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Chisen-Lupus

Yichen Liu

=author:("liu,yichen") keyword:("astrophysics")

EDUCATION

University of Arizona | Steward Observatory   **Expected 2024/08**
- Ph.D. Student (Advisor: Professor Xiaohui Fan)

University of Illinois at Urbana-Champaign | College of Liberal Arts & Sciences   **2022/08 - 2024/05**
- Bachelor of Science in **Astrophysics** (Highst Distinction) and **Mathematics** (Highest Distinction), **3.95/4.00**
- Minors in **Physics**, **Computer Science**, and **Chemistry**
- Graduated with **James Scholar Honor** and **Cum Laude**

University of Macau | Faculty of Science and Technology   **2019/08 - 2022/05**
- Completed Junior Year of **Applied Physics and Chemistry** (**Honour**) major and **Sociology** minor

RSEARCH EXPERIENCES

Research Assistant (advisor: Professor Xin Liu), *Department of Astronomy*   **2022/09 - Present**
- **Instance segmentation in sky surveys with deep learning (NCSA SPIN internship)**   DeepDISC & Publication 3|
- **SED fitting and AGN selection of DES sources in Stripe 82 field**   DES-SED-Fitting|
- **Host galaxy properties of variable AGNs in HSC COSMOS field**   Dwarf-AGN-COSMOS & Publication 2|
- **Black hole - host galaxy relation of AGNs in DES deep fields (leading)**   Dwarf-AGN-COSMOS & Publication 1|
- **Redshift estimation of distant galaxies with deep learning (NCSA SPIN internship)**   rail_deepdisc|

Summer Internship (advisor: Professor Chaojian Wu), *National Astronomical Observatory of China*   **2022/06 - 2022/08**
- **Meteor slitless spectrum analysis captured by DSLR camera (leading)**   Metspec|

Research Assistant (advisor: Professor Hongchao Liu), *Institute of Applied Physics& Materials Engineering*   **2019/09 - 2022/05**
- **Stability of ghost imaging in varied environment conditions**   Publication 5|
- **Image encryption based on computational ghost imaging (leading)**   gradient-orthogonalization & Publication 4|
- **Advancement in ghost imaging through neural network (leading)**   CNN_SEGI|

PUBLICATIONS

(3 in Total, Total Citation: 16, First-Author Citation: 8)

First-Author Publications

1. **Yichen Liu**, Peixia Zheng, Hong-Chao Liu, "Anti-loss-compression image encryption based on computational ghost imaging using discrete cosine transform and orthogonal patterns," Optics Express 30, 14073 (2022)

Co-Author Publications

1. Colin J. Burke, **Yichen Liu**, Charlotte A. Ward, Xin Liu, Priyamvada Natarajan, Jenny E. Greene, "Dwarf AGNs from Variability for the Origins of Seeds (DAVOS): Properties of Variability-Selected AGNs in the COSMOS Field and Expectations for Rubin Observatory," arXiv e-prints , arXiv:2402.06882 (2024)

2. Grant Merz, **Yichen Liu**, Colin J. Burke, Patrick D. Aleo, Xin Liu, Matias Carrasco Kind, Volodymyr Kindratenko, Yufeng Liu, "Detection, instance segmentation, and classification for astronomical surveys with deep learning (DEEPDISC): DETECTRON2 implementation and demonstration with Hyper Suprime-Cam data," Monthly Notices of the Royal Astronomical Society 526, 1122 (2023)

old versions

1. **Yichen Liu**, Xin Liu, et al., "Black hole - host galaxy relations of dwarf AGNs in DES supernova field up to $z \sim 3.4$", In prep.

2. **Yichen Liu**, Colin J. Burke, Charlotte A. Ward, Xin Liu, Priya Natarajan, Jenny E. Greene, "Dwarf AGNs from Variability for the Origins of Seeds (DAVOS): Properties of Variability-Selected AGNs in the COSMOS Field and Expectations for Rubin Observatory", submitted to ApJ and available at arXiv

3. Grant Merz, **Yichen Liu**, Colin J. Burke, Patrick D. Aleo, Xin Liu, Matias Carrasco Kind, Volodymyr Kindratenko, Yufeng Liu, "Detection, Instance Segmentation, and Classification for Astronomical Surveys with Deep Learning (DeepDISC): Detectron2 Implementation and Demonstration with Hyper Suprime-Cam Data," MNRAS 526, 1122 (2023)
4. **Yichen Liu**, Peixia Zheng, Hong-Chao Liu, "Anti-loss-compression image encryption based on computational ghost imaging using discrete cosine transform and orthogonal patterns," Optics Express 30, 14073 (2022)
5. Peixia Zheng, **Yichen Liu**, Hong-Chao Liu, "Single-pixel imaging and metasurface imaging," Infrared and Laser Engineering 50, 20211058-1 (2022)

