

# Yumi Choi

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📄 <https://galaxyumi.github.io>

## Research Interest

Galaxy Formation and Evolution, Resolved Stellar Populations, Dwarf Galaxies, Star Formation History, Galactic Structure, Near-Field Cosmology, Cosmic Reionization, Leakage of LyC, ISM, Stellar Feedback, Probabilistic Modeling

## Education

Aug 2016 **Ph.D. in Astronomy**, *University of Washington*, USA.

Advisor: Dr. Julianne Dalcanton

Title: "Resolved Stars' Insights into Galaxy Physics"

Aug 2011 **M.S. in Astronomy**, *University of Washington*, USA.

Feb 2009 **M.S. in Astronomy**, *Yonsei University*, South Korea.

Feb 2007 **B.S. in Astronomy**, *Yonsei University*, South Korea.

## Research Experience

May 2018 – **SMASH Postdoctoral Research Associate**, *Montana State University/UA*, USA.

- Present
- Continuing the SMASH Projects Including the SMC 3D Structure
  - Searching for Stellar Components in the Leading Arm Using Gaia DR2
  - Contributing to Measuring Spatially Resolved SFHs in the LMC/SMC
  - Exploring the Origin of the Ring stellar Overdensity in the LMC with APOGEE-S data

Sept 2016 – **SMASH Postdoctoral Research Associate**, *Steward Observatory/University of Arizona*,  
Apr 2018 USA.

Advisor: David Nidever & Knut Olsen

- Conducting Intensive Photometric Quality Assurance
- Constructing an Accurate 2D Reddening Map (165 deg<sup>2</sup>) of the LMC disk
- Mapping the 3D Structure of the LMC and Detecting an Outer Warp for the First Time
- Modeling the LMC Disk and Characterizing the Ring-like Stellar Overdensity

2012 – 2016 **Graduate Research Assistant**, *University of Washington*, USA.

Advisor: Julianne Dalcanton

- Measuring Spatially Resolved Star Formation History and Testing the Density Wave Theory in M81
- Modeling SEDs of Individual Stars in NGC 4214 and Measuring the Global Escape Fraction of LyC
- Modeling M31 Disk Using Both RGB Stars and WISE Images to Characterize the 10 kpc Ring

2009 – 2012 **Graduate Research Assistant**, *University of Washington*, USA.

Advisor: Zeljko Ivezic & Andrew Connolly

- Generating Difference Images for the SDSS Stripe 82 Data Using the LSST Software
- Constructing Difference Image Light Curves for QSOs/AGNs and Characterizing Their Optical Variability
- Verifying High Completeness and Efficiency of Variability-based AGN Selection

Jan 2008 – **Global Internship Researcher**, *ISAS/JAXA*, Japan.

Mar 2008 Mentor: Tomotsugu Goto

- Identifying E+A Galaxies from SDSS DR6 and Measuring their Fundamental Plane

2007 – 2009 **Research Assistant**, *Yonsei University*, South Korea.

Advisor: Suk-Jin Yoon

- Identifying UV-excess Early-type Galaxies from SDSS DR6 and GALEX DR4
- Classifying Them Based on H $\alpha$  and *NUV* – *r* and Measuring Their Fundamental Planes
- Comparing Those with That of E+A Galaxies to Explore Evolutionary Connection

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## Awards & Scholarships

Winter 2015 **Jacobsen Fellowship**, *University of Washington*.

Winter 2013 **Jacobsen Fellowship**, *University of Washington*.

2013 **UW Graduate Student Travel Awards**, *University of Washington*.

2013 **International Travel Grant**, AAS, USA.

2008 **Global Internship Award at ISAS/JAXA in Japan**, *National Research Foundation of Korea*.

2007 – 2009 **Brain Korea 21 Fellowship**, *National Research Foundation of Korea*.

2003 – 2007 **Korea Science and Engineering Foundation Fellowship**, *National Research Foundation of Korea*.

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## Research Programs & Grants

HST **Securing HST’s UV Legacy in the Local Volume: Probing Star Formation and the Interstellar Medium in Low Mass Galaxies**, *Cycle 25*, PI: K. Gilbert (GO-15275; 58 orbits).

NSF **Survey of the MAgellanic Stellar History**, 2015, PI: D. Nidever (\$454k).

HST **A Legacy Imaging Survey of M33**, *Cycle 24*, PI: J. Dalcanton (GO-14610; 108 orbits).

HST **A New Method to Measure the UV Escape Fraction from Galaxies**, *Cycle 23*, PI: Y. Choi (AR-14288; \$70k).

Chandra **A Large-scale Chandra Archive Study of the X-ray Activity of Optically-variable Galaxies**, *Cycle 13*, PI: R. Gibson (\$80k).

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## Refereed Publications ([ADS Listing](#))

- [15] 2018 **Choi, Yumi** et al., “Mapping the Escape Fraction of Ionizing Photons Using Resolved Stars: A Much Higher Escape Fraction for NGC 4214”, will be submitted in November 2018
- [14] 2018 Nidever, D. L.; Olsen, K.; **Choi, Yumi** et al., “Exploring the Very Extended Low Surface Brightness Stellar Populations of the Large Magellanic Cloud with SMASH”, submitted to ApJ ([arXiv:1805.02671](#))
- [13] 2018 **Choi, Yumi** et al., “SMASHing THE LMC: Mapping A Ring-like Stellar Overdensity in the LMC Disk”, 2018, ApJ, accepted ([arXiv:1805.00481](#))
- [12] 2018 Dey, A. et al. including **Choi, Yumi**, “Overview of the DESI Legacy Imaging Surveys”, submitted to AJ ([arXiv:1804.08657](#))
- [11] 2018 **Choi, Yumi** et al., “SMASHing the LMC: A Tidally-induced Warp in the Outer LMC and a Large Scale Reddening Map”, 2018, ApJ, 866, 90
- [10] 2018 Martínez-Delgado, D. et al. including **Choi, Yumi**, “A Shell of Young Stars in the Outskirts of the Small Magellanic Cloud”, submitted to MNRAS
- [9] 2017 Nidever, D. L. et al. including **Choi, Yumi**, “SMASH: Survey of the MAgellanic Stellar History”, 2017, AJ, 154, 199

