

# Ulrike KUCHNER

Astronomer, Interdisciplinary Academic

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2017	PhD	Astrophysics	University of Vienna
2011	MSc	Astrophysics	University of Vienna & Sydney University
2010	BFA/MFA	Fine Arts, Painting	University of Applied Arts Vienna
2007	BSc	Astronomy	University of Vienna

My professional training and practice span astronomy, art, and their integration. In my scientific research I aspire to understand how galaxies evolve as part of the largest structures in the Universe. In my interdisciplinary research and artistic practice, I aim to find ways through which interdisciplinary methods can be beneficial for frontier science research processes. My vision is to lead a shift in how knowledge is produced through reciprocal collaborative research.

## EMPLOYMENT HISTORY

- 2018 - University of Nottingham. Postdoctoral Research Fellow in Large-Scale Structures.
- Research and preparation of research articles (Astronomy, Arts, Interdisciplinary Research)
  - Development of independent research agenda in Astronomy & Interdisciplinarity
  - Preparation of the WEAVE Wide-Field Cluster Survey
  - WEAVE Survey Working Group member (“Builder”)
  - Co-lead of the Euclid Morphology Challenge
  - Co-lead of the Euclid Cosmic Web Detection group
  - Preparation of observing proposals: co-I of 4MOST CHANCES & 4HS Surveys
  - 4MOST CHANCES Survey preparation
  - Co-creator of ARTlab incubation space Nottingham
  - Founding member of ITD-Alliance for Inter- and Transdisciplinarity; Interdisciplinary Research Cluster Nottingham
  - coordinator transdisciplinary network SEADS (Space Ecologies Art and Design)
  - PI, curator, facilitator of ArtScience collaborations & workshops
  - ~60 invited conference (incl review & seminar talks), panels, workshop (incl KITP)
  - Peer reviewer and selection panels in Astronomy, Art, UKRI Interdisciplinary Assessment College for grant funding
  - Co-supervisor of 9 students (5 PhD, 4 MSci)
  - Consultancy for museums on digital transformation
  - Curation and participation of multiple international exhibitions, including art-astronomy (PI)
  - Invited artistic director & concept creator art-astronomy theatre production Zurich
  - Broad range of CPD including leadership training
  - Undergraduate teaching
  - Organizer/facilitator/mentor of a winter school (“Climate crisis and the new space race”) & meeting for women and minorities in Astronomy
  - co-organizer of weekly Astronomy Group seminars
  - Scientific organizing committee of 4 conferences
- 2018 MINES Paris Tech, France. Postdoctoral Research Fellow
- Machine Learning: Anomaly detection for Euclid (cut short to take up Nottingham post)
- 2017 - 18 University of Nottingham. Postdoctoral Research Fellow
- Galaxy Morphology measurements Euclid mission
- 2011 - 17 University of Vienna. University Assistant (PhD student, pre-doctoral contract)
- EDI faculty representative 2013-2016

**QUALIFICATIONS & CONTINUING PROFESSIONAL DEVELOPMENT**

2023	UKRI Interdisciplinary Assessment College member
2022 - 2023	Digital Maturity and Digital Skills in Creative Industries (Ars Electronica)
2022	Conducting Systematic Reviews (Univ. of Plymouth)
2021 - 2022	Fellow of the <u>Leadership Academy 5</u> , Leadership for emerging group leaders (German Scholars Organization)
2020	<u>Action Learning Set (ALS) Facilitator</u> (3D Coaching)
2019	ECR Leadership Programme (Joint Univ. of Nottingham & Birmingham)
2019	Project Management (Project Management Rebels, Octopus Consultants)
2019	Scientific Writing (Productivity for Scientists Limited)
2018	Media Training (Univ. of Nottingham)
2011 - 2017	PhD Astronomy (Univ. of Vienna, excellent, defended August 2017)
2013 - 2016	Diversity and equality officer for Faculty, incl. EDI training (Univ. of Vienna)
2007 - 2011	MSc Astronomy (Univ. of Vienna, excellent)
2005 - 2010	BFA/MFA Fine Arts, Specialisation Painting (Univ. of Applied Arts Vienna, excellent, defended June 2010)
2003 - 2007	BSc Astronomy (Univ. of Vienna, excellent)

