Nicholas Martis

nicholas.martis@fmf.uni-lj.si | martisn.github.io
Faculty of Mathematics and Physics, University of Ljubljana

Research Interests

Observational galaxy formation and evolution; dust-obscured galaxies; galaxy cluster formation

Research Positions

- **Assistant with a Doctorate** *2023 - Present*
  University of Ljubljana Ljubljana, Slovenia
  - CANUCS collaboration imaging working group lead - data release [🌐]
  - MINERVA collaboration MIRI imaging reduction lead
  - VENUS collaboration team member
- **Post Doctoral Fellow, Astronomy and Physics** *2020 - 2023*
  St. Mary's University Halifax NS, Canada
  - CANUCS collaboration imaging working group lead
- **Research Assistant** *2015 - 2020*
  Tufts University Medford MA, United States
  - 2 nights of near-infrared imaging with MOSFIRE at Keck telescope (Hawaii, USA)

Education

- **Tufts University** *2020*
  Ph.D. Astrophysics Medford MA, United States
  - Advisor: Danilo Marchesini
  - Thesis: "The Prevalence and Properties of Dusty Galaxies Through Cosmic Time"
- **Tufts University** *2016*
  M.S. Physics Medford MA, United States
  - Completed Graduate Professional Development Workshop Series
- **Boston College** *2014*
  B.S. Physics summa cum laude Chestnut Hill MA, United States
  - Second major: Philosophy

Research Mentorship

Oskar Mlakar, master's student, distribution of globular clusters in Bullet Cluster *2025-Present*
Tijana Leban, master's student, intracluster light in CANUCS clusters *2025-Present*
Miha Brvar, undergraduate student, intracluster light in Bullet Cluster *2025*
Tess Grindlay, CSA co-op (undergraduate) student, emission line maps of cluster galaxies *2022*

Teaching

University Teaching for Graduate Students *2023*
- Completed course on pedagogical technique

Graduate Writing Consultant *2019-2020*
- Provide writing tutoring to undergraduate and graduate students of all disciplines

Mathematics and Physics Tutor *2018-2021*
- Tutor high school and college students in pre-calculus, calculus, and introductory physics

Teaching Assistant *2014-2015*
- Lab and Recitation instructor for introductory Physics

Awards

University of Ljubljana Outstanding Research *2025*
- Project selected as one of the ten greatest research achievements of the University of Ljubljana

John F. Burlingame Graduate Fellowship in Physics *2019-2020*
Graduate Student Travel Fund Award *2016, 2019*

Service

Journal Referee: Astronomy & Astrophysics, Astrophysical Journal
JWST External Panelist: Cycle 4, 5
MAST High Level Science Products: CANUCS 🌐

Outreach

Golovec Evening at the Observatory – public lecture *2025*
Kozmični Glasovi – collaboration between astronomers and Academy of Music at University of Ljubljana *2025*
Salish Middle School Career Day *2024*
CANUCS mini documentary. *2022*

Observational Programs

James Webb Space Telescope

1. MINERVA: Unlocking the Hidden Gems of the Distant Universe and Completing HST and JWST's Imaging Legacy with Medium Bands, 260 hours. PIs: Muzzin, Suess, Marchesini
2. A Unique Opportunity to Probe Lensing-Magnified Star Clusters in a Low-Mass Galaxy at $z\_spec = 8.3$ with JWST, 50 hours. PI: Mowla
3. Vast Exploration for Nascent Unexplored Sources (VENUS), 252 hours. PI: Fujimoto
4. JUMPS: The JWST Ultimate Medium-band Photometric Survey, X hours PI: Withers
5. Resolving galaxy building blocks at high-z: the comprehensive picture of internal physical properties in an ultra-low-mass major merger system at z=5.2, X hours. PI: Asada
6. JWST in Technicolor: Finding and Mapping the Most Extreme Star Forming Galaxies in the Epoch of Reionization with Medium and Narrow Bands, X hours. PI: Muzzin
7. Silver Bullet for Dark Matter, X hours. PI: Rhitaršič, Bradač, Sawicki
8. Completing the SMACS 0723 NIRISS WFSS EROs, 2 hours PI: Noirot
9. Distant Sparkles: Are We Seeing Ancient Globular Clusters at Cosmic Noon?, X hours. PIs: Mowla, Iyer

