SCIENCE ASCEND

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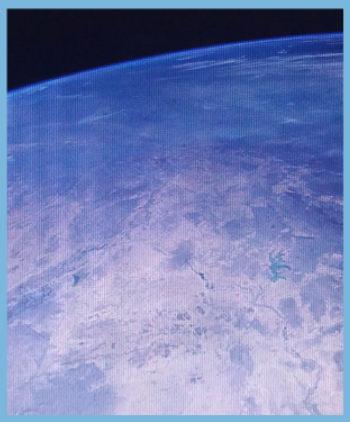

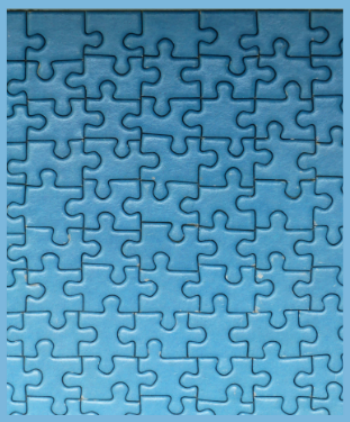

Highlights

Astrophysics: Circumstellar habitability + UV habitable zone scan of the solar neighborhood

Analytical Chem.: Protecting the polymer through the Size Exclusion Chromatography analysis

Remote Sensing: Video encoder block to monitor change detection in remote sensing images

Environmental Chem.: Atmospheric aging the diesel exhaust to better simulate the human exposure

Data Decomposition: Singular Value Decomposition methods in causal analysis

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Science Ascend

Rising to New Heights of Discovery!

Science Ascend teleports you to the frontiers of science. It compiles and discuss the scientific research preprints from arXiv, bioRxiv, chemRxiv just from the previous week to be cognizant of the *state-of-the-art* of knowledge in astrophysics, chemistry, environmental chemistry, remote sensing, and applied statistics/data science. Light from the *Science Ascend* will keep brightening the dark horizon beyond the limits of our comprehension. FIRE Araştırma Eğitim Ltd. Şti. guarantees the weekly publication and dissemination of this journal, and make it available for everyone at most fifteen days after its publication freely.

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Bilim Yükselişi

Keşfin Yeni Yükseklerine Ulaşmak!

Science Ascend sizi bilimin sınırlarına ışınlar. Astrofizik, kimya, çevre kimyası, uzaktan algılama ve uygulamalı istatistik/veri bilimi alanlarındaki bilgi birikiminin *en son durumu* hakkında bilgi sahibi olmak için arXiv, bioRxiv, chemRxiv'den sadece bir önceki haftaya ait bilimsel araştırma ön baskılarını derler ve tartışır. *Bilim Yükselişi*'nden gelen ışık, kavrayışımızın sınırlarının ötesindeki karanlık ufku aydınlatmaya devam edecektir. FIRE Araştırma Eğitim Ltd. Şti. bu derginin haftalık olarak yayınlanmasını, dağıtılmasını ve yayınlandıktan en geç on beş gün sonra ücretsiz olarak herkesin erişimine açılmasını garanti eder.

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Contents

Foreword

Greetings everyone!
In all five domains there were quite novel approaches to the problems in their fields.

- We had lots of studies approaching space-habitability from other perspectives in astro-ph.EP

- Analytical chemistry works provided better controls on the stability of analytes during the analysis.

- Change detection in remote sensing included a video-encoder to capture the change without textual and image-based separate blocks.

- An environmental chemistry study constructed a setup to assess the exposure of diesel exhaust for more realistic simulation by atmospherically aging it.

- We have seen many causal analysis application of singular value decomposition-based techniques.

See you all at the next issue!

Güray Hatipoğlu

Last week in Astrophysics

Author: Yasin Güray Hatipoğlu

The preprints summarized here were published between October 29, November 4, 2024. These are from arXiv's astro.EP cross-fields

Reviews - Reports

Kane et al.[1] explained Venus, Earth, and Mars habitability changes throughout time in separate chapters.

Menti et al.[2] reported the database for the Large Interferometer for Exoplanets mission for the Voyage 2050 science program of the European Space Agency.

Bourdarot and Eisenhauer[3] reported the science drivers of kilometer-baseline (or in general, very large baseline instrument - VLBI) and briefly introduced the Extended Very Large Telescope Interferometer and the GRAVITY+.

Pancher et al.[4] presented the laboratory calibration bench for the GIGAPYX4600 sensor of Pyxalis in standard detector calibration, interferometric pixel centroid position calibration, and optical distortion calibration. The approach is overall followed for a high-precision differential astrometry case.

Pedersen et al.[5] presented the first-light results of the SPIRIT (SPECULOOS Infrared Imager for Transits), ground-based near-infrared InGaAs CMOS instrument and its near-infrared feasibility and real-life performance (the photon transfer curve, gain, noise, dark current, bad pixels, on-sky performance, and precipitable water vapor (PWV) sensitivity results among other things.

Malbet et al.[6] reviewed the overall astrometry research briefly and focused on space-based astrometry and potential future achievable goals by them.

van't Hoff and Bergner[7] reviewed the literature on protoplanetary disk chemical compositions, focusing on carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur elements.

Jones et al.[8] provided a chapter for the journey from the planet formation to the emergence of life, specifically for the Solar system case.

Haqq-Misra et al.[9] discussed the interesting caveats in the search for extraterrestrial life, and specifically the technology leap from the current Earth to the *stellivores*, in which the stellar mass was being harnessed for the corresponding technology.

Astrochemistry

Seeyangnok et al.[10] made density functional calculations to predict the potential organic chemistry through the metallic hydrogen medium, and reported that the expected results are charged, sixfold coordinated carbon compounds with more hydrogen than expected.

Cabedo et al.[11] estimated the reactivity of chondritic meteorites under the hydrogen-dominated reducing atmospheres from experimental studies with meteorite samples to computational estimations, and interpretations.

White and Liu[12] investigated carboxysulfitic reaction network on the grounds that it can be a probiotically significant reaction. They examined it under the pH values of 6,9, and 12 with a solar simulation irradiation onto a bicarbonate and sulfite mixture.