**RESEARCH FUNDING**

	Grant title and funder	Role	Amount
2024	UKRI STFC: ArtScience Immersive Exhibition on Quantum Technologies for Fundamental Physics	co-PI	€280k
2024	British Council UK-East Asia Connections Through Culture Grant: bioSignals	Partner	€12k
2023-24	Strategic Innovation Fund: Working on working together: Establishing best-practice for creative collaborations	PI	€51k
2023	Higher Education Innovation Fund: Successful collaborations across art and science: supporting the co-production of knowledge	PI	€57k
2023 - 2026	Consolidated Grant, Nottingham Astronomy (UKRI/UKRI): The effect of the large-scale environment on galaxy evolution – infall regions and filaments with WEAVE	Named postdoc; significant contributor	€2.4m (1 of 5 PDRAs funded)
2022	Spark Award (STFC/UKRI) & Lewisham Creative Change Fund: SPACE Lab [co-creative art-astronomy experiments]	PI	€23k
2022 - 2023	DOORS - Digital Incubator for Museums (EC Horizon2020 & Ars Electronica): Digital Warmth: Digital incubator for Museums	Co-I (of 3)	€30k
2021 - 2022	Leadership Academy [one of 25 fellows ready for junior group leader roles] (German Scholars Organization & Klaus Tschira Foundation)	PI	€5k
2020 - 2023	Consolidated Grant, Nottingham Astronomy (UKRI/STFC): Cluster infall regions and filaments with WEAVE	Named postdoc; significant contributor	€1.7m (1 of 4 PDRAs funded)
2019	Royal Astronomical Society small Grant for "Trailblazing Women in Astronomy"	Co-I (of 2)	€1.2k
2016 - 2017	Marietta Blau Grant (Austrian Science Ministry ): The formation and evolution of galaxy components over time	PI	€18k
2011 & 2016	ESO Director General Grants (ESO)	PI	€10k
2008 & 2009	Research/Study abroad grants (Univ. of Vienna)	PI	€25k

**AWARDS AND PRIZES**

2022	University Nottingham Tri-Campus Award for outstanding contribution to the research culture
2021	University of Nottingham Rising Star Award
2010	Prize for best Diploma awarded by the City of Vienna
2010	Johanna Dohnal Prize of the Austrian Ministry for Women's Affairs: female role model

**INTERNATIONAL MOBILITY**

JPL, Pasadena	Collaborative work (1 month)
STScI, Baltimore	Collaboration work (1 month)
ESO, Garching	Collaboration work (3 months)
ESO, Santiago	Collaboration work (6 months)
Art @CMS	CERN residency with 10 artists, Geneva, Switzerland
The Scientific Brain	Colloquium invitation and work at a school in Bogotá, Colombia
openGLAM Hackathon	Mentoring creative industries, open data use, Austria
CALIFA observations	Observing run at the Calar Alto Observatory, Spain
WiggleZ observations	Observing run at Australian Astronomical Telescope, Australia

**LEADERSHIP, PROJECT MANAGEMENT & CURATION (selected)**

- Coordinator international transdisciplinary collective SEADS (Space Ecologies Art Design)
- Survey Working Group member for WEAVE facility (ongoing)
- Quality Control and Assurance WEAVE Clusters Survey (ongoing)
- Euclid Morphology Challenge co-lead (ongoing)
- DOORS (Digital Incubator for Museums) project "Digital Warmth" co-lead (ongoing)
- Co-organizer of SPACE Lab (Spark Award) and artistic lead of UoN's ARTlab (ongoing)
- Co-lead of SEADS project "Theater Neumarkt Mimikry" (Zurich, 2022-2023)
- Co-lead of Winter School RITCS art school, Brussels, Belgium (2022)
- Scientific organising committee special session at EAS annual meeting (2021)
- SEADS Biomodd, Interaction Design Team, exhibition Musea Brugges, Belgium (2021)
- Co-organizer of Astronomy Seminar Series (2018-2020)
- "Of Clouds and Clocks": panel discussion moderator at Nottingham Contemporary (2020)
- Pamela Breda: The Quintessence. ArtScience colloquium and exhibition at UoN (2020)
- Two Panel Discussions at NHM Vienna in collaboration with GLOBART Think Tank (2019): "A change of perspectives: Science on Art/Art on Science" and "Escape to Space"
- Co-organizer of "Trailblazing Women in Astronomy" Network meeting (2019)
- Suratómica: Art & Science Encounter, CERN residency, Geneva, Switzerland (2018)
- Curator, fund-raiser for "Our Place in Space" exhibition, NHM Vienna, Austria (2018)

