Microsoft Research
FacultySummit

Welcome and Introduction

Tony Hey
Corporate Vice President
Microsoft Research

FUTURE/WORLD 2011 2031

Welcome to Faculty Summit 2011

229 First Time Attendees

128 International Attendees

300 Faculty and Researchers

187 Institutions and Organizations

80 Presenters

28 Countries Represented

Exciting and Diverse Program

Monday

Research in Academia, Government, and now Industry

- Mobile Computing
- Open Data
- Design Expo
- Kinect for Windows SDK
- DemoFest

Tuesday

Vision-based Natural User Interfaces

- Project Roslyn
- Faculty Fellows
- Big Data
- Semantic Knowledge
- Dynamic Languages

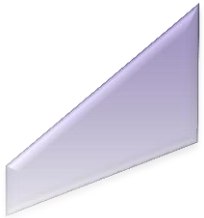
Wednesday

Future Social Experiences

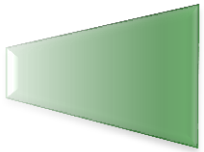
- Program Verification Tools in Teaching
- Medical Visualization
- Academic Search
- Computational Science in LATAM

Microsoft Research Connections

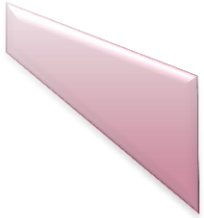
Work with the worldwide academic research community to speed research, improve education, and foster innovation



Collaborations to pursue scientific breakthroughs



Inspire emerging computer and research scientists



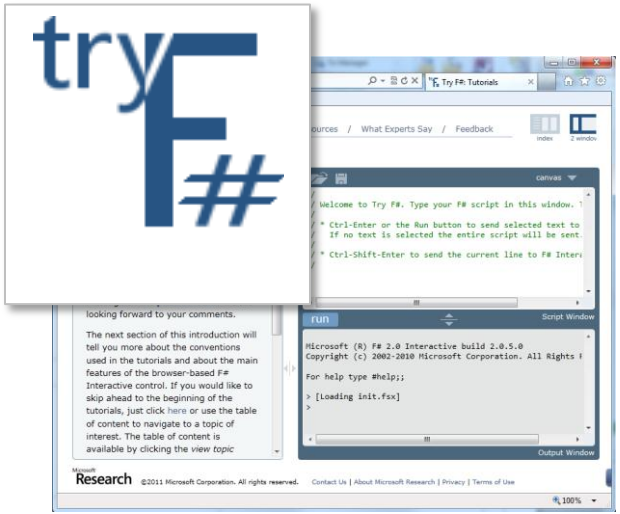
Accelerate scientific exploration with computing

Microsoft Research Connections

- Try F#
- Project Hawaii - Mobile + Cloud
- WWT Add-in for Excel
- Kinect for Windows SDK
- WikiBhasha
- Cloud Services – NSF, VENUS-C …
- ChronoZoom/BigTime
- Machine Translation
- Rich Interactive Narratives
- Geospatial Data Visualization
- Academic Search
- Microsoft Biology Foundation