Stellar Systems - Populations - Clusters

Zandt and Petigura[13] made an exoplanetary demographics study on finding correlations between the stellar metallicity and giant planet companions in the California Legacy survey sample and found no evidence of enhancement in cases with metal-rich systems.

Muresan et al.[14] compiled stellar systems with at least three confirmed exoplanets (282 systems and 991 exoplanets altogether) to investigate their architecture and check for similarities/patterns. They reported curious insights on orbital spacing and its relation with the exoplanetary mass and radius.

Li et al.[15] used ultraviolet photometry data from the GALEX and Swift UVOT missions to check the ultraviolet irradiance from host stars to their exoplanets (over 2700 stars) which is crucial in habitability determination. Among this many host stars' combined UV-habitable and circumstellar habitable zones, only lower than 100 of them were detected to be present with most gas giants.

Pyne et al.[16] studied the 10 pc stellar neighborhood of the solar system and included 84 habitable zone ones closest to the Sun to check the threats on their habitability from the nearby cataclysmic events and stellar encounter-originated perturbations. They also defined a Solar Similarity Index and Neighborhood Similarity Index, in which the HD 40307 was the most similar to the Sun.

El-badry et al.[17] created a mock Milky Way catalog to investigate the types of binaries that are **likely** to be cataloged by *Gaia* and provided a

prediction for what the Data Release 4 will yield.[1]. A related approach was utilized to generate a fast, analytic-empirical model for the *Gaia* Data Release 3 selection function estimation by Lam, El-Badry, and Simon[18].

Burgasser et al.[19] reported the spectroscopic follow-up measurements (by mainly Keck/NIRES, IRTF/SpeX, APO/TripleSpec, Magellan/FIRE, and Gemini-North/GNIRS) of candidate T subdwarfs identified by the Backyard Worlds: Planet 9 citizen science program. They reported that the candidates had comparatively low metallicity state, more success from the LOWZ spectral models to fit, radial velocities of several candidates, and T dwarf metallicity classification standards.

Single Star System (Star, Exoplanet)

Su et al.[20] observed/imaged the Vega Debris System with the JWST/MIRI and interpreted the observations as the present grain drags by the Poynting-Robertson effect, and other disk-related insights hinting at a Neptune-size exoplanet.

Horner et al.[21] checked the following TESS discovered systems for any more exoplanets in between already confirmed ones: HD 15337; HD 21749; HD 63433; HD 73583, LTT 3780, TOI-1670, and TOI-421, with the first five of these, can accommodate in-betweener planets according to the researchers' simulations.

Dong et al.[22] studied the origin of a warm super Jupiter with a high eccentricity with the data from TESS, Keck/HIRES, Rossiter-McLaughlin effect, and WIYN Telescope NEID spectrometer on the representative TOI-2145b. They concluded that this exoplanet might have been formed either via starting with a high initial mass, or collisions with other planets and growing in that manner to its current several Jupiter mass content, while population simulations showed a tendency toward a collision past.

Tomoyoshi et al.[23] studied the binary V723 Monocerotis system, a single-lined spectroscopic binary to estimate masses via tidally deformed primary star radial velocity (tidal RV) without employing ellipsoidal variations as they can include more error terms and contaminating lights.

Maciejewski et al.[24] studied the planet star interactions with precise transit timing, more specifically orbital period shortening, with GK spectral type 0.8 to 1 solar mass host stars of HATS-18, HIP 65A, TrES-3, WASP-19, WASP-43, and WASP-173A and reported that in this sample, no wave-breaking on host star was observed to be boosted by tidal dissipation.

Cretignier et al.[25] used the information they gathered from their previous study that the Sun's regions differing in activity contain varying and unique Ca II H and K lines and that this information can ameliorate radial velocity retrievals. They applied principal and independent component analysis (PCA and ICA[2]) on the α Cen B's Ca II H and K lines, and reported that he second component actually yields the activity index.

Ishibashi[26] discussed the black hole activity effects on exoplanet evolution in the Milky Way Galaxy. The discussion focused on the central black hole Sagittarius A* and Black Hole-radiation-related photoevaporation of exoplanet atmospheres, but the author also briefly discussed stellar mass black holes.

Exoplanet Atmospheres

Kennedy et al.[27] presented a grid of general circulation models with varying irradiation temperatures, cloud and magnetism relations for hot Jupiter atmospheres, with RM-GCM, and reported different estimations for cloud status under different temperatures and magnetic effects.

Zhang et al.[28] utilized JWST/NIRcam emission spectrum data from the HD 189733b with the Planetary Atmospheric Tool for Observed Noobs (PLATON) to retrieve atmospheric characteristics and also presented a GPU-supporting version of PLATON, version 6.

Hamill et al.[29] simulated the exoplanet salt-cloud KCl particles with the Exoplanet Cloud Ensemble Scattering System (ExCESS) to work on their optical characteristics. They formed small, medium, and large KCl particles in wet and dry generation methods and reported inconsistencies between the observed scattering characteristics and the Lorenz-Mie scattering estimations.

Protoplanetary - Circumstellar Disks

Castrejon et al.[30] studied the necessary timescale to form a super-Earth from pebbles considering the effect of dynamic temperatures. They used a viscous and passively heated disk containing dust thermostat and dust removal, and a passively heated power law model, and explored these parameter spaces to comprehend these dynamics regarding super-Earth formation and pebble isolation.

Liu et al.[31] studied the protoplanetary disks' dust opacities, considering the porous ones in addition to the current compact cases with mass budget issues, and also applied their method with the new IRAM/NIKA-2 observations to the IRAS 04370+2559 disk.

[1] Their code can be found here.

[2] A version of PCA in which the components are iteratively found on the condition that they are statistically independent in addition to being orthogonal to each other

Qi and Wilner[32] studied the disk around the Herbig Ae star HD 163296 from the archival Atacama Large Millimeter/submillimeter Array (ALMA) observations on the carbon monoxide - CO snowline with the carbon isotopologue, and they stated that the next generation very large telescope will increase the sensitivity/accuracy of estimating this characteristic.