**COLLABORATION AFFILIATIONS, COMMUNITY SERVICE AND ACADEMIC CITIZENSHIP**

Scientific	full member of WEAVE @William Herschel Telescope, ESA Euclid consortium; Javalambre Photometric Local Universe Survey (J-PLUS); The ThreeHundred project for cluster simulations; CHANCES (Chilean Cluster Evolution survey) and 4HS (4MOST Hemisphere survey) @4MOST ESO; MSE Mauna Kea Spectroscopic Explorer; Cluster Lensing and Supernova Survey with Hubble (CLASH)
Peer Review	Astronomy & Astrophysics Journal; Monthly Notices for the Royal Astronomical Society; The Astrophysical Journal
Art, ArtScience, ITDR	<u>SEADS</u> (Space, Ecology, Art and Design) transdisciplinary collective; <u>ITD-Alliance</u> (Global Alliance for Inter- and Transdisciplinarity); <u>GLOBART</u> creative Think Tank; <u>Suratómica</u> platform for Art, Science, Technology creation; <u>IRC Interdisciplinary Research Cluster</u> "Creative and Digital" UoN
Professional Societies	International Astronomical Union (IAU); European Astronomical Union (EAU); Fellow of the Royal Astronomical Society (FRAS)
Professional Service, EDI	Yellow Book assessor to support Mental Health of students and staff; ITD-Alliance "ECR" and "integration experts" group; Public

Engagement Grant panel member University of Nottingham; Weekly Astronomy Seminar organiser; Network for women in Geography, Earth Sciences and Astronomy committee; Diversity and gender equality committee University of Vienna

## TEACHING, RESEARCH SUPERVISION & MENTORSHIP

- Assistant supervisor for 5 PhD students (two completed), UoN
- Assistant supervisor for 4 4th-year Research Projects (all completed), UoN
- Mentoring for 10 visual artist
- Hackathon mentor for creative and cultural industries (openGLAM)
- Undergraduate teaching: scientific writing, UoN
- Winter school teaching and mentoring 15 performing art students
- Lecture course “Galaxy evolution in the era of ALMA, VLT and E-ELT”, Univ. of Vienna, (joint with 2 other lecturers)
- Teaching Assistant and Tutor “Observational Astronomy Lab”, Univ. of Vienna

## RECENT INVITED TALKS, SPEAKING ENGAGEMENTS AND PANELS (selected)

In the last four years, I have given ~60 talks at conferences, seminars and colloquia, was invited to contribute to workshops, panel discussions, openings, hackathons and mentoring sessions. The following is a list of selected contributions of the last years highlighting their breadth:

- 2023 Invited Keynote, Photographs from space: a female archaeology of image-data, Milan, Italy  
 2023 Invited talk, A journey through galactic environments, Porto Ercole, Italy  
 2023 Invited review talk WEAVE special session EAS Krakow  
 2023 Selection panel of 16th International Symposium on Visual Information Communication and Interaction (VINCI 2023), Guangzhou, China.  
 2023 Invited review talk for the conference “Galaxy Groups and Clusters III”, La Serena, Chile.  
 2023 Invited Seminar talk, University of Sao Paulo, online.  
 2023 Invited Seminar talk, University of Bristol, UK.  
 2023 Invited Seminar talk, University College London, UK.  
 2023 Invited Seminar talk, University of Hertfordshire, UK.  
 2023 Invited conference talk and workshop participation at KITP Santa Barbara “The Co-evolution of the cosmic web and Galaxies across Cosmic Time”.  
 2023 Invited talk for the Chilean Cluster Galaxy Evolution Survey meeting, online.  
 2022 Invited review talk for the S-PLUS collaboration meeting, Brazil, virtual  
 2022 Invited workshop lead for “We do not have a recipe” exhibition opening, Dresden, Germany  
 2022 Invited talk “WEAVE-Euclid collaborations”, Euclid Galaxy Evolution meeting, Naples, Italy  
 2022 Invited talk “ARTlab at UoN” to Quantum Simulation for Fundamental Physics, London, UK  
 2022 Contributed talk and STEAM Panelist, “Digital Research in Humanity and Art”, Kingston, UK  
 2022 Invited review talk “Euclid Legacy Science”, Euclid UK Meeting, virtual  
 2022 Invited talk at “TheThreeHundred” collaboration meeting, Madrid, Spain  
 2022 Invited talk at “art:sci:lab” opening and symposium, Univ. of Hertfordshire, UK  
 2022 Invited talk at “Pint of Science” Nottingham, UK.  
 2022 Invited talk at RITCS “You better get used to this” winter school, Brussels, Belgium  
 2021 Invited Seminar talk, Korean Astronomy and Space Science Institute, virtual  
 2021 Invited Seminar talk, University of Western Australia, virtual  
 2021 Invited Seminar talk, University of Groningen, virtual  
 2021 Discussion “Transdisciplinarity as institutional challenge for Universities”, virtual  
 2021 Invited Conference talk, European Astronomy Society Annual Meeting, virtual  
 2021 Contributed talk “NAM — National Astronomy meeting” about ArtScience, virtual  
 2021 Invited Symposium talk for LASER talks Brussels, “Light, Time and Collaboration between Art and Science”, virtual.  
 2021 Invited mentor for “openGLAM cultural Hackathon for creative industries”, St. Pölten, Austria  
 2021 Invited podcast recording for Open Culture Cast, "If it's worth it, let me work it"  
 2021 Invited podcast recording for “The error bar” podcast  
 2021 Contributed Conference talk, discussion “Transdisciplinarity: Creating spaces and cultivating mindsets for learning and experimentation” International TD conference, virtual  
 2021 Contributed Symposium talk at “Theorizing Visual Arts and Design”, Univ. of Hertfordshire  
 2020 Invited Seminar talk, INAF Italian National Institute for Astrophysics, virtual  
 2020 Invited talk and discussion “ArtScience Master class”, Suratómica Festival: About the origin

- 2020 Contributed talk “Cosmic Flows, Large-scale structure and Visualisation”, South Africa  
 2020 Invited talk and panel moderator. “Of Clouds and Clocks”, Nottingham Contemporary  
 2019 Invited talk about ArtScience for “Frontiers lecture”, Univ. of Nottingham, UK  
 2019 Invited seminar talk, Oxford University, UK  
 2019 Invited seminar talk, Univ. of Hertfordshire, UK  
 2019 Invited talk and podcast recordings for the Leonardo ArtScience workshop "Of some visions in/for the 21st Century", Paris, France  
 2019 Contributed talk “Cosmic web workshop”, Edinburgh, UK  
 2019 Contributed talk “European Week of Astronomy and Space Science”, Lyon, France  
 2019 Invited talk “WEAVE collaboration meeting”, La Laguna, Tenerife, Spain  
 2019 Contributed talk “NAM – National Astronomy meeting” Lancaster, UK

## FULL LIST OF PUBLICATIONS

PEER-REVIEWED JOURNAL ARTICLES (→♣ = top 5 papers, detailed below; \* = PhD supervision)