Microsoft Research Connections

Advancing Computing Science



Semantic Computing: Web N-gram Services

Microsoft Research
Project Hawaii

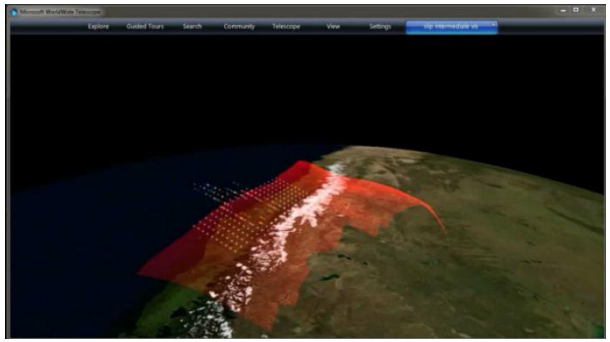
Windows Azure

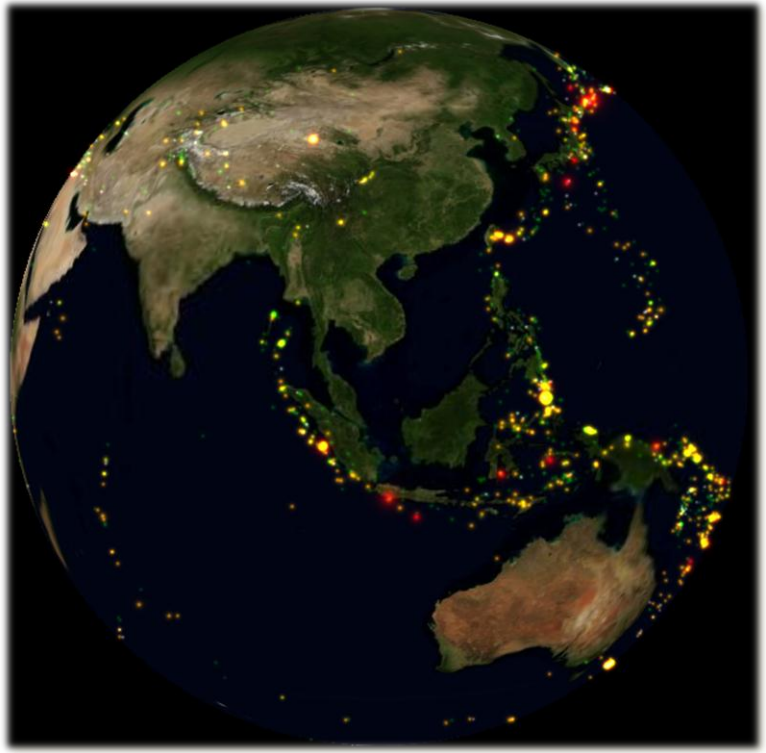
Windows Phone

eScience – Earth, Energy, and Environment

WorldWide Telescope Add-in for Excel

- Location-Based Data Visualization Using Excel and WorldWide Telescope (WWT)
- Support Earth Science researchers with a strong emphasis on time-series support and 3-D rendering





eScience – Genetics and Machine Learning

Identifying genetic and environmental causes of disease

Fighting HIV/AIDS

Tackling societal challenges

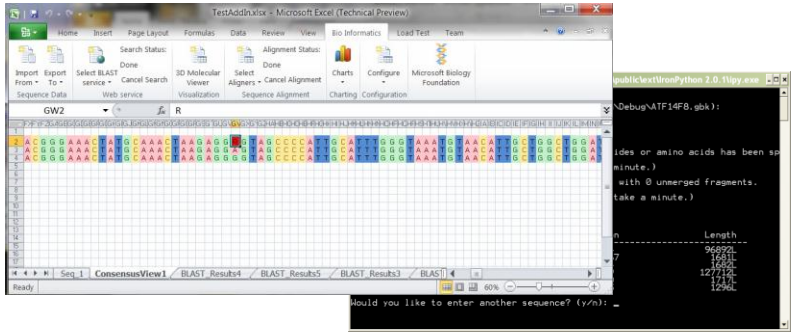
Increasing energy yield of sugar cane through genome assembly

Microsoft Biology Foundation

Open Source Bioinformatics Library for .NET

- Simplifies the creation of bioinformatics applications on the Microsoft platform
- Focuses on the assembly, manipulation and comparison of next-generation DNA sequencing data
- Ownership is being transferred to the Outercurve Foundation

The Microsoft Biology Foundation is available under an open-source license, and executables, source code, demo applications, and documentation are freely downloadable.



ChronoZoom and 'Big History'

History in its broadest possible context …

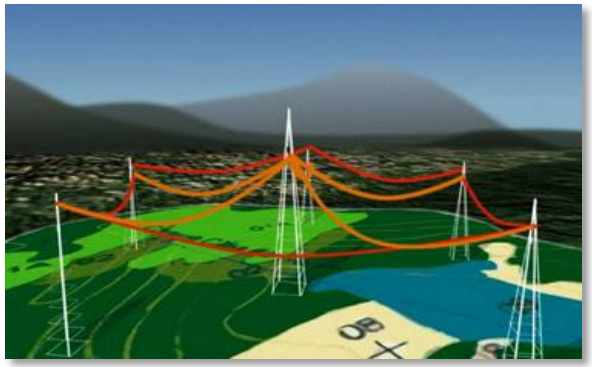
The challenge: exploration of all known time series data with the ability to smoothly transition from billions of years down to individual nanoseconds…

This is what Walter Alvarez, Professor of Earth and Planetary Science at University of Berkeley set out to do.