Wolff et al.[33] studied the debris disk around Vega, similar to the Solar System's Kuiper Belt, with the Hubble Space Telescope STIS coronagraph and detected a halo in this structure.

Carvalho and Hillenbrand[34] provided specific bolometric corrections for astrophysical accretion disks regarding FU Ori disk luminosities and applied them to well-studied FU Ori systems, V960 Mon and HBC 722.

Near-Earth Objects

Kokhirova et al.[35] studied the Near Earth Asteroids (NEAs) descending from the δ-Cancrid Meteorid Stream by backwardly evolving a sample of NEAs, and 13 of them were associated with the δ-Cancrid.

Myers et al.[36] checked the inconsistencies between simple thermal model results of the NEOWISE and Infrared Telescope Facility SpeX data from the siz NEA data, and reported that fainter objects and more primitive compositions were more prone to yield inconsistencies, among other results.

Deme et al.[37] analyzed the Perseid and Geminid meteor shower activity over Hungary in 2019-2023 statistically via video meteor observations from MetRec-based analog video cameras and automated DSLR camera comparisons.

Lodders et al.[38] examined the condensation calculations on chondritic meteorites and Earth for all-natural elements and provided the volatility trends in different chondrites and the bulk silicate Earth.

Mars

Yang et al.[39] worked on the orbit-rotation dynamics of Phobos and Deimos. They fit their ephemerides model results to NOE-4-2020 data with the least-squares method, and their simultaneously computed Euler angles and Phobos-Deimos rates were in good agreement with IAU values.

Solar System - TNOs

Kiss et al.[40] detected a mid-infrared excess emission from Makemake using the data from the James Webb Space Telescope - Mid-Infrared Instrument (JWST MIRI). The estimated temperature of approx. 150 K was not expected from this distant object, hence, several scenarios were put forward to explain this phenomenon.

Magnetohydrodynamics

Kilmetis et al.[41] used MESA and dynamo formalism from the literature to simulate the magnetic field evolution of hot Jupiters and Neptunes and reported interesting age ranges and magnetic field variations.

Gravitational-related and N-body works

Tamayo and Hadden[42] developed a unified and simpler physical-based framework for mean motion resonances (MMRs). They focused on the first-order MMRs and provided a scaling argument for width and oscillation parameters, within the Planar, Circular Restricted Three Body Problem - PCR3BP).

Chen and Li[43] replaced the common uniform-ring models for Kuiper belt objects' gravitational influence, with the three-arc model introduced by them. They showed the deviations between the two approaches considering the Sun-Neptune distance and other orbital parameters and found their method more beneficial, and also for other MMRs.

Guidos et al.[44] provided a novel code (Discrete Element Cosmic COllision - DECCO) for self-gravitating granular materials' discrete element simulation. They conducted validation runs, rotational effects, and particle size distribution on the outcomes. They stated that they will also add Van der Walls forces when small particles are added to this code.

Thong and Melatos[45] made an exotic Newtonian-restricted three-body problem study with one positive mass, one negative mass, and a positive or negative tertiary mass, presented Lagrange points and estimated their stability.

Last week in Chemistry

Author: Yasin Güray Hatipoğlu

The preprints summarized here were published between October 29, November 4, 2024. They are more in nature of spectroscopy alone, and hence several studies regarding biochemistry, chromatography, and several other disciplines might be missed here.

Spectroscopic Techniques

Misiewicz et al.[46] monitored and studied the capacity fade in Prussian White-based sodium ion fuel cells using online electrochemical mass spectrometry, operando Fourier Transform Infrared Spectroscopy (FTIR), and Mössbauer spectroscopy (MöS). They delineated degradation paths and matched them with the emanating products.

Sapkal et al.[47] utilized the near-infrared emissive probe for fluorescence turn-on-based dead cell sorting, understanding apoptosis and ferroptosis pathways, and also differentiating live and dead animals.

Jong et al.[48] combined the thermogravimetric analysis with nuclear magnetic resonance (TGA with NMR) to study the metal-organic framework stoichiometry and applied it to MAF-6 and MOF-5 cases successfully, while for ZIF-8, it required further investigation.

Chromatographic Techniques

Serizawa et al.[49] studied the suitability of applying size exclusion chromatography-mass spectrometry (SEC-MS) to the PLGA biodegradable polymers without degrading the polymer through the analysis process itself, and reported that ionization-phase alkali metal salt influences the polymer stability, especially CsI salt.

Cerrato et al.[50] studied the persistent and mobile organic compounds (PMOCs) in water with the Unified Chromatography-Hydrophilic Interaction Liquid Chromatography (UC-HILIC) coupled with high-resolution mass spectrometry on 18 representative PMOCs and found the new method successful.

Mass Spectroscopy

Rangel-Angarita et al.[51] reported regarding the Peptide-N-Glycosidase F (PNGaseF) N-glycan release in gas-phase and their random adduct to other unmodified peptides and resultant false identifications. They employed nanoflow Liquid Chromatography-Mass Spectrometry/Mass Spectrometry (LC-MS/MS).

Trinklein et al.[52] utilized the Matrix-assisted laser desorption/ionization with laser-induced postionization (MALDI-2) mass spectrometry imaging with the trapped ion mobility spectrometry spatial lipidomics on better understanding of amyloid beta plaques in a mouse Alzheimer's disease and reported interesting spatial heterogeneity in lipids.

Dynamic Light Scattering

Ashfaq et al.[53] probed nanophase formation in ternary mixtures of water, cosolvents, and oils with dynamic light scattering to uncover the role of intermolecular interactions. They reported that aromatic groups stabilized nanophases but intermolecular interactions solely with the van der Walls did not.

Last week in Remote Sensing

Author: Yasin Güray Hatipoğlu

The preprints summarized here were published between October 29, November 4, 2024. These are generally based on the preprints retrieved when "remote sensing" words are given between quotation marks within arXiv's cs.CV and similar cross-fields.