- 2024 Euclid Collaboration: Aussel B., Kruk S., [...] Kuchner U et al. “Euclid preparation. Measuring detailed galaxy morphologies for Euclid with Machine Learning” submitted to *A&A*; [10.48550/arXiv.2402.10187](https://arxiv.org/abs/10.48550/arXiv.2402.10187)
- 2023 Cornwell D.\*, Kuchner U., Gray M., et al., “The localization of galaxy groups in close proximity to galaxy clusters using cosmic web nodes”. Accepted for publication in *MNRAS*
- 2023 Rost A.\*, Nuza S., Kuchner U., et al., “The three hundred project: thermodynamical properties, shocks and gas dynamics in simulated galaxy cluster filaments and their surroundings”. Accepted for publication in *MNRAS*
- 2023 Cornwell D.\*, Aragon-Salamanca A., Kuchner U., et al., “The probability of identifying the cosmic web environment of galaxies around clusters motivated by the Weave Wide Field Cluster Survey”, *MNRAS*, 524, 2, 2148-2160
- 2023 →♣ **Kuchner U.**, Nasser, M., Steyaert P., et al., “Biomodd: The integration of art into transdisciplinary research practices”, *Ecological Perspectives for Science and Society: GAIA*, Volume 32, Number 1, 2023, pp. 144-153(10)
- 2023 Jin S., Trager S., Dalton G., [...] Kuchner U., et al., “The WEAVE Survey: Design, Overview and simulated Implementation”, *MNRAS*, [arXiv:2212.03981](https://arxiv.org/abs/2212.03981)
- 2023 Maranan D., Steyaert P., Vengua L., Casauay F., Kuchner U., et al., “The BUKAS Lab: Opening ArtScience exploration and futures literacy in the Global South”, peer-reviewed paper for 28th International *Symposium on Electronic Art*, Paris, France
- 2022 Hough T., Cora S., Hagggar R., Vega-Martinez C., Kuchner U., et al., “The Three Hundred project: connection between star formation quenching and dynamical evolution in and around simulated galaxy clusters”, *MNRAS*, 518, 2398
- 2022 Hagggar R.\*, Kuchner U., Gray M., et al., “The Three Hundred project: Galaxy groups do not survive cluster infall”, *MNRAS*, 518, 1316
- 2022 Cornwell D.\*, Kuchner U., Aragón-Salamanca A., et al., “Forecasting the success of the WEAVE Wide-Field Cluster Survey on the extraction of the cosmic web filaments around galaxy clusters”, *MNRAS*, 517, 1678
- 2022 →♣ **Euclid Collaboration**: Bretonnière H.\*, Kuchner U., Huertas-Company M., et al., “Euclid preparation XXVI: The Euclid Morphology Challenge. Towards structural parameters for billions of galaxies”, *A&A* 671, A101
- 2022 Euclid Collaboration: Merlin E., Castellano M., Bretonnière H., Huertas-Company M., Kuchner, U., et al., “Euclid preparation. XXV. The Euclid Morphology Challenge. Towards model-fitting photometry for billions of galaxies”, *A&A*, 671, A102
- 2022 Cui W., Dave R., Knebe A., [...] Kuchner U., “THE THREE HUNDRED project: The GIZMO-SIMBA run”, *MNRAS*, 514, 977
- 2022 Ferreira L.\*, Conselice C., Kuchner U., Tohill, C., “A Simulation-driven Deep Learning Approach for Separating Mergers and Star-forming Galaxies: The Formation Histories of Clumpy Galaxies in All of the CANDELS Fields”, *ApJ*, 931, 34
- 2022 →♣ **Kuchner U.**, Hagggar, R., Aragón-Salamanca A., Pearce F., Gray M., et al., “An inventory of galaxies in cosmic filaments feeding galaxy clusters: galaxy groups, backplash galaxies, and pristine galaxies”, *MNRAS*, 510, 581
- 2022 Euclid Collaboration: Bretonnière H., Huertas-Company M., Boucaud A., [...] Kuchner U., et al., “Euclid preparation. XIII. Forecasts for galaxy morphology with the Euclid Survey using deep generative models”, *A&A*, 657, 90

