

Open Data for Open Astronomy

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Microsoft Research (MSR)

<http://research.microsoft.com>

- Founded in 1991
 - Staff of 1000+ in 60+ disciplines
- Internationally recognized research teams
- A “Safe house” for incubating technologies/ideas
 - Computer Science
 - Computational Science, eScience
- A environment for research collaboration
 - Sabbaticals, Post-docs , interns
 - University Relations
 - External Research



Open Data for Open Science

Vision:

Facilitate seamless access to data and information for scientists

Focus: data discoverability, accessibility, and consumability

Objectives:

- Advance the technology use in data-intensive sciences
- Create design wins using Microsoft technologies to
 - ❑ Foster innovations in computational science research
 - ❑ Advance interoperability of data and information sharing
 - ❑ Bridge the gaps between research and education
- Enhance connections among multiple disciplines and stakeholders

WorldWide Telescope – a giant testcase

Astronomy in ~10 years ago

- Sloan Digital Sky Survey – mapping the universe
 - Influential in astronomical history
 - Dedicated instruments to image 1.5 square degrees of sky at a time
 - Petabytes of data ...
- Problems:
 - ❑ vast amount of heterogeneous data (petabytes)
 - ❑ limited use of data
- Solution: Virtual Observatories (VO)
 - ❑ Allows transparent and distributed access to data worldwide
 - ❑ Enables interoperability standards development
 - ❑ Facilitates user-friendly tools development
- From Microsoft: the **WorldWide Telescope (WWT)**



The SDSS Telescope

“WWT is a realization of VO” - Ajit Kembhavi, Director of IUCAA

WorldWide Telescope

<http://www.worldwidetelescope.org/>

- A visualization software environment
 - Enables your computer to function as a virtual telescope
- A one-stop research/education platform:
 - Aggregate data and information from major telescopes, observatories, and institutions.
 - Make temporal and multi-spectral studies available through a single cohesive Internet-based portal
 - Enhance the connections among professional astronomers, science educators, and the amateurs.
 - Facilitate historical and cultural astronomy research
 - User interface in local languages
- It is free for academia

WWT for Astronomical Research and Education

Seamless Astronomy

- Project Website: <http://projects.iq.harvard.edu/seamlessastronomy/>
- Multiple innovative interdisciplinary research projects



WorldWide Telescope (WWT)

WorldWide Telescope provides a rich contextual visualization environment for astronomical data. Our group collaborates with the WWT Team at Microsoft Research both to enrich WWT for use in research as well as in teaching. On the research end, we seek to integrate WWT "Seamlessly" with VAO-sponsored projects, as well as with ADS Labs. On the teaching end, we founded and now run the **WorldWide Telescope Ambassadors** outreach effort.

<https://wwtambassadors.org/wwt/>

WWT for Astronomical Research and Education

AstroInformatics2012, hosted by Microsoft Research

<http://www.astro.caltech.edu/ai12/>



AstroInformatics 2012

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AstroInformatics 2012

Redmond, WA, Sep 10-13 (Mon-Thu), 2012

Conference motivation and goals:

Astroinformatics is an emerging discipline at the intersection of astronomy/astrophysics and applied computer science and engineering. It is one of a growing number of science informatics disciplines that represent scientific and methodological responses to the challenges and opportunities of an exponential growth of data volumes, rates, and complexity. These fields - often unified under the term of e-Science, or the Fourth Paradigm - are facilitating the transition to a data-driven, computationally enabled science in the 21st century.

Astroinformatics is a broad, open, scholarly and organizational environment for the data- and computation-intensive astronomy in this rapidly evolving scientific and technological landscape. It is intended to be more inclusive and less structured than the earlier concept of a Virtual Observatory, engaging a much broader community of researchers and educators, both as contributors and as users of the new tools, techniques, and massive data resources.

This is the third in an annual series of international conferences ([AstroInformatics 2010](#), [AstroInformatics 2011](#)) that serve as discussion forums for development of relevant ideas and foster new collaborations in this arena.