Segmentation

Gong et al.[54] constructed the CrossEarth, domain generalization for remote sensing with a vision foundation model, using aerial and satellite-based remote sensing data for multiple different tasks. This generalizability was enhanced with the Earth-Style Injection and Multi-Task Training pipelines.

Bansal et al.[55] worked with drone images for weed segmentation, considered more than 600 neural network architectures from the segmentation models library in Python, and indicated a considerable saving in herbicide application using such techniques.

Xu et al.[56] constructed the padding-based rotation equivariant convolution mode (PreCM) and also provided a rotation difference metric for evaluation. They were successful in providing a more powerful method to assist in learning different imaging angles.

Modelling-Forecast

Silva et al.[57] examined the vision-language pretraining case for remote sensing scene classification in multilingual inputs to generate texts according to the provided images, with their method named RS-M-CLIP[3], and found it to be successful in 12 different datasets, and also provided the results for 10 different languages in text retrieval cases.

Thomas et al.[58] used different pre-processing techniques (value thresholding, built masking, and quality filtering/imputation) on the VIIRS nighttime light data to estimate damages inflicted by hurricanes.

Eddin and Gall[59] aimed to predict the drivers of spatio-temporal extreme events from climate data. Their method consists of a feature embedding step from climate variables using transformers and attention modules, a lockup-free quantization to assign them as potential drivers, and a 3D convolutional neural network module[4], and they found this approach successful.

Zhang et al.[60] worked on a balanced efficiency and accuracy in point cloud registration in two steps as coarse and fine registry and found this method better performing in 3DMatch and ETH datasets compared to other algorithms.

Wu et al.[61] presented $E^2DiffSR$[5] to create super-resolution images from low-resolution present ones by adding high-frequency details. It is based on the latent diffusion model, and includes two stages with one focusing on high-frequency, and the other on overall details.

Zhou et al.[62] provided a benchmark for satellite image cloud removal algorithms and a comprehensive related dataset - AllClear, 23742 region of interests and around four million images.

Object Detection

Xie et al.[63] presented the LBA-MCNet[6] for salient object detection from optical remote sensing images, which uses both edge clue (local) and global clue to detect objects.

Chen et al.[64] used a YOLOv8-based Restar the Sky Network - RSNet to detect targets from the synthetic aperture radar images.

Change Detection

Lin et al.[65] used the RS-MoE with the image encoder, vision language model encoder, and a mixture of experts block for RS image captioning, tried it on several datasets and found it successful. Other researchers followed a different approach. Liu et al.[66] used a video encoder for remote sensing change detection captioning, and developed masks to only capture interesting changes.[7]

Li et al.[67] presented the VisTA method, utilized the QAG-360K dataset, and introduced a novel task type Change Detection Question Answering and Grounding (CDQAG)[8]. In other words, the algorithm takes images as inputs and looking at them, answers change detection-related textual questions with texts.

[3]The algorithm is here.

[4]The code can be found here.

[5]The repository for the code is here.

[6]The code can be found here.

[7]The code is here.

[8]The method and dataset are here.

Last week in Environmental Chemistry

Author: Yasin Güray Hatipoğlu

The preprints summarized here were published between October 29, November 4, 2024 in chemRxiv's Earth, Space, and Environmental chemistry preprints are being surveyed, and unfortunately, not many preprints are published under environmental topics in this field.

Nair et al.[68] studied the toxicity of alkyl-OH-6PPD-Q isomers by synthesizing them and monitoring its metabolism and reported the cases for different isomers and different parts of the trouts. In another similar research study from them, Li et al.[69] checked the enantioselectivity of 6PPD-Quinone in salmonids.

Diment et al.[70] measured the impact of changing experimental conditions while evaluating the **lignin antioxidant activity** and reported both medium, sample, and lignin-specific conditions affected the results.

Trinh et al.[71] examined the ways to enhance ultrasound degradation - sonolysis in wastewater treatment by utilizing microfluidic reactor and microbubble technology, reported a very high H_2O_2 generation and 35% degradation efficiency of methyl orange in less than 3 seconds.

Lu et al.[72] studied the oceanic dissolved organic matter chemical structure and reported that approx. 10% of it by weight was formed by bonded water molecules. They also stated that removing the water by heating increased the bioavailability, hence, water molecules' stabilizing impact on DOM in the ocean was observed.

Dalmjin et al.[73] sampled neighborhood air and water around a **fluoropolymer production plant** to check the target and suspect per- and poly-fluoroalkyl substances (PFAS) and measured them using UHPLC-HRMS. They stated that the site still emits the legacy PFAS to the surrounding environment.

An interesting study by Choudhary et al.[74] stressed the importance of measuring not freshly-emitted, but atmospherically-aged polluted air in exposure studies, as humans don't generally inhale fresh emissions. They constructed a fast oxidation box around one cubic meter and focused on diesel exhaust's atmospheric aging.

Last week in Data Decomposition/Transformation

Author: Yasin Güray Hatipoğlu

The preprints summarized here were published between October 29, November 4, 2024. This is generally from arXiv's stat.ML or stat.ME cross-list. The section focuses on preprints heavily worked with or developed data decomposition/transformation techniques, such as principal component analysis (PCA) or Fourier Transformation.

Data Imputation

Jiang et al.[75] employed a CANDECOMP/PARAFAC (CP) way with a flexible Bayesian framework[9] to impute missing values without ignoring uncertainties, with the method named the Bayesian Multiple Imputation for Tensor Arrays (BAMITA). In other words, a missing entry was imputed by multiple values (rather than a single value in existing approaches) with an efficient Monte Carlo Markov Chain sampling.

Distance

Auricchio et al.[76] worked on the distance between two multivariate datasets, which contained scale-invariance and uniform redistribution characteristics using Fourier transformation, multivariate expressions of Gini and Pietra indices, and Mahalanobis distance.

