Expanding EOSC participation by a factor of a thousand: citizen science in the EOSC

Prof Stephen Serjeant, EOSC Symposium, 17 June 2021

The Open University

Provocative statement 1:

Making data FAIR is easy

compared to making FAIR data ***useful***

Physics of the Dark Universe 12 (2016) 1–23

Contents lists available at ScienceDirect

Physics of the Dark Universe

journal homepage: www.elsevier.com/locate/dark

The characterization of the gamma-ray signal from the central Milky Way: A case for annihilating dark matter

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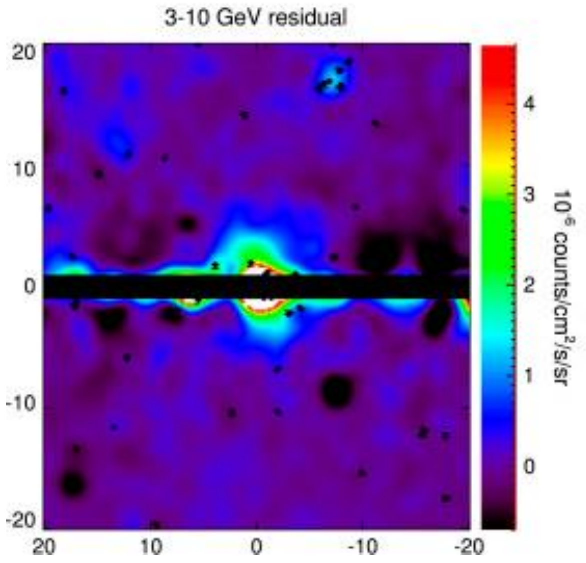

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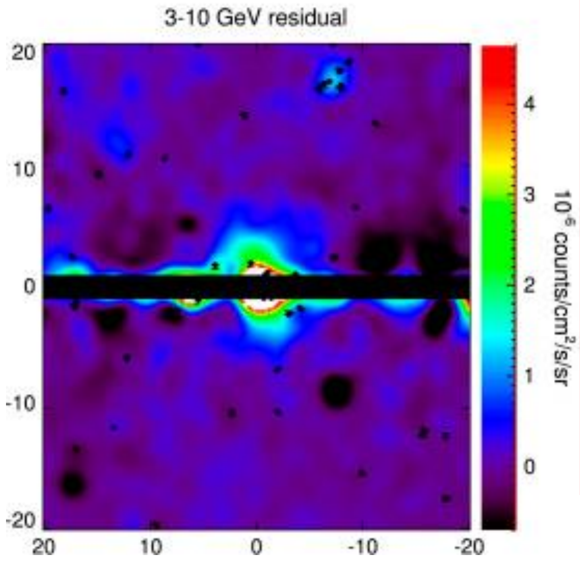

The Astrophysical Journal, 840:43 (34pp), 2017 May 1 https://doi.org/10.3847/1538-4357/aa6cab

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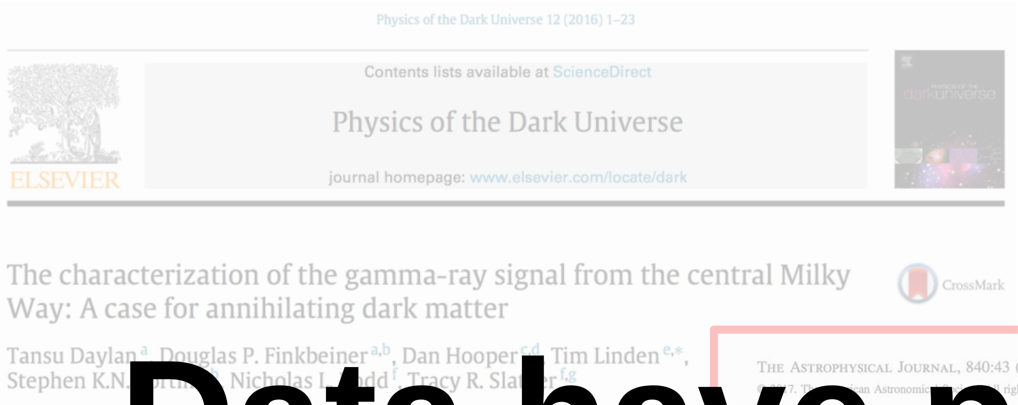
The *Fermi* Galactic Center GeV Excess and Implications for Dark Matter

