

Sandor Kruk

GENERAL INFORMATION

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Citizenship: Romanian & Hungarian

I am a resourceful and results-driven astrophysicist, with a strong interest in engaging with the public. My drive is to bring a real change and long-lasting impact in space science and science education.

EXPERTISE:

• Space Data Science • Citizen Science • Machine Learning • Education and Public Engagement

RESEARCH INTERESTS:

• Galaxy Morphology • Galaxy Evolution • Gravitational lensing • Solar System Object detection

PUBLICATION RECORD:

• Refereed publications: 21 • First author: 3 • *h*-index: 11

EDUCATION AND OUTREACH IMPACT:

• Citizen science (Hubble Asteroid Hunter): 10,300 volunteers • Romanian Science Festival: 700 volunteers, 20,000 participants • Oxford for Romania: 75 students • British Astronomy and Astrophysics Olympiad: 3,000 students (13 students selected in the UK team)

RESEARCH APPOINTMENTS

PRESENT
OCT 2018

Research Fellow

European Space Agency, ESTEC, Netherlands

- Independent research fellowship in space science.
- Principal investigator of [Hubble Asteroid Hunter](#) - citizen science project to identify asteroid trails and other rare objects in Hubble Space Telescope archival data.

EDUCATION

SEP 2018
SEP 2014

DPhil, Astrophysics

University of Oxford, Merton College, Oxford, UK

Thesis: *Evolution of Barred Galaxies and Associated Structures*. Advisor: Chris Lintott.

JUN 2014
SEP 2010

MSci, Astrophysics, with distinction

University College London (UCL), London, UK

Grade: First Class Honours (Average Mark 92/100). Commended on the **Dean's list** of the UCL Mathematical & Physical Sciences Faculty.

AWARDS AND PRIZES

2019

Royal Astronomical Society **Group Achievement Award** - Galaxy Zoo Team.

2017

Ambassador's Diploma for research and social impact awarded by the Romanian Ambassador in the UK.

2017

Special Award for Excellency during Doctoral Studies awarded by the League of Romanian Students Abroad, supported by the Romanian Presidential Cabinet and Romanian Academy.

2014

Dean's List award for being in top 5% undergraduates of the Mathematical & Physical Sciences Faculty at UCL.

2011-2014

Prizes for the Best Performance every year, from 1st to 4th year, during the MSci Astrophysics degree at UCL.

2008-2010

Gold Medal, Bronze Medal and Honourable Mention in the 2nd, 3rd & 4th International Olympiads on Astronomy and Astrophysics.

2009

Silver Medal in the XIVth International Astronomy Olympiad.

FELLOWSHIPS AND GRANTS

2018-2021	ESA Research Fellowship , €200k .
2019	Grants for the Romanian Science Festival , various sources, equivalent to €15k.
2014-2018	UK STFC PhD Scholarship , £50k.
2014	Clockmakers' Prize from the Clockmakers Livery Company, City of London, £1k.
2012	RAS Summer Studentship , £2.5k.

EDUCATION PROJECTS

PRESENT 2017	Co-founder and Coordinator , Romanian Science Festival <ul style="list-style-type: none">• Co-founded and coordinated the first national Science Festival in Romania, inspired by the science festivals in Western Europe and in the US.• Built a platform to bring closer the academic diaspora with the Romanian educational system, inviting over 50 academics, researchers and students to be mentors to the over 700 volunteers and lead them in designing experiments.• 20.000+ attendees so far enjoyed sciences such as astronomy, robotics, physics, mathematics, biology or chemistry presented by the volunteers and mentors at the open-air festival and during our workshops in schools.
2018 2015	Founder and Coordinator , British Astronomy and Astrophysics Olympiad <ul style="list-style-type: none">• Initiated the Astronomy Olympiad in the United Kingdom and coordinated the national Olympiad. Achieved wide national participation, the papers being taken by 1000+ students across the UK every year.• Organised two training camps every year for 25 students in Oxford and Cambridge and coordinated the teaching and programme.• Successfully led the team in the International Astronomy and Astrophysics Olympiads, winning 1 Gold, 4 Silver and 4 Bronze Medals.
2018 2016	Co-founder , Oxford For Romania Summer School <ul style="list-style-type: none">• Brought 25 bright Romanian students from disadvantaged backgrounds to a multidisciplinary summer school at one of the world leading universities every year.• Lead the volunteer team in charge of logistics, planned the programme of the summer school and organised workshops on novel discoveries in astronomy.• The project received three prizes: UK Romanian Ambassador's Community Diploma, the Citizens' Initiatives Prize and the Generosity Trophy (Hategan Foundation).

