

# Sangjun Cha — CV

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## Education

### Yonsei University

*Integrated course in Astronomy*

2021/03 – present

Supervisor: Prof. Myungkook. James Jee

### Yonsei University

*B.S. in Astronomy & Physics (Double majors)*

2015/03 – 2021/02

## Research Interests

Strong gravitational lensing in the galaxy cluster scale

Merging galaxy clusters and dark matter

Weak gravitational lensing analysis using deep learning

## Publications

### First Author.....

[5]: A High-Caliber View of the Bullet Cluster Through JWST Strong and Weak Lensing Analyses, **Cha, S.**, Cho, B. Y., Joo, H., Lee, W., HyeongHan, K., Scofield, Z. P., Finner, K., Jee, M. J., 2025, arXiv:2503.21870, accepted in ApJL

[4]: Weak-lensing Mass Reconstruction of Galaxy Clusters with a Convolutional Neural Network. II. Application to Next-Generation Wide-Field Surveys, **Cha, S.**, Jee, M. J., Hong, S. E., Park, S., Bak, D., Kim, T., 2025, ApJ, 981, 52

[3]: Precision MARS Mass Reconstruction of A2744: Synergizing the Largest Strong-lensing and Densest Weak-lensing Data Sets from JWST, **Cha, S.**, HyeongHan, K., Scofield, Z. P., Joo, H., Jee, M. J., 2024, ApJ, 961, 186

[2]: Model-independent Mass Reconstruction of the Hubble Frontier Field Clusters with MARS Based on Self-consistent Strong-lensing data, **Cha, S.**, Jee, M. J., 2023, ApJ, 951, 140

[1]: MARS: A New Maximum-entropy-regularized Strong Lensing Mass Reconstruction Method, **Cha, S.**, Jee, M. J., 2022, ApJ, 931, 127

### Co-Author.....

[8]: Is Earendel a Star?: Investigating the Sunrise Arc Using JWST Strong and Weak Gravitational Lensing Analyses, Scofield, Z. P., Jee, M. J., **Cha, S.**, Park, H., 2025, arXiv:2504.08879, submitted to ApJ

[7]: A dynamical mass measure of an inactive black hole in the distant universe, Newman, A. B., Gu, M., Belli, S., Ellis, R. S., Gangula, S., Greene, J. E., Walsh, J., Suyu, S. H., Ertl, S., Caminha, G. B., Granata, G., Grillo, C., Schuldt, S., Barone, T., Bird, S., Glazebrook, K., Jafariyazani, M., Kriek, M., Matthews, A., Morishita, T., Nanayakkara, T., Pierel, J. D. R., Acebron, A., Bergamini, P., **Cha, S.**, Diego, J. M., Foo, N., Frye, B. L., Fudamoto, Y., Jee, M. J., Kamieneski, P. S., Koekemoer, A. M., Meena, A. K., Nishida, S., Oguri, M., Rosati, P., Zitrin, A., 2025, arXiv:2503.17478, submitted

[6]: Cosmology with Supernova Encore in the strong lensing cluster MACS J0138-2155: photometry, cluster members, and lens mass model, Ertl, S., Suyu, S. H., Schuldt, S., Granata, G., Grillo, C., Caminha, G. B., Acebron, A., Bergamini, P., Cañameras, R., **Cha, S.**, Diego, J. M., Foo, N., Frye, B. L., Fudamoto, Y., Halkola, A., Jee, M. J., Kamieneski, P. S., Koekemoer, A. M., Meena, A. K., Nishida, S., Oguri, M., Pierel,

J. D. R., Rosati, P., Tortorelli, L., Wang, H., Zitrin, A., 2025, arXiv:2503.09718, submitted to A&A

[5]: SN H0pe: The First Measurement of  $H_0$  from a Multiply Imaged Type Ia Supernova, Discovered by JWST, Pascale, M., Frye, B. L., Pierel, J. D. R., Chen, W., Kelly, P. L., Cohen, S. H., Windhorst, R. A., Riess, A. G., Kamienieski, P. S., Diego, J. M., Meena, A. K., **Cha, S.**, Oguri, M., Zitrin, A., Jee, M. J., Foo, N., Leimbach, R., Koekemoer, A. M., Conselice, C. J., Dai, L., Goobar, A., Siebert, M. R., Strolger, L., Willer, S. P., 2025, ApJ, 979, 13

[4]: Weak-lensing detection of intracluster filaments in the Coma cluster, HyeonHan, K., Jee, M. J., **Cha, S.**, Cho, H., 2024, NatAs, 8, 377

