

# JIAXUAN LI

## PERSONAL INFORMATION

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Homepage:	<a href="https://astrojacobli.github.io/">https://astrojacobli.github.io/</a>	ORCID:	<a href="https://orcid.org/0000-0001-9592-4190">orcid.org/0000-0001-9592-4190</a>

## RESEARCH INTEREST

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I am enthusiastic about almost all aspects of astrophysics and cosmology. Some of them are listed below.

- Low surface brightness astrophysics: galaxy outskirts, intracluster/intragroup lights, ultra-diffuse galaxies.
- Galaxy evolution: quenching of galaxies, formation of massive galaxies, galaxy-halo connection.
- Cosmology: large-scale structure, weak lensing, cosmological simulations.
- Statistical methods and machine learning in astrophysics.

## EDUCATION

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<b>Undergraduate Student</b> , Department of Astronomy, Peking University, China	Sept 2016 - Now
<ul style="list-style-type: none"><li>• Major: Astrophysics. GPA: 3.83/4.00</li><li>• GRE General: verbal 153/170, quantitative 170/170, writing 3.5.</li><li>• GRE Physics: 990/990 (Percentile 94%)</li></ul>	<a href="#">  Detailed Transcript</a>
<b>Senior High School</b> , Dingxi NO.1 Middle School, Dingxi, Gansu	Aug 2013 – June 2016

## RESEARCH POSITIONS

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Undergraduate Research Intern, Yale University, U.S.	June 2019 – Sept 2019
Undergraduate Research Fellow, University of California, Santa Cruz, U.S.	Oct 2018 – Jan 2019
Undergraduate Research Assistant, Peking University, China	July 2017 – Now

## RESEARCH EXPERIENCE

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### **Multi-resolution filtering: an empirical method for isolating faint, extended emission in Dragonfly data and other low resolution images**

**Advisor:** [Pieter van Dokkum](#) June 2019 – Sept 2019

We developed an empirical, self-contained method “Multi-resolution filtering” (MRF) to isolate and study faint, large-scale emission in imaging data of low spatial resolution. The method was developed for the Dragonfly Telephoto Array, which produces images that have excellent low surface brightness sensitivity but poor spatial resolution. The resulting image only contains emission fainter than a pre-defined surface brightness limit. The method is implemented in [mrf](#), an open-source MIT licensed Python package.

### **Reaching for the Edge: Probing the Outskirts of Massive Galaxies with HSC, DECaLS, SDSS and Dragonfly**

**Advisor:** [Alexie Leauthaud](#), [Song Huang](#) Sept 2018 – Now

We compared the abilities to detect massive galaxy outskirts and related systematics for Hyper Suprime-Cam (HSC), Dark Energy Camera Legacy Survey (DECaLS), Dragonfly Telephoto Array and SDSS. Dragonfly shows outstanding ability on recovering outskirts of low- $z$  bright galaxies to 30 mag/arcsec<sup>2</sup>. Good agreements are achieved between HSC and DECaLS profiles of intermediate- $z$  galaxies down to 28 mag/arcsec<sup>2</sup> ( $\sim 100$  kpc). HSC profiles converge to zero intensity smoothly to  $\sim 300$  kpc without any evidence of over-subtraction. This work serves as a good reference for low surface brightness studies using different datasets.

## SDSS IV MaNGA: Inside-out quenching galaxies with H $\alpha$ ring-like structures

**Advisor:** [Yingjie Peng](#)

July 2017 – Now

We investigated galaxies with H $\alpha$  emission ring-like structures in Mapping Nearby Galaxies at APO (MaNGA) survey, with stellar mass in the range of  $10.0 < \log(M/M_{\odot}) < 11.5$ . They are located in the “green valley” and experiencing the inside-out quenching process. We measure the radii of H $\alpha$  rings and find that bars are just stuck in the H $\alpha$  rings. High bar fraction, high AGN (Seyfert/LINER) fraction and high bulge-to-total ratio support that the joint effects of bar, bulge and AGN could quench the massive disk galaxies efficiently by the inside-out quenching mode and form the H $\alpha$  ring-like structure.