TEACHING, SUPERVISION & MENTORING

2020	<ul style="list-style-type: none">• Matthijs Mars (Leiden Observatory) MSc project: <i>Characterising the Galactic Dust in the Euclid survey</i>• Emily Omayya Garvin (ETH Zürich) Summer project: <i>Modelling gravitational lenses discovered in HST archives</i>• Pablo García Martín (Universidad Autónoma Madrid) PhD project (mentor): <i>Asteroid detection with artificial intelligence</i>
2019	<ul style="list-style-type: none">• Lorena Acuna (Lund University) LEAPS project (co-supervisor): <i>Characterising the cloudiness of exoplanet atmospheres</i>
2016	<ul style="list-style-type: none">• Jesse Murray-Dean (University of Kent) Summer project: <i>Identifying inner lenses in Galaxy Zoo.</i>
2018 2015	Tutor of 4 th Year MPhys Astrophysics Major, University of Oxford <ul style="list-style-type: none">• Tutor of the year-long astrophysics course at the University of Oxford Department of Physics, accounting 1/3 of the 4th year's overall mark.• Taught two groups of five students every year.• Covered a range of topics in modern astrophysics (cosmology, galaxies, high energy astrophysics, stellar evolution, radiative processes).

PUBLICATIONS

Number of refereed publications	21
Number of referred publications as first author	3
<i>h-index</i>	11

A full up-to-date list of publications can be found at [ADS Sandor J. Kruk search](#).

First author

1. *Revealing the cosmic evolution of boxy/peanut-shaped bulges from HST COSMOS and SDSS*
Kruk, Erwin, Debattista and Lintott, MNRAS 490, 4, 4721 (2019)
2. *Galaxy Zoo: Secular evolution of barred galaxies using structural decomposition of multiband galaxy images*
Kruk, Lintott, Bamford, Masters, Simmons, Haußler, Cardamone, Hart, Kelvin, Schawinski, Smethurst, Vika, MNRAS, 473, 4731 (2018)
3. *Galaxy Zoo: Finding offset discs and bars in SDSS*
Kruk, Lintott, Simmons, Bamford, Cardamone, Fortson, Hart Haußler, Masters, Nichol, Schawinski, Smethurst MNRAS, 469, 3363 (2017)

Contributing author

1. *Galaxy Zoo Builder: Four Component Photometric decomposition of Spiral Galaxies Guided by Citizen Science*
Lingard, Masters, Krawczyk, Lintott, Bamford, **Kruk**, Simmons, Simpson, Nichol, Baeten, submitted to AJ (2020)
2. *The H I morphology and stellar properties of strongly barred galaxies: support for bar quenching in massive spirals*
Newnham, Hess, Masters, **Kruk**, Penny, Lingard, Smethurst, MNRAS, 492, 4697 (2020)
3. *Galaxy Zoo: probabilistic morphology through Bayesian CNNs and active learning*
Walmsley, Smith, Lintott, Gal, Bamford, Dickinson, Fortson, **Kruk**, Masters, Scarlata, Simmons, Smethurst, Wright, MNRAS, 491, 1554 (2020)
4. *Effect of galaxy mergers on star-formation rates*
Pearson, Wang, Alpaslan, Baldry, Bilicki, Brown, Grootes, Holwerda, Kitching, **Kruk**, van der Tak, A&A, 631, 19 (2019)
5. *SDSS-IV MaNGA: stellar population gradients within barred galaxies*
Fraser-McKelvie, Merrifield, Aragon-Salamanca, Peterken, Masters, Krawczyk, Andrews, Knapen, **Kruk** et al. MNRAS Letters, 488, L6 (2019)
6. *The Frequency of Dust Lanes in Edge-on Spiral Galaxies Identified by Galaxy Zoo in KiDS Imaging of GAMA Targets*
Holwerda, Kelvin, Baldry, et al. [including **Kruk**], AJ, 158, 103 (2019)
7. *Galaxy Zoo: unwinding the winding problem - observations of spiral bulge prominence and arm pitch angles suggest local spiral galaxies are winding*
Masters, Lintott, Hart, **Kruk**, Smethurst, Casteels, Keel, Simmons, Stanescu, Tate, Tomi, MNRAS, 487, 1808 (2019)
8. *The Fifteenth Data Release of the Sloan Digital Sky Surveys: First Release of MaNGA-derived Quantities, Data Visualization Tools, and Stellar Library*
Aguado et al. [including **Kruk**] ApJS, 240, 23 (2019)
9. *SDSS-IV MaNGA: characterizing non-axisymmetric motions in galaxy velocity fields using the Radon transform*
Stark, Bundy, Westfall, Bershad, Weijmans, Masters, **Kruk**, Brinchmann, Soler, Abraham, Cheung, Bizyaev, Drory, Lopes, Law, MNRAS 480, 2217 (2018)
10. *Galaxy Zoo: constraining the origin of spiral arms*
Hart, Bamford, Keel, Kruk, Masters, Simmons, Smethurst, MNRAS, 478, 932 (2018)