Modelling

Shahverdikondori et al.[77] utilized a singular value decomposition-based technique with the Gram-Schmidt algorithm for causal discovery search as QWO[10] (Q (arbitrary orthogonal matrix) W (whitening matrix) O (Orthogonality)), and experimented it on low, high dimensional data and on non-Gaussian noise cases, and Oracle Inverse Covariance Experiments, and reported that their method is much faster than the state-of-the-art Bayesian Information Criterion methods.

Wallin et al.[78] modified the current two-parameter logistic Item Response Theory model so as to account for time-pressure effect in educational assessments, focusing on change-point detection. The presented generalizations included latent trait-dependent change points, person and item level covariates, and many other details to make it a more robust assessment. They hinted at the importance of the test-taking behavior changes *during the test* as well.

He et al.[79] worked on a novel factor analysis-based interference that did not ignore interference effects (but still only required them broadly, hence practically realistic), provided the basis, and applied it to the Middle East conflicts data including the US embassy relocation from Tel Aviv to Jerusalem.

Hasan and Ahmad[80] considered the lack of experiments and orthogonal block designs in the order-of-addition (OofA) cases and presented the optimal mixture designs, then, worked with the yarn forming data, vinyl production data, and migraine relief tablet formulation.

Bayisa et al.[81] studied the interactions among the black bears in southern Alabama, USA with the following home range estimation methods; minimum convex polygon, kernel density estimator, and autocorrelated kernel density estimator, then, inhomogeneous multitype or cross-type summary statistics, and envelope testing with GPS collar data on them and found no tendency towards aggregation or segregation.

[9] Their R code is here.
[10] The code ishere.

References

[1] Stephen R. Kane, Richard Ernst, Cedric Gillmann, Christopher Jones, Timothy Lyons, and Christopher Tino. Our solar system neighborhood: Three diverging tales of planetary habitability and windows to earth's past and future. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01150v1.

[2] Franziska Menti, José A. Caballero, Mark C. Wyatt, Antonio García Muñoz, Keivan G. Stassun, Eleonora Alei, Markus Demleitner, Grant Kennedy, Tim Lichtenberg, Uwe Schmitt, Jessica S. Schonhut-Stasik, Haiyang S. Wang, Sascha P. Quanz, and the LIFE Collaboration. Database of candidate targets for the life mission. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23892v1.

[3] G. Bourdarot and F. Eisenhauer. Kilometer-baseline interferometry: science drivers for the next generation instrument. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22063v1.

[4] Fabrice Pancher, Sebastien Soler, Fabien Malbet, Manon Lizzana, Pierre Kern, Thierry Lepine, and Alain Leger. Laboratory characterisation bench for high precision astrometry. *arXiv*, 2024. URL https://arxiv.org/abs/2410.21911v1.

[5] Peter P. Pedersen, Didier Queloz, Lionel Garcia, Yannick Schacke, Laetitia Delrez, Brice-Olivier Demory, Elsa Ducrot, Georgina Dransfield, Michael Gillon, Matthew J. Hooton, Clàudia Janó-Muñoz, Emmanuël Jehin, Daniel Sebastian, Mathilde Timmermans, Samantha Thompson, Amaury H. M. J. Triaud, Julien de Wit, and Sebastián Zúñiga-Fernández. Infrared photometry with ingaas detectors: First light with speculoos. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22140v1.

[6] Fabien Malbet, Gary A. Mamon, Lucas Labadie, Alessandro Sozzetti, Manon Lizzana, Thierry Lépine, Alain Léger, and Pierre-Olivier Lagage. High precision astrometry science in the context of space mission prospectives. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23019v1.

[7] Merel L. R. van 't Hoff and Jennifer B. Bergner. Protoplanetary disk chemistry and structure. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23235v1.

[8] Christopher K Jones, Michaela Leung, Chenyi Tu, Saleheh Ebadirad, Nate Marshall, Lin Tan, and Tim Lyons. Setting the stage: Building and maintaining a habitable world and the early conditions that could favor life's beginnings on earth and beyond. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23344v1.

[9] Jacob Haqq-Misra, Clément Vidal, and George Profitiliotis. Projections of earth's technosphere: Luminosity and mass as limits to growth. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23420v1.

[10] Jakkapat Seeyangnok, Udomsilp Pinsook, and Graeme John Ackland. Organic compounds in metallic hydrogen. *arXiv*, 2024. URL https://arxiv.org/abs/2410.21772v1.

[11] V. Cabedo, G. Pareras, J. Allitt, A. Rimola, J. Llorca, H. H. P. Yiu, and M. R. S. McCoustra. Reactivity of chondritic meteorites under h2-rich atmospheres: Formation of h2s. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23012v1.

[12] S. B. White, P. B. Rimmer, and Z. Liu. Shedding a light on the kinetics of the carboxysulfitic scenario. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23151v1.

[13] Judah Van Zandt and Erik Petigura. No evidence for a metallicity-dependent enhancement of distant giant companions to close-in small planets in the california legacy survey. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23071v2.

[14] Alexandra Muresan, Carina Persson, and Malcolm Fridlund. Diversities and similarities exhibited by multi-planetary systems and their architectures: I. orbital spacings. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23399v1.

[15] Xue Li, Song Wang, Henggeng Han, and Jifeng Liu. Ultraviolet photometry and habitable zones of over 2700 planet-hosting stars. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23665v1.

[16] Tisyagupta Pyne, Ravinder K. Banyal, C. Swastik, and Ayanabha De. The 10 pc neighborhood of habitable zone exoplanetary systems: Threat assessment from stellar encounters & supernovae. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22396v2.

[17] Kareem El-Badry, Casey Lam, Berry Holl, Jean-Louis Halbwachs, Hans-Walter Rix,

Tsevi Mazeh, and Sahar Shahaf. A generative model for gaia astrometric orbit catalogs: selection functions for binary stars, giant planets, and compact object companions. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00088v1.

[18] Casey Y. Lam, Kareem El-Badry, and Joshua D. Simon. A fast, analytic empirical model of the gaia data release 3 astrometric orbit catalog selection function. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00654v1.

