

Dr. Konstantinos Migkas

✉ kmigkas@strw.leidenuniv.nl • 🌐 kmigkas.wixsite.com/kostasmigkas
📞 0000-0003-0451-0449

Professional Summary

Astrophysicist specializing in observational cosmology and galaxy clusters. Pioneer in the search for cosmic dipoles and bulk flow motions in the late Universe using multiwavelength galaxy cluster scaling relations, drawing significant attention from the scientific community and the public. My work focuses on using X-ray and multiwavelength galaxy cluster data, combined with other probes, to test cosmological models, map large-scale structure, study cosmic filaments, and baryonic cluster physics.

Future Research Vision

My research aims to leverage **new galaxy cluster data** (including an *XMM-Newton Large Program* of which I am the PI) to refine the kinematics and dynamics of the late Universe by mapping **cluster bulk flows and tracing cosmic expansion dipoles** up to unprecedented scales. Additionally, I plan to provide the **first-ever absolute distance calibration for thousands of galaxy clusters using Type Ia supernovae** and cluster scaling relations, addressing critical tensions in cosmology.

Education

University of Bonn <i>Ph.D. in Astrophysics</i> Best Ph.D. dissertation award 2022	Germany 2017–2021
University of Bonn <i>M.Sc. in Astrophysics</i> Full 2-yr scholarship by Uni Bonn, top of my class	Germany 2015–2017
Aristotle University of Thessaloniki <i>B.Sc. Honors (4-yr) in Physics</i> Top of my class	Greece 2010–2015

Professional Experience

Leiden Observatory <i>Oort Postdoctoral Fellow</i>	Leiden, Netherlands 2023–2026
Argelander Institute for Astronomy <i>Postdoctoral Researcher</i>	Bonn, Germany 2021–2023

Peer-Reviewed Publications and Metrics

First-author: 8 papers, 308 citations (ADS)
Co-author: 15 papers, 823 citations (ADS)
Total: 23 papers, 1131 citations, h-index: 14, i10-index: 18 (ADS)

Observing Time (as PI/Co-I)

As PI: XMM-Newton Large Program (497 ks / 140 hours). “Galaxy Clusters in the Zone of Avoidance and Cosmic (An)isotropy” (2024, data to be available by April 2026)
As Co-I: 8 XMM-Newton (total 1.3 Ms), 1 XRISM (250 ks), and 1 VLT (316 ks) proposals

Grants and Funding as PI

2025: Open Competition NWO ENW-XS (€50k): "Is the Universe Lopsided? Mapping cosmic expansion with the largest catalogs of X-ray galaxy clusters"

2025: Fonds Rijke-Hamaker/FWN (€35k): "Is there a Cosmic Dipole? Mapping the Universe's Expansion with new Galaxy Cluster Data"

2023: ESA Archival Research Program (€10k): "Observational Cosmology with Galaxy Clusters"

Honours, Awards, and Fellowships

2024: **Royal Society invitation** as speaker to "Challenging the standard cosmological model" meeting among Nobel Laureates and renown cosmologists (London)

2023: Oort fellowship, Leiden Observatory

2023: ESA research fellowship in space science (declined)

2023: Exceptional Scientific Achievements Award, Region of Thessaloniki, Greece (€1,000)

2021: Best Ph.D. dissertation award Promotionspreis 2022, University of Bonn and the Wilhelm und Else Heraeus foundation (€4,000)

2015-2021: Full scholarship for Ph.D. and M.Sc. studies by IMPRS-Bonn and University of Bonn (additional to Ph.D. employment contract)

2015: Best Academic Performance Award for B.Sc. studies by the Greek State Scholarship Foundation (€1,500)

Mentoring and Teaching

Main Advisor: 7 M.Sc. and 2 B.Sc. theses on X-ray galaxy clusters, cosmology, and simulations

Main Lecturer: "Photometry of star clusters" lab (M.Sc., Uni Bonn, 2017-2021)

Guest Lecturer: "Radio & X-ray Observations of Dark Matter and Dark Energy" (M.Sc., Uni Bonn, 2021-2023)

Teaching assistant: Astronomy, Physics, and Mathematics courses (B.Sc & M.Sc., 2011-2017)

Service and Leadership

Workshop organiser: Main organiser of Lorentz Workshop "Cosmology at the Crossroads: Galaxy Clusters in the Era of Large Surveys"

Seminar Organiser: Galaxy cluster seminars at Leiden Observatory (2023-now) and Uni Bonn (2018-2023)

Reviewer: Manuscripts for A&A, MNRAS

Committee Member: IMPRS Ph.D. selection committee (2022-2023)

Projects in International Collaborations

eROSITA: 1 first-author and 12 co-authored publications, PI of 1 ongoing project, Co-I in 8 projects.

Euclid: Member of Galaxy Cluster WP, soon to apply for 1 PI project.

SPT: 1 first-author publication

FLAMINGO: PI of 1 published project and 1 ongoing, Co-I in 1 project

X-CLASS: PI of 1 ongoing project, Co-I in 3 projects

XRISM: Co-I in 1 project

eeHIFLUGCS: 2 first-author publications, core-member of all running projects.