- [8] 2017 Williams, B. et al. including **Choi, Yumi**, “PHAT. XIX. The Ancient Star Formation History of the M31 Disk”, 2017, ApJ, 846, 145
- [7] 2017 Yukita, M. et al. including **Choi, Yumi**, “Identification of the Hard X-ray Source Dominating the  $E > 25$  keV Emission of the Nearby Galaxy M31”, 2017, ApJ, 838, 47
- [6] 2016 Gordon, K. D. et al. including **Choi, Yumi**, “The Panchromatic Hubble Andromeda Treasury. XV. The BEAST: Bayesian Extinction and Stellar Tool”, 2016, ApJ, 826, 104
- [5] 2015 **Choi, Yumi** et al., “Testing Density Wave Theory with Resolved Stellar Populations around Spiral Arms in M81”, 2015, ApJ, 810, 9
- [4] 2015 Lewis, A. R. et al. including **Choi, Yumi**, “The Panchromatic Hubble Andromeda Treasury. XI. The Spatially Resolved Recent Star Formation History of M31”, 2015, ApJ, 805, 183
- [3] 2014 **Choi, Yumi** et al., “Variability-based Active Galactic Nucleus Selection Using Image Subtraction in the SDSS and LSST Era”, 2014, ApJ, 782, 37
- [2] 2009 **Choi, Yumi** et al., “The Fundamental Planes of E+A Galaxies and GALEX UV-excess Early-type Galaxies: Revealing Their Intimate Connection”, 2009, MNRAS, 395, 637
- [1] 2006 Kim, J.-W., **Choi, Yumi** et al., “Red Giant Branch of the Metal Poor Globular Clusters: II. Bump, Tip, and Distance of NGC 1904”, 2006, JASS, 23, 97

## Talks and Presentations

- June 2018 “SMASHing the LMC”, Workshop: Near-Field Cosmology With DES DR1 and Beyond, University of Chicago
- June 2018 “SMASHing the Large Magellanic Cloud: dust map and galactic structures around the LMC”, Journal Club Seminar, UC San Diego
- May 2018 “A Ring-like Stellar Overdensity Structure in the Large Magellanic Cloud”, Galactic Rings: Signposts of Secular Evolution in Disk Galaxies, University of Alabama
- Sep 2017 “Stellar Overdensity in the Southern Disk of the LMC”, 5th GMT Community Science Meeting, New York
- Jan 2017 “The Survey of the MAgellanic Stellar History (SMASH): Tracing Stellar Structures in the southern disk of LMC”, 229th AAS, Grapevine
- Oct 2016 “Resolved Stars’ Insights into Galaxy Physics: (1) Mapping fesc for NGC 4214, (2) Testing density wave theory in M81, and (3) Tracing stellar structures in M31”, Flash Talk, NOAO
- Mar 2016 “A New Method to Measure the LyC Escape Fraction from Galaxies: the escape fraction for NGC 4214”, Aspen Center for Physics
- May 2015 “Escape fraction of ionizing photons from a dwarf galaxy NGC 4214”, The Olympian symposium on cosmology and the epoch of reionization, Greece
- Jan 2015 “Escape fraction of ionizing photons from a dwarf galaxy NGC 4214”, 225th AAS, Seattle
- Aug 2014 “The Power of Panchromatic Imaging: Intrinsic UV flux and its leakage from NGC4214”, Lyman Continuum Leakage and Cosmic Reionization, AlbaNova University Center, Sweden
- Oct 2013 “Testing Density Wave Theory with Stellar Populations around Spiral Arms in M81”, The 7th Korean Astrophysics workshop on Dynamics of disk galaxies, Seoul National University, South Korea
- Jan 2013 “Identifying QSOs/AGNs by Variability Seen in Difference Images”, 221st AAS, Long Beach
- Jan 2011 “A Difference-Imaging Survey for AGN in Stripe 82”, 217th AAS, Seattle
- Jan 2009 “The Possible Evolutionary Connection between E+A Galaxies and GALEX UV-excess Early-type Galaxies”, 213th AAS, Long Beach

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## Professional Activities

Referee The Astronomical Journal

Panel *Swift* review

Full Member American Astronomical Society

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## Teaching Experience

TA Astronomy 101, Spring 2010 & Winter 2011, UW

TA The Planets, Fall 2010, UW

TA Exploring the Universe, Fall 2007, Yonsei University

TA Astrophysics I, Spring 2007, Yonsei University

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## Computer Skills

Language fluent in python and IDL

Software MATCH (deriving SFH), BEAST (stellar SED fitting), GALFIT (modeling objects in 2D), MySQL, Condor

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## References

- [1] **Dr. Julianne J. Dalcanton.**  
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(+1)206-619-1959
- [2] **Dr. Knut Olsen.**  
National Optical Astronomy Observatory  
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(+1)520-318-8555
- [3] **Dr. David L. Nidever.**  
Montana State University/National Optical Astronomy Observatory  
david.nidever@montana.edu  
(+1)434-249-6845
- [4] **Dr. Evan D. Skillman.**  
University of Minnesota  
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