[19] Adam J. Burgasser, Adam C. Schneider, Aaron M. Meisner, Dan Caselden, Chih-Chun Hsu, Roman Gerasimov, Christian Aganze, Emma Softich, Preethi Karpoor, Christopher A. Theissen, Hunter Brooks, Thomas P. Bickle, Jonathan Gagné, Étienne Artigau, Michaël Marsset, Austin Rothermich, Jacqueline K. Faherty, J. Davy Kirkpatrick, Marc J. Kuchner, Nikolaj Stevnbak Andersen, Paul Beaulieu, Guillaume Colin, Jean Marc Gantier, Leopold Gramaize, Les Hamlet, Ken Hinckley, Martin Kabatnik, Frank Kiwy, David W. Martin, Diego H. Massat, William Pendrill, Arttu Sainio, Jörg Schümann, Melina Thévenot, Jim Walla, Zbigniew Wedracki, and the Backyard Worlds: Planet 9 Collaboration. New cold subdwarf discoveries from backyard worlds and a metallicity classification system for t subdwarfs. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01378v2.

[20] Kate Y. L. Su, Andras Gaspar, George H. Rieke, Renu Malhotra, Luca Matra, Schuyler Grace Wolff, Jarron M. Leisenring, Charles Beichman, and Marie Ygouf. Imaging of the vega debris system using jwst/miri. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23636v1.

[21] Jonathan Horner, Robert A. Wittenmyer, Stephen R. Kane, and Timothy R. Holt. The search for the inbetweeners: How packed are tess planetary systems? *arXiv*, 2024. URL https://arxiv.org/abs/2411.00245v1.

[22] Jiayin Dong, Ashley Chontos, George Zhou, Gudmundur Stefansson, Songhu Wang, Chelsea X. Huang, Arvind F. Gupta, Samuel Halverson, Shubham Kanodia, Jacob K. Luhn, Suvrath Mahadevan, Andrew Monson, Jaime A. Alvarado-Montes, Joe P. Ninan, Paul Robertson, Arpita Roy, Christian Schwab, and Jason T. Wright. Origins of super jupiters: Toi-2145b has a moderately eccentric and nearly aligned orbit. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01356v1.

[23] Mio Tomoyoshi, Kento Masuda, Teruyuki Hirano, Yui Kasagi, Hajime Kawahara, Takayuki Kotani, Tomoyuki Kudo, Motohide Tamura, and Sébastien Vievard. Weighing single-lined spectroscopic binaries using tidal effects on radial velocities: The case of v723 monocerotis. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22083v1.

[24] G. Maciejewski, J. Golonka, M. Fernandez, J. Ohlert, V. Casanova, and D. Perez Medialdea. Planet-star interactions with precise transit timing. iv. probing the regime of dynamical tides for gk host stars. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22162v1.

[25] M. Cretignier, N. C. Hara, A. G. M. Pietrow, Y. Zhao, H. Yu, X. Dumusque, A. Sozzetti, C. Lovis, and S. Aigrain. Stellar surface information from the ca ii h&k lines – ii. defining better activity proxies. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00557v1.

[26] W. Ishibashi. How black hole activity may influence exoplanetary evolution in our galaxy. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22428v1.

[27] Thomas D. Kennedy, Emily Rauscher, Isaac Malsky, Michael T. Roman, and Hayley Beltz. Radiatively active clouds and magnetic effects explored in a grid of hot jupiter gcms. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23436v1.

[28] Michael Zhang, Kimberly Paragas, Jacob L. Bean, Joseph Yeung, Yayaati Chachan, Thomas P. Greene, Jonathan Lunine, and Drake Deming. Retrievals on nircam transmission and emission spectra of hd 189733b with platon 6, a gpu code for the jwst era. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22398v1.

[29] Colin D. Hamill, Alexandria V. Johnson, and Peter Gao. Light scattering measurements of kcl particles as an exoplanet cloud analog. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00952v1.

[30] Areli Castrejon, Michiel Min, Inga Kamp, and Uffe Gråe Jørgensen. The effect of dynamic temperatures on pebble dynamics and planet formation. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22737v1.

[31] Yao Liu, Hélène Roussel, Hendrik Linz, Min Fang, Sebastian Wolf, Florian Kirchschlager,

Thomas Henning, Haifeng Yang, Fujun Du, Mario Flock, and Hongchi Wang. Dust mass in protoplanetary disks with porous dust opacities. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00277v1.

[32] Chunhua Qi and David J. Wilner. Evidence for a sharp co snowline transition in a protoplanetary disk and implications for millimeter-wave observations of co isotopologues. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23036v2.

[33] Schuyler G. Wolff, András Gáspár, George H. Rieke, Jarron M. Leisenring, Kate Su, David Wilner, Luca Matrà, Marie Ygouf, and Nicholas P. Ballering. Deep search for a scattered light dust halo around vega with the hubble space telescope. *arXiv*, 2024. URL https://arxiv.org/abs/2410.24042v2.

[34] Adolfo S. Carvalho and Lynne A. Hillenbrand. Bolometric corrections for fu ori object accretion disk luminosities. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22270v1.

[35] G. I. Kokhirova, M. Zhang, X. G. Li, A. I. Zhonmuhammadi, and X. Liu. Near-earth asteroids as the parents of the δ-cancrid meteoroid stream. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22543v1.

[36] Samuel A. Myers, Ellen S. Howell, Christopher Magri, Ronald J. Vervack Jr., Yanga R. Fernández, Mary L. Hinkle, and Sean E. Marshall. Inconsistencies in simple thermal model results for near-earth asteroids between infrared telescope facility spex and neowise data. *arXiv*, 2024. URL https://arxiv.org/abs/2410.24101v1.

[37] Livia Deme, Krisztián Sárneczky, Antal Igaz, Balázs Csák, Nándor Opitz, Nóra Egei, and József Vinkó. The perseid and geminid meteor shower activity over hungary in 2019-2023. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00183v1.

[38] Katharina Lodders, Bruce Fegley, Klaus Mezger, and Denton Ebel. Condensation and the volatility trend of the earth. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01362v2.