LOFAR: Recent member, currently designing project

4MOST: Recent member

Media Coverage for my Papers and Outreach

For cosmic expansion anisotropy papers (2020; 2021): ESA & NASA press releases, Scientific American cover

page, The Guardian interview, popular Youtube science channels

For missing-baryon paper (2025): ESA, NOVA, and several other press releases, BBC podcast interview, hundreds of news articles

Public Outreach: Popular articles in Greek local newspaper (Filyrea), public talks in schools, Cholomontas observatory tours, Astronomy on Tap events

Extended (>1 week) invited visits

2025: Astronomy Dept., Sussex University, Brighton, UK

2024: Institute of Astrophysics, University of Crete, Greece

2023: European Space Astronomy Centre, Madrid, Spain

2022: Leiden Observatory, Leiden, Netherlands

2022: INAF, Observatory of Bologna, Italy

Invited Seminars (last 5 years)

2025: Center for Astrophysics (CfA), Harvard & Smithsonian, USA. *X-ray emission of cosmic filaments at the local and distant Universe.*

2025: University of Sussex, UK. *X-ray emission of cosmic filaments at the local and distant Universe.*

2024: University of Crete, Greece. *Probing cosmic isotropy with galaxy clusters: current results and what the future holds.*

2024: National Observatory of Rio, Brazil. *Challenging the isotropy of the local Universe with galaxy clusters.*

2024: National Observatory of Athens, Greece. *Tracing cosmic anisotropy with galaxy clusters: new, exciting results.*

2022: Massachusetts Institute of Technology, USA. *The (an)isotropy of the local Universe as seen through galaxy clusters.*

2022: Observatory of Bologna/INAF, Italy. *Cosmic isotropy as seen through galaxy clusters.*

2022: University of Paris/Saclay, France. *The (an)isotropy of the Universe as seen through galaxy clusters.*

2022: University of Sussex, UK. *The (an)isotropy of the Universe as seen through galaxy clusters.*

2022: Leiden University, the Netherlands. *Probing cosmic isotropy using galaxy clusters.*

2022: University of Innsbruck, Austria. *A unique, high-z, merging double cluster.*

2021: University of Crete, Greece. *Probing cosmic isotropy with cluster scaling relations.*

2021: Max-Planck Institute for Extraterrestrial Physics (MPE), Germany. *Probing the isotropy of the local Universe with X-ray galaxy clusters.*

2020: Center for Astrophysics (CfA), Harvard & Smithsonian, USA. *Anisotropies of local cluster scaling relations & their cosmological implications.*

2020: University of Athens, Greece. *Probing cosmic isotropy with galaxy clusters.*

2020: University of Paris/Saclay, France. *Probing local isotropy with galaxy clusters.*

2020: National Observatory of Athens, Greece. *Tracing cosmic isotropy with galaxy cluster scaling relations.*

Talks in Conferences

Invited Talks

2025: Corsica, Italy: 17th Spontaneous Workshop on Hot Topics in Modern Cosmology. *Large bulk flow motions in the local Universe as probed by galaxy clusters.*

2024: London, UK: Challenging the Standard Cosmological Model. *Probing the isotropy of the local Universe with galaxy clusters.*

2023: Thessaloniki, Greece: A Multipolar Universe? *New results on cosmic isotropy by the eROSITA X-ray telescope.*

2022: Corfu, Greece: Tensions in Cosmology. *Challenging Λ CDM and the isotropy of the local Universe with galaxy clusters.*

2022: Thessaloniki, Greece: Challenges to Λ CDM. *Challenging the isotropy of the local Universe with galaxy clusters.*

2021: Pohang, South Korea: A Discussion on the Cosmological Principle. *Galaxy clusters point at a 5σ anisotropy in the local Universe: H_0 variation or large bulk flows?*

Contributed Talks

2025: Patras, Greece: 17th Hellenic Astronomical Society meeting. *The first robust spectroscopic detection of pure WHIM from a cosmic filament*

2024: Padova, Italy: European Astronomical Society Annual Meeting. *Detected WHIM emission from a supercluster filament.*

2023: Corfu, Greece: Tensions in Cosmology. *Challenging cosmic isotropy with new cluster data from the eROSITA X-ray telescope.*

2023: Athens, Greece: The X-ray Universe 2023. Talks titles: 1) *Redefining the isotropy of the local Universe with X-ray galaxy clusters.* & 2) *Cross-calibration of eROSITA, XMM-Newton, and Chandra cluster temperatures.*

2023: Athens, Greece: 16^o Hellenic Astronomical Society meeting. *Cross-calibration of eROSITA cluster temperatures with other X-ray telescopes.*

2022: Barcelona, Spain: Exploring the Hot and Energetic Universe. *Cosmic (an)isotropy and Athena: finally, a definite answer.*

2022: Bamberg, Germany: German eROSITA Consortium meeting. *The (an)isotropy of the local Universe as seen by eROSITA.*

2022: Cosmology from Home, online: *Probing cosmic isotropy with galaxy clusters: a new challenge for Λ CDM?*

2022: Athens, Greece: COSPAR 2022, 44th Scientific Assembly. 1) *Probing the isotropy of the late Universe with galaxy clusters.* & 2) *A unique, high-z, merging double cluster.*

2021: Tehran, Iran: Cosmology at the Crossroads. *Is the local Universe anisotropic? Galaxy clusters seem to think so.*

2021: Patras, Greece: 15^o Hellenic Astronomical Society meeting. *Is the local Universe anisotropic? Galaxy clusters seem to think so.*

2018: Dubrovnik, Croatia: Cosmology 2018 in Dubrovnik. *Testing the isotropy of the Universe with galaxy clusters in X-rays.*