M. Ackermann[1], M. Ajello[2], A. Albert[3], W. B. Atwood[4], L. Baldini[5], J. Ballet[6], G. Barbiellini[7,8], D. Bastieri[9,10], R. Bellazzini[11], E. Bissaldi[12], R. D. Blandford[13], E. D. Bloom[13], R. Bonino[14,15], E. Bottacini[13], T. J. Brandt[16], J. Bregeon[17], P. Bruel[18], R. Buehler[1], T. H. Burnett[19], R. A. Cameron[13], R. Caputo[4], M. Caragiulo[12,20], P. A. Caraveo[21], E. Cavazzuti[22], C. Cecchi[23,24], E. Charles[13], A. Chekhtman[25], J. Chiang[13], A. Chiappo[26,27], G. Chiaro[10], S. Ciprini[22,23], J. Conrad[26,27,67], F. Costanza[12], A. Cuoco[14,28], S. Cutini[22,23], F. D'Ammando[29,30], F. de Palma[12,31], R. Desiante[14,32], S. W. Digel[13], N. Di Lalla[5], M. Di Mauro[13], L. Di Venere[12,20], P. S. Drell[13], C. Favuzzi[12,20], S. J. Fegan[18], E. C. Ferrara[16], W. B. Focke[13], A. Franckowiak[1], Y. Fukazawa[33], S. Funk[34], P. Fusco[12,20], F. Gargano[12], D. Gasparrini[22,23], N. Giglietto[12,20], F. Giordano[12,20], M. Giroletti[29], T. Glanzman[13], G. A. Gomez-Vargas[35,36], D. Green[16,37], I. A. Grenier[6], J. E. Grove[38], L. Guillemot[39,40], S. Guiriec[16,68], M. Gustafsson[41], A. K. Harding[16], E. Hays[16], J. W. Hewitt[42], D. Horan[18], T. Jogler[34,43], A. S. Johnson[13], T. Kamae[44], D. Kocevski[44], M. Kuss[11], G. La Mura[10], S. Larsson[27,45], L. Latronico[14], J. Li[46], F. Longo[7,8], F. Loparco[12,20], M. N. Lovellette[38], P. Lubrano[23], J. D. Magill[37], S. Maldera[14], D. Malyshev[34], A. Manfreda[5], P. Martin[47], M. N. Mazziotta[12], P. F. Michelson[13], N. Mirabal[16,68], W. Mitthumsiri[48], T. Mizuno[49], A. A. Moiseev[37,50], M. E. Monzani[13], A. Morselli[36], M. Negro[14,15], E. Nuss[17], T. Ohsugi[49], M. Orienti[29], E. Orlando[13], J. F. Ormes[51], D. Paneque[52], J. S. Perkins[16], M. Persic[7,53], M. Pesce-Rollins[11], F. Piron[17], G. Principe[34], S. Rainò[12,20], R. Rando[9,10], M. Razzano[11,66], S. Razzaque[54], A. Reimer[13,55], O. Reimer[13,55], M. Sánchez-Conde[26,27], C. Sgrò[11], D. Simone[12], E. J. Siskind[56], F. Spada[11], G. Spandre[11], P. Spinelli[12,20], D. J. Suson[57], H. Tajima[13,58], K. Tanaka[33], J. B. Thayer[13], L. Tibaldo[59], D. F. Torres[46,60], E. Troja[16,37], Y. Uchiyama[61], G. Vianello[13], K. S. Wood[62], M. Wood[13], G. Zaharijas[63,64], and S. Zimmer[65]
(The *Fermi* LAT Collaboration)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Data have pitfalls!
Users need training!

Provocative statement 2:

The science-inclined public is both the largest and most overlooked group of EOSC stakeholders