[39] Yongzhang Yang, Kai Huang, Jianguo Yan, and Yuqiang Li. A novel ephemeris model for martian moons incorporating their free rotation. *arXiv*, 2024. URL https://arxiv.org/abs/2410.21707v1.

[40] Csaba Kiss, Thomas G. Müller, Anikó Farkas-Takács, Attila Moór, Silvia Protopapa, Alex H. Parker, Pablo Santos-Sanz, Jose Luis Ortiz, Bryan J. Holler, Ian Wong, John Stansberry, Estela Fernández-Valenzuela, Christopher R. Glein, Emmanuel Lellouch, Esa Vilenius, Csilla E. Kalup, Zsolt Regály, Róbert Szakáts, Gábor Marton, András Pál, and Gyula M. Szabó. Prominent mid-infrared excess of the dwarf planet (136472) makemake discovered by jwst/miri indicates ongoing activity. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22544v1.

[41] Konstantinos Kilmetis, Aline A. Vidotto, Andrew Allan, and Daria Kubyshkina. Magnetic field evolution of hot exoplanets. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00674v2.

[42] Daniel Tamayo and Samuel Hadden. A unified, physical framework for mean motion resonances. *arXiv*, 2024. URL https://arxiv.org/abs/2410.21748v1.

[43] Yue Chen and Jian Li. A new multiple-arc model of the resonant kuiper belt objects – plutinos. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00829v1.

[44] Job Guidos, Lucas Kolanz, and Davide Lazzati. Discrete element simulations of self-gravitating rubble pile collisions: the effects of non-uniform particle size and rotation. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22189v1.

[45] K. H. Thong and A. Melatos. Newtonian restricted three-body gravitational problem with positive and negative point masses. *arXiv*, 2024. URL https://arxiv.org/abs/2411.00933v1.

[46] Casimir Misiewicz, Alexandra E Ulander, Tim Melin, Aram Hall, and Erik J Berg. Decoupling degradation at the electrode interfaces in prussian white full cells. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/671f9db798c8527d9ea0f3f9.

[47] Goraksha T Sapkal, Farhan Anjum, Abdul Salam, Bodhidipra Mukherjee, Shilpa Chandra, Purabi Bala, Richa Garg, Shagun Sharma, Kush Kaushik, and Chayan Kanti Nandi. Nir emissive probe for fluorescence turn-on based dead cell sorting and in vivo viscosity mapping in c. elegans. *Journal of Materials Chemistry B*, 2024. URL https://chemrxiv.org/

engage/chemrxiv/article-details/6720efbf5a82cea2fa35394f.

[48] Flip de Jong, Tim Balcaen, Giel Arnauts, Leen Boullart, Alice Suarez Kahan, Johan Hofkens, Rob Ameloot, Mark Van der Auweraer, and Gert Steurs. Probing metal-organic framework stoichiometry using quantitative nmr and tga. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/67225b9bf9980725cf97b44a.

[49] Masashi Serizawa, Pieter van Delft, Peter J Schoenmakers, Ron AH Peters, and Andrea FG Gargano. Size-exclusion chromatography–electrospray-ionization mass spectrometry to characterize end group and chemical distribution of poly (lactide-co-glycolide) co-polymers. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/6722265a5a82cea2fa84092a.

[50] Andrea Cerrato, Thomas Holmark, Erik Emke, Elvio D Amato, and Andrea FG Gargano. Expanding the chemical coverage of polar compounds in water analysis by coupling supercritical fluid with hydrophilic interaction chromatography high-resolution mass spectrometry. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/672349925a82cea2fa9b0e08.

[51] Valentina Rangel-Angarita, Joann Chongsaritsinsuk, Keira Mahoney, Lea Kim, Ryan Chen, Akua Appah-Sampong, Isabella Tran, Alexandra Steigmeyer, Marie Hollenhorst, and Stacy Malaker. Pngasef-generated n-glycans adduct onto peptides in the gas phase. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/671e7cf81fb27ce124c345df.

[52] Timothy J Trinklein, Stanislav S Rubakhin, Samuel Okyem, Seth W Croslow, Marisa Asadian, KR Sabitha, Orly Lazarov, Fan Lam, and Jonathan V Sweedler. Multimodal mass spectrometry imaging for plaque-and region-specific neurolipidomics in an alzheimer's disease mouse model. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/672114d2f9980725cf48458f.

[53] Binish Ashfaq, Ayusman Sen, and Lauren Zarzar. Uncovering chemical principles governing nanophase formation in ternary solvents. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/6723fce07be152b1d09cbc2c.

[54] Ziyang Gong, Zhixiang Wei, Di Wang, Xianzheng Ma, Hongruixuan Chen, Yuru Jia, Yupeng Deng, Zhenming Ji, Xiangwei Zhu, Naoto Yokoya, Jing Zhang, Bo Du, and Liangpei Zhang. Crossearth: Geospatial vision foundation model for domain generalizable remote sensing semantic segmentation. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22629v2.

[55] Ishita Bansal, Peder Olsen, and Roberto Estevão. Remote sensing for weed detection and control. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22554v1.

[56] Xinyu Xu, Huazhen Liu, Huilin Xiong, Wenxian Yu, and Tao Zhang. Precm: The padding-based rotation equivariant convolution mode for semantic segmentation. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01624v1.

[57] João Daniel Silva, Joao Magalhaes, Devis Tuia, and Bruno Martins. Multilingual vision-language pre-training for the remote sensing domain. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23370v1.

[58] Nancy Thomas, Saba Rahimi, Annita Vapsi, Cathy Ansell, Elizabeth Christie, Daniel Borrajo, Tucker Balch, and Manuela Veloso. Shining a light on hurricane damage estimation via nighttime light data: Pre-processing matters. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22150v1.

[59] Mohamad Hakam Shams Eddin and Juergen Gall. Identifying spatio-temporal drivers of extreme events. *arXiv*, 2024. URL https://arxiv.org/abs/2410.24075v1.

