

Chloe M. Cheng

Leiden Observatory, Leiden University
Einsteinweg 55, 2333 CC Leiden, The Netherlands
+31 71 527 2727

cheng@strw.leidenuniv.nl • [chloe-mt-cheng.github.io](https://github.com/chloe-mt-cheng) • github.com/chloe-mt-cheng

PRINCIPAL INTERESTS

Galaxy formation and evolution, with a particular interest in using spectroscopic techniques to measure elemental abundances and stellar population parameters.

EDUCATION

Doctor of Philosophy Expected Aug. 2026

[Leiden Observatory](#), Leiden University, Leiden, The Netherlands

- Supervisor: Professor [Mariska Kriek](#).
- Thesis: Unravelling the formation histories of distant quiescent galaxies using ultra-deep spectroscopy.
- Projects:
 - Age & metal gradients in massive quiescent galaxies at $0.6 \lesssim z \lesssim 1.0$ using LEGA-C. In prep.
 - Understanding the relationship between UVJ colours and ages and metallicities at $0.6 \lesssim z \lesssim 3.0$.
 - Age & metal gradients in massive quiescent galaxies at $1.0 \lesssim z \lesssim 3.0$ using JWST-SUSPENSE.
 - Measuring the stellar initial mass function in massive early-type galaxies at $z \sim 0.7$ using JWST.

Master of Science

Oct. 2022

[University of Waterloo](#), Department of Physics & Astronomy/Waterloo Centre for Astrophysics, Waterloo, Ontario, Canada

- Supervisor: Professor [Michael L. Balogh](#).
- Thesis: Testing the extremes of initial mass function variability using compact stellar systems (<http://hdl.handle.net/10012/18473>, [arXiv:2309.14415](#), [10.1093/mnras/stad2967](#)).
- Cum. GPA: 83.5% / 100%

Honours Bachelor of Science with Distinction

Jun. 2020

[University of Toronto](#), Faculty of Arts & Science, Trinity College, Toronto, Ontario, Canada

- Astronomy & Physics Specialist, Mathematics Minor
- Supervisor: Professor [Jo Bovy](#).
- Thesis: Testing the chemical homogeneity of chemically-tagged dissolved birth clusters ([10.1093/mnras/stab2106](#)).
- Cum. GPA: 3.24 / 4.0

OTHER RESEARCH EXPERIENCE

Research Assistant

May – Aug. 2019

GRIFIN Collaboration, TRIUMF, Vancouver, BC, Canada

- Supervisor: Dr. Adam B. Garnsworthy
- Project: Probing shape coexistence in ^{192}Hg through combined electron and γ -ray spectroscopy (established spin-parity assignments for negative-parity band and 8^- state; measured mixing ratio for $8^- \rightarrow 7^-$ transition).
- Hands-on work: re-configuring detectors; re-cabling data acquisition systems; assisting during experimental beam run-time (calibrating and monitoring equipment and experiment, communicating with beam operations staff).

NSERC USRA/Institute of Medical Science Research Student

May - Aug. 2018

Toronto Western Hospital/Krembil Research Institute, Toronto, ON, Canada

- Supervisor: Dr. Liang Zhang, Department of Fundamental Neurobiology
- Project: Verification of the mouse model for MRI-negative temporal lobe epilepsy (duties detailed below).
- Leadership role - taught, organized, supervised, and managed undergraduate students, International Research Fellows, and Faculty members.

PUBLICATIONS *As First Author*

- **Cheng, C. M.**, Kriek, M., Beverage, A. G., van der Wel, A., Bezanson, R., D'Eugenio, F., Franx, M., Mancera Piña, P. E., Nersesian, A., Slob, M., Suess, K. A., van Dokkum, P. G., Wu, P.-F. “Age and metal gradients in massive quiescent galaxies at $0.6 \lesssim z \lesssim 1.0$: implications for quenching and assembly histories”. In prep.
- **Cheng, C. M.**, Villaume, A., Balogh, M., Brodie, J. P., Martín-Navarro, I., Romanowsky, A. J., & van Dokkum P. G. “Initial mass function variability from the integrated light of diverse stellar systems”. 2023, MNRAS, 526, 4004, doi: [10.1093/mnras/stad2967](https://doi.org/10.1093/mnras/stad2967). [arXiv:2309.14415](https://arxiv.org/abs/2309.14415)
- **Cheng, C. M.**, Price-Jones, N., & Bovy, J. “Testing the chemical homogeneity of chemically tagged dissolved birth clusters”. 2021, MNRAS, 506, 5573, doi: [10.1093/mnras/stab2106](https://doi.org/10.1093/mnras/stab2106). [arXiv:2010.09721](https://arxiv.org/abs/2010.09721).

