Pooneh **Nazari**

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Email: **Pooneh.Nazari@eso.org**
ESO Headquarters,
Karl-Schwarzschild-Strasse 2, 85748,
Garching

Positions

ESO Fellow 2023–present
Garching, Germany

IAU Gruber Foundation Fellow 2023–present

Education

Leiden University Leiden, Netherlands
Ph.D. in Astrophysics 2019–2024
Promotor: Prof. E. F. van Dishoeck, Co-Promotors: Dr. B. Tabone and Dr. G. P. Rosotti

- Thesis: "Bridging the gap between physics and chemistry in early stages of star formation"

University of Cambridge Cambridge, UK
MPhil in Astrophysics 2018–2019
Supervisor: Prof. C. J. Clarke

- Thesis: "Observational consequences of planet migration"

MASt (Part III) in Astrophysics 2017–2018

University of St Andrews St Andrews, UK
B.Sc. in Astrophysics 2013–2017

Research Interests

Interstellar molecules, Planet formation, Submillimetre and infrared astronomy, Astrochemistry

Publications

I have **28** publications with **11** as first author and **10** as second to fourth author. H-index $= 12$, total citations > 400, first-author citations > 140. See the full list at the end of the CV.

Talks

I have given **27** talks including **10** invited. See the full list at the end of the CV.

Awards

- Gruber Foundation Fellowship 2023–2025
- ESO Fellowship 2023–2026
- Funding from Leids Kerkhoven-Bosscha Fonds (LKBF) 2022
- Sheepshanks Scholarship and Studentship in Astronomy (Trinity College, Cambridge) 2017–2018
- Harvard Origins of Life Initiative Undergraduate Research Award 2017

- The Astrophysics Project Prize (University of St Andrews) 2017
- Royal Astronomical Society Undergraduate Research Bursary (University of St Andrews) 2015

Observing programs

I am a **PI of 16.9 hours** of JWST NIRSpec-IFU observations and **Co-I of 243 hours** of JWST NIRCam, NIRSpec, and MIRI observations.

Major collaborations

HEFE: High Angular Resolution observations of Stellar Emergence in Filamentary Environments 2024–present
PI: T. Megeath
JWST NIRCam, NIRSpec, and MIRI-MRS large program of the OMC2/3 region

COMPASS: Complex Organic Molecules in Protostars with ALMA Spectral Surveys 2023–present
PI: J. K. Jørgensen
ALMA large program and NIRSpec MOS medium program of 11 protostars

JOYS+: Jwst Observations of Young protoStars 2023–present
PIs: E. F. van Dishoeck; M.E. Ressler; T. P. Ray; T. P. Greene
Combination of MIRI-MRS and NIRSpec-IFU observations of $\sim$30 protostars

IPA: Investigating Protostellar Accretion JWST program 2023–present
PI: T. Megeath
MIRI-MRS and NIRSpec-IFU observations of 5 protostellar systems

Research visits

Frequent research visits to University of Copenhagen	2023–present
Extended research visit, Harvard University	Oct 2022–Nov 2022
Research visits, Universities of St Andrews, Cambridge, and Harvard University	Summers 2015-2018

Supervision

Kasra Hajian (Sharif Univ. of Tech., Iran), Funded by Gruber Foundation Summer 2024
Working on high-z universe as a summer student
At ESO, In collaboration with Danial Langeroodi

Lauren Mason (Univ. of Cambridge, UK), Funded by ESO Summer 2024
Working on protostellar disk winds as a summer student
At ESO

- Co-supervision of one LEAPS student and three MSc students 2020-2022
  At Leiden Observatory

Teaching

- Teaching Assistant of Astrochemistry course taught by Prof. E. F. van Dishoeck 2022
  Leiden Observatory
- Teaching Assistant of SPF course taught by Prof. E. F. van Dishoeck and Dr. M. K. McClure 2020, 2021, 2022
  Leiden Observatory

Selected outreach and service activities

- Spending 25% of my time on ESO duties working with: Observing Programmes Office (OPO), ELT Observing Simulations, and Science Policies, 2023-present
- Scientific Assistant at ESO's Observing Programmes Committees (OPCs), 2024
- Reviewer for A&A, ApJ, Nat. Astron., and Front. Astron. Space Sci.
- Organiser of the NOVA Network II seminars in the Netherlands, 2019-2022
- Main author of a CASSIS manual, 2022
- ALMA proposal reviewer, 2021-2024
- Invited talk at Astronomy on Tap, 2021
- Author at She Speaks Science, 2018

Presentations

I have given 27 talks, including 10 ***invited***.