> *Our vision is to create an application that allows researchers to browse, overlay, and explore interdisciplinary data sources.*

Regional Research Collaborations

Asia - eHeritage

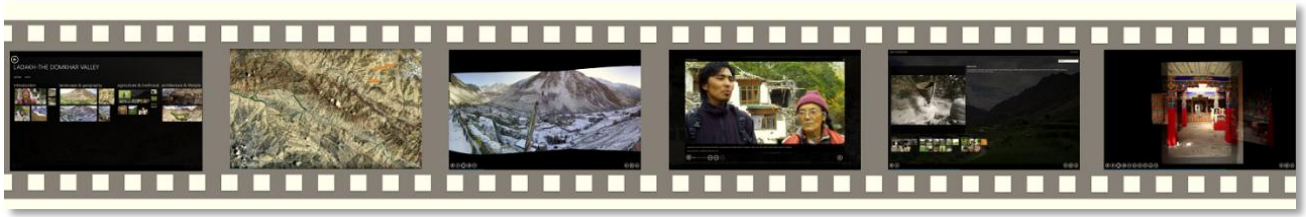


Brazil - Rainforest Sensors

Venus-C

Virtual multidisciplinary EnviroNments USing Cloud infrastructures

Europe – Venus-C



India - Rich Interactive Narratives

Virtual Fire

Virtual Fire (VF) is an early warning and decision support system for integrated forest fire management, based on geoinformatics and modeling fire risk.

University of the Aegean, University of Athens, MS Hellas/MIC in Greece, and Microsoft Research

Venus-C
Virtual multidisciplinary EnviroNments USing Cloud infrastructures

Windows Azure

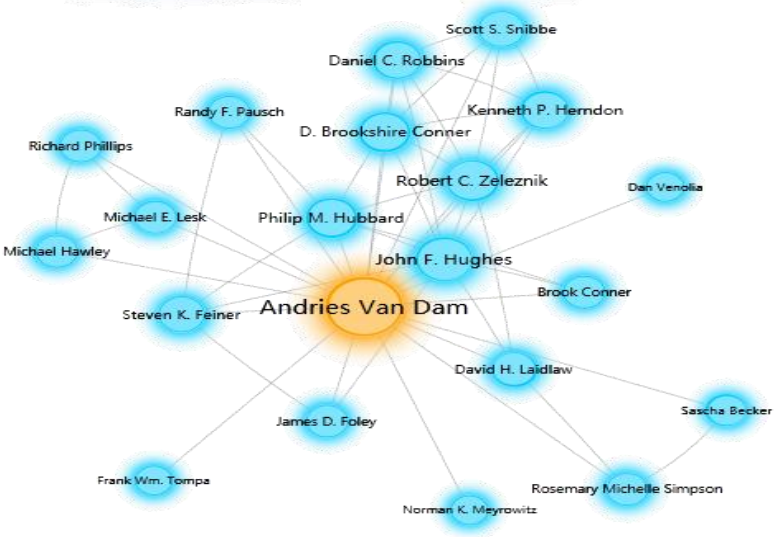
Transformation of Scholarly Communication

"Approximately 3,000 scientific articles are published per day – roughly one every 10 seconds of a working day. We can now expect that these papers will, each year, cite around five million previous publications. And the rate of production of scientific papers is quadrupling every generation."