As Co-Author

- Beverage, A. G., et al. incl. **Cheng, C. M.**. “Iron and Carbon Deficiencies in Quiescent Galaxies at $z = 1 - 3$ from JWST-SUSPENSE: Implications for Star-Formation Timescales and the Evolution of the Mass-Metallicity Relation”. In prep.
- Slob, M., Kriek, M., Beverage, A. G., Suess, K. A., Barro, G., Bezanson, R., **Cheng, C. M.**, et al. “The JWST-SUSPENSE Ultra-deep Spectroscopic Program: Survey Overview and Star-Formation Histories of Quiescent Galaxies at $1 < z < 3$ ”. 2024, ApJ, submitted. [arXiv:2404.12432](https://arxiv.org/abs/2404.12432).
- Romanowsky, A. J., Larsen, S. S., Villaume, A., Carlin, J., Janz, J., Sand, D., Strader, J., Brodie, J. P., **Cheng, C. M.**, et al. “Low-density star cluster formation: discovery of a young faint fuzzy on the outskirts of the low-mass spiral galaxy NGC 247”. 2023, MNRAS, 518, 3164. [10.1093/mnras/stac2898](https://doi.org/10.1093/mnras/stac2898). [arXiv:2210.03220](https://arxiv.org/abs/2210.03220).

Non-Astronomy

- Rocchini, M., Garrett, P. E., Zielińska, M., Lenzi, S. M., Dao, D. D., Nowacki, F., Bildstein, V., MacLean, A. D., Olaizola, B., Ahmed, Z., Andreoiu, C., Babu, A., Ball, G. C., Bhattacharjee, S. S., Bidaman, H., **Cheng, C.**, et al.

- “First Evidence of Axial Shape Asymmetry and Configuration Coexistence in ^{74}Zn : Suggestion for a Northern Extension of the $N = 40$ Island of Inversion”. 2023, Phys. Rev. Lett., 130, 122502. [10.1103/PhysRevLett.130.122502](https://doi.org/10.1103/PhysRevLett.130.122502). [arXiv:2302.07394](https://arxiv.org/abs/2302.07394).
- Liu, H., Hameed, A. Z., Chow, J., Sivanenthiran, N., **Cheng, C.**, et al. “EEG features of spontaneous recurrent seizures in a mouse model of extended hippocampal kindling”. 2021, Clinph, 132(9), e2, doi: [10.1016/j.clinph.2021.03.028](https://doi.org/10.1016/j.clinph.2021.03.028).
 - Liu, H., Tufa, U., Zahra, A., Chow, J., Sivanenthiran, N., **Cheng, C.**, et al. “Electrographic Features of Spontaneous Recurrent Seizures in a Mouse Model of Extended Hippocampal Kindling”. 2021, TexCom, 2(1), doi: [10.1093/textcom/tgab004](https://doi.org/10.1093/textcom/tgab004).
 - MacLean, A. D., Laffoley, A. T., Svensson, C. E., et al, incl. **Cheng, C.**. “High-precision branching ratio measurement and spin assignment implications for ^{62}Ga superallowed β decay”. 2020, Phys Rev C, 102(5), doi: [10.1103/physrevc.102.054325](https://doi.org/10.1103/physrevc.102.054325). [arXiv:2011.03857](https://arxiv.org/abs/2011.03857).
 - Liu, H., Stover, K. R., Sivanenthiran, N., Chow, J., **Cheng, C.**, et al. “Impaired Spatial Learning and Memory in Middle-Aged Mice with Kindling-Induced Spontaneous Recurrent Seizures”. 2019, Front. Pharmacol., 10, 1077, doi: [10.3389/fphar.2019.01077](https://doi.org/10.3389/fphar.2019.01077).
 - Song, H., Tufa, U., Chow, J., Sivanenthiran, N., **Cheng, C.**, et al. “Effects of Antiepileptic Drugs on Spontaneous Recurrent Seizures in a Novel Model of Extended Hippocampal Kindling in Mice”. 2018, Front. Pharmacol., 9, 451, doi: [10.3389/fphar.2018.00451](https://doi.org/10.3389/fphar.2018.00451).