- ***Invited talk*** **at COSPAR panel F3.4** — South Korea, 2024
  'Complex organic molecules in the gas and ices'
- ***Invited talk*** **at Villa Vigoni workshop** — Villa Vigoni, 2024
  'Complex organic molecules in the gas and ices around protostars'
- ***Invited talk*** **at Celebrating 30 Years of Protoplanetary Disk Chemistry** — Ringberg, 2024
  'Bridging the gap between physics and chemistry in early stages of star formation'
- **PhD Colloquium** — Leiden University, 2024
  'Bridging the gap between physics and chemistry in early stages of star formation'
- **Star and Planet Formation Seminar** — ESO, 2024
  'Bridging the gap between physics and chemistry in early stages of star formation'
- ***Invited talk*** **at Workshop on Interstellar Catalysis** — Aarhus, 2023
  'Complex organic molecules around protostars'
- **NOVA Network II seminar** — Netherlands, 2023
  'Complex organic molecules around protostars'
- **Blaauw workshop** — University of Groningen, 2023
  'Evidence for ubiquitous carbon grain destruction around young protostars'
- **Origins seminar series** — University of Arizona, 2022
  'Complex organic molecules around low- and high-mass protostars'
- **Lunch talk** — University of Virginia/NRAO, 2022
  'Complex organic molecules around low- and high-mass protostars'
- **Star and planet formation meeting** — University of Michigan, 2022
  'Complex organic molecules around low- and high-mass protostars'
- **Star formation journal club** — Harvard University, 2022
  'Complex organic molecules around low- and high-mass protostars'
- **Disk and Astrochemistry meeting** — Harvard University, 2022
  'Complex organic molecules around low- and high-mass protostars'
- ***Invited talk*** **at Niels Bohr Legacy Symposium in Astrochemistry** — Copenhagen University, 2022
  'Complex organic molecules toward low- and high-mass protostars'
- ***Invited talk*** **at Astrochemistry Seminar** — Leiden University, 2022
  'Can disks explain lack of COM emission from low-mass protostars?'

- ***Invited talk* at Iranian National Observatory workshop** Online, 2022
  'Astrochemistry in the embedded phase of star formation'
- ***Invited talk* at InterCat Centre meeting** Online, 2021
  'N-bearing complex organic molecules: From low- to high-mass protostars'
- **Star formation meeting** Leiden University, 2021
  'Methanol emission from protostars: Can disks explain lack of emission from some sources?'
- **Informal seminar at Centre for Star and Planet Formation** Copenhagen University, 2021
  'Complex organic molecules: From low- to high-mass protostars'
- **Contributed talk at Chemical processes in Solar-type star forming regions** Torino, 2021
  'Complex organic molecules: From low- to high-mass protostars'
- **Contributed talk at Astrochemical Frontiers** Online, 2021
  'Methanol emission from protostars: Can disks explain lack of emission from some sources?'
- ***Invited talk* at Astrochemistry Seminar** Leiden University, 2021
  'Complex organic molecules in low-mass protostars'
- **Contributed talk at ALMA day** Leiden University, 2021
  'Complex organic molecules in low-mass protostars'
- **Contributed talk at Five Years After HL Tau** Online, 2020
  'Observational consequences of planet migration'
- **Seminar at Institute of Astronomy** University of Cambridge, 2020
  'N-bearing complex organic molecules in low-mass protostars'
- **Contributed talk at Trinity forum, Trinity college** University of Cambridge, 2019
  'Observational consequences of planet migration'
- ***Invited talk* at Kavli Institute** University of Cambridge, 2019
  'Observational consequences of planet migration'

Publications

I have 28 publications with 11 as first author and 10 as second to fourth author. H-index $= 12$, total citations > 400, first-author citations > 140.