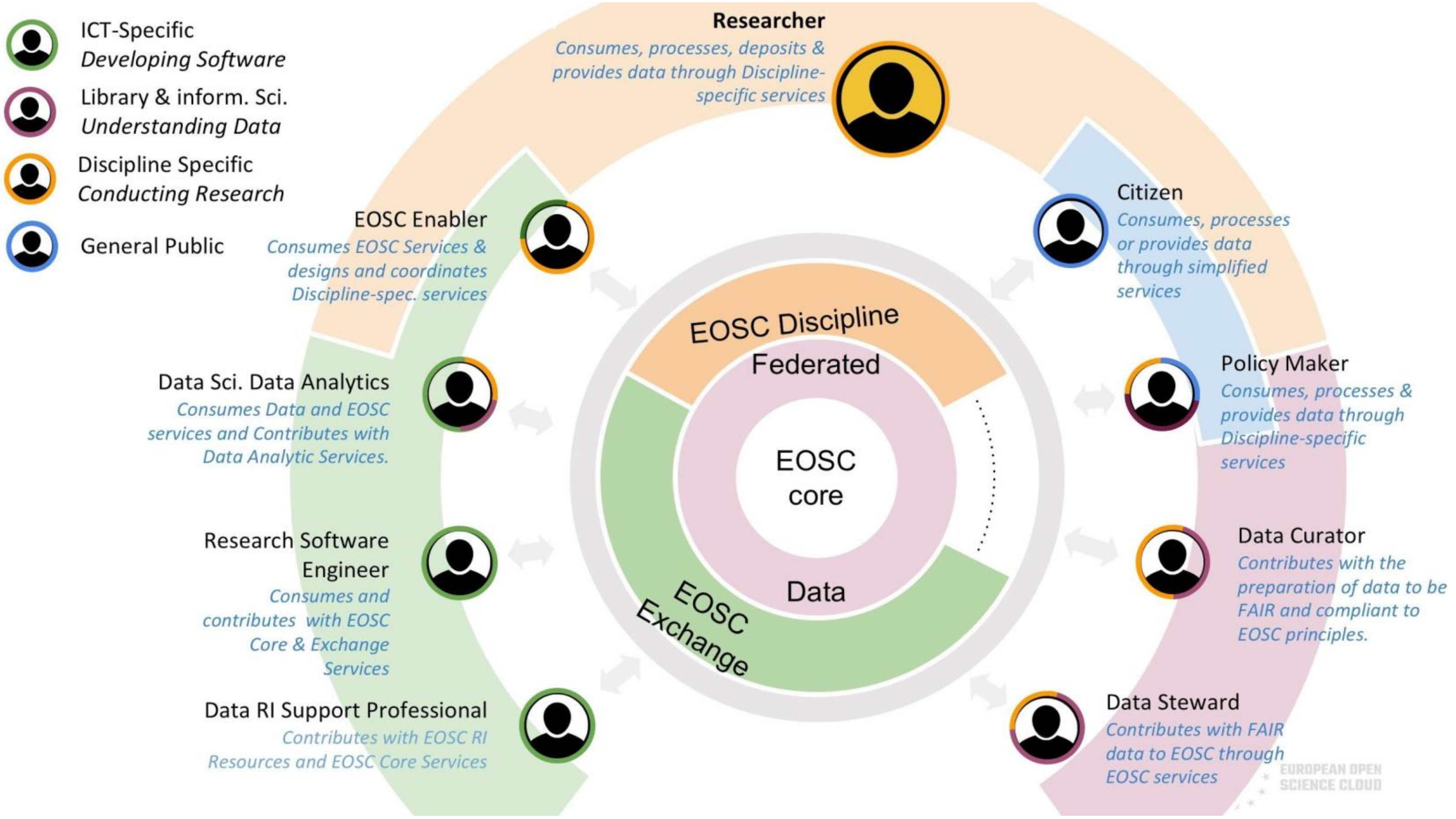
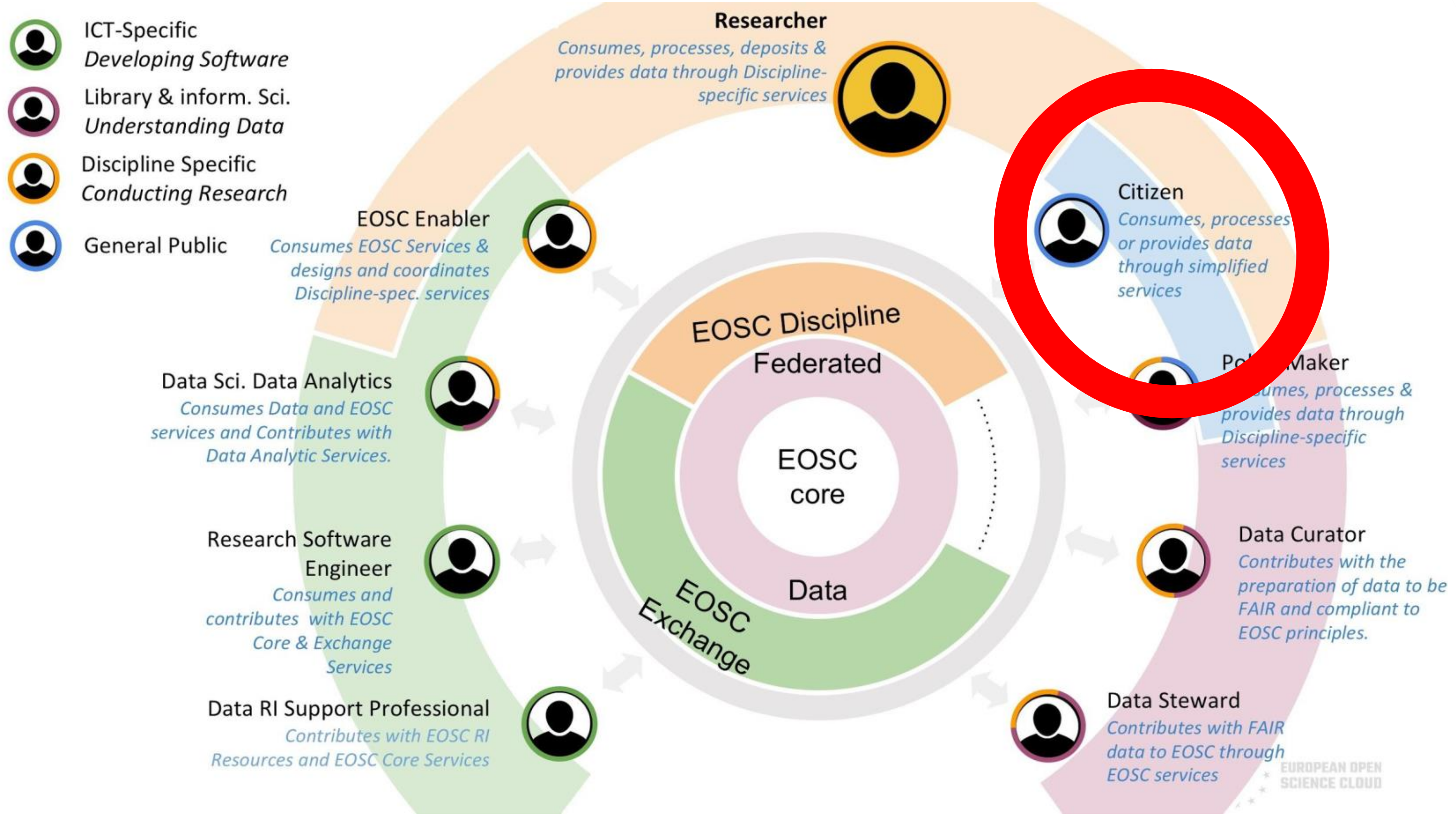