CONFERENCE *Invited Talks*

- CONTRIBUTIONS** • *APOGEE Monthly Teleconference*. “Testing the chemical homogeneity of chemically-tagged dissolved birth clusters”. 10 Nov. 2020.

Contributed Talks

- *NOVA NW1 Autumn 2023 Meeting*. “Age and metal gradients in quiescent galaxies over cosmic time with LEGA-C and JWST”. 23 Nov. 2023; Leiden, The Netherlands.
- *A Life Devoted to Stellar Populations*. “Age and metal gradients in quiescent galaxies over cosmic time with LEGA-C and JWST”. 5 Oct. 2023; Puerto de la Cruz, Tenerife, Canary Islands, Spain.
- *SDSS 2020 Collaboration Meeting Lightning Talks*. “Testing the chemical homogeneity of open clusters”. 23 Jun. 2020.
- *TRIUMF Summer Undergraduate Student Symposium*. “Examining internal conversion electrons in ^{192}Hg ”. 15 Aug. 2019; TRIUMF, Vancouver, BC, Canada.

Posters

- **Cheng, C. M.**, Kriek, M., Beverage, A. G., van der Wel, A., et al. “Age and metal gradients in massive quiescent galaxies at $0.6 \lesssim z \lesssim 1.0$: implications for quenching and assembly histories”. Presented at: *Netherlands Astronomers’ Conference (NAC) 2024*; May 2024, Egmond aan Zee, The Netherlands.
- **Cheng, C. M.**, Villaume, A., Balogh, M. L., et al. “Initial mass function variability from the integrated light of diverse stellar systems”. Presented at: *A Life Devoted to Stellar Populations*; Oct. 2023, Puerto de la Cruz, Tenerife, Canary Islands, Spain.

- **Cheng, C. M.**, Kriek, M., Beverage, A. G., et al. “Resolving the formation histories of $0.6 < z < 2.5$ galaxies with LEGA-C and JWST”. Presented at: *IAU Symposium 377: Early Disk-Galaxy Formation from JWST to the Milky Way*; Feb. 2023; Kuala Lumpur, Malaysia.
- **Cheng, C. M.**, Villaume, A., and Balogh, M. L. “Testing the extremes of initial mass function variability using compact stellar systems”. Presented at: *CASCA 2022 Annual General Meeting*; May 2022; Waterloo, ON, Canada.
- **Cheng, C.**, Olaizola, B., Paxman, C., et al. “Probing shape coexistence in ^{192}Hg through combined electron and γ -ray spectroscopy”. Presented at:
 - *The Canadian Conference for Undergraduate Women in Physics 2020*; 19 Jan. 2020; University of Toronto, Toronto, ON, Canada.
 - *The Department of Physics Undergraduate Research Fair 2019*; 26 Sept. 2019; University of Toronto, Toronto, ON, Canada.
 - *The TRIUMF Users’ Group Annual General Meeting Student Poster Slam and Oral Presentation Competition*; 22 Aug. 2019; TRIUMF, Vancouver, BC, Canada.
- **Cheng, C.**, Chow, J., Lim, S., et al. “Verification of the mouse model for MRI-negative temporal lobe epilepsy”. Presented at: *50th Annual Institute of Medical Science Summer Undergraduate Research Day*; 15 Aug. 2018; Toronto, ON, Canada.

AWARDS AND ACHIEVEMENTS

- *Leids Kerkhoven-Bosscha Fonds (LKBF) Grant* (600 EUR), subsidy number 24.1.017, May 2024 - Oct. 2024.
- *Leids Kerkhoven-Bosscha Fonds (LKBF) Grant* (400 EUR), subsidy number 23.2.009, Nov. 2023 - Apr. 2024.
- *IAU Grant* (320 EUR) for Symposium 377: Early Disc-Galaxy Formation from JWST to the Milky Way, Kuala Lumpur, Malaysia, Feb. 6-10, 2023.
- *Science Graduate Award* (8332 CAD), University of Waterloo, 2020-2022.
- *Marie Curie Graduate Award* (4100 CAD), University of Waterloo, 2020-2022.
- *2nd Place*, Department of Physics Undergraduate Research Fair for poster titled “Probing shape coexistence in ^{192}Hg through combined electron and γ -ray spectroscopy”, University of Toronto, Sept. 2019.
- *Undergraduate Student Research Award (USRA)* (5625 CAD), Natural Sciences and Engineering Research Council (NSERC), University of Toronto/Toronto Western Hospital/Krembil Research Institute, May-Aug. 2018.
- *President’s Entrance Scholarship* (2000 CAD), University of Toronto, Sept. 2016.