## HONORS AND AWARDS

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<a href="#">Tang Li-Xin Scholarship</a> (唐立新奖学金) (10,000 RMB per year)	May 2019
<a href="#">AEON Scholarship</a> , Peking University (10,000 RMB)	Sept 2018
<a href="#">Leo KoGuan Scholarship</a> (廖凯原奖学金), Peking University (10,000 RMB)	Oct 2017
Weiming Physics Outstanding Student (未名物理学子) (7,000 RMB per year)	2017, 2018, 2019
National Undergraduate Research & Training Program (10,000 RMB)	May 2019
<a href="#">Linbridge Prize</a> for Excellent Undergraduate Astronomy Research (2,800 RMB)	Sept 2018
Merit Student, Peking University	2017, 2018
First Prize, 8 <sup>th</sup> China Undergraduate Physicists Tournament	Aug 2017
Meritorious Winner in Mathematical Contest In Modeling (MCM/ICM)	Apr 2018
8 <sup>th</sup> Place in Beijing Division, AI Challenger: <a href="#">SEARCHING SUPERNOVAE IN SKY SURVEY</a>	Apr 2019
Silver Medal, 9 <sup>th</sup> International Olympiad on Astronomy and Astrophysics (IOAA)	Aug 2015
Gold Medal & Best Result, China National Astronomy Olympiad	2014, 2015
Gold Medal (3 <sup>rd</sup> place), 1 <sup>st</sup> Princeton University Physics Competition	Jan 2015

## COMPUTER SKILLS

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<b>Skilled Languages:</b>	Python, L <sup>A</sup> T <sub>E</sub> X, Mathematica, Shell/Bash, Git.
<b>Experienced with:</b>	<ul style="list-style-type: none"><li>• Significant experience with <a href="#">HSC</a>, <a href="#">DECaLS</a>, <a href="#">Dragonfly</a> and <a href="#">SDSS-MaNGA</a> data</li><li>• Manipulating catalogs, analyzing dataset and visualization</li><li>• Photometry of galaxies and low surface brightness features</li></ul>
<b>Often-used Packages:</b>	<a href="#">Astropy</a> , <a href="#">IRAF</a> , <a href="#">The tractor</a> , <a href="#">GalSim</a> , <a href="#">emcee</a> , <a href="#">PyTorch</a> .
<b>Basic Knowledge:</b>	SQL/ADQL, C/C++, Lightroom, Photoshop.
<b>Software Contributions:</b>	<ul style="list-style-type: none"><li>• <a href="#">mrf</a>: Multi-Resolution Filtering – a method for isolating faint extended emission in Dragonfly data and other low resolution images</li><li>• <a href="#">kungpao</a>: Photometric analysis library for Hyper Suprime Camera images</li><li>• <a href="#">unagi</a>: Search and download data from Hyper Suprime Camera Subaru Strategic Survey (HSC-SSP) on Subaru Telescope</li><li>• Some of my works can be found on Github: <a href="#">@AstroJacobLi</a></li></ul>

## OBSERVATIONAL EXPERIENCE

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Peking University 40-cm Telescope (PKUFT)	
Shane 3-m Telescope, UCO Lick Observatory: 2 nights observation of spectroscopy.	Jan 2019

## LANGUAGES

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<b>English:</b> Fluent.
TOEFL iBT: <a href="#">109 (Jan 05, 2019)</a> .
Reading: 29, Listening: 28, Speaking: 24, Writing: 28.

## LEADERSHIP EXPERIENCE

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President of Peking University [Youth Astronomy Society](#) (YAS)  
Monitor of Undergraduate Class 2016, Department of Astronomy

May 2017 – May 2018  
Sept 2016 – Now

## ACTIVITIES AND TALKS

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Presentation in HSC galaxy group telecon	June 2019
<a href="#">Theoretical Problems Designer</a> , 12 <sup>th</sup> IOAA	Nov 2018
PKU Undergraduate Astronomy Symposium	Sept 2018
Mentor, Training for Chinese National Astronomy Olympiad Team	July 2018
PKU Representative, “Young Talent Plan” 10 Year Anniversary Symposium, USTC	July 2018
Asian Science Camp, Kampar, Malaysia	Aug 2017
Pacific Astronomy and Engineering Summit, Hawaii, U.S.	Aug 2014

## REFERENCES

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<b>Prof. Yingjie Peng</b> ✉ <a href="mailto:yjpeng@pku.edu.cn">yjpeng@pku.edu.cn</a>	Kavli Institute on Astronomy and Astrophysics, Peking University
<b>Prof. Alexie Leauthaud</b> ✉ <a href="mailto:alexie@ucsc.edu">alexie@ucsc.edu</a>	University of California, Santa Cruz
<b>Prof. Pieter van Dokkum</b> ✉ <a href="mailto:pieter.vandokkum@ucsc.edu">pieter.vandokkum@ucsc.edu</a>	Yale University
<b>Dr. Song Huang</b> ✉ <a href="mailto:shuang89@ucsc.edu">shuang89@ucsc.edu</a>	University of California, Santa Cruz