Image credit: Natalia Manola (OpenAIRE), Vinciane Gaillard (EUA), Iryna Kuchma (EIFL)



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PROJECTS ABOUT GET INVOLVED TALK BUILD SIGN IN REGISTER

Planet Hunters TESS

ABOUT CLASSIFY TALK COLLECT

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Every click counts! Join Planet Hunters TESS's community to complete this project and help researchers produce important results. Click "View more stats" to see even more stats.

100%

Percent complete

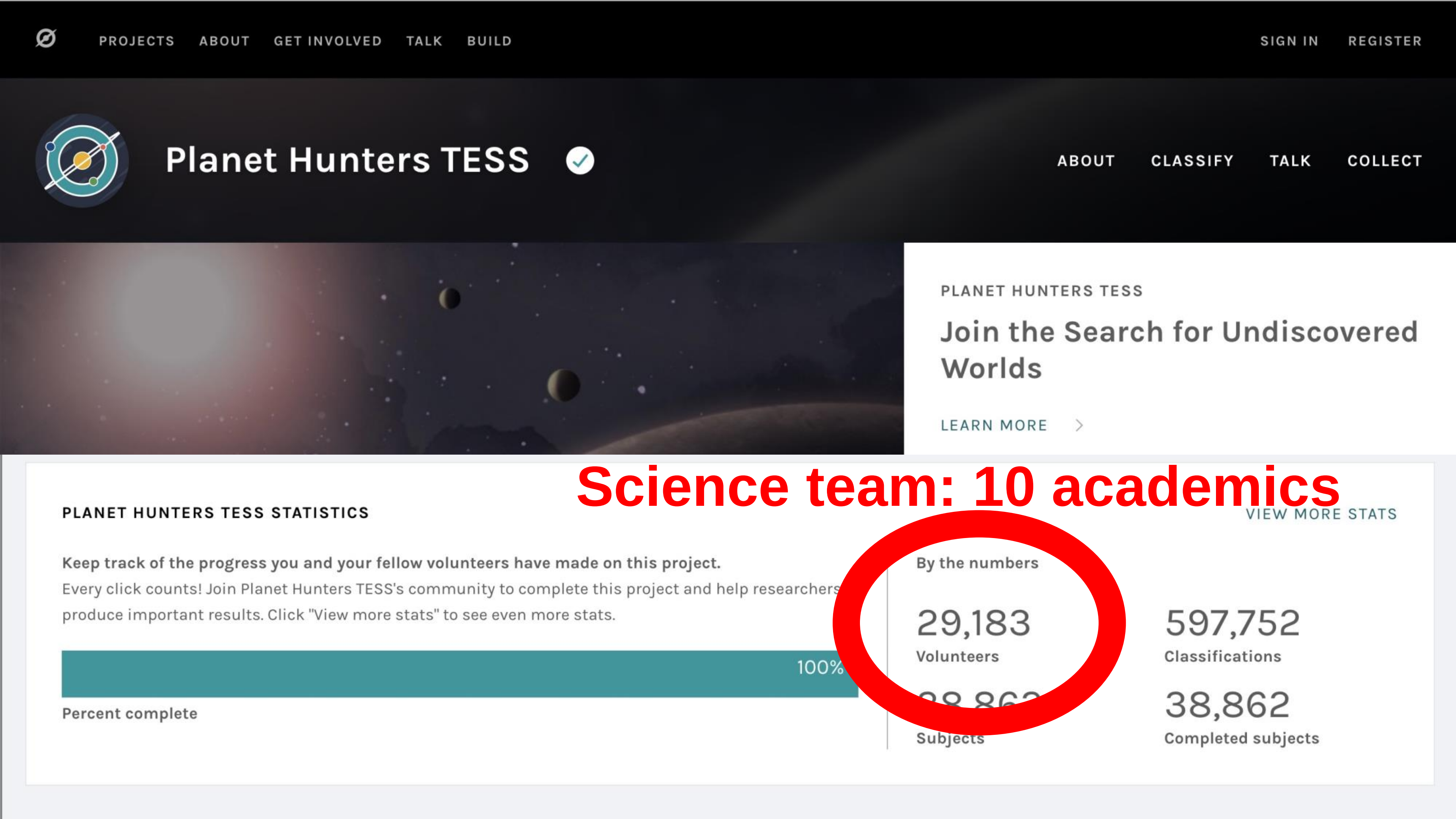
By the numbers

29,183
Volunteers

597,752
Classifications

38,862
Subjects

38,862
Completed subjects


PROJECTS
ABOUT
GET INVOLVED
TALK
BUILD
SIGN IN
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Planet Hunters TESS
ABOUT
CLASSIFY
TALK
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PLANET HUNTERS TESS
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Science team: 10 academics
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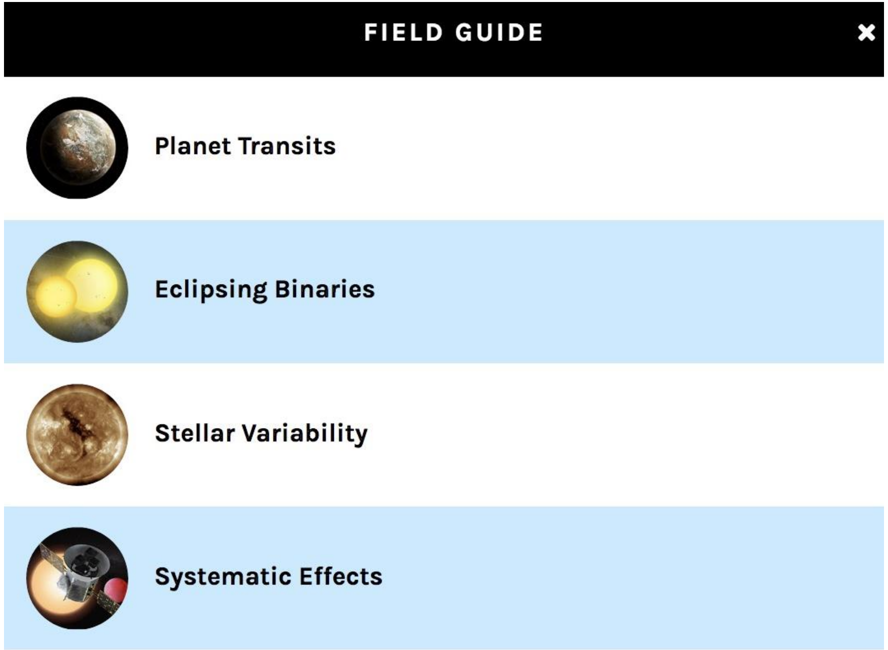
Built-in training



Built-in training

FIELD GUIDE

Planet Transits

Eclipsing Binaries

Stellar Variability

Systematic Effects

SIGN IN REGISTER

FIELD GUIDE