Based on data from the Institute for Scientific Information

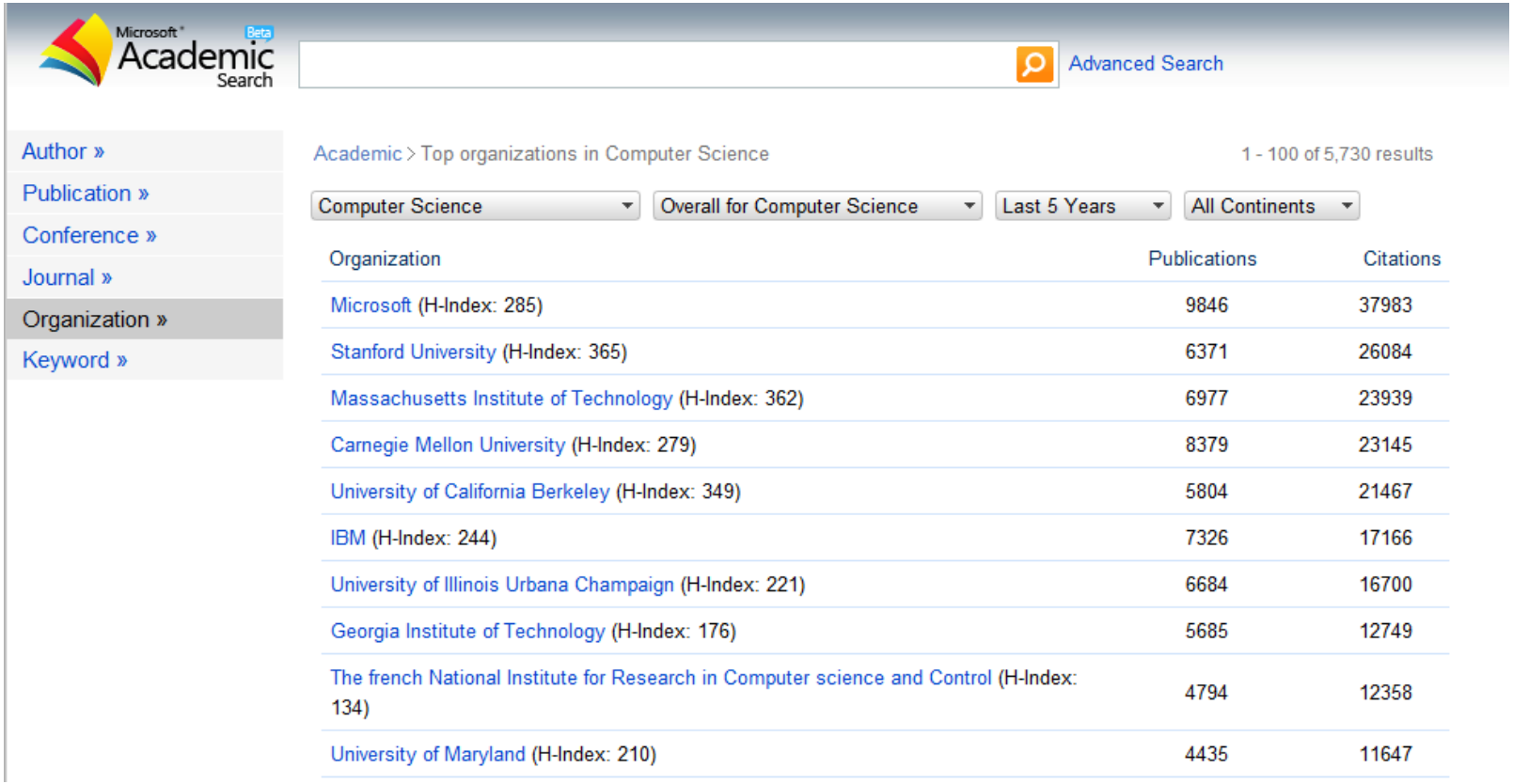
Academic Search Beta

- Powerful search tool for academic papers
- From our MSR Asia Lab (Beijing)
- Historically focused on Computer Science
- Key functionality includes
  - Find top papers in a domain
  - Easily search the top papers, authors, conferences, and journals for a topic
  - See details about a specific paper, author, conference or journal
  - Quickly find relationships between authors (with Visual Explorer)



Microsoft Beta Academic Search

Top 10 Computer Science Organizations



eigenFACTOR.org™

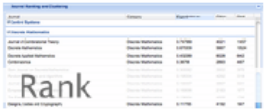
RANKING AND MAPPING SCIENTIFIC KNOWLEDGE

Microsoft® Academic Search Beta

By uncovering the hierarchical structure of scholarly citation, we can identify key papers pertaining to any search query. For a reader new to the field we can find the classic and foundational papers; for an expert we can find the latest innovations.

From patterns of scholarly citation, we use Rosvall and Bergstrom's map equation to chart the topography of science and the relations among fields and subfields.
[journal map] [paper map]

By integrating a hierarchical clustering of citation networks with semantic analysis, we develop a scalable map of scientific fields and the key research terms and topics therein.



Scientific influence is often quantified using simple citation counts, but the structure of a citation network provides far more information than can be revealed by these simple counts. This is principle behind the Eigenfactor metrics; we can better rank the importance of scientific journals or papers by viewing them in the context of the full citation network.

“The first thing most of us think about when we hear the word 'open' is Windows”

Steve Jobs

October 2010

Apple earnings call

OUTERCURVE FOUNDATION

Enable the exchange of code and understanding among software companies and open source communities.

> *"Microsoft has (over the last 18 months at least) open sourced most of its community developed projects and technologies via the Outercurve Foundation — the not-for-profit software IP management and project development organization."*
>
> *Adrian Bridgwater*
> *Dr. Dobbs*
> *April 2011*

Research Accelerators Gallery

- **Project Trident**
- **Chemistry Add-in for Word**
- **ConferenceXP**

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Enjoy the Conference

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