



ARIEL Data Challenge Series launched to build global community for exoplanet data solutions
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For immediate release

ARIEL, a mission to make the first large-scale survey of exoplanet atmospheres, has launched a global competition series to find innovative solutions for the interpretation and analysis of exoplanet data. The first ARIEL Data Challenge invites professional and amateur data scientists around the world to use Machine Learning (ML) to remove noise from exoplanet observations caused by starspots and by instrumentation.

ARIEL has been selected by the European Space Agency (ESA) as its next medium-class science mission and is due for launch in 2028. The ARIEL Data Challenge series was announced today at the UK Exoplanet Community Meeting (EXOM) 2019 in London.

ARIEL's ability to extract spectral information on gases in exoplanets' atmospheres will rely on precise knowledge of 'light-curves', which describe the amount of light blocked by a planet as it transits in front of its parent star. Dark spots on the stars' surfaces and stray photons hitting instrumentation can contaminate this data. Automated solutions for improved analysis of light-curves through the ARIEL Machine Learning and Stellar Activity Challenge (MLSAC) will lead to better accuracy in the detection and characterisation of exoplanets – for current missions as well as future ARIEL observations.

Each team competing in MLSAC will be given 1000 simulated ARIEL observations of exoplanet transits, 700 of which are provided with 'clean' solutions to train ML algorithms. Participants will submit their predicted solutions for the remaining 300 examples. The effectiveness of the teams' models will be ranked on the ARIEL Data Challenge leader-board.

"The aim of launching the ARIEL Data Challenges is to build a wide international collaboration from our own research community and from other data analysis fields to develop a diverse range of solutions to the complex computational problems faced by the mission," said Prof Giovanna Tinetti of UCL, who is Principal Investigator of the ARIEL mission.

The ARIEL MLSAC contest has been selected as a Discovery Challenge by the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECMLPKDD). The closing date is Thursday 15th August. Results will be presented at ECMLPKDD in Würzburg from 16-20th September and at the EPSC-DPS Joint Meeting 2019, which takes place in Geneva during the same week.

A second ARIEL Data Challenge that focuses on the retrieval of spectra from simulations of cloudy and cloud-free super-Earth and hot-Jupiter data was also launched today. A further data analysis challenge to create pipelines for faster, more effective processing of the raw data gathered by the mission will be launched in June. Outcomes from all three ARIEL Data Challenges will be discussed at the EPSC-DPS Joint Meeting 2019.

"We hope that these three competitions will be the first of many and will help us build a community that will enable us to tackle increasingly difficult ARIEL Data Challenges in the future," said Dr Nikos

Nikolaou, who is leading MSLAC along with Dr Angelos Tsiaras, both also of the UCL Centre for Space Exoplanet Data.

Images

The ARIEL Data Challenge Series 2019. Credit: ARIEL Consortium

<https://arielspacemission.files.wordpress.com/2019/04/arieldatachallenge1.jpg>

Details of the ARIEL Data Challenge Series 2019 are available at: <http://ariel-datachallenge.space>

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Notes for Editors

ARIEL (Atmospheric Remote-sensing Infrared Exoplanet Large-survey)

ARIEL, a mission to answer fundamental questions about how planetary systems form and evolve, is a European Space Agency (ESA) medium-class science mission due for launch in 2028. During a 4-year mission, ARIEL will observe 1000 planets orbiting distant stars and make the first large-scale survey of the chemistry of exoplanet atmospheres. The ARIEL mission has been developed by a consortium of more than 60 institutes from 17 ESA member state countries, including UK, France, Italy, Poland, Spain, the Netherlands, Belgium, Austria, Denmark, Ireland, Hungary, Sweden, Czech Republic, Germany, Portugal, Norway and Estonia with an additional contribution from NASA in the USA currently under study. The UK ARIEL team at UCL, STFC RAL Space, Cardiff University, Oxford University, Mullard Space Science Laboratory, STFC RAL Technology Department and UK ATC is supported by the UK Space Agency.

<https://ariel-spacemission.eu/>

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UKEXOM2019

The UK Exoplanet Community Meeting, jointly organised this year by Imperial College London, Queen Mary University of London and University College London, is being held at Imperial College London from 15-17 April 2019. <https://ukexcon19.github.io/index.html>

ECMLPKDD

The European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases will take place in Würzburg, Germany, from the 16th to the 20th of September 2019. This event is the premier European machine learning and data mining conference and builds upon over 17 years of successful events and conferences held across Europe. <http://www.ecmlpkdd2019.org/>

EPSC-DPS Joint Meeting 2019

The EPSC-DPS Joint Meeting 2019 is the third cooperation between the European Planetary Science Congress (EPSC), organised by the Europlanet Society, and the Division for Planetary Sciences of the American Astronomical Society. The goal of the joint meeting is to strengthen international scientific collaboration in all areas of planetary science. For more information, see: <https://www.epsc-dps2019.eu/>. Follow: #epsc-dps2019, @europlanetmedia, @DPSMeeting and @AAS_Press on Twitter.