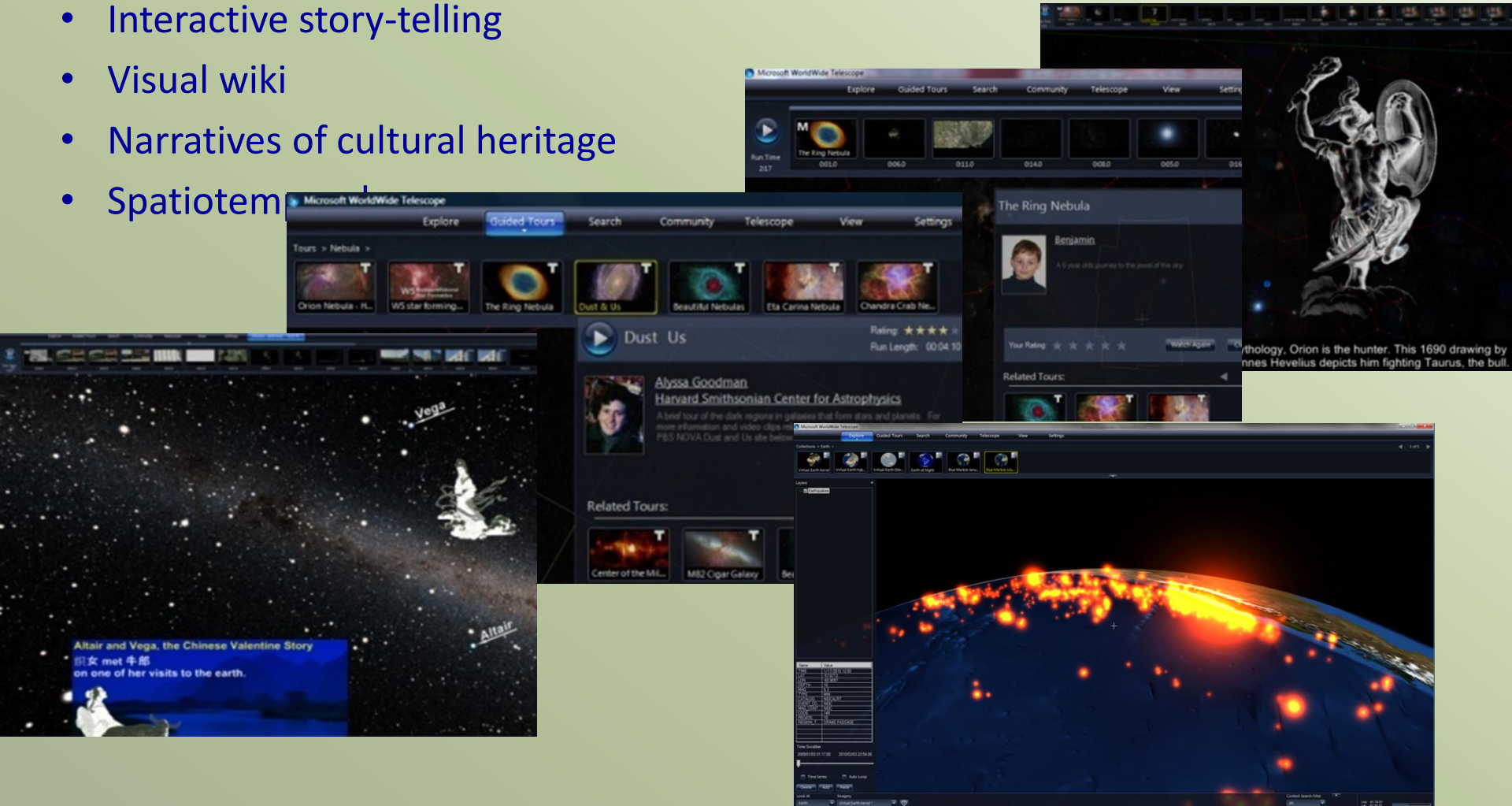
Organized by:

Day-4: 20 Scenarios for Connecting Research with Education

WWT for Astronomical Research and Education

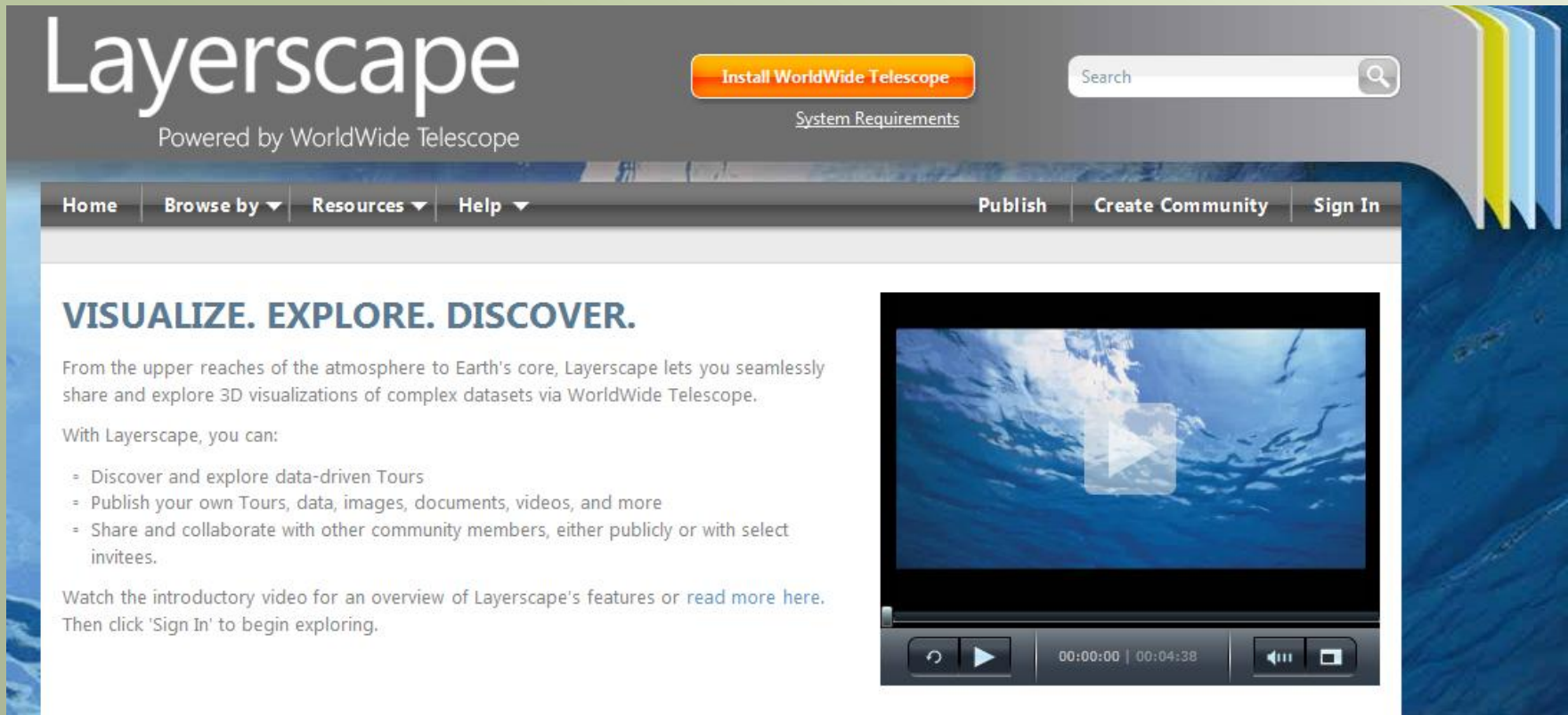
Guided Tours – the most loved feature of WWT

- Interactive story-telling
- Visual wiki
- Narratives of cultural heritage
- Spatiotem



WWT for Astronomical Research and Education

Share data and knowledge: <http://www.layerscape.org/>



The screenshot shows the Layerscape website interface. At the top left is the 'Layerscape' logo with the tagline 'Powered by WorldWide Telescope'. To the right of the logo is an orange button labeled 'Install WorldWide Telescope' and a link for 'System Requirements'. Further right is a search bar with a magnifying glass icon. Below the logo and search bar is a navigation menu with 'Home', 'Browse by', 'Resources', and 'Help' on the left, and 'Publish', 'Create Community', and 'Sign In' on the right. The main content area features the heading 'VISUALIZE. EXPLORE. DISCOVER.' followed by a paragraph: 'From the upper reaches of the atmosphere to Earth's core, Layerscape lets you seamlessly share and explore 3D visualizations of complex datasets via WorldWide Telescope.' Below this is a section titled 'With Layerscape, you can:' followed by a bulleted list: '- Discover and explore data-driven Tours', '- Publish your own Tours, data, images, documents, videos, and more', and '- Share and collaborate with other community members, either publicly or with select invitees.' At the bottom of this section is a link: 'Watch the introductory video for an overview of Layerscape's features or read more here. Then click 'Sign In' to begin exploring.' To the right of the text is a video player showing an underwater scene with a play button overlay. The video player controls at the bottom show a play button, a progress bar at 00:00:00 / 00:04:38, and buttons for previous, next, and full screen.

WWT for Astronomical Research and Education

Regional Communities

- e.g. WWT Community Beijing: <http://wwt.china-vo.org/home.htm>
- Train the trainers: WWT Teachers Workshops
- Connection research, education, and cultural heritage
- National WWT Tours competitions
- Building the best WWT/VO ambassadors



WWT for Astronomical Research and Education

Related Links:

- Free WWT download: <http://www.worldwidetelescope.org>
- Layerscape: <http://www.layerscape.org>
- Microsoft Research: <http://research.microsoft.com>
- Kinect for Windows: <http://www.microsoft.com/kinectforwindows/>
- WWT Ambassadors Program: <https://wwtambassadors.org/wwt/>
- WWT Community Beijing: <http://wwt.china-vo.org/home.htm>
- AstroInformatics2012: <http://www.astro.caltech.edu/ai12/>

Contact Us: wwt-ap@microsoft.com

Thank you!