[60] Rongling Zhang, Li Yan, Pengcheng Wei, Hong Xie, Pinzhuo Wang, and Binbing Wang. Micro-structures graph-based point cloud registration for balancing efficiency and accuracy. *arXiv*, 2024. URL https://arxiv.org/abs/2410.21857v1.

[61] Hanlin Wu, Jiangwei Mo, Xiaohui Sun, and Jie Ma. Latent diffusion, implicit amplification: Efficient continuous-scale super-resolution for remote sensing images. *arXiv*, 2024. URL https://arxiv.org/abs/2410.22830v1.

[62] Hangyu Zhou, Chia-Hsiang Kao, Cheng Perng Phoo, Utkarsh Mall, Bharath Hariharan, and Kavita Bala.

Allclear: A comprehensive dataset and benchmark for cloud removal in satellite imagery. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23891v1.

[63] Yakun Xie, Suning Liu, Hongyu Chen, Shaohan Cao, Huixin Zhang, Dejun Feng, Qian Wan, Jun Zhu, and Qing Zhu. Localization, balance and affinity: a stronger multifaceted collaborative salient object detector in remote sensing images. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23991v1.

[64] Hongyu Chen, Chengcheng Chen, Fei Wang, Yuhu Shi, and Weiming Zeng. Rsnet: A light framework for the detection of multi-scale remote sensing targets. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23073v3.

[65] Hui Lin, Danfeng Hong, Shuhang Ge, Chuyao Luo, Kai Jiang, Hao Jin, and Congcong Wen. Rs-moe: Mixture of experts for remote sensing image captioning and visual question answering. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01595v1.

[66] Ruixun Liu, Kaiyu Li, Jiayi Song, Dongwei Sun, and Xiangyong Cao. Mv-cc: Mask enhanced video model for remote sensing change caption. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23946v1.

[67] Ke Li, Fuyu Dong, Di Wang, Shaofeng Li, Quan Wang, Xinbo Gao, and Tat-Seng Chua. Show me what and where has changed? question answering and grounding for remote sensing change detection. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23828v2.

[68] Pranav Nair, Holly Barrett, Kaylin Tanoto, Linna Xie, Jianxian Sun, Diwen Yang, Han Yao, Datong Song, and Hui Peng. Structure and toxicity characterization of alkyl hydroxylated metabolites of 6ppd-q. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/671fe8ef83f22e4214789e89.

[69] Rui Li, Holly Barrett, Pranav Nair, Minghua Wang, Linna Xie, and Hui Peng. Enantioselectivity in metabolism and toxicity of 6ppd-quinone in salmonids. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/67240516f9980725cfba3171.

[70] Daryna Diment, Oliver Musl, Mikhail Balakshin, and RIGO Davide. Guidelines for evaluating the antioxidant activity of lignin via the 2, 2-diphenyl-1-picrylhydrazyl (dpph) assay. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/6720008083f22e42147a06f7.

[71] Quang Thang Trinh, Yuran Cheng, Haotian Cha, Kin Un Tai, Lingxi Ouyang, Prince Nana Amaniampong, Jun Zhang, Hongjie An, Zuojun Wei, and Nam-Trung Nguyen. Harnessing the power of microfluidics in sustainable sonochemistry: case study of ultra-fast removal of methyl orange from wastewater. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/6720640e83f22e42147f7c5a.

[72] Kaijun Lu, Xiao You, Laodong Guo, Carlos Baiz, and Zhanfei Liu. Bonded water is an integral component of dissolved organic matter in the ocean. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/67213da05a82cea2fa3de2f9.

[73] Joost Dalmijn, Jonathan Benskin, Matthew Salter, Andrew Sweetman, Crispin Halsall, Jack Garnett, and Ian Cousins. Perfluoro (2-ethoxy-2-fluoroethoxy)-acetic acid (eea) and other target and suspect pfas in the vicinity of a fluoropolymer production plant. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/672242fe5a82cea2fa866390.

[74] Vikram Choudhary, Yu Xi, Cynthia Pham, Yuetong Zhang, Kristen Hardy, Christopher F Rider, Julia Zaks, Allan K Bertram, Arthur Chan, William H Brune, et al. Characterization and integration of a new oxidative flow reactor for use in in vitro and human exposure systems with diesel exhaust and other aerosol. 2024. URL https://chemrxiv.org/engage/chemrxiv/article-details/67231a315a82cea2fa97ce2b.

[75] Ziren Jiang, Gen Li, and Eric F. Lock. Bamita: Bayesian multiple imputation for tensor arrays. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23412v1.

[76] Gennaro Auricchio, Giovanni Brigati, Paolo Giudici, and Giuseppe Toscani. Multivariate gini-type discrepancies. *arXiv*, 2024. URL https://arxiv.org/abs/2411.01052v1.

[77] Mohammad Shahverdikondori, Ehsan Mokhtarian, and Negar Kiyavash. Qwo: Speeding up permutation-based causal discovery in ligams. *arXiv*, 2024. URL https://arxiv.org/abs/2410.23155v1.

[78] Gabriel Wallin, Yunxiao Chen, Yi-Hsuan Lee, and Xiaoou Li. A latent variable model with change points and its application to time pressure effects in educational assessment. *arXiv*, 2024. URL `https://arxiv.org/abs/2410.22300v1`.

[79] Peiyu He, Yilin Li, Xu Shi, and Wang Miao. A novel method for synthetic control with interference. *arXiv*, 2024. URL `https://arxiv.org/abs/2411.01249v1`.

[80] Taha Hasan and Touqeer Ahmad. Order of addition in orthogonally blocked mixture and component-amount designs. *arXiv*, 2024. URL `https://arxiv.org/abs/2410.22501v1`.

[81] Fekadu L. Bayisa, Christopher L. Seals, Hannah J. Leeper, Todd D. Steury, and Elvan Ceyhan. Modeling home range and intraspecific spatial interaction in wild animal populations. *arXiv*, 2024. URL `https://arxiv.org/abs/2411.01694v1`.