EDUCADO: Exploring the Deep Universe by Computational Analysis of Data from Observations

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EDUCADO

- A Horizon Europe DN project funded under call HORIZON-MSCA-2022-DN-01 (MSCA Doctoral Networks 2022)
- Collaboration between astronomy and computer science
- Coordinated by Instituto de Astrofísica de Canarias, Tenerife (IAC)

- 10 (maybe 11) DCs, 2 at IAC, 1 at Univ. of Barcelona

Network

- Beneficiaries:
  - Astronomy: IAC-ES, Univ Barcelona-ES, INAF Padova-IT, Univ Groningen-NL, Univ Gent –B
  - Data science/astro-informatics: Univ Napoli Federico II-IT, Heidelberg Institute for Theoretical Studies-DE
  - Computer Science: Univ Gustave Eiffel-F, (Univ Groningen-NL, Univ of Birmingham-UK)

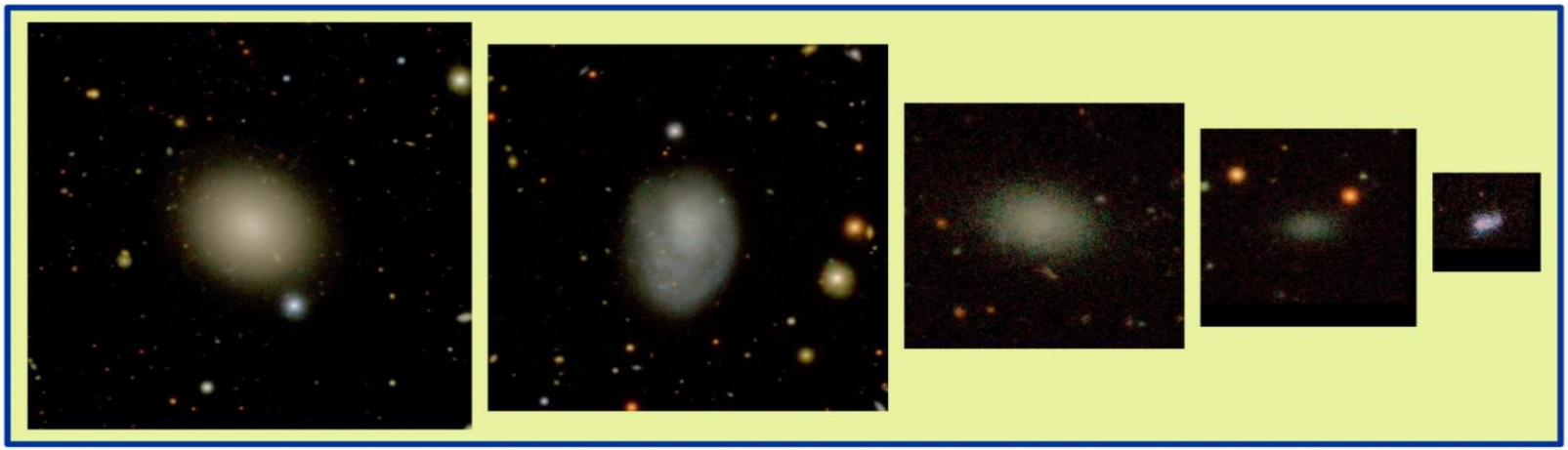
Network

- Associated Partners:
  - For PhD awards: Univ La Laguna-ES, Univ Padova-IT (‘APs linked to beneficiary’)
  - Academic: Univ of Birmingham-UK, DIRAC Institute-USA, Italian Aerospace Research Centre-IT, Courant Institute New York University-USA
  - Commercial: ADCIS-F, AVS-ES, Adtac BV/TILT-NL, Spheer AI-NL, Vicomtech-ES, Pervasive Technologies-ES

