# Mengyuan XIAO

(She/her/hers)
Postdoctoral Researcher

#### Research Interests

- The first generation of massive galaxies in the early Universe.
- The dusty star-forming galaxies in the early Universe.
- Star-formation, interstellar medium properties, and kinematics in high-redshift galaxies.

#### Education

- 2023- **Postdoctoral fellow**, *Geneva observatory*, University of Geneva, Advisor: Prof. Pascal Oesch
- 2018- PhD Degree in Astrophysics, School of Astronomy & Space Science, Nanjing University
- 2022 Advisors: Dr. David Elbaz and Prof. Qiu-Sheng Gu
  - **2019-2022**, *Joint PhD student*, CEA Saclay, France, Advisor: Dr. David Elbaz **Feb-May 2019**, *Visiting student*, NAOJ, Japan, Host: Assoc. Prof. Daisuke Iono
- 2014- Master Degree in Astrophysics, School of Astronomy & Space Science, Nanjing
- 2018 University, Advisor: Prof. Qiu-Sheng Gu
  - Aug-Oct 2017, Visiting student, NAOJ, Japan, Host: Assoc. Prof. Daisuke Iono
- 2009- Bachelor of Science, Science of Chinese Materia Medica, School of Pharmacy, Nanjing
- 2013 University of Traditional Chinese Medicine

# Honors and Awards

- 2024 Excellent Doctoral Thesis in the Jiangsu Province.
- 2024 Excellent Doctoral Thesis of Nanjing University.
- 2023 MERAC Awards by Swiss Society for Astrophysics and Astronomy (SSAA).
- 2022 Nanjing University Cao Erjie Scholarship.
- 2021 Nanjing University Excellent Postgraduate.
- 2019 2019-2021 China Scholarship Council (CSC) Scholarship.
- 2019 Provincial Excellent Master's Thesis.
- 2018 Nanjing University Yingcai Scholarship for Graduate Student.
- 2017 Excellent Postgraduate in the Jiangsu Province.
- 2016 Nanjing University Excellent Postgraduate.
- 2016 National Scholarship (the most prestigious scholarship in China).
- 2015 Nanjing University Excellent Postgraduate Cadre.

- 2015 President of Postgraduate Student Union in School of Astronomy & Space Science.
- 2013 Nanjing University of Traditional Chinese Medicine People's Scholarship.
- 2012 Nanjing University of Traditional Chinese Medicine People's Scholarship.

# Teaching Experience and Student Supervision

- 2024 Teaching for Galaxies and cosmology an introduction at the University of Geneva.
- 2024- Supervision of semester thesis projects for Master student at the University of Geneva: present
  - A. Okeanova: "Unveiling the fast formation of ultra massive galaxies (monsters) in the first Billion years"
  - A. Sawarkar: "Spotlight on the most extreme and spectacular galaxy populations in the early Universe with JWST"
- 2023- Supervision of Master Thesis for A. Ganguly: "Galaxy Morphology with the James Webb present Space Telescope at Redshifts beyond 3"
- 2017 Teaching assistant for *Extragalactic Astrophysics* at Nanjing University (professor: Dr. Qiusheng Gu).
- 2016 Teaching assistant for *Extragalactic Astrophysics* at Nanjing University (professor: Dr. Qiusheng Gu).

# Community Activities and Outreach

- 2023- Referee for Astronomy and Astrophysics present
- 2024 *Co-Organizer* of colloquium, journal club talk, and academic visit at Geneva Observatory: Dr. Emanuele Daddi (CEA-Saclay, France), Dr. Boris Kalita (KIAA/IPMU, Japan), PhD candidate Yi Xu (Tokyo U., Japan), Master candidate Yuta Ishikawa (Waseda U., Japan)
- 2024 *Co-Organizer* of European Astronomical Society Annual Meeting; SS9: "Dust enrichment of early galaxies (z > 5) in the era of JWST and ALMA"
- 2023 *Outreach*, Introducing the JWST during the open days of the 250th Anniversary of the Geneva Observatory
- 2016 LOC, the Star Formation and SMBH accretion across the Universe, Nanjing, China
- 2015 LOC, the 2nd China MaNGA workshop, Nanjing, China

### Computer Skills

- Skilled in Python and IDL.
- Experienced in data reduction for interferometric imaging and spectra.
- Experienced in the tool of image photometric reduction, decomposition, and SED fitting.
- Experienced in the tool of gas kinematics, galaxy blind detection, stellar population synthesis, and general spectral analysis.