11. *Galaxy Zoo: Morphological classification of galaxy images from the ILLUSTRIS simulation*
Dickinson, Fortson, Lintott, Scarlata, Willett, Bamford, Beck, Cardamone, Galloway, Simmons, Keel, **Kruk**, Masters, Vogelsberger, Torrey, Snyder, AJ, 853, 194 (2018).
12. *Galaxy Zoo: Morphological classification of galaxy images from the ILLUSTRIS simulation*
Dickinson, Fortson, Lintott, Scarlata, Willett, Bamford, Beck, Cardamone, Galloway, Simmons, Keel, **Kruk**, Masters, Vogelsberger, Torrey, Snyder, AJ, 853, 194 (2018).
13. *Galaxy Zoo and SPARCFIRE: constraints on spiral arm formation mechanisms from spiral arm number and pitch angles*
Hart, Bamford, Hayes, Cardamone, Keel, **Kruk**, Lintott, Masters, Simmons, Smethurst, MNRAS, 472, 2263 (2017)
14. *Galaxy Zoo: the interplay of quenching mechanisms in the group environment*
Smethurst, Lintott, Bamford, Hart, **Kruk**, Masters, Nichol, Simmons, MNRAS, 469, 3670 (2017)
15. *Galaxy Zoo: Major Galaxy Mergers Are Not a Significant Quenching Pathway*
Weigel, Schawinski, Caplar, Carpineti, Hart, Kaviraj, Keel, **Kruk**, Lintott, Nichol, Simmons, Smethurst, AJ 845, 145 (2017).
16. *Galaxy Zoo: star formation versus spiral arm number*
Hart, Bamford, Casteels, **Kruk**, Lintott, Masters, MNRAS, 468, 1850, (2017)
17. *Galaxy Zoo: quantitative visual morphological classifications for 48 000 galaxies from CANDELS*
Simmons, Lintott, Willett, Masters, Kartaltepe, Haubler, Kaviraj, Krawczyk, **Kruk** et al., MNRAS, 464, 4420 (2017)
18. *Galaxy Zoo: evidence for rapid, recent quenching within a population of AGN host galaxies*
Smethurst, Lintott, Simmons, Schawinski, Bamford, Cardamone, **Kruk**, Masters, Willett, Wong, MNRAS, 463, 2986 (2016)