Eclipsing Binaries

Most stars are not alone, but instead exist in pairs or even triplets that orbit around one another. When one star passes in front of the other we see a dip in the lightcurve, known as an eclipsing binary. Transits due to eclipsing binaries tend to be more V-shapes, whereas transits due to plants are more U-shaped.

If you see an eclipsing binary in a lightcurve, please mark it as a transit and tell us about it using the Talk tool.

ALTERNATING DIPS

Lightcurves of eclipsing binaries can often be identified due to the repetition two dips of different depths. When the two stars are in circular orbits around one another, these dips are evenly spaced:

Built-in training

This is the only way to have two-way engagement and training of x1000 more EOSC users

Provocative statement 3:

Citizen science is not outreach

Provocative statement 1:

Making data FAIR is easy

compared to making FAIR data *useful*

Provocative statement 2:

The science-inclined public is both the largest and most overlooked group of EOSC stakeholders

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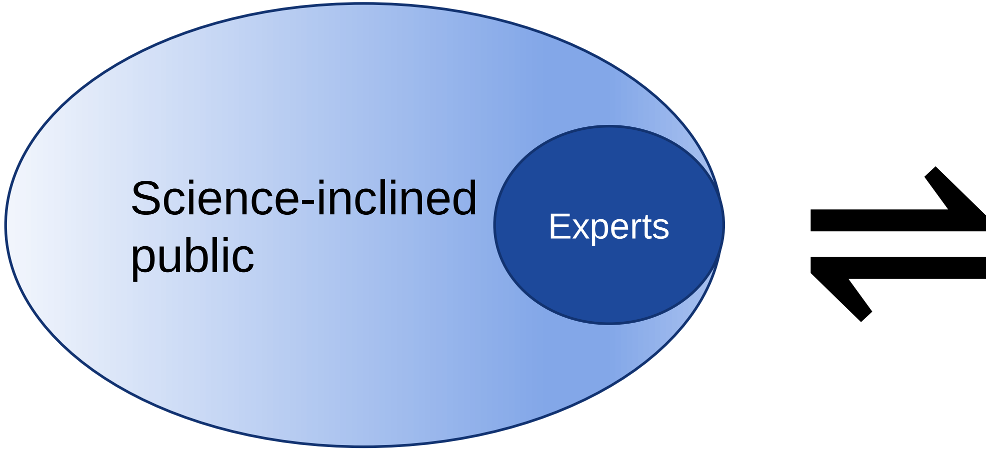
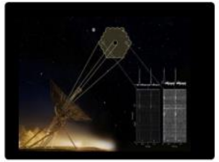