Hubble Space Telescope

1. The Final Frontier: HST and JWST Exploration of Galaxies Across Cosmic Epochs, 56 orbits. PI: Bradač

Conferences/Workshops

Unraveling Little Red Dots: Linking JWST Discoveries with Simulations to Understand Early Galaxies, Trieste, Italy *October 2025*
Kaba Kada: Exploring the First Billion Years of the Universe, Port Douglas, Australia *September 2025*
Peering Through an Opaque ISM, Ferrara, Italy *September 2025*
Quo Vadis Galaxy Evolution? Heidelberg, Germany *July 2025*
From the First Stars to the Epoch of Reionization, Trieste, Italy *April 2025*
First Galaxies: Building Blocks of Galaxies Across Cosmic Time, Oxford, England *April 2025*
Unveiling the physics of early galaxy and black hole formation with JWST, Paris, France *December 2024*
European Astronomical Society Annual Meeting, Padova, Italy *July 2024*
Extreme galaxies in their extreme environments at extremely early epochs, Reykjavik, Iceland *April 2024*
First Year of JWST Science Conference, Space Telescope Science Institute, MD USA *September 2023*
First Science Results from JWST, Virtual *December 2022*
CASCA 2022: Canadian Astronomy in the Roaring 2020's, Virtual *May 2022*
Large-Volume Spectroscopic Analyses of AGN and Star Forming Galaxies in the Era of JWST, Virtual *March 2022*
SAZERAC SIPS: Early Galaxy Formation Near and Far, Virtual *November 2021*
CASCA 2021 AGM, Virtual *May 2021*
The Art of Measuring Galaxy Physical Properties, Milano, Italy *November 2019*
Graduate Research Excellence at Tufts (GREAT), Tufts University, MA USA *June 2018*
User Training in JWST Data Analysis, Space Telescope Science Institute, MD USA *November 2016*
Deconstructing Galaxies at Cosmic Noon: The Present and Future of Deep Spectroscopic Surveys at High Redshift, Lorentz Center, Netherlands *August 2016*

Seminars/Talks

FCAD Astronomy Seminar, UMass Amherst, USA *December 2025*
Astrodebata, University of Ljubljana, Slovenia *February 2023*
Canadian Virtual Astronomy Seminar *November 2022*
Astronomy and Physics Colloquium, St. Mary's University, Canada *February 2021*
Seminar, Brera Astronomical Observatory, Milano, Italy *November 2019*
Astronomy Seminar, University of California Riverside, CA USA *April 2019*
Lunch Talk, Carnegie Observatories, CA USA *April 2019*
Lunch Talk, University of California Los Angeles, CA USA *April 2019*

Selected Press

1. $z \sim 8.6$ "little red dot" published in Nature
   (a) https://www.delo.si/novice/znanoteh/odkrili-nenavadno-supermasivno-crno-luknjo-v-mladem-vesolju
   (b) https://www.24ur.com/novice/slovenija/velik-uspeh-slovenskih-astrofizikov-odkrili-supermasivno-crno-luknjo.html
   (c) https://n1info.si/magazin/slovenski-astrofiziki-odkrili-zelo-lacno-crno-luknjo/
   (d) https://siol.net/novice/svet/astrofiziki-z-ljubljanske-fakultete-odkrili-supermasivno-crno-luknjo-677587
   (e) https://www.dnevnik.si/nedeljski/prosti-cas/znanost-in-tehnologija/astrofiziki-z-ljubljanske-fakultete-odkrili-supermasivno-crno-luknjo-2768418/
2. Firefly Sparkle - star clusters in a lensed Milky Way progenitor at $z = 8.3$
   (a) https://science.nasa.gov/missions/webb/found-first-actively-forming-galaxy-as-lightweight-as-young-milky-way/
3. Detailed spatially resolved analysis of gravitationally lensed "Question Mark Galaxy"
   (a) https://science.nasa.gov/missions/webb/nasas-webb-reveals-distorted-galaxy-forming-cosmic-question-mark/
4. Globular clusters in a lensed $z = 1.3$ "Sparkler Galaxy"
   (a) https://www.artsci.utoronto.ca/news/researchers-help-reveal-galaxy-sparkling-universe-oldest-star-clusters
5. "Universe Breakers" don't live up to the name
   (a) https://news.smu.ca/news/2024/4/22/new-data-challenge-early-jwst-claims-about-the-age-of-the-universe
6. $z = 5$ merging galaxies show show how high-z galaxies grow
   (a) https://news.smu.ca/news/2023/9/21/researchers-use-the-james-webb-space-telescope-to-view-growing-baby-galaxy
7. Redshift Catalog from first JWST data
   (a) https://www.smu.ca/webfiles/CANUCS_Eng_PressRelease_Oct30.23.pdf

