Inexorable Logic of the Open Universe Initiative

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Outline

• Contemporary conditions
  • Technical
  • Philosophical
  • Financial
• Ambitions
• Means
• UNOOSA
Open Universe is about science & services

- Scientific software has been undervalued
  - Historical resource limitations have disappeared
    - Storage
    - Memory
    - CPU
    - [Cost]
- Archive science's response
  - Building on progress over 30 years
  - New scientific services
  - Consolidated obligations
    - cf Wider economy
- Beneficiaries
  - Professionals, students, citizens, private sector
- UN's top-level enabling cultural role
  - Dialogue with decision makers
Open-Universe-inspired expansion of services

- Potential
  - Global smart mobile-device science
- Means
  - Collective agreement
  - Open source and commercial
- Cost
  - Inform agency committees
- Outcome
  - Increased scientific and economic participation
  - Sustainable development
  - Knowledge
Era of Open Data

- 2017-01-18 An Open Catalog for Supernova Data $9
- 2017-01-06 Cyberinfrastructure for Open Neurological Science
- 2016-09-07 Open Data for Science, Policy and the Public Good $38
- 2015-12-07 Open Data in a Big Data World
- 2015-09-18 50 years of Data Science
- 2015-02-18 Open Universe T₀
- 2013-06-18 G8 Open Data Charter
- 2012-06-21 Science as an Open Enterprise
- 2009-05-01 Spheres of Knowledge that require Open-Mindedness and Open Data
- 2008-12-06 Disclosure or Secrecy? The Dynamics of Open Science $35.95
- 2007-06-29 Apple iPhone
Principles

1. Open by Default
2. Timely and Comprehensive
3. Accessible and Usable
4. Comparable and Interoperable
5. For Improved Governance and Citizen Engagement
6. For Inclusive Development and Innovation

ADOPT THE CHARTER
Good things == Services == Way of the Future

- Aggregation
- Animation
- Calibration
- Catalogues
- Client-centred services
- Data model disclosure
- Dialogue
- Interoperability
- Long-term curation
- Metrics
- Mobile technology

- Open source
- Persistence
- Personalisation
- Pipelines
- Recontextualisation
- Reproducibility
- Standards
- Statistics
- Table syntax
- Visualisation
- Web applications
Bad things == Disservices == Way of the Past

- Bureaucracy
- Clutter
- Duplication
- Errors of commission
- Errors of omission
- Information overload
- Opacity
- Platform dependencies
- Privilege
The **Einstein** View of the Wolf-Rayet Stars (1987)

<table>
<thead>
<tr>
<th>WR Name</th>
<th>IPC Hold</th>
<th>Date (MM/DD)</th>
<th>l, b (deg)</th>
<th>A.</th>
<th>A.</th>
<th>Cy (0.2-4 keV) (10⁻¹² erg cm⁻² s⁻¹)</th>
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*American Astronomical Society • Provided by the NASA Astrophysics Data System*
The *Einstein* View of the Wolf-Rayet Stars (1987)

### TABLE 2

*Einstein IPC X-Ray Observations of Wolf-Rayet Stars*

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<thead>
<tr>
<th>WR</th>
<th>Name</th>
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<th>$t_{\text{obs}}$ (100s)</th>
<th>$\lambda$</th>
<th>$h_-$ counts per 100s</th>
<th>$h_+$</th>
<th>$L_X$ (0.2–4. keV) ($10^{32}$ ergs s$^{-1}$)</th>
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</tbody>
</table>
• Name resolution
  • Coordinates + metadata
• Relevant data notification
  • Footprint (instrument, time)
• Catalogue extraction
  • Counterpart Figure-of-Merit
  • Image + metadata
  • Photometry + metadata
  • Spectrum + metadata
  • Time-series + metadata
• Other analytics
  • "Upper limits"
• Visualisations
• More…
Open Universe Key Concepts

• World archives are full of undiscovered scientific treasure
• Open Data Science is here
  • Counterarguments
• Computer resources are essentially unlimited
• Client-centred services
• Global space culture will empower new communities
• Mobile devices
• Linguistics
• National and international partners
• Complete observational history of the Universe
• Role of the United Nations
  • ¿ UNOOSA Open Data Charter ?
A tripartite division of labour is necessary:

- Only technical experts – including national and international civil servants – can do the necessary thorough groundwork by way of advance studies, pre-negotiations, and identification of options with attendant costs and benefits;
- Only heads of governments personally engaged and with sufficient familiarity with and trust in one another can focus and deliver on the tradeoffs as a steering group on behalf of the world;
- Only universal organizations, led by the UN system, can authenticate and legitimize the grand bargains.
Open Universe

The sky’s the limit.