Nikolaj Bjerregaard Sillassen

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Education

2023 - PhD in extragalactic astronomy at **Cosmic DAWN Center** & **DTU Space**. **Technical University of Denmark**
Supervisors: Prof. Georgios E. Magdis, Dr. Shuowen Jin, and Prof. Kirsten Knudsen.

2021 - 2023 M.Sc. Eng. in Earth and Space Physics and Engineering - Space Research at **Technical University of Denmark** (GPA: 10.5/12)

2018 - 2021 B.Sc. Eng. in Earth and Space Physics and Engineering at **Technical University of Denmark**

Main Interest Areas

- Astronomy and Astrophysics
  - Extragalactic astrophysics
  - Galaxy (proto)clusters/groups and evolution
- Data and image analysis
- Machine learning and artificial intelligence

Publications

2024

Nikolaj B. Sillassen, Shuowen Jin, Georgios E. Magdis, Jacqueline Hodge, Raphael Gobat, Emanuele Daddi, Kirsten Knudsen, Alexis Finoguenov, Eva Schinnerer, Wei-Hao Wang, Zhen-Kai Gao, John R. Weaver, Hiddo Algera, Irham T. Andika, Malte Brinch, Chian-Chou Chen, Rachel Cochrane, Andrea Enia, Andreas Faisst, Steven Gillman, Carlos Gomez-Guijarro, Ghassem Gozaliasl, Chris Hayward, Vasily Kokorev, Maya Merchant, Francesca Rizzo, Margherita Talia, Francesco Valentino, David Blánquez-Sesé, Anton M. Koekemoer, Benjamin Magnelli, Michael Rich, and Marko Shuntov (2024). "Behind the dust veil: A panchromatic view of an optically dark galaxy at z=4.82". In: arXiv: 2412.09363 [astro-ph.GA]. URL: https://arxiv.org/abs/2412.09363.

Shuowen Jin, **Nikolaj B. Sillassen**, Jacqueline Hodge, Georgios E. Magdis, Francesca Rizzo, Caitlin Casey, Anton M. Koekemoer, Francesco Valentino, Vasily Kokorev, Benjamin Magnelli, Raphael Gobat, Steven Gillman, Maximilien Franco, Andreas Faisst, Jeyhan Kartaltepe, Eva Schinnerer, Sune Toft, Hiddo S. B. Algera, Santosh Harish, Minju Lee, Daizhong Liu, Marko Shuntov, Margherita Talia, and Aswin Vijayan (Oct. 2024). "A photo-z cautionary tale: Redshift confirmation of COSBO-7 at z = 2.625". In: *Astronomy & Astrophysics* 690, L16, p. L16. DOI: 10.1051/0004-6361/202451445. arXiv: 2407.07585 [astro-ph.GA].

Nikolaj B. Sillassen, Shuowen Jin, Georgios E. Magdis, Emanuele Daddi, Tao Wang, Shiying Lu, Hanwen Sun, Vinod Arumugam, Daizhong Liu, Malte Brinch, Chiara D'Eugenio, Raphael Gobat, Carlos Gómez-Guijarro, Michael Rich, Eva Schinnerer, Veronica Strazzullo, Qinghua Tan, Francesco Valentino, Yijun Wang, Mengyuan Xiao, Luwenjia Zhou, David Blánquez-Sesé, Zheng Cai, Yanmei Chen, Laure Ciesla, Yu Dai, Ivan Delvecchio, David Elbaz, Alexis Finoguenov, Fangyou Gao, Qiusheng Gu, Catherine Hale, Qiaoyang Hao, Jiasheng Huang, Matt Jarvis, Boris Kalita, Xu Ke, Aurelien Le Bail, Benjamin Magnelli, Yong Shi, Mattia Vaccari, Imogen Whittam, Tiancheng Yang, and Zhiyu Zhang (Oct. 2024).

"NOEMA formIng Cluster survEy (NICE): Characterizing eight massive galaxy groups at $1.5 < z < 4$ in the COSMOS field". In: *Astronomy & Astrophysics* 690, A55, A55. DOI: 10.1051/0004-6361/202450760. arXiv: 2407.02973 [astro-ph.GA].