Additional Information

Languages: English (Native), Slovenian (A1)

Publications (55 total, 5 as first author; ADS)

As of January 2026, these works have 1681 citations with an h-index of 25. In the list below, my name is bolded.

First author

5. **Martis**, **N. S.** Withers, S. Bradač, M., et al., "CANUCS/Technicolor: JWST Medium-band Photometry Finds Half of the Star Formation at z > 7.5 Is Obscured", 2025, 990 p. 83.
4. **Martis**, **N. S.** Sarrouh, G. T. E. Willott, C. J., et al., "Modeling and Subtracting Diffuse Cluster Light in JWST Images: A Relation between the Spatial Distribution of Globular Clusters, Dwarf Galaxies, and Intracluster Light in the Lensing Cluster SMACS 0723", 2024, 975 p. 76.
3. **Martis**, **N. S.** Marchesini, D. M. Muzzin, A., et al., "Identifying and characterizing the most heavily dust-obscured galaxies at $1 \leq z \leq 4$", 2023, 518 pp. 4961–4975.
2. **Martis**, **N. S.** Marchesini, D. M. Muzzin, A., et al., "Stellar and Dust Properties of a Complete Sample of Massive Dusty Galaxies at $1 \leq z \leq 4$ from MAGPHYS Modeling of UltraVISTA DR3 and Herschel Photometry", 2019, 882 p. 65.
1. **Martis**, **N. S.** Marchesini, D. Brammer, G. B., et al., "The Evolution of the Fractions of Quiescent and Star-forming Galaxies as a Function of Stellar Mass Since $z = 3$: Increasing Importance of Massive, Dusty Star-forming Galaxies in the Early Universe", 2016, 827 p. L25.

Second or third author

3. Sarrouh, G. T. E. Asada, Y. **Martis**, **N. S.**, et al., "CANUCS/Technicolor Data Release 1: Imaging, Photometry, Slit Spectroscopy, and Stellar Population Parameters", 2026, 282 p. 3.

2. Tripodi, R. **Martis**, **N.** Markov, V., et al., "Extreme properties of a compact and massive accreting black hole host in the first 500 Myr", 2025, *Nature Communications* 16 p. 9830.

1. Desprez, G. **Martis**, **N. S.** Asada, Y., et al., "ΛCDM not dead yet: massive high-z Balmer break galaxies are less common than previously reported", 2024, 530 pp. 2935–2952.

Contributing author

47. Asada, Y. Willott, C. J. Muzzin, A., et al., **(including N. S. M.)** "Earliest Galaxy Evolution in the CANUCS+Technicolor Fields: Galaxy Properties at z ∼ 1016 Seen with the Full NIRCam Medium- and Broadband Filters", 2026, 996 p. 115.

46. Coulter, D. A. Larison, C. Pierel, J. D. R., et al., **(including N. S. M.)** "A spectroscopically confirmed, strongly lensed, metal-poor Type II supernova at z = 5.13", 2026, *arXiv e-prints* arXiv:2601.04156.

45. Yanagisawa, H. Ouchi, M. Golubchik, M., et al., **(including N. S. M.)** "VENUS: Two Faint Little Red Dots Separated by ∼ 70 pc Hidden in a Single Lensed Galaxy at $z \sim 7$", 2026, *arXiv e-prints* arXiv:2601.06015.