[3]: Weak-lensing Analysis of the Complex Cluster Merger A746 with Subaru/Hyper Suprime-Cam, HyeonHan, K., Cho, H., Jee, M. J., Wittman, D., **Cha, S.**, Lee, W., Finner, K., Rajpurohit, K., Brüggen, M., Forman, W., Jones, C., van Weeren, R., Botteon, A., Lovisari, L., Stroe, A., Domínguez-Fernández, P., O'Sullivan, E., Vrtilek, J., 2024, ApJ, 962, 100

[2]: Weak-lensing Mass Bias in Merging Galaxy Clusters, Lee, W., **Cha, S.**, Jee, M. J., Nagai, D., King, L., ZuHone, J., Chadayammuri, U., Felix, S., Finner, K., 2023, ApJ, 945, 71

[1]: Weak-lensing Mass Reconstruction of Galaxy Clusters with a Convolutional Neural Network, Hong, S. E., Park, S., Jee, M. J., Bak, D., **Cha, S.**, 2021, ApJ, 923, 266

## Presentations

### Talk.....

**2024:** Probing Galaxy Clusters by Combining Strong and Weak Gravitational Lensing in the JWST Era / NOIRLab, University of Arizona / USA

**2024:** Probing Galaxy Clusters by Combining Strong and Weak Lensing in the JWST Era: Mass Reconstruction of Abell 2744 / The 11th KIAS Workshop on Cosmology and Structure Formation / South Korea / Contributed

**2024:** Do Globular Cluster Trace Dark Matter? / 2024 KAS Fall Meeting / South Korea / Contributed

**2024:** Constraining Cosmological Parameters through Strong Lensing / 2024 KAS Spring Meeting / South Korea / Contributed

**2023:** Precision MARS Mass Reconstruction of Abell 2744: Combining Large Strong and Weak Lensing Datasets from JWST / 2023 KAS Fall Meeting / South Korea / Contributed

**2022:** Wide-field Weak-lensing Mass Reconstruction with Improved Convolutional Neural Network / 2022 KAS Fall Meeting / South Korea / Contributed

**2022:** MARS Probe of Hubble Frontier Fields Clusters / IAUGA 2022 / South Korea / Contributed

### Poster.....

**2025:** Probing Galaxy Clusters from Cores to the Outskirts in the JWST Era: Mass Reconstruction of the Galaxy Cluster Abell 2744 by Combining Strong and Weak Lensing / Tracing Cosmic Evolution with Galaxy Clusters V / Italy

**2025:** Lensing through JWST: Greater Detail Nearby, New Perspectives High Redshift / EAS 2025 / Ireland

**2025:** Lensing Analysis of the Bullet Cluster with JWST / 2025 KAS Spring Meeting / South Korea

**2024:** Multi-resolution MAXimum-entropy Reconstruction Technique Integrating Analytic Node (Mr.MARTIAN): A New Hybrid Lensing Reconstruction Method for the JWST Era / The 11th KIAS Workshop on Cosmology and Structure Formation / South Korea

**2024:** Precision MARS Mass Reconstruction of A2744: Synergizing the Largest Strong-lensing and Densest Weak-lensing Data Sets from JWST / EAS 2024 / Italy

**2024:** Constraining Cosmological Parameters through Strong Lensing / EAS 2024 / Italy

**2023:** MAXimum-entropy ReconStruction (MARS): A New Strong-lensing Reconstruction Algorithm for the JWST Era / IAUS 381: Strong gravitational lensing in the era of Big Data / Italy

**2022:** A New Maximum-entropy-regularized Strong Lensing Mass Reconstruction Method / 240th AAS

Meeting / USA

## Fellowship & Awards

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**2021 – 2023:** Integrated Undergraduate-and-Graduate Program Scholarship (Yonsei University; Three-year full-tuition)

**2021 – 2023:** Brain Korea 21 Plus Fellowship (Yonsei University)

**2023:** Yonsei Merit Academic Paper Award (Yonsei University)

**2024 – 2026:** Doctoral Student Research Fellowship (National Research Foundation of Korea), ~\$40k

**2024:** Excellent Academic Paper Award (Yonsei University)

## Teaching Assistant

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**2021:** UNDERSTANDING OF SPACE (Yonsei University)

**2021:** ASTROPHYSICS (Yonsei University)

**2022:** INTRODUCTION TO ASTROPHYSICS (Yonsei University)

**2022:** SCIENTIFIC IMAGE DATA PROCESSING (Yonsei University)

## Outreach

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**2023:** Merging Cluster Workshop at Yonsei – Served as a LOC

## Military Service

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**2016 – 2017:** Korea National Police Agency Auxiliary Police  
Served as part of the mandatory military service in South Korea