# Languages

Chinese: Native
 English: Advanced
 French: A1

### Conference & Seminar Contributions

- Invited Talk, Workshop 'Big Galaxies, Big Problems', Leiden, Netherlands, April, 2025
- Talk, Conference 'The 40th IAP Symposium: Unveiling the physics of early galaxy and black hole formation with JWST', Paris, France, Dec, 2024
- Talk, Conference 'Beyond the Edge of the Universe', Sintra, Portugal, Oct, 2024
- Talk, Conference 'Observing and Simulating Galaxy Evolution in the Era of JWST', Ascona, Switzerland, Aug, 2024
- Talk, EAS Symposium 'New light on Galaxies from Cosmic Dawn to Noon', Padova, Italy, July, 2024
- Talk, EAS Special Session 'Removing the Disguise: SMGs in the era of JWST', Padova, Italy, July, 2024
- Invited Talk, Conference 'Cosmic Odysseys 2024: The Interstellar Medium of Galaxies and AGN since Cosmic Dawm', Crete, Greece, July, 2024
- Talk, Conference 'Extreme galaxies in their extreme environments at extremely early epochs', Reykjavík, Iceland, April, 2024
- Invited Talk, Conference 'The Growth of Galaxies in the Early Universe –IX', Sesto, Italy, Jan, 2024
- Seminar Talk, Title 'A new era of studying extremely dust-obscured massive galaxies in the early Universe with JWST and ALMA', NAOJ, Japan, Nov, 2023
- Talk, Conference 'Resolving the Extragalactic Universe with ALMA & JWST', Tokyo, Japan, Nov, 2023
- CakeTalk,Title 'FRESCO: A new era of studying extremely dust-obscured massive galaxies in the early Universe with JWST spectroscopy', DAWN, Denmark, Aug, 2023
- Talk, Title 'Towards a Complete Picture of Galaxy Build-up at the First 3 Billion Years', Yunnan University, China, Jun, 2022
- Talk, Workshop 'Sino-French workshop on confronting simulations with observations of high-redshift galaxies and (proto)clusters', Online, Nov, 2021
- Talk, Workshop 'High-z dusty galaxies', Marseille, France, Oct, 2021
- Two Posters (Lightning Talks), European Astronomical Society Annual Meeting (EAS Leiden 2021), Online, Jun, 2021
- Talk, Conference 'Galaxy Cluster Formation II (GCF 2021)', Online, Jun, 2021
- Poster (Lightning Talk), Workshop on Protoclusters: Galaxies in Confinement, Online, Nov. 2020
- Invited Talk, Conference 'THE GROWTH OF GALAXIES IN THE EARLY UNIVERSE VI', Sesto, Italy, Jan, 2020

- Seminar Talk, Title 'Starbursts with regular rotating disks in z=2.51 Cluster', NAOJ, Japan, May, 2019
- Lightning Talk, Galaxy Evolution Workshop 'The Co-Evolution of Galaxies and Their Central Regions', Dali, China, Oct, 2018
- Talk, 2018 Annual Meeting of Chinese Astronomical Society, Kunming, China, Oct, 2018
- Talk, 2017 Annual Meeting of Chinese Astronomical Society, Urumqi, China, Aug, 2017
- Poster, Asia-Pacific Regional IAU Meeting, Taipei, China/Taiwan, Jul, 2017
- ullet Talk, The  $19^{th}$  CAS Guoshoujing Symposium on Galaxies and Cosmology, Beijing, China, Jul, 2016
- Lightning talk, CLOUDY workshop, Shandong, China, Jun, 2016

### Approved Proposals

- 2024 IRAM NOEMA Interferometer (ID: W24EP, Time awarded: 18.0 hrs) PI Studying the efficient formation of three monsters in  $z_{spec} \sim 6.7$  overdensity (PI: David Elbaz & **Mengyuan Xiao**)
- 2024 ALMA (ID: 2024.1.01744.S, Time awarded: 38.5 hrs) PI ALMA+JWST: studying the efficient formation of massive galaxies at  $z_{spec}=3-5$  (PI: Mengyuan Xiao)
- 2023 JWST (ID: Cycle3 GO-5572, Time awarded: 16.8 hrs)