Luwenjia Zhou, Tao Wang, Emanuele Daddi, Rosemary Coogan, Hanwen Sun, Ke Xu, Vinodiran Arumugam, Shuowen Jin, Daizhong Liu, Shiying Lu, **Nikolaj Sillassen**, Yijun Wang, Yong Shi, Zhi-Yu Zhang, Qinghua Tan, Qiusheng Gu, David Elbaz, Aurelien Le Bail, Benjamin Magnelli, Carlos Gómez-Guijarro, Chiara d'Eugenio, Georgios E. Magdis, Francesco Valentino, Zhiyuan Ji, Raphael Gobat, Ivan Delvecchio, Mengyuan Xiao, Veronica Strazzullo, Alexis Finoguenov, Eva Schinnerer, R. Michael Rich, Jiasheng Huang, Yu Dai, Yanmei Chen, Fangyou Gao, Tiancheng Yang, and Qiaoyang Hao (Apr. 2024). "Noema formIng Cluster survEy (NICE): Discovery of a starbursting galaxy group with a radio-luminous core at z=3.95". In: *Astronomy & Astrophysics* 684, A196, A196. DOI: 10.1051/0004-6361/202348351. arXiv: 2310.15925 [astro-ph.GA].

Shuowen Jin, **Nikolaj B. Sillassen**, Georgios E. Magdis, Malte Brinch, Marko Shuntov, Gabriel Brammer, Raphael Gobat, Francesco Valentino, Adam C. Carnall, Minju Lee, Aswin P. Vijayan, Steven Gillman, Vasily Kokorev, Aurélien Le Bail, Thomas R. Greve, Bitten Gullberg, Katriona M. L. Gould, and Sune Toft (Mar. 2024). "Cosmic Vine: A z = 3.44 large-scale structure hosting massive quiescent galaxies". In: *Astronomy & Astrophysics* 683, L4, p. L4. DOI: 10.1051/0004-6361/202348540. arXiv: 2311.04867 [astro-ph.GA].

Malte Brinch, Thomas R. Greve, David B. Sanders, Conor J. R. McPartland, Nima Chartab, Steven Gillman, Aswin P. Vijayan, Minju M. Lee, Gabriel Brammer, Caitlin M. Casey, Olivier Ilbert, Shuowen Jin, Georgios Magdis, H. J. McCracken, **Nikolaj B. Sillassen**, Sune Toft, and Jorge A. Zavala (Jan. 2024). "DEIMOS spectroscopy of z = 6 protocluster candidate in COSMOS - a massive protocluster embedded in a large-scale structure?" In: *Monthly Notices of the Royal Astronomical Society* 527.3, pp. 6591–6615. DOI: 10.1093/mnras/stad3409. arXiv: 2311.00511 [astro-ph.GA].

2023

D. Blánquez-Sesé, G. E. Magdis, C. Gómez-Guijarro, M. Shuntov, V. Kokorev, G. Brammer, F. Valentino, T. Díaz-Santos, E. -D. Paspaliaris, D. Rigopoulou, J. Hjorth, D. Langeroodi, R. Gobat, Jin, **N. B. Sillassen**, S. Gillman, T. R. Greve, and M. Lee (Nov. 2023). "Uncovering the MIR emission of quiescent galaxies with JWST". In: *Astronomy & Astrophysics* 679, L2, p. L2. DOI: 10.1051/0004-6361/202347771. arXiv: 2310.01601 [astro-ph.GA].

Shuowen Jin, **Nikolaj B. Sillassen**, Georgios E. Magdis, Aswin P. Vijayan, Gabriel B. Brammer, Vasily Kokorev, John R. Weaver, Raphael Gobat, Clara Giménez-Arteaga, Francesco Valentino, Malte Brinch, Carlos Gómez-Guijarro, Marko Shuntov, Sune Toft, Thomas R. Greve, and David Blanquez Sese (Feb. 2023). "Massive galaxy formation caught in action at z ∼ 5 with JWST". In: *Astronomy & Astrophysics* 670, L11, p. L11. DOI: 10.1051/0004-6361/202245724. arXiv: 2212.09372 [astro-ph.GA].

2022

Nikolaj B. Sillassen, Shuowen Jin, Georgios E. Magdis, Emanuele Daddi, John R. Weaver, Raphael Gobat, Vasily Kokorev, Francesco Valentino, Alexis Finoguenov, Marko Shuntov, Carlos Gómez-Guijarro, Rosemary Coogan, Thomas R. Greve, Sune Toft, and David Blanquez Sese (Sept. 2022). "A galaxy group candidate at z ≈ 3.7 in the COSMOS field". In: *Astronomy & Astrophysics* 665, L7, p. L7. DOI: 10.1051/0004-6361/202244661. arXiv: 2209.05895 [astro-ph.GA].

