

The logo is contained within a white circle. It features a stylized blue starburst at the top, a yellow circle at the bottom, and two thin blue curved lines that sweep from the starburst to the yellow circle. The word "ESCAPE" is written in a bold, dark blue, sans-serif font in the center.

# ESCAPE

European Science Cluster of Astronomy &  
Particle physics ESFRI research Infrastructures

# Welcome to the 2nd ESCAPE Citizen Science Workshop

Stephen Serjeant, The Open University

15 September 2021



What would you  
like ten thousand  
people to do for  
you?



# What we want for you

- Learn a bit about citizen science
- Maybe build something amazing!



# CITIZEN SCIENCE IS NOT OUTREACH





# So why are we running this workshop?





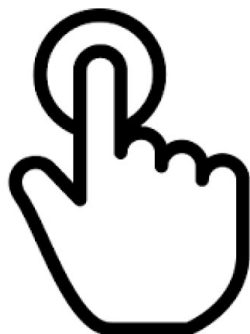
# **EUROPEAN OPEN SCIENCE CLOUD**



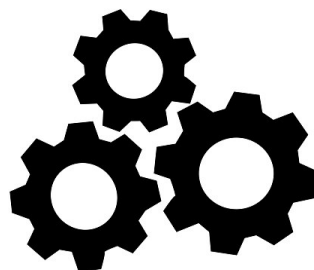
F<sub>indable</sub>



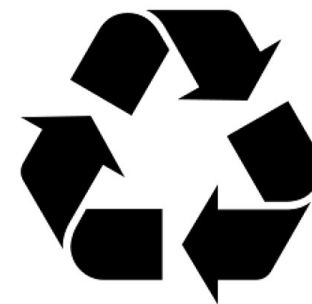
A<sub>ccessible</sub>



I<sub>nteroperable</sub>



R<sub>eusable</sub>



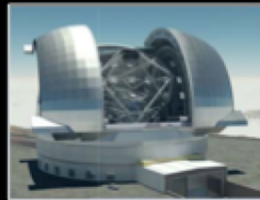
**Radio**



SKA

JIVE-  
VLBI

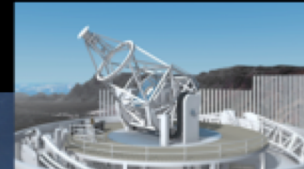
**Visible light**



ELT

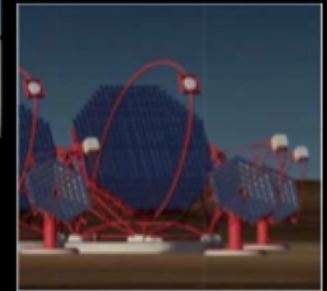


ESO



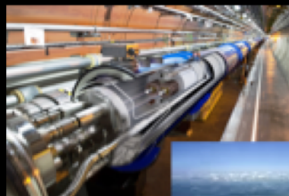
EST

**Gamma rays**



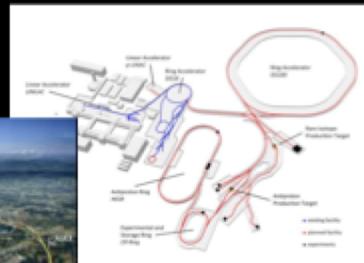
CTA

**Accelerator-based  
Particle Physics**



HL-LHC

**Accelerator-based  
Nuclear Physics**



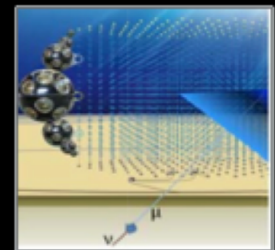
FAIR

**Gravitational  
Waves**



EGO-VIRGO

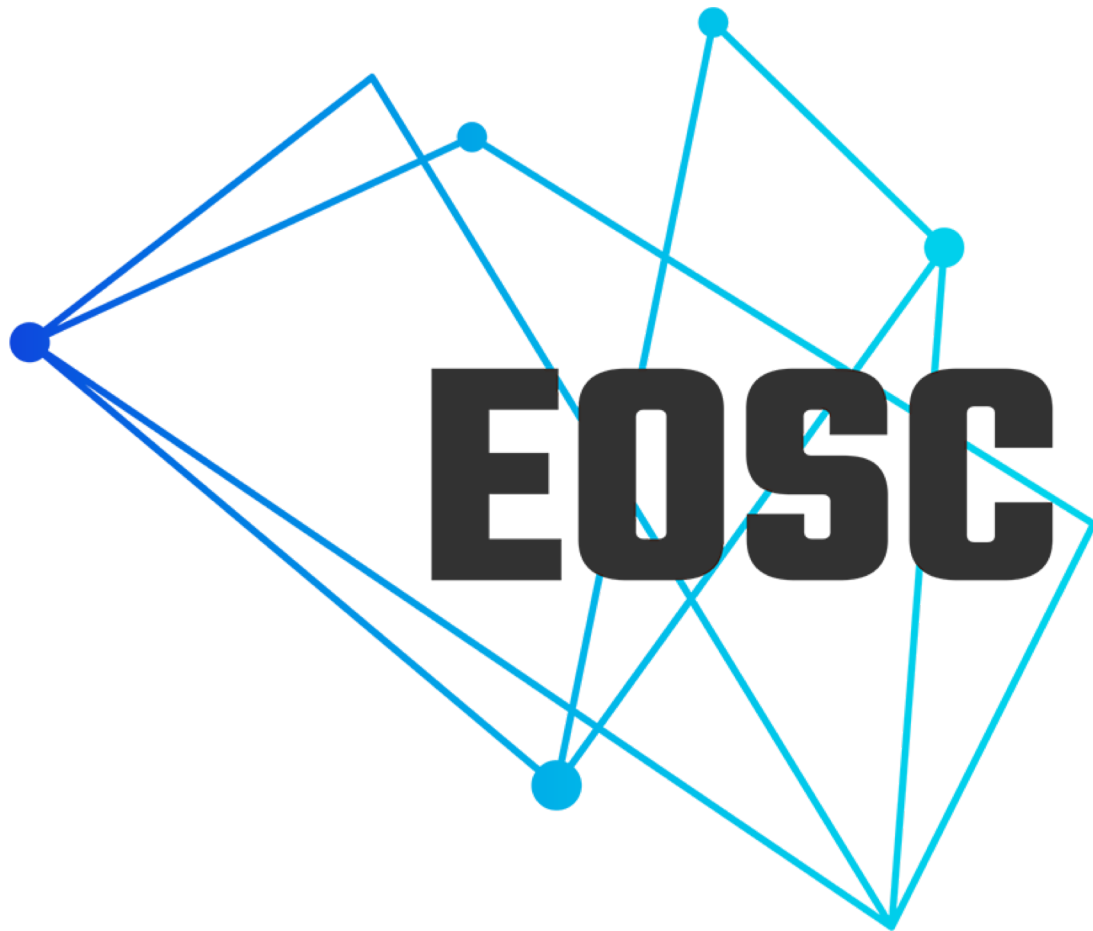
**Cosmic-rays  
Neutrinos**



KM3NeT



CERN



# EOSC Future





**EOSC Future**

**ESCAPE**

European Science Cluster of Astronomy & Particle physics ESFRI research Infrastructures

