabry-Pérot