44. Antwi-Danso, J. Muzzin, A. Robbins, L., et al., **(including N. S. M.)** "An Ancient Descendant of the First Galaxies", 2025, *arXiv e-prints* arXiv:2512.03154.

43. Asada, Y. Desprez, G. Willott, C. J., et al., **(including N. S. M.)** "Improving Photometric Redshifts of Epoch of Reionization Galaxies: A New Empirical Transmission Curve with Neutral Hydrogen Damping Wing Lyα Absorption", 2025, 983 p. L2.

42. Bradač, M. Judež, J. Willott, C., et al., **(including N. S. M.)** "Star Formation under a Cosmic Microscope: Highly Magnified z = 11 Galaxy behind the Bullet Cluster", 2025, 995 p. L74.

41. Estrada-Carpenter, V. Sawicki, M. Abraham, R., et al., **(including N. S. M.)** "Metal-poor Star-forming Clumps in Cosmic Noon Galaxies: Evidence for Gas Inflow and Chemical Dilution Using JWST NIRISS", 2025, 991 p. 188.

40. Harris, W. E. Reina-Campos, M. Keatley, K. E., et al., **(including N. S. M.)** "JWST Photometry of Globular Cluster Populations in MACS0417.5−1154", 2025, 993 p. 210.

39. Markov, V. Bradač, M. Estrada-Carpenter, V., et al., **(including N. S. M.)** "Resolving dust and Lyα emission in a lensed galaxy at the epoch of reionization with JWST/CANUCS", 2025, *arXiv e-prints* arXiv:2512.13778.

38. Markov, V. Gallerani, S. Pallottini, A., et al., **(including N. S. M.)** "Unveiling the trends between dust attenuation and galaxy properties at z ∼ 2−12 with the James Webb Space Telescope", 2025, 702 A33.

37. Mérida, R. M. Gaspar, G. Asada, Y., et al., **(including N. S. M.)** "The rise and fall of Little Red Dots could be driven by the environment", 2025, *arXiv e-prints* arXiv:2510.06408.

36. Mérida, R. M. Gaspar, G. Sawicki, M., et al., **(including N. S. M.)** "Possible environmental quenching in an interacting little red dot pair at z ∼ 7", 2025, 698 A317.

35. Mérida, R. M. Sawicki, M. Iyer, K. G., et al., **(including N. S. M.)** "Probing the Star Formation Main Sequence down to $10^7 M_\odot$ at $1 < z < 9$", 2025, *arXiv e-prints* arXiv:2509.22871.

34. Muzzin, A. Suess, K. A. Marchesini, D., et al., **(including N. S. M.)** "MINERVA: A NIRCam Medium Band and MIRI Imaging Survey to Unlock the Hidden Gems of the Distant Universe", 2025, *arXiv e-prints* arXiv:2507.19706.

33. Rihtaršič, G. Bradač, M. Desprez, G., et al., **(including N. S. M.)** "CANUCS: Constraining the MACS J0416.1-2403 strong lensing model with JWST NIRISS, NIRSpec, and NIRCam", 2025, 696 A15.

32. Sok, V. Muzzin, A. Tan, V. Y. Y., et al., **(including N. S. M.)** "The Stellar Mass and Age Distributions of Star-Forming Clumps at $0.5 < z < 5$ in JWST CANUCS: Implications for Clump Formation and Destruction", 2025, *arXiv e-prints* arXiv:2509.25363.

31. Tan, V. Y. Y. Muzzin, A. Sarrouh, G. T. E., et al., **(including N. S. M.)** "Resolved Mass Assembly and Star Formation in Milky Way Progenitors since z = 5 from JWST/CANUCS: From Clumps and Mergers to Well-ordered Disks", 2025, 994 p. 94.

30. Tripodi, R. Bradač, M. D'Eugenio, F., et al., **(including N. S. M.)** "A Deep Dive down the Broad-line Region: Permitted O I, Ca II, and Fe II Emission in an Active Galactic Nucleus Little Red Dot at z = 5.3", 2025, 994 p. L6.