astro/particle  
physics



**EOSC-Life**

life sciences



photon & neutron



**SSHOC**

social sciences & humanities open cloud

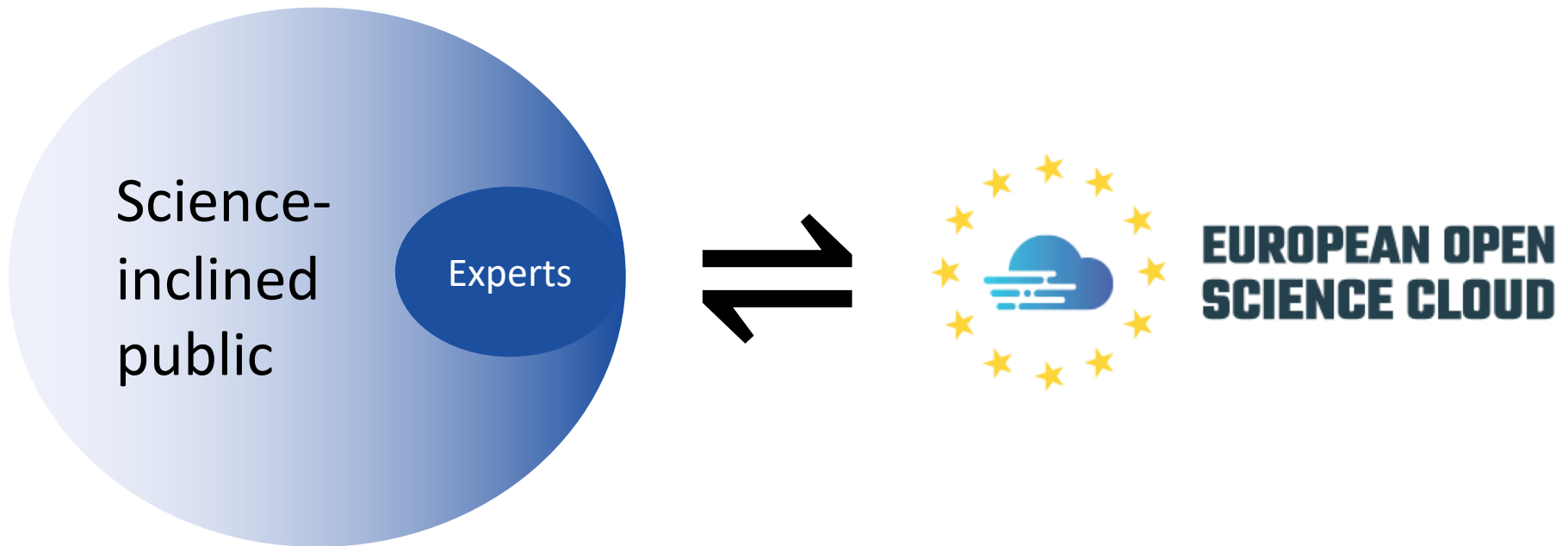
social sciences



environmental science



Our mission: get 100x more people involved in **doing** open science on EOSC via citizen science





# Planet Hunters TESS

## PLANET HUNTERS TESS

### Join the Search for Undiscovered Worlds

[LEARN MORE](#) >

## PLANET HUNTERS TESS STATISTICS

[VIEW MORE STATS](#)

Keep track of the progress you and your fellow volunteers have made on this project. 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.