EUROPEAN OPEN SCIENCE CLOUD

WSRT-Apertif



Apertif Surveys

Data from the Apertif surveys include imaging and time-domain data. The time-domain products consist of high-time resolution filterbank data in the PSRFITS standard. The imaging data products include the raw observations in the measurement set (MS) standard format. In addition, processed data products are available, including calibration tables, calibrated visibilities, multi-frequency synthesis continuum images, polarization images and cubes, and uncleaned neutral hydrogen (HI) line and beam cubes. Full details of these data will be provided in upcoming papers (van Leeuwen et al. 2020, Adams et al. 2020).

Visit WSRT-Apertif Archives

ASTRON VO

ASTRON Virtual Observatory

The Virtual Observatory defines a set of standards that can be used to download astronomical data. The ASTRON VO contains several image surveys, which are images in the FITS format. Since the VO is currenty under development, more data types will be available in the future.

Visit ASTRON VO Archives

LOFAR-LTA

LOFAR LTA data

The data from all LOFAR cycle, commissioning and DDT projects since 2013 are stored in the archive. The interferometric data products that can be found include raw, pre-processed data in the measurement set (MS) format, and the products from the calibration, imaging and long baseline pipelines. In the case of beamformed observations, raw data are available in HDF5 format as well as higher-level data products including de-dispersed time series, dynamic spectra and folded pulse profiles. More details on the types of data products stored on the archive are provided [here]. ([here] is wherever you put the more detailed description that was sent to you separately).

Visit LOFAR-LTA Archives

Zooniverse

Zooniverse Classification Database

The Zooniverse is the world's largest and most popular platform for people-powered research. This research is made possible by volunteers — more than a million people around the world who come together to assist professional researchers. Our goal is to enable research that would not be possible, or practical, otherwise. Zooniverse research results in new discoveries, datasets useful to the wider research community, and many publications.

Visit Zooniverse Archives

Virtual Observatory (VO)

Virtual Observatory (VO)

The Virtual Observatory defines a set of standards that can be used to download astronomical data.

Visit Virtual Observatory (VO) Archives

RUCIO

Rucio

Built on more than a decade of experience, Rucio serves the data needs of modern scientific experiments. Large amounts of data, countless numbers of files, heterogeneous storage systems, globally distributed data centres, monitoring and analytics. All coming together in modular solution to fit your needs.

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ESCAPE ESAP ESFRI Science Analysis Platform

Archives Query Rucio Interactive Analysis VO-SAMP Login

Archive - Zooniverse

Instrument	Multiple
Description	Zooniverse Classification Database

Zooniverse Classification Database

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Data Retrieval

Data retrieval is facilitated by a RESTful web API. The ESAP platform makes use of a Python client library provided by the Zooniverse development team.

Data Product Categories in Zooniverse

Data Product Category	Catalog name	Categories access
Zooniverse Panoptes	Zooniverse	Query this Dataset