TALKS AND INVITED SEMINARS

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|------|--|
| 2020 | Astronomical Institute of the Romanian Academy, Bucharest (<i>seminar</i>) – EAS Annual Meeting 2020 (<i>online, three talks</i>) |
| 2019 | ESAC Data Centre, Madrid (<i>seminar</i>) – ESA SSW12, Aranjuez – EWASS2019, Lyon – Euclid Consortium Meeting, Helsinki – Oulu, Finland (<i>seminar</i>) – Euclid Netherlands Meeting, Leiden |
| 2018 | NAM and EWASS2018, Liverpool – Zooniverse Meeting, Oxford – ESTEC, Netherlands (<i>seminar</i>) - ESA SSW11, Akersloot |
| 2017 | SDSS-IV MaNGA Team Meeting, Mexico – Gas in Galaxies Conference, Malta, – ESO, Garching (<i>seminar</i>) – MPE, Garching (<i>seminar</i>) – Universitäts Sternwarte Munich (<i>seminar</i>) – Galaxy Zoo 10 Meeting, Oxford – NAM2017, Hull – EWASS2017 Prague, Czech Republic – University of Oxford, UK (<i>seminar</i>) |
| 2016 | Discs in Galaxies Conference, ESO, Garching – NAM2016, Nottingham – What Shapes Galaxies Symposium, STScI, Baltimore |

INTERNATIONAL COLLABORATIONS

EUCLID	Member of the ESA Euclid team, Euclid Consortium Galaxy & AGN Evolution Science Working Group, Strong Lensing SWG, Solar System Objects SWG, Morphologies Working Package; leading a Key Project on the detailed morphologies of galaxies in Euclid.
GALAXY ZOO	Core member of the team; leading studies on barred galaxies and peculiar objects identified in images; organising bi-weekly teleconferences and internal communication.
ZOONIVERSE	Member of the science team; regularly interacting with the team regarding new features added to the Project Builder; communicating with and coordinating volunteers on citizen science projects.
SDSS-IV	Member of SDSS-IV (2015-2018). Working on the Galaxy Zoo-MaNGA Value Added Catalogue and Galaxy Zoo 3D (PI Karen Masters).
ESDC	Collaboration with ESA Archives team at the ESA Science Data Centre (ESDC, ESAC, Madrid); leading citizen science projects with ESA data; leading a machine learning project on object identification, in collaboration with Google.

REFEREEING AND SERVICE

REFEREEING

2019 - Astrophysical Journal
2018 - Monthly Notices of the Royal Astronomical Society

SERVICE

FEB 2020 ESA JWST Masterclass at the Institute of Space Science, Magurele, Romania.
JAN 2020 Topical Teams Meeting for Voyage 2050, ESTEC.
NOV 2019 ESA Euclid Technical Keypoint Meeting, ESTEC.
OCT 2019 ESA Voyage 2050: Long-term planning of science missions Workshop, CSIC Madrid, Spain.
SEPT 2019 - Member of the ESTEC Science Faculty.

OUTREACH AND MEDIA HIGHLIGHTS

I regularly give space talks to the public, both in person and online, and talk to students in schools in Romania and the UK. Some recent examples on online talks:

- 30 years of the Hubble Space Telescope (*ESERO 'Bringing Space to your Homes', in Romanian*)
- Three (astronomical) ways the world will end (*in Romanian*)

In 2015 and 2016 I was the graduate outreach representative for Oxford Astrophysics, organising telescope evenings and activities during the Open Days.

MEDIA APPEARANCES OF MY WORK:

- [ESA Image of the Week – One galaxy, two asteroids](#)
- [ESA Image of the Week – Hubble's Celestial Peanut](#)
- [ESA Image of the Week – Foreground Asteroid Passing in Front of Crab Nebula](#)
- www.spacetelescope.org – [Search for Hidden Asteroids with the Hubble Asteroid Hunter](#)
- www.syfy.com – [Citizen Scientists Find Asteroids in Hubble Images](#)

SKILLS

Languages

- *Romanian*: mother tongue
- *Hungarian*: mother tongue
- *English*: fluent
- *French*: intermediate

Operating systems: • Linux, Windows, MacOS

Programming: • Python, Jupyter, Matlab, Fortran, HTML, Bash, Tcsh

Astronomy tools: • Galfit, GalfitM, DS9, Topcat, SExtractor, EAZY, Astropy, Lenstronomy

Other: • SQL, Google Cloud

REFEREES

Name:	DR RENÉ LAUREIJS	PROF CHRIS LINTOTT
Relation:	ESA Mentor	PhD supervisor
Position:	Euclid Project Scientist	Professor in Astrophysics & Citizen Science Lead
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