Percent complete

### By the numbers

29,183

Volunteers

38,862

Subjects

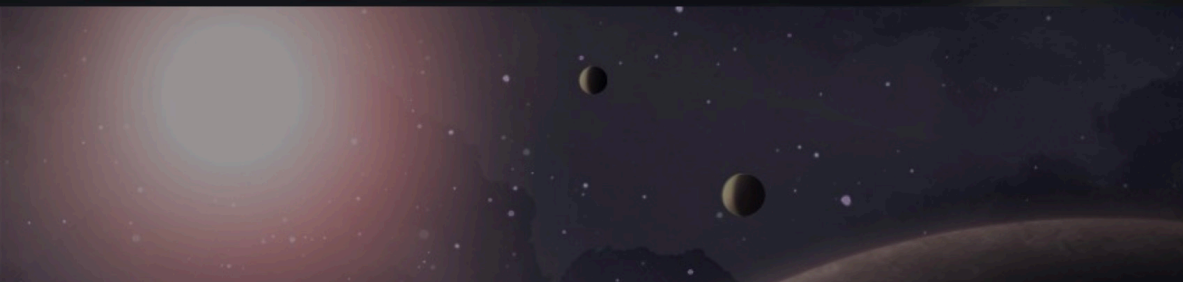
597,752

Classifications

38,862

Completed subjects





## PLANET HUNTERS TESS

### Join the Search for Undiscovered Worlds

[LEARN MORE](#) >

## PLANET HUNTERS TESS STATISTICS

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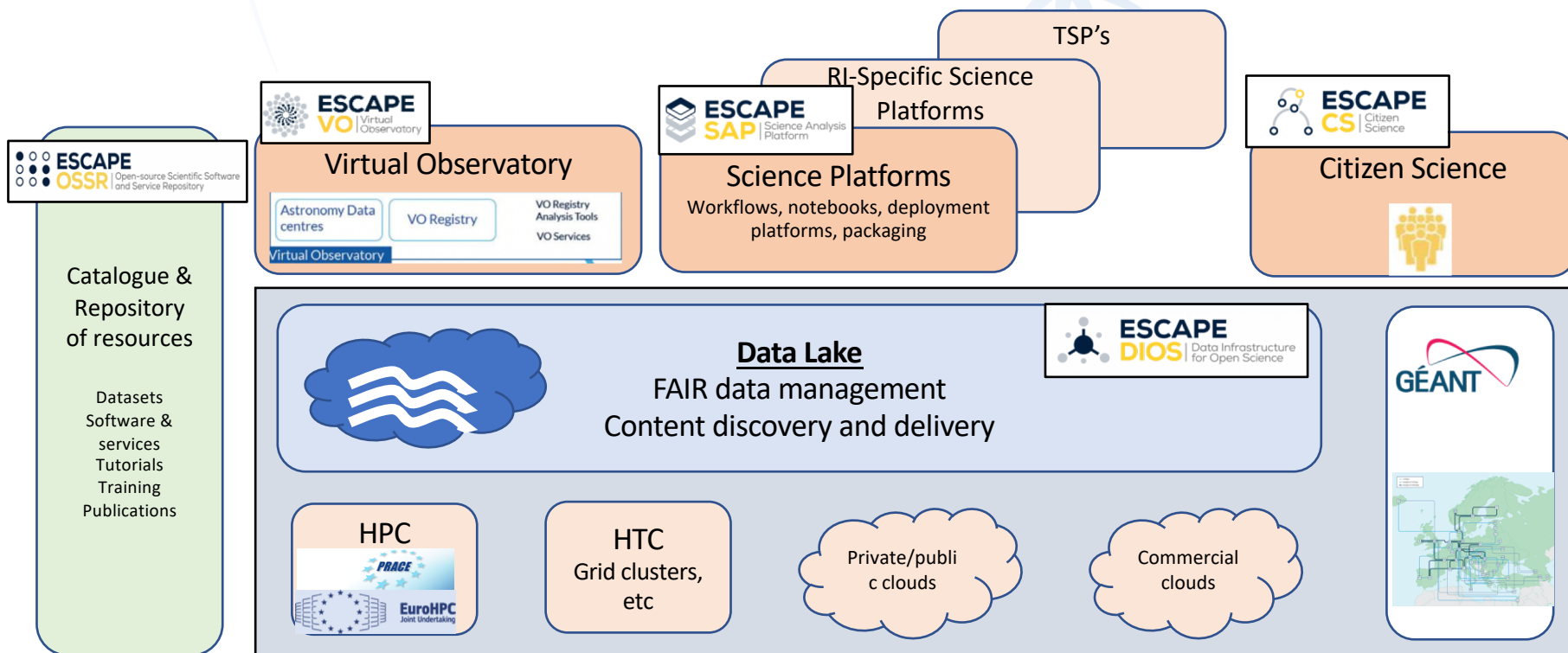
Classifications

38,862

Completed subjects

**Science team: 10 academics**







ok, but why not just  
give the public the  
tools to play with  