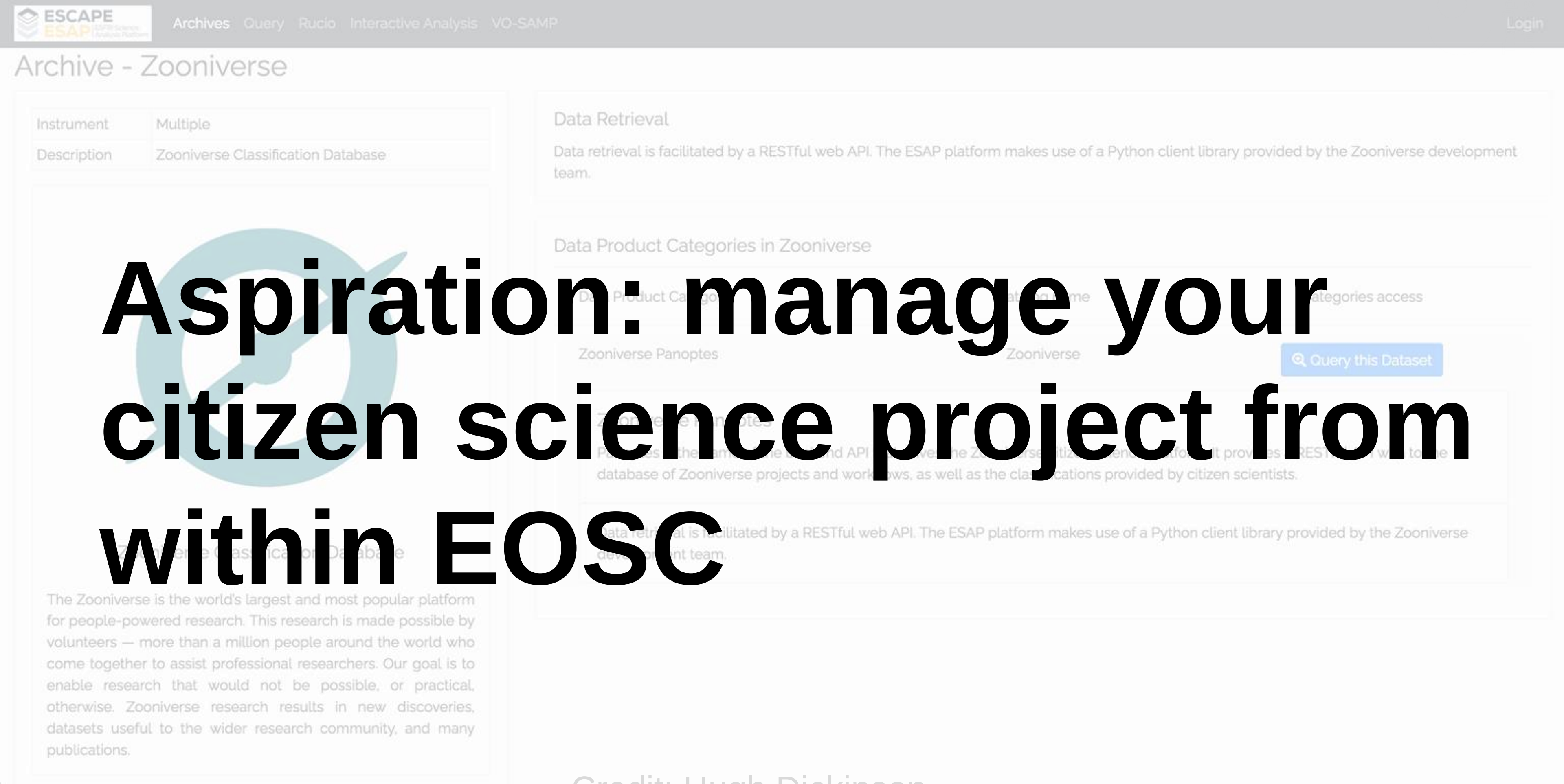
Zooniverse Panoptes

Panoptes is the name of the backend API that drives the Zooniverse citizen science platform. It provides a RESTful API with to the database of Zooniverse projects and workflows, as well as the classifications provided by citizen scientists.

Data retrieval is facilitated by a RESTful web API. The ESAP platform makes use of a Python client library provided by the Zooniverse development team.