- 2021 Kuchner U. "The Value of ArtScience: improving the balance in collaboration practices between artists and scientists can impact knowledge production." *Writing Visual Culture*, Vol 10, ISSN: 2049-7180
- 2021 →♣ **Kuchner U.**, Aragón-Salamanca A., Rost A., Pearce F., et al., "Cosmic filaments in galaxy cluster outskirts: quantifying finding filaments in redshift space", *MNRAS*, 503, 2065
- 2021 Rost A\*, Kuchner U., Welker, C., Pearce, F., et al. "The ThreeHundred: the structure and properties of cosmic filaments in the outskirts of galaxy clusters", *MNRAS*, 502, 714
- 2020 →♣ **Kuchner U.**, Aragón-Salamanca A., Pearce F. Gray M., Rost A., et al., "Mapping and characterisation of cosmic filaments in galaxy cluster outskirts: strategies and forecasts for observations from simulations", *MNRAS*, 494, 5473
- 2020 Bisigello L., Kuchner U., Conselice C., et al., "Euclid: the selection of quiescent and star-forming galaxies using observed colours", *MNRAS*, 494, 2337
- 2019 Dimauro P., Huertas-Company M., Daddi E., [...] Kuchner U., et al., "The structural properties of classical bulges and discs from  $z \sim 2$ ", *MNRAS*, 489, 413
- 2018 Marian V., Ziegler B., Kuchner U., Verdugo M., "Color gradients reflect an inside-out growth in early-type galaxies of the cluster MACS J1206.2-0847", *A&A*, 617, 34
- 2017 Kuchner U., Ziegler B., Verdugo M., Bamford S., Häußler B. "The effects of the cluster environment on the galaxy mass-size relation in MACSJ1206.2-0847", *A&A*, 604, 54
- 2016 Maier C., Kuchner U., Ziegler B., Verdugo M., Balestra I., Girardi M., et al., "CLASH-VLT: Strangulation of cluster galaxies in MACS J0416.1-2403 as seen from their chemical enrichment", *A&A*, 590, 108
- 2016 Annunziatella M., Mercurio A., Biviano A., [...], Kuchner U., 18 et al. "CLASH-VLT: Environment-driven evolution of galaxies in the  $z=0.209$  cluster A209", *A&A*, 585, 160
- 2015 Girardi M., Mercurio A., Balestra I., [...] Kuchner U., et al., "CLASH-VLT: Substructure in the galaxy cluster MACS J1206.2-0847 from kinematics of galaxy populations", *A&A* 579 4
- 2014 Annunziatella M., Biviano A., Mercurio A. [...] Kuchner U., et al., "CLASH-VLT: The stellar mass function and stellar mass density profile of the  $z=0.44$  cluster of galaxies MACS J1206.2-0847", *A&A*, 579, 4
- 2014 Presotto V., Girardi M., Bonino M., [...] Kuchner U., et al., "Intracluster light properties in the CLASH-VLT cluster MACS J1206.2-0847", *A&A*, 565, 126
- 2014 Sartoris B., Biviano A., Rosati P., [...] Kuchner U., et al. "CLASH-VLT: Constraints on the Dark Matter Equation of State from Accurate Measurements of Galaxy Cluster Mass Profiles", *ApJ*, 783, 11
- 2014 Monna A., Seitz S, Greisel N [...] Kuchner U., et al., "CLASH:  $z \sim 6$  young galaxy candidate quintuply lensed by the frontier field cluster RXC J2248.7-4431", *MNRAS*, 438, 1417
- 2013 Balestra I., Vanzella E., Rosati P. [...] Kuchner U., et al. "CLASH-VLT: spectroscopic confirmation of a  $z = 6.11$  quintuply lensed galaxy in the Frontier Fields cluster RXC J2248.7-4431", *A&A*, 559, 9
- 2013 Biviano A., Rosati P., Balestra I., Mercurio A., [...] Kuchner U., et al. "CLASH-VLT: The mass, velocity-anisotropy, and pseudo-phase-space density profiles of the  $z = 0.44$  galaxy cluster MACS J1206.2-0847", *A&A*, 558, 1

#### →♣ SELF-SELECTED TOP 5 PUBLICATIONS

Euclid Collaboration: Bretonniere H., **Kuchner U.**, Huertas-Company M., Merlin E. et al, "*Euclid preparation. XXVI. The Euclid Morphology Challenge: Towards structural parameters for billions of galaxies*". *A&A*, **2023**, 671, A102, 29.

This is the second of two key pre-launch deliverables from the Euclid Morphology Working Group and presents the reference for high-quality galaxy morphology measurements for billions of galaxies imaged with *Euclid*. It is the culmination of a five-year and highly complex "Morphology Challenge" that grew from initial exploratory studies that I led and advocated for. The first author is a PhD student for whom I was the de facto co-supervisor for this part of his PhD. He won a Euclid star prize for this work in 2023. We evaluated and assessed the accuracy of the parametric galaxy morphology measurements from five state-of-the-art surface-brightness-fitting codes applied to galaxies of varying complexity simulated for the Euclid Wide Survey. Results of this Challenge led to the selection of the fitting code now implemented in the Euclid pipeline.

**Kuchner U.**, Nasser, M., Steyaert P., Maranan D., et al. "*Biomodd: The integration of art into transdisciplinary research practices.*" *GAIA - Ecological Perspectives for Science & Society*: **2023**, 32/1, 144 – 153.