the data?





Contents lists available at ScienceDirect

## Physics of the Dark Universe

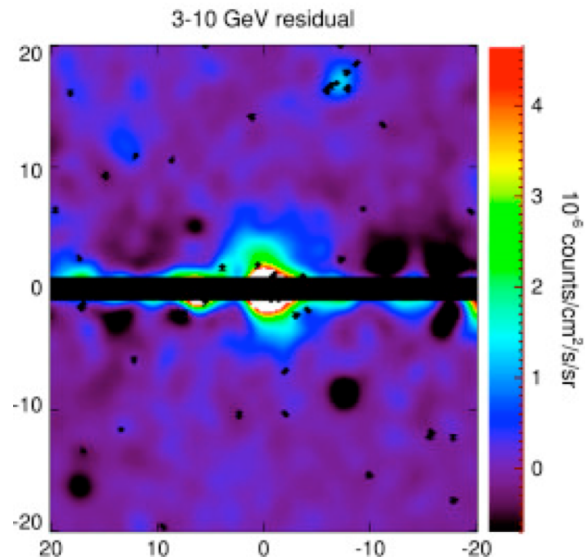
journal homepage: [www.elsevier.com/locate/dark](http://www.elsevier.com/locate/dark)



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



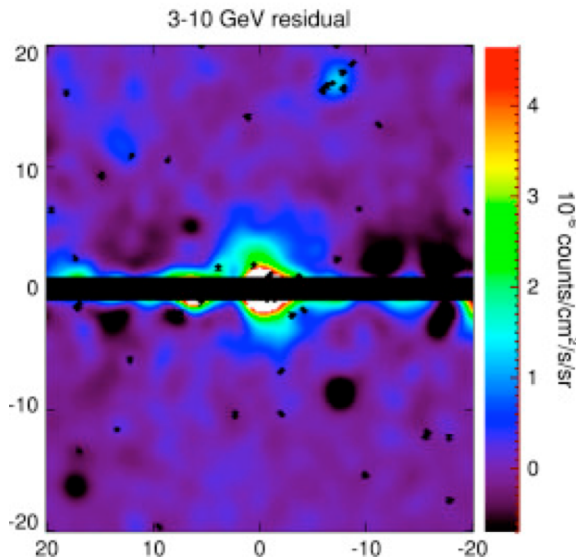
Tansu Daylan<sup>a</sup>, Douglas P. Finkbeiner<sup>a,b</sup>, Dan Hooper<sup>c,d</sup>, Tim Linden<sup>e,\*</sup>,  
Stephen K.N. Portillo<sup>b</sup>, Nicholas L. Rodd<sup>f</sup>, Tracy R. Slatyer<sup>f,g</sup>