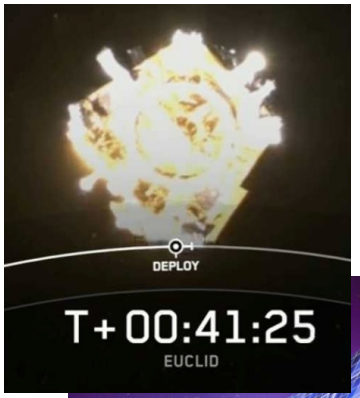
- All DCs will spend mandatory time as secondments at other beneficiaries, and as internships at associated partners

What we plan to do

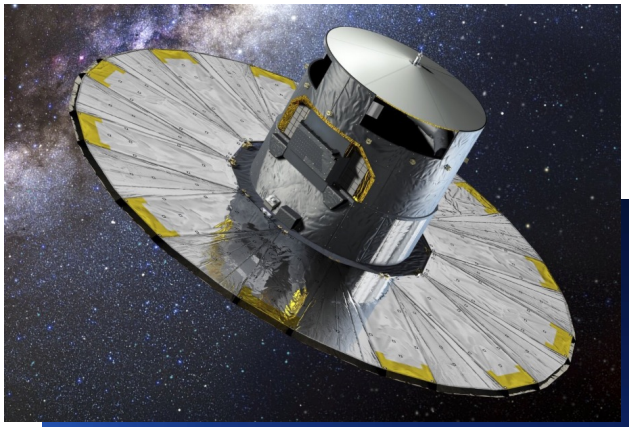
- Explore properties of dwarf galaxies and use them to resolve problems and inconsistencies in modern cosmological models
- Use deepest possible imaging of galaxies and combine with detailed spectroscopic studies of our Milky Way and Local Group
- Do this by developing cutting-edge computer science and data science techniques, incl. mathematical morphology, AI, machine learning, probabilistic modelling

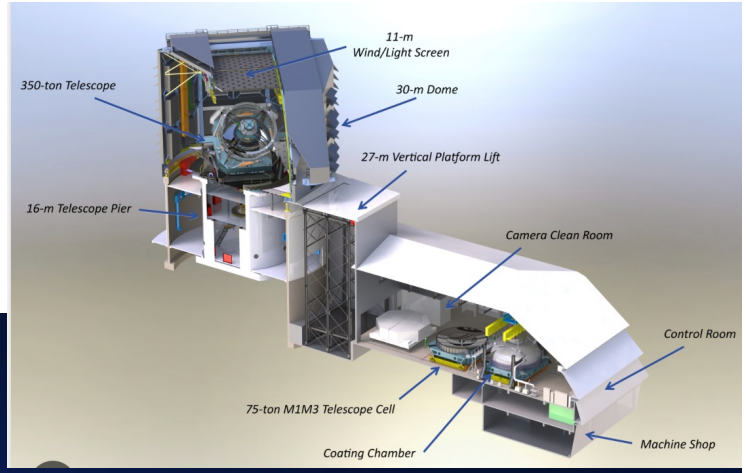


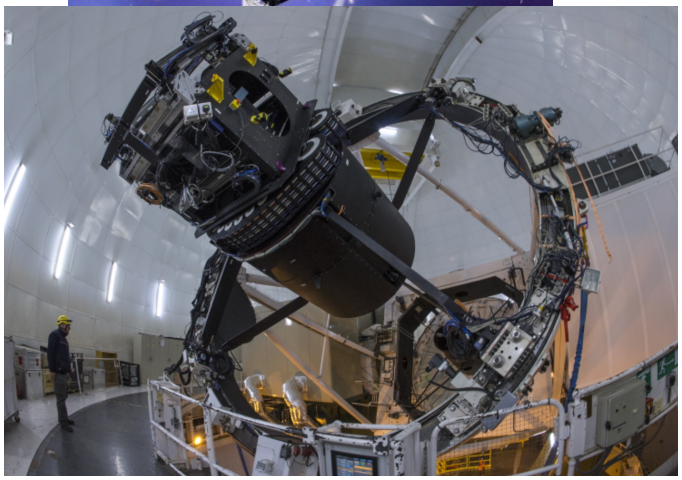
Data/telescopes we will use



Euclid, Gaia, Rubin Obs. LSST, GTC, WEAVE@ WHT (clockwise from top left)