Credit: Hugh Dickinson

Aspiration: manage your citizen science project from within EOSC



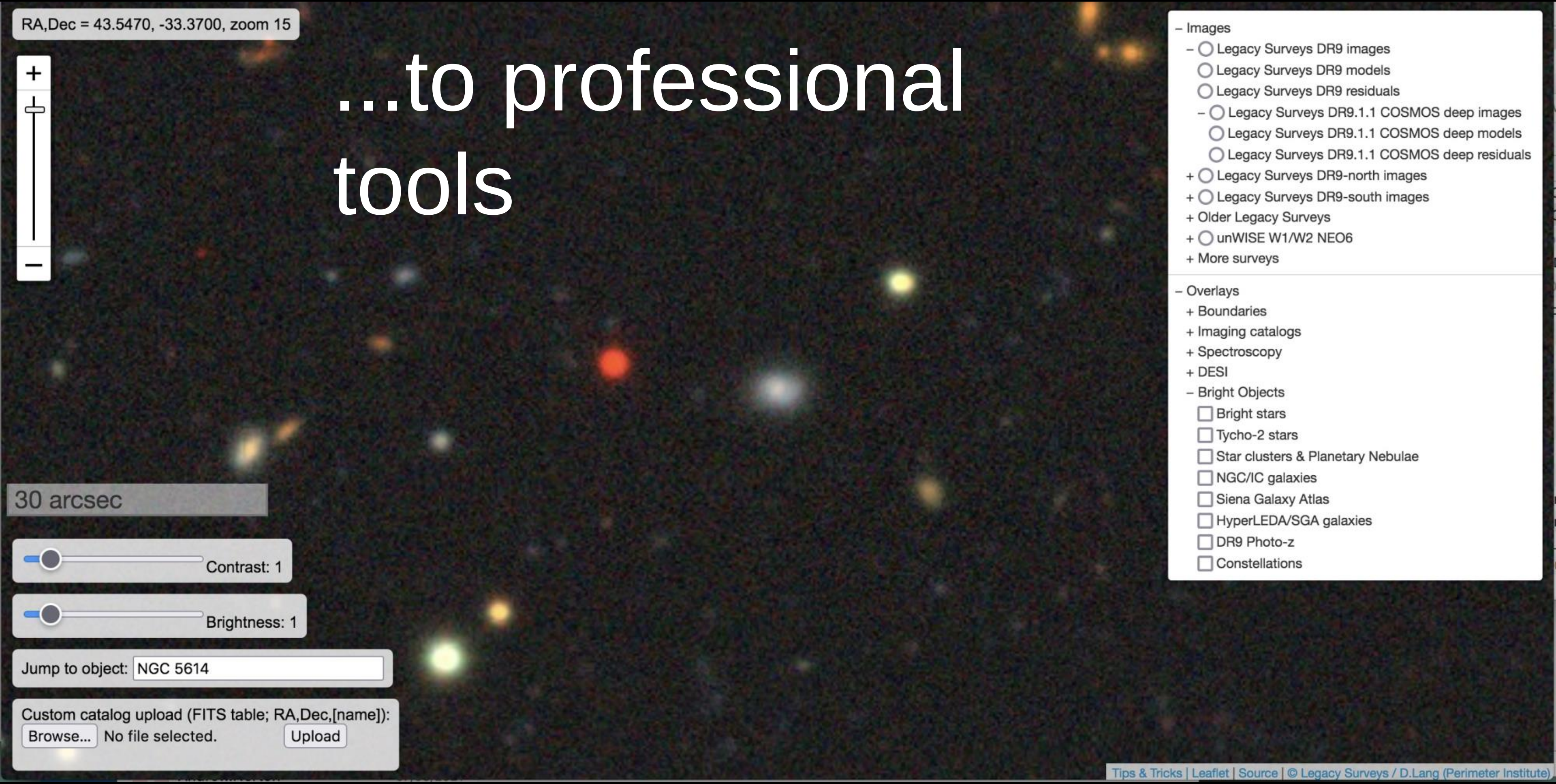
Credit: Hugh Dickinson

Volunteers already jump from Galaxy Zoo...

SUBJECT METADATA

ra	43.57565186771203
dec	-33.35775666586277
sdss_search	Click to view in SDSS
decals_search	Click to view in DECALS
simbad_search	Click to search SIMBAD
vizier_search	Click to search VizieR
nasa_ned_search	Click to search NASA NED
metadata_message	Metadata is available in Talk
panstarrs_dr1_search	Click to view in PANSTARRS DR1

...to professional tools



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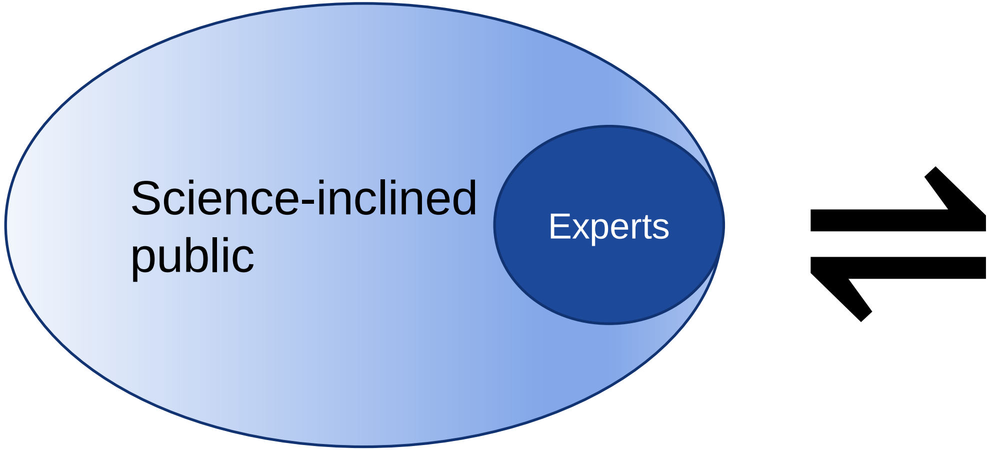

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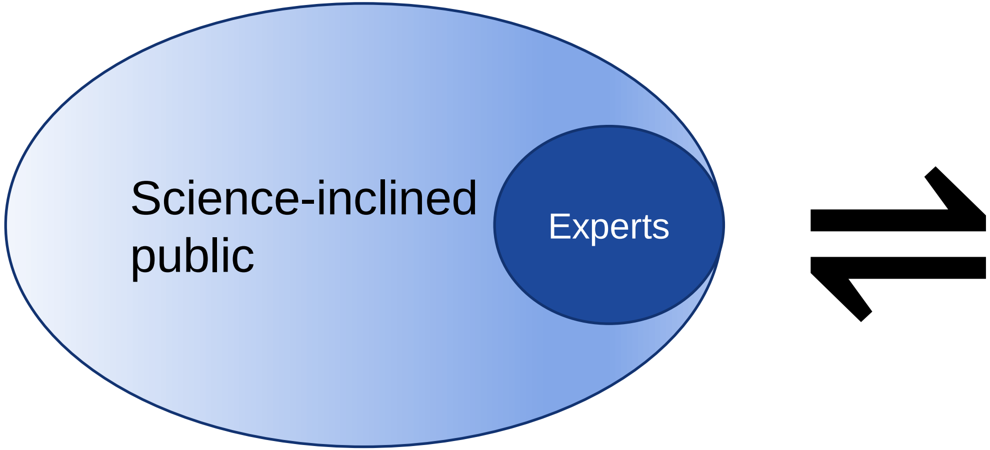
Realistic plan for genuinely two-way “win-win” benefits for citizen scientists and EOSC



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