In this invited article we present the SEAD collective's Biomodd project, an ArtScience creation around sustainability themes ecology, humanity, technology and technological waste, that aims to

ignite interdisciplinary experimentation and critical conversations. In this first-ever hybrid Biomodd, we investigated (1) the generation and evolution of new ideas and (2) the impact of hybrid participation on the interdisciplinary process. We created a conceptual model that builds upon the framework of the idea journey from generation to implementation, to examine whether, how and where hybrid artistic practices can be most beneficial for sustainability research. GAIA is a leading international journal in the field of transdisciplinary approaches to global sustainability.

**Kuchner U.**, Haggard, R., Aragón-Salamanca A., Pearce F. Gray M., et al., “*An inventory of galaxies in cosmic filaments feeding galaxy clusters: galaxy groups, backplash galaxies, and pristine galaxies*”. MNRAS, **2022**, 510, 581.

This article defines the benchmark for overcoming the notorious challenge of disentangling the various modes of pre-processing present in cluster infall regions. In particular, filaments comprise a heterogeneous range of environments including groups of galaxies embedded within them and backplash galaxies that contain a record of their previous passage through the cluster. Identifying the components accurately is fundamental to achieving robust breakthrough results on galaxy pre-processing with imminent surveys. I use modern cosmological simulations to track halos through time, identify their environment, and dissect the population of galaxies found in filaments that feed galaxy clusters.

**Kuchner U.**, Aragón-Salamanca A., Rost A., Pearce F. et al., “*Cosmic filaments in galaxy cluster outskirts: quantifying finding filaments in redshift space*”. MNRAS, **2021**, 503, 2065.

In practice, finding filaments is complicated by redshift space distortions (RSD) related to the peculiar velocities of galaxies. This is widely expected to be most challenging in cluster infall regions and had not been addressed specifically in the literature. In this article I tested methods from large-scale-structure studies in the dynamically complex cluster infall regions. This led to me designing the first fully tested RSD mitigation strategy for filaments in cluster infall regions, ready for application to WEAVE and 4MOST survey data. In a companion article led by a PhD student (Rost, Kuchner, et al., 2021), we showed the turbulent flow gas collapsing onto filaments around clusters, and that it is shocked where filaments penetrate the cores of clusters. Together these articles are fundamental to robust detection and interpretation of filaments feeding clusters.

**Kuchner U.**, Aragón-Salamanca A., Pearce F. Gray M., Rost A., et al. , “*Mapping and characterisation of cosmic filaments in galaxy cluster outskirts: strategies and forecasts for observations from simulations*”. MNRAS, **2020**, 494, 5473.

This article defines how to identify and characterize cosmic web filaments with a new generation of spectroscopic surveys. This is a challenge because the filaments are very low in contrast against their surroundings. An important strength of this work is the combination of state-of-the-art hydrodynamic simulations and observations. Our results provide a reference for numerous studies in the upcoming era of wide-field spectroscopic surveys and will shape their design.

## ARTICLES SUBMITTED OR IN PREP

- 2023 Aussel B., Kruk S., .. Kuchner U. “*Euclid* preparation. Predicting detailed galaxy morphologies for *Euclid*”, submitted to collaboration
- 2023 Kuchner U., Aragon-Salamanca A., et al., “The WEAVE Wide-Field Cluster Survey”, writing
- 2023 Cornwell D., Kuchner U., Aragon-Salamanca A., et al, “Cluster merger signatures from Infall region observations ”, writing

## BOOK CHAPTER

- 2021 Kuchner U. “Near the Origin” published as opening chapter in “A | Cerca del Origen - [fronteras Inexistentes]. Libro de Memorias.”, ISBN: 978-958-53865-0-1-1, Eds. N. Rivera, D. Brill Estrada, Suratómica Publishing House 2022.

## RECENT ART EXHIBITIONS & PERFORMANCES

- 2023 Artistic director: Exomoon Mimikry: an immersive space experience, Zurich, CH
- 2023 Curator: Digital Warmth, Kaiser Franz Josef Museum, Baden, Austria
- 2023 Curator: SPACE Lab [co-creative art-astronomy experiments], London, UK
- 2022 - 2023 Artist: “Wir haben kein Rezept”, Group exhibition, Dresden, Germany
- 2022 Biennale de Venezia Sessions: “What is NORM? What is NORM-al?” Venice, Italy
- 2021 Artist: “What is NORM?”, Gender Art Lab, Haus Wittgenstein Vienna, Austria
- 2021 Biomodd [BRG13], community-led installation, Saint Johns Hospital Bruges, Belgium
- 2021 Architecture Biennale Venice, “100 ways to say we”, as part of SEADS collective

