

Sihao Cheng (程思浩)

Curriculum Vitae / May, 2021

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EDUCATION

Ph.D. & M.A., Physics and Astronomy <i>Johns Hopkins University</i> , United States advisor: Brice Ménard	2017–2021 (expected)
B.Sc. (with Honors), Astronomy <i>Peking University</i> , China advisor: Eric W. Peng	2012–2016

RESEARCH INTEREST

I am interested in using statistical analysis of large data set to obtain more understanding of our Universe, including topics in observational cosmology, stellar physics, and extrasolar planets. I am mainly working on two topics now: 1. a new statistic borrowing ideas from convolutional neural nets and its cosmological applications; 2. a cooling anomaly (which I discovered) of white dwarfs and the physics behind it.

AWARDS

2020 Outstanding Publication in Astrostatistics Award (student category)	Jan 2021
IAU travel grant for Symposium No.357	Oct 2019
Lin-Qiao Prize for Undergraduate Research at Peking University	Sept 2015
Wu-Si Scholarship	May 2015, May 2014

PUBLICATIONS

[Weak lensing scattering transform: dark energy and neutrino mass sensitivity](#)

Visualised what the scattering transform sees from a lensing mass map, and emphasised its advantage of having Gaussian likelihood

Sihao Cheng and Brice Ménard

2021, arXiv:2103.09247

[Forever young white dwarfs: when stellar ageing stops](#)

Camisassa, M. **et al.**

2021, *A&A Letters*, 649, 7

[A new approach to observational cosmology using the scattering transform](#)

Introduced a new statistic inspired by convolutional neural nets to observational cosmology, and demonstrated that it outperforms classic estimators

Sihao Cheng, Yuan-Sen Ting, Brice Ménard, and Joan Bruna

2020, *MNRAS*, 499, 5902

[An Increase in Small-planet Occurrence with Metallicity for Late-type Dwarf Stars in the Kepler Field and Its Implications for Planet Formation](#)

Cicero X. Lu, Kevin C. Schlaufman, and **Sihao Cheng**

2020, *AJ*, 160, 253

Multi-Gigayear White Dwarf Cooling Delays from Clustering-Enhanced Gravitational Sedimentation

Evan B. Bauer, Josiah Schwab, Lars Bildsten, and **Sihao Cheng**

2020, *ApJ*, 902, 93

A Gravitational Redshift Measurement of the White Dwarf Mass–Radius Relation

Used populational gravitational redshift to probe the white dwarf mass–radius relation over a wide mass range

Vedant Chandra, Hsiang-Chih Hwang, Nadia L. Zakamska, and **Sihao Cheng**

2020, *ApJ*, 899, 146

Carbon star formation as seen through the non-monotonic initial–final mass relation

Marigo, P. **et al.**

2020, *Nature Astronomy*

Double White Dwarf Merger Products among High-mass White Dwarfs

Measured the white dwarf merger rate with unprecedented high precision using a novel kinematic method

Sihao Cheng, Jeffrey D. Cummings, Brice Ménard, and Silvia Toonen

2020, *ApJ*, 891, 160

Two delays in white dwarf evolution revealed by *Gaia*

Sihao Cheng

2019, *Proceedings of IAU*, 15 (S357), 175

A Cooling Anomaly of High-mass White Dwarfs

Discovered an unexpected, extremely long cooling delay in a population of white dwarfs using *Gaia* data

Sihao Cheng, Jeffrey D. Cummings, and Brice Ménard

2019, *ApJ*, 886, 100

Meteor spectral observation with DSLR, normal lens and prism

Sihao Cheng and Simiao Cheng

2011, *JMO*, 39, 39

TALKS & PRESENTATIONS

Poster, <i>Where the Earth Meets the Sky</i> , online	May 2021
Seminar at the German Center for Cosmological Lensing	May 2021
Cosmology group meeting at University of Edinburgh	May 2021
Seminar at Shanghai Jiao Tong University	Apr 2021
Invited Talk , <i>White Dwarfs from Physics to Astrophysics</i> , KITP	Mar 2021
Cosmology group meeting at Harvard University	Mar 2021
Lunch talk at Peking University	Mar 2021
Seminar at Tsinghua University	Mar 2021
Colloquium (with Brice Ménard) at University of British Columbia	Mar 2021
Cosmology group meeting at Leiden	Jan 2021
Cosmology seminar at IPMU	Jan 2021
Cosmology seminar at IAP	Dec 2020
Lunch talk at University of Virginia/NRAO	Nov 2020
Euclid US telecon	Nov 2020
Cosmology/machine learning journal club at Fermilab	Oct 2020
Seminar at DIRAC, University of Washington	Oct 2020
(invited) Cosmology seminar at Duke University	Oct 2020
Seminar at Columbia University	Oct 2020
Astrophysics and Cosmology Seminar at University of Arizona	Sep 2020
Wine & Cheese seminar at Johns Hopkins University	Sep 2020
Cosmology journal club at University of Oxford	Sep 2020
<i>Euclid</i> Modelling working group	Sep 2020

Astrocoffee at Weizmann Institute of Science	Aug 2020
Contributed Talk, <i>Cosmology from Home</i>	Aug 2020
LSST DESC weak lensing mass mapping working group	Aug 2020
Astrophysics/Cosmology Seminar at University of Sussex	July 2020
Compact object journal club, STScI, Baltimore, MD	Apr 2020
Lunch Seminar at Indiana University, Bloomington, IN	Mar 2020
CTC seminar at University of Maryland, College Park, MD	Mar 2020
Thunch seminar at Princeton University and astro-coffee at IAS, Princeton, NJ	Feb 2020
A special seminar at Boston University, Boston, MA	Feb 2020
(invited) The Stars & Planets Seminar at Harvard-Smithsonian CfA, Cambridge, MA	Feb 2020
Contributed Talk, <i>White Dwarfs as Probes of Fundamental Physics and Tracers of Planetary, Stellar, and Galactic Evolution</i> , Hilo, HI (IAU grant awarded for travel)	Oct 2019
Contributed Talk, <i>The Beginnings and Ends of Double White Dwarfs</i> , Copenhagen, Denmark (grant awarded for travel)	July 2019
Poster, 2019 STScI Spring Symposium: <i>The Deaths and Afterlives of Stars</i> , Baltimore, MD	Apr 2019

TEACHING EXPERIENCE

Teaching assistant, Johns Hopkins University, Stars & the Universe	2019
Teaching assistant, Johns Hopkins University, Physics I & II	2017–2018

REFERENCES

Prof. Brice Ménard	menard@jhu.edu
Johns Hopkins University	1-443-345-6791
Prof. Marc Kamionkowski	kamion@jhu.edu
Johns Hopkins University	1-410-516-0373
Prof. Nadia L. Zakamska	zakamska@jhu.edu
Johns Hopkins University	1-410-516-6657
Dr. Yuan-Sen Ting	ting@ias.edu
Assistant professor (starting from Dec 2021), Australian National University	