  Red Monsters: Kinematics of Two 'Universe Breaking', Ultra- Massive Galaxies in the First Gyr (PI: **Mengyuan Xiao**)
- 2023 ALMA (ID: 2023.1.00837.S, Grade A, Time awarded: 1.0 hrs) PI Hidden in plain sight: dynamical mass estimates for a newly-discovered red monster at  $z_{svec} \sim 5.6$  in the GOODS-S field (PI: **Mengyuan Xiao**)
- 2023 IRAM NOEMA Interferometer (ID: S23CY, Grade A, Time awarded: 12.0 hrs) PI Revealing the interstellar medium of two extremely massive galaxies at  $z_{spec} > 7$  (PI: David Elbaz & **Mengyuan Xiao**)
- 2019 IRAM 30m (ID: 204-19, Time awarded: 19.45 hrs)
  Probing Molecular Gas in Extremely Compact Starbursts as Major Merger Remnants (PI: Mengyuan Xiao)
- 2024 IRAM NOEMA Interferometer (ID: W24EA, Time awarded: 24.0 hrs) Co-I Residual Cold Gas in A Descendant of High-z Ultra-Massive Galaxies (PI: Longji Bing)
- 2024 ALMA (ID: 2024.1.00638.S, Time awarded: 24.4 hrs) Co-I Toward the Representative [CII] 158um Lines in the Reionization Era (PI: Yoshi Fudamoto)
- 2024 ALMA (ID: 2024.1.00106.S, Time awarded: 35.3 hrs) Co-I A survey of cold molecular gas in  $z\sim6.5$  quasars and their companion galaxies (PI: Romain Meyer)

- 2023 JWST (ID: Cycle 3 GO-4762, Time awarded: 15.3 hrs)

  Panchromatic characterizations of the super-Eddington accretion black hole, host, and environment: Epicenter of red dots, mergers, and dusty starbursts at z=7.2 (PI: Seiji Fujimoto)
- 2023 JWST (ID: Cycle 3 GO-5664, Time awarded: 44.8 hrs)

  Dissecting Little Red Dots: the connection between early SMBH growth and cosmic reionization (PI: Jorryt Matthee)
- 2023 IRAM NOEMA Interferometer (ID: W23CX, GradeA, Time awarded: 13.5 hrs) Co-I Exploring an ultra-massive and extremely efficient star forming galaxy at high redshift (PI: Guilaine Lagache)
- 2023 IRAM NOEMA Interferometer (ID: W23CJ, GradeA, Time awarded: 24.4 hrs) Co-I COSMOS DSFGs Unveiled: A Comprehensive Identification (PI: Alexandre Beelen)
- 2023 VLA (ID: 23B-125, GradeA, Time awarded: 29.3 hrs) Co-I A systematic CO(1-0) survey of z=2.5-4 protocluster cores (PI: Luwenjia Zhou)
- 2022 VLA (ID: 22B-243, GradeB, Time awarded: 13.15 hrs)

  The true extent of the cold gas content in a red sequence progenitor (PI: Carlos Gómez-Guijarro)
- 2022 VLT KMOS (ID: 110.23UN, Time awarded: 12 hrs)

  Instantaneous star formation rate to uncover the role of compact star formation in galaxy evolution (PI: Carlos Gómez-Guijarro)
- 2022 VLT KMOS (ID: 110.240K, Time awarded: 21.25 hrs) Co-I Uncovering the role of optically dark galaxies in an overdensity at z=3.5 (PI: Maximilien Franco)
- 2022 IRAM NOEMA Interferometer (ID: S22CN, Time awarded: 20.0 hrs) Co-I Optically dark galaxies in the EGS field (PI: Maximilien Franco)
- 2022 IRAM NOEMA Interferometer (ID: S22DG, Time awarded: 24.0 hrs) Co-I Unveiling the most massive galaxies at z  $\sim$  6 with NOEMA (PI: David Elbaz)
- 2021 IRAM NOEMA Interferometer (ID: M21AA, Time awarded: 159.0 hrs) Co-I NOEMA formIng-Clusters Evolution survey (NICE): unveiling the physics of galaxies and structure assembly at 2 < z < 3.5 (PI: Emanuele Daddi, Tao Wang)
- 2021 IRAM NOEMA Interferometer (ID: W21CV, Time awarded: 39.5 hrs) Co-I A Complete Census on the Counterparts of DSFGs in GOODS-N (PI: Longji Bing)
- 2021 ALMA (ID: 2021.1.01650.S, Time awarded: 24.5 hrs) Co-I Towards a systematic redshift determination of HST-dark galaxies (PI: Kotaro Kohno)
- 2021 ALMA (ID: 2021.1.00815.S, Time awarded: 39.8 hrs) Co-I Testing structure formation, quenching and gas accretion models with a sample of 36 groups/clusters at 2 < z < 3.5 (PI: Emanuele Daddi)
- 2021 JVLA (ID: VLA/21A-276, Time awarded: 25.20 hrs) Co-I A deep CO(1-0) survey towards the most distant known galaxy cluster at z=2.51 (PI: Tao Wang)