- 2020 Artist: “Creative Reactions” online exhibition, group exhibition, virtual  
 2018 Artist: “Our Place in Space” group exhibition, Bogotá, Colombia.  
 2018 Curator: “Our Place in Space” exhibition, Natural History Museum Vienna, Austria

### BLOG POSTS, PODCASTS, FILMS (selected)

- 2022 The CareOperative, Transforming Academia participants, “A collaborative vision & pathways for transforming academia”, [Integration & Implementation Insights](#) community blog  
 2022 “A journey through matter, from the big to the small” Article for children’s magazine (bi-lingual French and English)  
 2022 UoN Physics & Astronomy [Yellow Book & Sound Inspired project](#) (two editions)  
 2021 Kuchner U., Christopher Tayler in discussion with Nick Holmes. “Do chickens see green stars?”, the [error bar podcast](#), “Where neuroscience meets uncertainty.”  
 2021 openGLAM cultural hackathon: Thinking about work in new ways. “Is it worth it, let me work it”, [Open culture cast](#)  
 2021 GLAMhack21, “Imperfect data and. Very different cosmic thought”, [openGLAM blog](#)  
 2021 “[The underused potential of ArtScience collaborations](#)”, Presentation at ITD conference.  
 2020 Suratomica, “[Do I dare disturb the Universe](#)” Master class film  
 2019 “Was ich lese” article for “Die Presse” Feuilleton “Spectrum“ (major Austrian newspaper)  
 2019 Leonardo Space Art & Science podcast 2019 “Age of Anthropocene, Of some visions in/for the 21st Century”, [Leonardo podcast](#)  
 2018 “[El cerebro científico](#)”, The scientific brain, documenting school work and exhibition  
 2018 “El cerebra científico”, Documentary about my work commissioned by Cinemark Colombia  
 2018 Radio interviews for “Our Place in Space”, Natural History Museum, Vienna, Austria.  
 2018 “Our Place in Space”, article for the “Universum magazine”, Austria.  
 2014 ORF “Die Akte Galilei” “Kreuz und Quer” science and religion [TV documentary](#), Austria.  
 2014 GLOBART Talk @ [Vienna Secession](#) “Measuring Mistakes” panel discussion film  
 2013 Ulrike Kuchner “[Measuring Mistakes](#)” FFAB-produced film commissioned by Blandina Baranes, European Space Policy Institute.

### CONFERENCE PROCEEDINGS, EXHIBITION CATALOGUES, DATA CATALOGUES (selected)

- 2023 Press Release “Immersive space experience is out of this world”, Theater Neumarkt, CH  
 2023 Maranan D., Kuchner U., et al., “Exploring the tension between climate change and the space race through somatic experiences, speculative design, and interactive performance”, [Convergence: Seminar on Technological and Somatic Perspectives](#)  
 2023 Exhibition text “SPACE Lab [co-creative art-astronomy experiments]”, A.P.T. Gallery, UK  
 2022 Exhibition text “Wir haben kein Rezept”, Motorenhalle Dresden, Germany  
 2021 Exhibition text “Nähe, Distanz und Ausweichchancen” Motorenhalle Dresden, Germany.  
 2018 Exhibition and press text “Our Place in Space”, Natural History museum Vienna, Austria.  
 2017 Kuchner U., Ziegler B., Bamford S., Verdugo M., Haeussler B., “The Size Distribution Of Cluster Galaxies” Galaxy Evolution Across Time, [Zenodo](#)  
 2015 Kuchner U., Maier C., Ziegler B., Verdugo M., et al “CLASH-VLT: Is there a dependence in metallicity evolution on galaxy structures?”, Galaxies in 3D across the Universe, Proceedings of the International Astronomical Union, Volume 309, [arXiv:1409.4999](#)  
 2015 Strazzullo V., Mohr J., Saro A., [...] Kuchner U., “Deep IRAC imaging of a complete sample of SPT selected clusters at z~1.5” Spitzer Telescope Proposal  
 2015 Girardi M., Mercurio A., Balestra I., [...] Kuchner U., VizieR Online data catalog: “MACS J1206.2-0847 galaxies spectral classification”