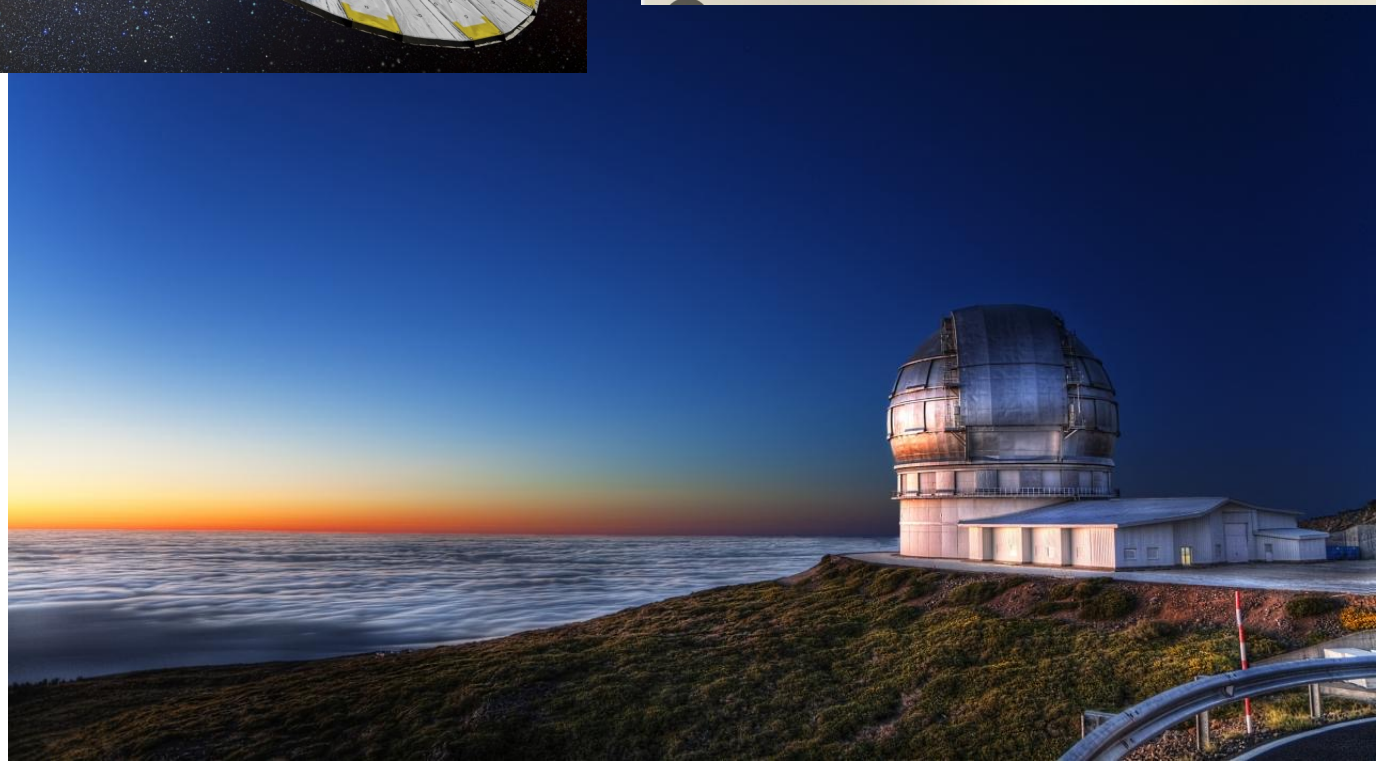


Image credit ESA, Wikipedia, VRO, IAC, ING

Timeline

- Proposal deadline Nov 2022
- Evaluation results March 2023
- Grant agreement signed July 2023

- Formal start network 1 Jan 2024 (duration 4 years)

- DC and PM recruitment from Sept 2023
- DC contract start Sept 2024 (36 month contracts)

UK status

- Univ of Birmingham (UoB) was part of proposal, as beneficiary
- REA notified us in April that UoB would not be allowed to sign Grant Agreement
- UoB moved to become Associated Partner
- REA allowed us to re-allocate funds -> 2nd DC at Univ Groningen, NL
- UoB will apply for UK government backup funding (-> 11th DC?)