OBSERVING PROPOSALS

- I am a Co-PI on a Cycle 3 JWST observing program ([GO-5629](#): “Extremely deep spectroscopy of quiescent galaxies at $z \sim 0.7$: A direct measurement of the stellar initial mass function beyond the low-redshift universe”. PI: Mariska Kriek, Co-PIs: Aliza Beverage and Chloe Cheng. 40.24 hours on NIR-Spec/MOS).
- I have participated as a Co-PI on two JWST observing proposals.
- I have participated as a collaborator on observing proposals for JWST (4), HST (2), and ALMA (3).

TECHNICAL SKILLS

Languages

Python • Bash shell • L^AT_EX • C++ • MATLAB • Fortran • R

Tools

alf • PypeIt • GALFIT • apogee • astropy • docopt • numpy • PyTorch • SLURM • ROOT • GRSISort • SciDraw

Techniques

spectroscopy • stellar population synthesis • full spectrum fitting • data reduction • Bayesian statistics • forward modeling • detector configuration

TEACHING

- Galaxies & Cosmology, Teaching Assistant, Universiteit Leiden, Feb. 2023 - Jun. 2023, Feb. 2024 - Jun 2024.
- Stars (PHYS 375), Teaching Assistant, University of Waterloo, Jan. - Apr. 2022.
- Electricity & Magnetism 2 (PHYS 342), Teaching Assistant, University of Waterloo, Sept. - Dec. 2021.
- Physics 2 Laboratory (PHYS 112L), Teaching Assistant, University of Waterloo, Jan. - Apr. 2021.
- Mechanics (PHYS 121), Teaching Assistant, University of Waterloo, Sept. - Dec. 2020.
- Fundamentals of University Teaching Program, University of Waterloo, 2020 - 2021.

LEADERSHIP AND EXTRA-CURRICULAR

Committees

- Member, Social Committee, Leiden Observatory, Apr. 2023 - Present.
- Member, Borrel Committee, Leiden Observatory, Sept. 2023 - Present.
- Member, Equity, Diversity, & Inclusion Committee, Leiden Observatory, Sept. 2022 - Apr. 2024.
- Social Media Coordinator and Representative, Graduate Student Committee, Canadian Astronomical Society (CASCA), Sept. 2021 - Aug. 2022.

Extra-Curricular Activities

- Member, Phski Comittee, Leiden Observatory, Aug. 2023 - Jan. 2024.
- Player, Rotterdam Ravens Quidditch Team, Rotterdam, Sept. 2022 - Aug. 2023.
- Player, University of Toronto Centaurs Quidditch Team, University of Toronto, Sept. 2017 - Apr. 2022.
- Co-Captain & Vice President, University of Toronto Centaurs Quidditch Team, University of Toronto, Sept. 2019 - Apr. 2020.
- Treasurer, University of Toronto Centaurs Quidditch Team, University of Toronto, Sept. 2018 - Aug. 2021.
- Voice Experience, Sept. 2010 - Apr. 2022
 - National Association of Teachers of Singing (NATS) Ontario Chapter Auditions 3rd Place (Nov. 2021)
 - NATS Ontario Chapter Auditions 2nd Place (Nov. 2019)

VOLUNTEER EXPERIENCE	<i>Seeing Stars Leiden</i>	Sept. 25, 2023
	Leiden, The Netherlands	
	<ul style="list-style-type: none"> • Supervised observing station for the public. 	
	<i>Canadian Conference for Undergraduate Women in Physics</i>	Jan. 19, 2020
	University of Toronto, Toronto, ON, Canada	
	<ul style="list-style-type: none"> • Directed conference attendees and speakers to workshops, talks, and activities. Arranged refreshments and gifts. Led small-group lab tours. 	
	<i>Zhang Lab</i>	May – Aug. 2017
	Toronto Western Hospital/Krembil Research Institute, Toronto, ON, Canada	
	<ul style="list-style-type: none"> • Kindled seizures in mice. Sectioned brain tissue and prepared slides. Performed cell counting. Soldered electrodes. Analyzed EEG recordings of seizures using MATLAB. 	
LANGUAGES	English (native), French (conversational), Dutch (basic, A2)	