2019 JVLA (ID: VLA/20A-334, Time awarded: 36.20 hrs) Co-I A deep CO(1-0) survey towards the most distant known galaxy cluster at z=2.51 (PI: Tao Wang) 2019 IRAM NOEMA Interferometer (ID: W19BJ, Time awarded: 6 hrs) Co-I CO observation of a star-forming SO galaxy PGC 34107 (PI: Xue Ge) Co-I 2019 IRAM 30m (ID: 199-19, Time awarded: 15.2 hrs) Molecular gas in low-mass star-forming S0 galaxies (PI: Xue Ge) 2018 JVLA (ID: VLA/19A-443, Time awarded: 49 hrs) Co-I A deep and sharp view of CO(1-0) towards the most distant galaxy cluster at z=2.51with JVLA (PI: Tao Wang) Co-I 2018 IRAM NOEMA Interferometer (ID: P329857, Time awarded: 2.5 hrs) The properties of star formation and post-starburst in a S0 galaxy (PI: Xue Ge)

### On-site Observing Experience

- 2020 IRAM 30m telescope, on-site observing, 7 nights, Pico Veleta, Spain
- 2017 CAHA 3.5m telescope, on-site observing, 3 nights, Calar Alto, Spain
- 2014 2.16m telescope, on-site observing, 1 night, Xinglong, China

#### List of Publications and Present Work

9 primary author papers (6 first-author papers and 3 additional primary author publications), 280 citations (current as of 14-Jan-2025), h-index 7, ADS library 38 total papers, 1143 citations (current as of 14-Jan-2025), h-index 18, ADS library

#### **Primary Author Papers**

- 2024 PANORAMIC: Discovery of an Ultra-Massive Grand-Design Spiral Galaxy at  $z\sim5.2$  Xiao, M.-Y., Williams, C. C., Oesch, P. A., Elbaz, D., and the JWST PANORAMIC team, submitted to A&A; arXiv:2412.13264
- 2024 Accelerated Formation of Ultra-Massive Galaxies in the First Billion Years

  Xiao, M.-Y., Oesch, P.A., Elbaz, D., L., Bing, and the JWST FRESCO team, Nature,
  635, 311
- 2024 Discovery of a new N-emitter in the epoch of reionization Schaerer, D., Marques-Chaves, R., Xiao, M.-Y., et al. 2024, A&A, 687, L11
- 2023 The hidden side of cosmic star formation at z>3: Bridging optically-dark and Lyman break galaxies with GOODS-ALMA

  Xiao, M.-Y., Elbaz, D., Gómez-Guijarro, C., Leroy, and the GOODS-ALMA team, A&A, 672, A18
- 2022 Starbursts with suppressed velocity dispersion revealed in a forming cluster at z=2.51 Xiao, M.-Y., Wang, T., Elbaz, D., Iono, D., et al. 2022, A&A, 664, A63
- 2022 GOODS-ALMA 2.0: Starbursts in the main sequence reveal compact star formation regulating galaxy evolution prequenching

  Gómez-Guijarro, C., Elbaz, D., Xiao, M.-Y., et al. 2022, A&A, 659, A196
- 2022 GOODS-ALMA 2.0: Source catalog, number counts, and prevailing compact sizes in 1.1 mm galaxies