First author

11. **P. Nazari**, A. D. Sellek, and G. P. Rosotti, "Hidden under a warm blanket: Planets can exist within protostellar disks without producing observable sub-structures", *Submitted to A&A Letters*, 2024

10. **P. Nazari**, B. Tabone, A. Ahmadi, S. Cabrit, E. F. van Dishoeck, C. Codella, J. Ferreira, L. Podio, Ł. Tychoniec, and M. L. van Gelder, "ALMA view of the L1448-mm protostellar system on disk scales: CH_3OH and $H^{13}CN$ as new disk wind tracers", *Accepted for publication in A&A*, 2023

9. **P. Nazari**, B. Tabone, G. P. Rosotti, and E. F. van Dishoeck, "Correlations among complex organic molecules around protostars: Effects of physical structure", *Accepted for publication in A&A*, 2024

8. **P. Nazari**, W. R. M. Rocha, A. E. Rubinstein, K. Slavicinska, M. G. Rachid, E. F. van Dishoeck, S. T. Megeath, R. Gutermuth, *et al.*, "Hunt for complex cyanides in protostellar ices with JWST: Tentative detection of CH_3CN and C_2H_5CN", *Accepted for publication in A&A*, 2023, See press release

7. **P. Nazari**, J. S. Y. Cheung, J. Ferrer Asensio, N. M. Murillo, E. F. van Dishoeck, J. K. Jørgensen, T. L. Bourke, K.-J. Chuang, *et al.*, "A deep search for large complex organic species toward IRAS16293-2422 B at 3 mm with ALMA", *Accepted for publication in A&A*, 2023

6. **P. Nazari**, B. Tabone, M. L. R. van't Hoff, J. K. Jørgensen, and E. F. van Dishoeck, "Evidence for Ubiquitous Carbon Grain Destruction in Hot Protostellar Envelopes", *ApJ Letters*, vol. 951, L38, 2023

5. **P. Nazari**, B. Tabone, and G. P. Rosotti, "Importance of source structure on complex organics emission. III. Effect of disks around massive protostars", *A&A*, vol. 671, A107, 2023

4. **P. Nazari**, J. D. Meijerhof, M. L. van Gelder, A. Ahmadi, E. F. van Dishoeck, B. Tabone, D. Langeroodi, N. F. W. Ligterink, J. Jaspers, M. T. Beltrán, G. A. Fuller, Á. Sánchez-Monge, and P. Schilke, "N-bearing complex organics toward high-mass protostars. Constant ratios pointing to formation in similar pre-stellar conditions across a large mass range", *A&A*, vol. 668, A109, 2022

3. **P. Nazari**, B. Tabone, G. P. Rosotti, M. L. van Gelder, R. Meshaka, and E. F. van Dishoeck, "Importance of source structure on complex organics emission. II. Do disks explain lack of methanol emission from low-mass protostars?", *A&A*, vol. 663, A58, 2022

2. **P. Nazari**, M. L. van Gelder, E. F. van Dishoeck, B. Tabone, M. L. R. van't Hoff, N. F. W. Ligterink, H. Beuther, A. C. A. Boogert, A. Caratti o Garatti, P. D. Klaassen, H. Linnartz, V. Taquet, and Ł. Tychoniec, "Complex organic molecules in low-mass protostars on Solar System scales. II. Nitrogen-bearing species", *A&A*, vol. 650, A150, 2021

1. **P. Nazari**, R. A. Booth, C. J. Clarke, G. P. Rosotti, M. Tazzari, A. Juhasz, and F. Meru, "Revealing signatures of planets migrating in protoplanetary discs with ALMA multiwavelength observations", *MNRAS*, vol. 485, pp. 5914–5923, 2019

Second-Fourth author

10. J. C. Santos, M. L. van Gelder, **P. Nazari**, A. Ahmadi, and E. F. van Dishoeck, "SO2 and OCS toward high-mass protostars: A comparative study between ice and gas", *A&A*, 2024

9. K. Slavicinska, E. F. van Dishoeck, Ł. Tychoniec, *et al.*, "JWST detections of amorphous and crystalline HDO ice toward massive protostars", *Accepted for publication in A&A*, 2024

8. A. E. Rubinstein, H. Tyagi, **P. Nazari**, *et al.*, "IPA. Class 0 Protostars Viewed in CO Emission Using JWST/NIRSpec", *Submitted to ApJ*, 2023

7. M. L. van Gelder, M. E. Ressler, E. F. van Dishoeck, *et al.*, "JOYS+: Mid-infrared detection of gas-phase SO_2 emission in a low-mass protostar. The case of NGC 1333 IRAS 2A: Hot core or accretion shock?", *A&A*, 2024