29. Willott, C. J. Asada, Y. Iyer, K. G., et al., **(including N. S. M.)** "In Search of the First Stars: An Ultra-compact and Very-low-metallicity Lyα Emitter Deep within the Epoch of Reionization", 2025, 988 p. 26.

28. Zhang, Z. Li, M. Oguri, M., et al., **(including N. S. M.)** "Little red dot variability over a century reveals black hole envelope via a giant Einstein cross", 2025, *arXiv e-prints* arXiv:2512.05180.

27. Asada, Y. Sawicki, M. Abraham, R., et al., **(including N. S. M.)** "Bursty star formation and galaxy-galaxy interactions in low-mass galaxies 1 Gyr after the Big Bang", 2024, 527 pp. 11372–11392.

26. Bradač, M. Strait, V. Mowla, L., et al., **(including N. S. M.)** "Star Formation at the Epoch of Reionization with CANUCS: The Ages of Stellar Populations in MACS1149-JD1", 2024, 961 p. L21.

25. Estrada-Carpenter, V. Sawicki, M. Brammer, G., et al., **(including N. S. M.)** "When, where, and how star formation happens in a galaxy pair at cosmic noon using CANUCS JWST/NIRISS grism spectroscopy", 2024, 532 pp. 577–591.

24. Gledhill, R. Strait, V. Desprez, G., et al., **(including N. S. M.)** "CANUCS: An Updated Mass and Magnification Model of A370 with JWST", 2024, 973 p. 77.

23. Harshan, A. Bradač, M. Abraham, R., et al., **(including N. S. M.)** "CANUCS: UV and ionizing properties of dwarf star-forming galaxies at z 5-7", 2024, 532 pp. 1112–1125.

22. Harshan, A. Tripodi, R. **Martis**, **N. S.**, et al., **(including N. S. M.)** "Detailed Study of Stars and Gas in a z = 8.3 Massive Merger with Extreme Dust Conditions", 2024, 977 p. L36.

21. Mowla, L. Iyer, K. Asada, Y., et al., **(including N. S. M.)** "Formation of a low-mass galaxy from star clusters in a 600-million-year-old Universe", 2024, 636 pp. 332–336.

20. Nedkova, K. V. Häußler, B. Marchesini, D., et al., **(including N. S. M.)** "Bulge+disc decomposition of HFF and CANDELS galaxies: UVJ diagrams and stellar mass-size relations of galaxy components at $0.2 \leq z \leq 1.5$", 2024, 532 pp. 3747–3777.

19. Sarrouh, G. T. E. Muzzin, A. Iyer, K. G., et al., **(including N. S. M.)** "Exposing Line Emission: The Systematic Differences of Measuring Galaxy Stellar Masses with JWST NIRCam Medium versus Wide Band Photometry", 2024, 967 p. L17.

18. Willott, C. J. Desprez, G. Asada, Y., et al., **(including N. S. M.)** "A Steep Decline in the Galaxy Space Density beyond Redshift 9 in the CANUCS UV Luminosity Function", 2024, 966 p. 74.

17. Antwi-Danso, J. Papovich, C. Leja, J., et al., **(including N. S. M.)** "Beyond UVJ: Color Selection of Galaxies in the JWST Era", 2023, 943 p. 166.

16. Asada, Y. Sawicki, M. Desprez, G., et al., **(including N. S. M.)** "JWST catches the assembly of a z 5 ultra-low-mass galaxy", 2023, 523 pp. L40–L45.

15. Matharu, J. Muzzin, A. Sarrouh, G. T. E., et al., **(including N. S. M.)** "A First Look at Spatially Resolved Balmer Decrements at $1.0 < z < 2.4$ from JWST NIRISS Slitless Spectroscopy", 2023, 949 p. L11.

14. Noirot, G. Desprez, G. Asada, Y., et al., **(including N. S. M.)** "The first large catalogue of spectroscopic redshifts in Webb's first deep field, SMACS J0723.3-7327", 2023, 525 pp. 1867–1884.