Publications[1st]: 9[3], Citations: 60[13], h-index: 5

Telescope time

- ALMA Cycle 12
  - Co-I: Testing cosmology with a massive dusty star-forming galaxy in EoR
    Awarded time: 2h12min
- ALMA DDT
  - Co-I: [CII] confirmation for a massive dusty star-forming galaxy at z∼7.5
    Awarded time: 30min
- NOEMA Summer 2024
  - Co-I: Confirming two massive dusty galaxies in the epoch of reionization
    Awarded time: 9h36min
- KECK 2023B
  - Co-I: A Galaxy Overdensity at z ∼ 4 in COSMOS-Web
    Awarded time: 2 nights
- ESO P112
  - Co-I: Doubling the sample of Lya halos in accretion-fed galaxy groups at z>3: unveiling the origin of cold gas.
    Awarded time: 15h20m
  - Co-I: Unveiling Mpc-scale structure of a maturing protocluster at z=3.61.
    Awarded time: 6h
- ALMA Cycle 10
  - PI: Unveiling the Mpc-scale structure of a maturing protocluster at z=3.61.
    Awarded time: 6h30m
- NOEMA Summer 2023
  - Co-I: CII followup for a dusty star-forming galaxy at z=6.09
    Awarded time: 5h24m
- NOEMA Winter 2022
  - Co-I: Confirming a starbursting protocluster at z=4.2
    Awarded time: 6h48m

Projects

Master's Thesis - The nature of protoclusters Link to thesis

Exploring the nature of the first proto-clusters in our Universe. Master's thesis at DTU Space, investigating the physical properties and evolutionary tracks of the earliest protoclusters in the universe. Based off my publication on the protocluster I discovered. Supervised by: Prof. Georgios E. Magdis and Dr. Shuowen Jin. Grade: 12/12

Synthesis Project - GalCluster Link to repository Link to project report

Automatic Search for Galaxy Clusters by Overdensity Mapping. Synthesis project at DTU Space, creating a public program to automatically search for galaxy clusters, using existing datasets. Supervised by: Prof. Georgios E. Magdis and Dr. Shuowen Jin. Spawned a first-author publication in Astronomy and Astrophysics. Grade: 12/12

Bachelor's Thesis - Main Sequence in COSMOS2020 Link to thesis

Unveiling the scaling laws of galaxy evolution across cosmic time. Bachelor's thesis at DTU Space, investigating the main sequence of star forming galaxies in the as of unreleased COSMOS2020 catalogue. Supervised by: Prof. Georgios E. Magdis. Grade: 12/12

Introductory project - Scaling relations in EGS

Scaling relations and properties of galaxies across cosmic time. Introductory project at DTU Space, investigating the scaling relation and properties of galaxies in the Extended Groth Strip. Supervised by: Prof. Georgios E. Magdis. Grade: 12/12

Work Experience

Student assistant Aug 2022 - Jun 2023

Student assistant at DTU Compute assisting in administration, hosting of events and communication.

Project assistant/Webmaster Nov 2020 - May 2022

- Project assistant at Cyber Hub, assisting in various projects and administration
- Webmaster at Cyber Hub creating and managing public website.

Elected positions and responsibilities

2024 -	–	Vice Chairman - DTU Space PhD Committee
2024 -	–	Earth and Space Physics and Engineering Advisory Board Member
2024	–	DAWN Summit 2024 Scientific Organizing Committee
2023 - 2024	–	D-LOCKS Workshop 2024 Local Organizing Committee
2022 - 2023	–	DTU Space Study Board substitute

Skills

Astrophysics	Astrophysics of galaxies, massive structures, and galaxy evolution
Programming	Experienced in Python & MATLAB, functional in R, C++, & C
Data analysis	Experience in reducing mm data using `CASA` & `GILDAS`
	Experience in reducing 2D MOS spectra data from VLT
	Experience in reducing 2D slit spectra data from NOT
Machine learning	Some experience with machine learning, data mining & neural networks.
Image analysis	Some experience with image analysis

Conferences and Talks

From Protoclusters to First Mature Clusters 2024	–	Invited to present results of NOEMA Forming Cluster Survey (NICE)
First Structures in the Universe 2024	–	Presented results of NOEMA Forming Cluster Survey (NICE) in the COSMOS field
Cosmic Odysseys 2024	–	Presented results of NOEMA Forming Cluster Survey (NICE) in the COSMOS field
DAWN Summit 2024	–	Presented preliminary results of my first PhD project
KAF 15th Feb. 2024	–	Presented my work at the Københavns Astronomiske Forening monthly meeting
DAWN Summit 2022	–	Presented GalCluster and Preliminary work on my first paper

Teaching

Programming project 2024	–	Teaching assistant in 1st year bachelor programming course
Supervision of students	–	1 Master project – 1 Bachelor Thesis