6. Y. Chen, M. L. van Gelder, **P. Nazari**, *et al.*, "CoCCoA: Complex Chemistry in hot Cores with ALMA. Selected oxygen-bearing species", *A&A*, vol. 678, A137, 2023

5. N. G. C. Brunken, A. S. Booth, M. Leemker, **P. Nazari**, N. van der Marel, and E. F. van Dishoeck, "A major asymmetric ice trap in a planet-forming disk. III. First detection of dimethyl ether", *A&A*, vol. 659, A29, 2022, See press release

4. M. L. van Gelder, **P. Nazari**, B. Tabone, A. Ahmadi, E. F. van Dishoeck, M. T. Beltrán, G. A. Fuller, N. Sakai, Á. Sánchez-Monge, P. Schilke, Y.-L. Yang, and Y. Zhang, "Importance of source structure on complex organics emission. I. Observations of CH_3OH from low-mass to high-mass protostars", *A&A*, vol. 662, A67, 2022

3. M. L. van Gelder, J. Jaspers, **P. Nazari**, A. Ahmadi, E. F. van Dishoeck, M. T. Beltrán, G. A. Fuller, Á. Sánchez-Monge, and P. Schilke, "Methanol deuteration in high-mass protostars", *A&A*, vol. 667, A136, 2022

2. F. Meru, G. P. Rosotti, R. A. Booth, **P. Nazari**, and C. J. Clarke, "Is the ring inside or outside the planet?: the effect of planet migration on dust rings", *MNRAS*, vol. 482, pp. 3678–3695, 2019, See press release

1. J. D. Ilee, C. J. Cyganowski, **P. Nazari**, T. R. Hunter, C. L. Brogan, D. H. Forgan, and Q. Zhang, "G11.92-0.61 MM1: a Keplerian disc around a massive young proto-O star", *MNRAS*, vol. 462, pp. 4386–4401, 2016, See press release

Other co-author

7. D. A. Neufeld, P. Manoj, H. Tyagi, *et al.*, "JWST/MIRI detection of suprathermal OH rotational emissions: probing the dissociation of the water by Lyman alpha photons near the protostar HOPS 370", *Accepted for publication in ApJ Letters*, 2024

6. N. G. C. Brunken, W. R. M. Rocha, E. F. van Dishoeck, S. T. Megeath, R. Gutermuth, H. Tayagi, K. Slavicinska, **P. Nazari**, M. Narang, P. Manoj, A. E. Rubinstein, *et al.*, "JWST observations of $^{13}CO_2$ ice: Tracing the chemical environment and thermal history of ices in protostellar envelopes", *Accepted for publication in A&A*, 2023

5. M. Narang, P. Manoj, H. Tyagi, *et al.*, "Discovery of a Collimated Jet from the Low-luminosity Protostar IRAS 16253-2429 in a Quiescent Accretion Phase with the JWST", *ApJL*, 2024

4. E. F. van Dishoeck, S. Grant, B. Tabone, *et al.*, "The diverse chemistry of protoplanetary disks as revealed by JWST", *Faraday Discussions*, vol. 245, pp. 52–79, 2023

3. G. M. Williams, C. J. Cyganowski, C. L. Brogan, T. R. Hunter, **P. Nazari**, and R. J. Smith, "ALMA observations of the Extended Green Object G19.01-0.03 - II. A massive protostar with typical chemical abundances surrounded by four low-mass pre-stellar core candidates", *MNRAS*, vol. 525, pp. 6146–6169, 2023

2. G. M. Williams, C. J. Cyganowski, C. L. Brogan, T. R. Hunter, J. D. Ilee, **P. Nazari**, J. M. D. Kruijssen, R. J. Smith, and I. A. Bonnell, "ALMA observations of the Extended Green Object G19.01-0.03 - I. A Keplerian disc in a massive protostellar system", *MNRAS*, vol. 509, pp. 748–762, 2022

1. A. J. Cridland, G. P. Rosotti, B. Tabone, Ł. Tychoniec, M. McClure, **P. Nazari**, and E. F. van Dishoeck, "Early planet formation in embedded protostellar disks. Setting the stage for the first generation of planetesimals", *A&A*, vol. 662, A90, 2022