  Gómez-Guijarro, C., Elbaz, D., Xiao, M.-Y., et al. 2022, A&A, 658, A43
- 2018 The Physical Characteristics of Interstellar Medium in NGC3665 with Herschel Observation Xiao, M.-Y., Zhao, Y.-H., Gu, Q.-S., & Shi, Y. 2018, ApJ, 854, 111
- 2016 The Nuclear Activities of Nearby S0 Galaxies

  Xiao, M.-Y., Gu, Q.-S., Chen, Y.-M., & Zhou, L. 2016, ApJ, 831, 63

### **Contributing Author Papers**

- 2024 Unveiling dust, molecular gas, and high star formation efficiency in extremely UV-bright star-forming galaxies at  $z\sim 2.1-3.6$  Dessauges-Zavadsky, M., Marques-Chaves, R., Schaerer, D., **Xiao, M.-Y.**, et al. 2024, A&A 693, A17
- The PANORAMIC Survey: Pure Parallel Wide Area Legacy Imaging with JWST/NIRCam Williams, C. C., Oesch, P. A., Weibel, A., ..., Xiao, M.-Y. 2024, arXiv:2410.01875

- JWST FRESCO: a comprehensive census of Hβ+[OIII] emitters at 6.8<sub>i</sub>z<sub>i</sub>9.0 in the GOODS fields
   Meyer, R. A., Oesch, P. A., Giovinazzo, E.,..., Xiao, M.-Y., et al. 2024, MNRAS, 535,
  - Meyer, R. A., Oesch, P. A., Giovinazzo, E.,..., **Xiao, M.-Y.**, et al. 2024, MINRAS, 535 1067
- 2024 A new census of dust and polycyclic aromatic hydrocarbons at z=0.7–2 with JWST MIRI
  - Shivaei, I., Alberts, S., Florian, M.,..., Xiao, M.-Y., et al. 2024, A&A, 690, A89
- 2024 A first look at spatially resolved star formation at 4.8 < z < 6.5 with JWST FRESCO NIRCam slitless spectroscopy

  Matharu, J., Nelson, E. J., Brammer, G.,..., Xiao, M.-Y. 2024, A&A, 690, A64
- 2024 NOEMA formlng Cluster survEy (NICE): Characterizing eight massive galaxy groups at 1.5 ; z ; 4 in the COSMOS field
  Sillassen, N. B., Jin, S., Magdis, G. E., Xiao, M.-Y., et al. 2024, A&A, 690, A55
- 2024 An  $H\alpha$  view of galaxy build-up in the first 2 Gyr: luminosity functions at  $z\sim 4-6.5$  from NIRCam/grism spectroscopy

  Covelo-Paz, A., Giovinazzo, E., Oesch, P. A., **Xiao, M.-Y.** 2024, arXiv:2409.17241
- 2024 Galaxy build-up in the first 1.5 Gyr of cosmic history: insights from the stellar mass function at z=4-9 from JWST NIRCam observations

  Weibel, A., Oesch, P. A., Barrufet, L.,..., Xiao, M.-Y. 2024, MNRAS, 533, 1808
- 2024 FRESCO: The Paschen-α Star-forming Sequence at Cosmic Noon Neufeld, C., van Dokkum, P., Asali, Y., ... Xiao, M.-Y. 2024, ApJ, 972, 156
- 2024 Measuring the gas reservoirs in  $10^8$  ;  $M_{\star}$  ;  $10^{11}$   $M_{\odot}$  galaxies at  $1 \le z \le 3$  Mérida, R. M., Gómez-Guijarro, C., Pérez-González, P. G.,..., Xiao, M.-Y. 2024, A&A, 686, A64
- Unveiling the hidden Universe with JWST: the contribution of dust-obscured galaxies to the stellar mass function at z = 3 8
   Gottumukkala, R., Barrufet, L., Oesch, P. A.,..., Xiao, M.-Y. 2024, MNRAS, 530, 966
- Noema formIng Cluster survEy (NICE): Discovery of a starbursting galaxy group with a radio-luminous core at z = 3.95
   Zhou, L., Wang, T., Daddi, E.,..., Xiao, M.-Y., et al. 2024, A&A, 684, A196
- 2024 Little Red Dots: An Abundant Population of Faint Active Galactic Nuclei at  $z\sim 5$  Revealed by the EIGER and FRESCO JWST Surveys