SYNERGISTIC ACTIVITIES

Summer schools:	University of California Berkeley (Remote), 4.000/4.000	06/2022 - 08/2022
	Shanghai Jiao Tong University (Shanghai, China), 4.00/4.00	06/2021 - 08/2021
Presentations:	AAS 243rd Meeting (LA, US), **Oral presenter**	Planned 2024/01
	STEM Career Exploration and Symposium (IL, US), **Poster Presenter**	2023/07
	NCSA lighning talk (IL, US), **Oral presenter**	2023/07
	EU Contest for Young Scientists (Sofia, Bulgaria), **Poster Presenter**	2019/09
Membership:	LSST Dark Energy Science Collaboration	2023/09 - Present

OBSERVATION EXPERIENCES

• Cerro Tololo Inter-American Observatory, Blanco 4m / DECam: 3 nights observation	2023/01 - 2023/04
• Personal Remote Observatory, BKP250 / QHY9sm: astrophotography and photometry	2019/08 - 2022/08

AWARDS AND GRANTS

• AAS 243rd Meeting Travel Grants from Department of Astronomy	2023/10
• University of Illinois Dean's Honor List (2022-2023)	2023/07
• Smart Star Sponsorship for studies at University of California, Berkeley	2022/06
• University of Macau Dean's Honour List (2020 and 2022)	2022/08
• Residential College Summer Programme Sponsorship for studies at Shanghai Jiao Tong university	2021/05
• Third Prize, China Undergraduate Physics Tournament	2020/10
• National Team Leader at the 2019 European Union Contest for Young Scientists	2019/09
• University of Macau Full Scholarship (2019-2021)	2019/08
• Bronze Medal, International Olympiad of Astronomy and Astrophysics	2018/11
• First Prize, China Adolescents' Science and Technology Innovation Contest	2018/08
• Second Prize, China National Astronomy Olympiad	2018/05

TEACHING EXPERIENCES

Undergraduate Tutor, *Department of Astronomy, University of Illinois at Urbana-Champaign (IL, US)* **2023/01 - 2023/05**

- Crafted and facilitated engaging tutorial workshops for undergraduate astronomy and physics majors, encompassing core principles in thermal physics, quantum physics, and astrophysics, to enhance their foundational course understanding

Physics and Mathematics Video Creator on Bilibili *(Remote)* **2021/09 - 2022/08**

- Developed and disseminated instructional material in physics and mathematics for a broad audience on the Bilibili platform, focusing on undergraduate-level topics and autonomous learning resources, such as the computation of the zeta function
- Achieved widespread outreach with the most popular video surpassing 160,000 views, contributing to the public education

Organizer and Lecturer of Seminar of Physics, *University of Macau (Macau SAR, China)* **2022/02 - 2022/05**

- Established and coordinated a comprehensive lecture series at the University of Macau with my peer, Jiheng Duan, delivering in-depth explorations of advanced mathematical and physical concepts that went beyond the standard curriculum
- Authored a comprehensive guide for freshmen, providing a roadmap for academic development and future study preparation

- Developed and delivered *SPUM 102 The tools of physical tools*, a weekly lecture series encompassing topics such as complex variables, gamma functions, integral transforms, delta functions, and Green's functions, with a detailed syllabus provided
- Made lecture recordings accessible to the public on Youtube, extending the reach of these resources beyond the classroom

EXTRACURRICULAR EXPERIENCES

Astrophotographer, *Personal 10-Inch Remote Observatory (Hebei, China)* **2019/08 - 2022/08**
- Sourced and developed a 2×2-meter unattended observatory with full internet connectivity and a retractable roof

Director, *Physics Society, University of Macau (Macau SAR, China)* **2020/08 - 2021/02**
- Established and expanded the Physics Society, leading promotional efforts and significantly growing its membership
- Guided undergraduates through the China Undergraduate Physics Tournament, enhancing the society's academic community

Student Helper, *Department of Physics and Chemistry, University of Macau (Macau SAR, China)* **2020/07 - 2020/10**
- Handled equipment procurement processes and budget recommendations, streamlining the department's operations

President, *Beijing Youth Astronomy Union (Beijing, China)* **2017/08 - 2018/08**
- Organized public stargazing events adjacent to Beijing's Olympic Park to foster community engagement in astronomy
- Managed the WeChat account "北京市中学生天文联盟", achieving widespread readership with a post over 100,000 views
- Orchestrated Beijing Astronomy and Astrophysics Olympiad, liaising with high schools nationwide for participation

SUMMARY OF TECHNICAL SKILLS

Programming:	Python/Jupyter, LaTeX, MATLAB, Git, Arduino, Bash/Zsh, C/C++, Mathematica, Julia, docker, SQL, and Java
Softwares:	MaxIm DL, COMSOL, Altium Designer, KiCAD, Solidworks, Cinema 4D, and SPSS
Python Packages:	AstroPy, Scarlet, PyTorch, Detectron2, CIGALE, and PyQSOFit
Machine Learning:	Neural (CNN, RNN, Mask R-CNN, ResNet, and Transformer)