- Advice: do not exclude UK partners but build in contingency (identify risk, work performed outside EU, ethics outside EU, etc.)

History of a successful proposal

- Existing scientific collaboration led to FP7 ITN DAGAL (2011-2015, 8 ESRs + 2 ERs, coordinator IAC-ES)
- Followed up with H2020 ITN SUNDIAL (2016-2021, 14 ESRs, coordinator RUG-NL)
  - Maintained 3 of 6 beneficiaries of DAGAL, added 6 new ones
- Followed up by HE-DN EDUCADO (2024-2028, 10 DCs, coordinator IAC-ES)
  - Maintained 6 of 9 beneficiaries, added 3 new ones

- DAGAL: submitted twice (…, 94.6%)
- SUNDIAL: once (94.6%)
- EDUCADO: three times… (82.4%, 88.4%, 93.8%)

DAGAL
Detailed Anatomy of GALaxies

SUNDIAL
H2020 Innovative Training Network

EDUCADO

Writing and revising the proposal

- First draft (90+% level) ready 3 months before deadline
- Revision by:
  - PI
  - co-Is
  - colleagues at own institute
  - IAC's OTAI (grants office)
  - Other nodes' grants offices and EU funding experts
  - NCP team in FECYT
  - External consultant (commercial service)
- Resulting in seemingly endless revision and editing…

Evaluation results

- EDUCADO scored 93.8% - just funded in PHY panel
- Criterion 1: 4.7; C2: 4.6; C3: 4.8

- Evaluation report very detailed, dominated by strengths.
- Evaluators are obviously being asked to comment on all subsections, so make sure you discuss them all even if you think not relevant, e.g.
  - *The open science and data management practices are well detailed, they are relevant and appropriate for the proposed action. They follow the FAIR principles and are very well explained.*
  - *Artificial intelligence (AI) is exploited in the proposal for extracting information from complex datasets, and the robustness is well demonstrated.*

Evaluation - 2

- Science is obviously important (were criticized in earlier submissions):

- The proposal is very convincing about the high quality of the proposed research and innovation objectives.

- The proposal is very timely in terms of the upcoming observations and current computational intelligence development.

- The state-of-the-art is described very well and the objectives are well defined and very ambitious, clearly contributing to significant potential advancements.

- The research projects of doctoral candidates (DCs) are well aligned with the overall goal of the research activities.

- Overall, the research methodology is well presented and based on sound concepts and state-of-the-art techniques. The scientific/technical challenges are sufficiently stated.

Evaluation - 3

- Shortcomings are minor:

  - C1: The specific expected results that will emerge from meeting the objectives are not sufficiently explained.

  - C1: It is not sufficiently clear how the different observational biases in the datasets to be used will be handled. This is a minor shortcoming.

  - C2: One minor shortcoming is that it is not entirely clear whether the courses developed for this proposal will still be available after the duration of the proposal.

  - C3: A minor shortcoming is that the late timing for reaching milestone M2 on finishing recruitment is not compelling, nor is it fully consistent with the planned much earlier start date for all DC projects.

Overall experience

- DNs are fantastic – collaborative, and emphasizing the mentoring and training of young people. Plus well funded.

- Competition is extremely fierce. Not just in success rate, also level of perfection of competing proposals.

- Recommendations:
  - Take loads of time to prepare a proposal (no less than 3 months, 6 is better)
  - Form and curate a world-leading but supportive team
  - Follow proposal instructions, and take every single aspect seriously
  - Request and incorporate comments from many different sources
  - Consider using commercial support services
  - Build and extend your collaborations even if you do not get funded

- Good luck!