  Matthee, J., Naidu, R. P., Brammer, G.,..., Xiao, M.-Y., et al. 2024, ApJ, 963, 129
- 2024 Faint mm NIKA2 dusty star-forming galaxies: Finding the high-redshift population Bing, L.-J., Beelen, A., Lagache, G.,..., Xiao, M.-Y., et al. 2024, A&A, 683, A232
- 2023 Ionized Gas Kinematics with FRESCO: An Extended, Massive, Rapidly Rotating Galaxy at z=5.4

- Nelson, E. J., Brammer, G., Gimenez-Arteaga, C.,..., Xiao, M.-Y., et al. 2023, APJL, 976, L27
- 2023 The JWST FRESCO survey: legacy NIRCam/grism spectroscopy and imaging in the two GOODS fields
  Oesch, P. A., Brammer, G., Naidu, R. P.,..., Xiao, M.-Y. 2023, MNRAS, 525, 2864
- 2023 The IR Compactness of Dusty Galaxies Sets Star Formation and Dust Properties at  $z\sim 0-2$  McKinney, J., Pope, A., Kirkpatrick, A.,..., **Xiao, M.-Y.** 2023, ApJ, 955, 136
- 2023 Mapping dusty galaxy growth at z>5 with FRESCO: Detection of H $\alpha$  in submm galaxy HDF850.1 and the surrounding overdense structures

  Herard-Demanche, T., Bouwens, R. J., Oesch, P. A.,..., Xiao, M.-Y., et al. 2023, arXiv.2309.04525
- 2023 JWST CEERS probes the role of stellar mass and morphology in obscuring galaxies Gómez-Guijarro, C., Magnelli, B., Elbaz, D.,..., Xiao, M.-Y., et al. 2023, A&A, 677, A34
- 2023 Accelerated Structural Evolution of Galaxies in a Starbursting Cluster at z=2.51 Xu, C., Wang, T., Gu, Q.,..., Xiao, M.-Y., et al. 2023, ApJL, 951, L21
- The gas mass reservoir of quiescent galaxies at cosmic noon

  Blánquez-Sesé, D., Gómez-Guijarro, C., Magdis, G. E.,..., Xiao, M.-Y., et al. 2023, A&A, 674, A166
- 2023 GOODS-ALMA 2.0: Last gigayear star formation histories of the so-called starbursts within the main sequence

  Ciesla, L., Gómez-Guijarro, C., Buat, V.,..., Xiao, M.-Y. 2023, A&A, 672, A191
- 2022 Star-forming S0 galaxies in the SDSS-IV MaNGA survey
  Xu, K., Gu, Q., Lu, S., Ge, X., Xiao, M.-Y., & Contini, E. 2022, MNRAS, 509, 1237
- 2021 *PGC 38025: A Star-forming Lenticular Galaxy With an Off-nuclear Star-forming Core*Chen, Z.-Y., Gu, Q.-S., García-Benito, R., Zhang, Z.-Y., Ge, X., **Xiao, M.-Y.**, & Yu, X.-L 2021, APJ, 915, 1
- 2021 Investigating the Nature of MGRO J1908+06 with Multiwavelength Observations Li, J., Liu, R.-Y., Ona Wilhelmi, E.,..., Xiao, M.-Y. 2021, APJL, 913, L33
- 2020 GOODS-ALMA: The slow downfall of star formation in z=2–3 massive galaxies Franco, M., Elbaz, D., Zhou, L., Magnelli, B., Schreiber, C., ... Xiao, M.-Y. 2020, A&A, 643, A30
- 2020 GOODS-ALMA: Using IRAC and VLA to probe fainter millimeter galaxies
  Franco, M., Elbaz, D., Zhou, L., Magnelli, B., Schreiber, C., ... Xiao, M.-Y. 2020, A&A, 643, A53
- 2020 The Physical Properties of S0 Galaxy PGC 26218: The Origin of Starburst and Star Formation
  Ge, X., Gu, Q.-S., García-Benito, R., Xiao, M.-Y., & Li, Z.-N. 2020, ApJ, 889, 132

2018 Revealing the Environmental Dependence of Molecular Gas Content in a Distant X-Ray Cluster at z=2.51

Wang, T., Elbaz, D., Daddi, E., Liu, D.-Z., ..., Xiao, M.-Y., et al. 2018, ApJL, 867, L29