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THE ASTROPHYSICAL JOURNAL, 840:43 (34pp), 2017 May 1

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<https://doi.org/10.3847/1538-4357/aa6cab>



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

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

Contents lists available at ScienceDirect

# Physics of the Dark Universe

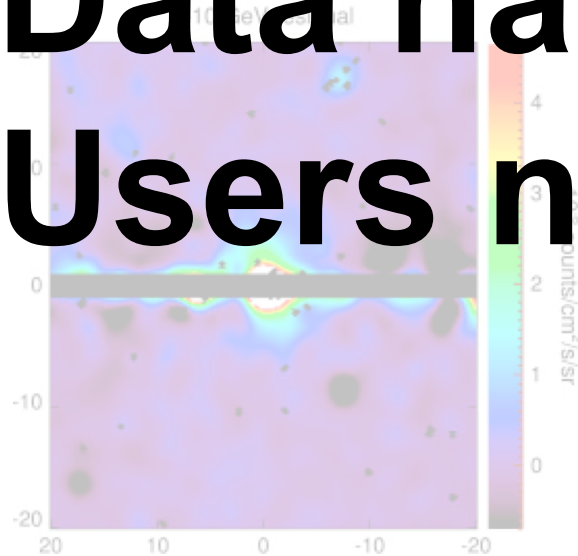


# The characterization of the gamma-ray signal from the central Milky Way: A case for annihilating dark matter

Tansu Daylan<sup>a</sup>, Douglas P. Finkbeiner<sup>a,b</sup>, Dan Hooper<sup>c,d</sup>, Tim Linden<sup>e,\*</sup>,  
Stephen K.N. Martin<sup>a</sup>, Nicholas L. Dodd<sup>f</sup>, Tracy R. Slater<sup>f,g</sup>



# Data have pitfalls! Users need training!

(The *Fermi* LAT Collaboration)

Making your data  
*“Findable, Accessible,  
Interoperable, Reusable”*  
is easy compared to  
making it **USEFUL**





# Volunteers already jump from Galaxy Zoo...

SUBJECT METADATA	
ra	43.57565186771203
dec	-33.35775666586277
sdss_search	<a href="#">Click to view in SDSS</a>
decals_search	<a href="#">Click to view in DECALS</a>
simbad_search	<a href="#">Click to search SIMBAD</a>
vizier_search	<a href="#">Click to search Vizier</a>
nasa_ned_search	<a href="#">Click to search NASA NED</a>
metadata_message	Metadata is available in <a href="#">Talk</a>
panstarrs_dr1_search	<a href="#">Click to view in PANSTARRS DR1</a>

# ...to professional tools

RA,Dec = 43.5470, -33.3700, zoom 15



30 arcsec

Contrast: 1

Brightness: 1

Jump to object: NGC 5614

Custom catalog upload (FITS table; RA,Dec,[name]):

Browse...

No file selected.

Upload

## - Images

- ☐ Legacy Surveys DR9 images
- ☐ Legacy Surveys DR9 models
- ☐ Legacy Surveys DR9 residuals
- ☐ Legacy Surveys DR9.1.1 COSMOS deep images
- ☐ Legacy Surveys DR9.1.1 COSMOS deep models
- ☐ Legacy Surveys DR9.1.1 COSMOS deep residuals
- ☒ Legacy Surveys DR9-north images
- ☒ Legacy Surveys DR9-south images
- ☒ Older Legacy Surveys
- ☒ unWISE W1/W2 NEO6
- ☒ More surveys

## - Overlays

- ☒ Boundaries
- ☒ Imaging catalogs
- ☒ Spectroscopy
- ☒ DESI
- ☒ Bright Objects
  - ☐ Bright stars
  - ☐ Tycho-2 stars
  - ☐ Star clusters & Planetary Nebulae
  - ☐ NGC/IC galaxies
  - ☐ Siena Galaxy Atlas
  - ☐ HyperLEDA/SGA galaxies
  - ☐ DR9 Photo-z
  - ☐ Constellations

So why are we running this workshop?

Citizen science mentors  
people into open science,  
not because it's outreach  
but **because they're doing  
something interesting and  
useful**



What motivates citizen scientists?

How *easy* is it?

How **beautiful** is it?

How important is it?

How **FAMOUS** could I get?

How much am I **Learning**?



# Volunteers can do things that algorithms can't













NASA, ESA, W. Keel, Galaxy Zoo Team (Hubble Space Telescope)





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