13. Strait, V. Brammer, G. Muzzin, A., et al., **(including N. S. M.)** "An Extremely Compact, Low-mass Galaxy on its Way to Quiescence at z = 5.2", 2023, 949 p. L23.

12. Vanzella, E. Loiacono, F. Bergamini, P., et al., **(including N. S. M.)** "An extremely metal-poor star complex in the reionization era: Approaching Population III stars with JWST", 2023, 678 A173.

11. Withers, S. Muzzin, A. Ravindranath, S., et al., **(including N. S. M.)** "Spectroscopy from Photometry: A Population of Extreme Emission Line Galaxies at 1.7 z 6.7 Selected with JWST Medium Band Filters", 2023, 958 p. L14.

10. Marsan, Z. C. Muzzin, A. Marchesini, D., et al., **(including N. S. M.)** "The Number Densities and Stellar Populations of Massive Galaxies at $3 < z < 6$: A Diverse, Rapidly Forming Population in the Early Universe", 2022, 924 p. 25.

9. Mowla, L. Iyer, K. G. Desprez, G., et al., **(including N. S. M.)** "The Sparkler: Evolved High-redshift Globular Cluster Candidates Captured by JWST", 2022, 937 p. L35.

8. Tan, V. Y. Y. Muzzin, A. Marsan, Z. C., et al., **(including N. S. M.)** "Resolved Stellar Mass Maps of Galaxies in the Hubble Frontier Fields: Evidence for Mass Dependency in Environmental Quenching", 2022, 933 p. 30.

7. Willott, C. J. Doyon, R. Albert, L., et al., **(including N. S. M.)** "The Near-infrared Imager and Slitless Spectrograph for the James Webb Space Telescope. II. Wide Field Slitless Spectroscopy", 2022, 134 p. 025002.

6. Nedkova, K. V. Häußler, B. Marchesini, D., et al., **(including N. S. M.)** "Extending the evolution of the stellar mass-size relation at $z \leq 2$ to low stellar mass galaxies from HFF and CANDELS", 2021, 506 pp. 928–956.

5. Silva, A. Marchesini, D. Silverman, J. D., et al., **(including N. S. M.)** "Galaxy Mergers up to $z < 2.5$. II. AGN Incidence in Merging Galaxies at Separations of 3-15 kpc", 2021, 909 p. 124.

4. Roebuck, E. Sajina, A. Hayward, C. C., et al., **(including N. S. M.)** "Simulations Find Our Accounting of Dust-obscured Star Formation May Be Incomplete", 2019, 881 p. 18.

3. Shipley, H. V. Lange-Vagle, D. Marchesini, D., et al., **(including N. S. M.)** "HFF-DeepSpace Photometric Catalogs of the 12 Hubble Frontier Fields, Clusters, and Parallels: Photometry, Photometric Redshifts, and Stellar Masses", 2018, 235 p. 14.

2. Silva, A. Marchesini, D. Silverman, J. D., et al., **(including N. S. M.)** "Galaxy Mergers up to $Z < 2.5$. I. The Star Formation Properties of Merging Galaxies at Separations of 3-15 kpc", 2018, 868 p. 46.

1. Brammer, G. B. Marchesini, D. Labbé, I., et al., **(including N. S. M.)** "Ultra-deep K $_S$-band Imaging of the Hubble Frontier Fields", 2016, 226 p. 6.

References

1. **Danilo Marchesini, danilo.marchesini@tufts.edu**
   Tufts University
   Physics and Astronomy
   574 Boston Avenue
   Room 312E
   Medford, MA, USA 02155
   Relationship: Thesis Advisor

2. **Maruša Bradač, Marusa.Bradac@fmf.uni-lj.si**
   Faculty of Mathematics and Physics
   University of Ljubljana
   Jadranska ulica 19, Ljubljana
   Relationship: Advisor

3. **Adam Muzzin, muzzin@yorku.ca**
   338 Petrie Science Engineering Building (PSE)
   Department of Physics and Astronomy
   York University
   4700 Keele St., Toronto, Ontario, Canada MJ3 1P3
   Relationship: Collaborator