

Microsoft® Research

# Faculty Summit

10  
YEAR ANNIVERSARY

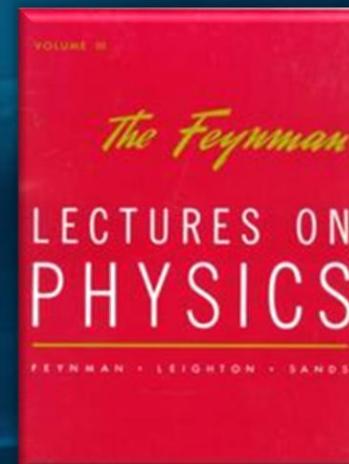
# Mr. Feynman Wasn't Joking

Tony Hey  
Corporate Vice President  
Microsoft External Research

# The Adventures of a Curious Character

- 1918 Nobel Prize-winning physicist Richard Feynman born in Far Rockaway on the outskirts of New York.
- 1939 Bachelor's degree in physics, MIT.
- 1942 Ph.D. degree in physics, Princeton University.
- 1939-1946 Worked on Manhattan at Los Alamos under Robert Oppenheimer. He was in charge of a group responsible for problems involving large-scale computations to predict the behavior of neutrons in atomic explosions.
- 1946-1951 Developed his own approach to quantum electrodynamics (QED) at Cornell with a unique diagrammatic approach – now called Feynman Diagrams - to conceptualizing and calculating interactions between particles in space-time.
- 1951-1988 With fellow Nobel Prize winner, Murray Gell-Mann at Caltech where he produced the famous 'Feynman Lectures on Physics'
- 1965 Shared the Nobel Prize in physics for his role in the development of the theory of quantum electrodynamics, the study of the interaction of light with atoms and their electrons.
- 1986 Member of the panel that investigated the Space Shuttle Challenger disaster.

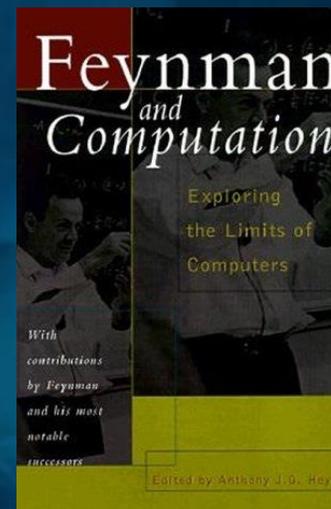
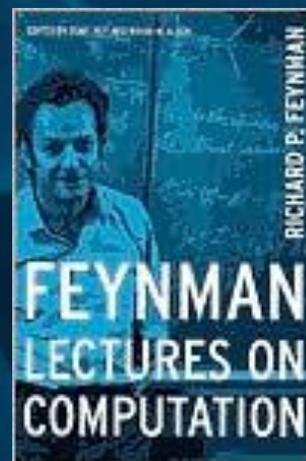
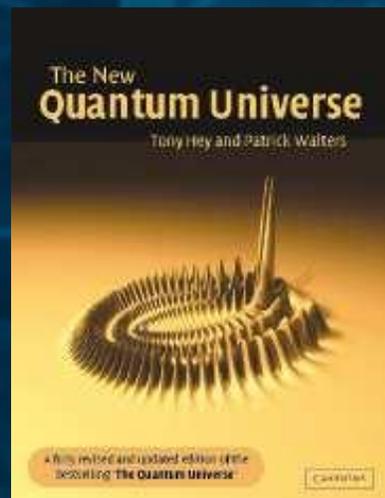
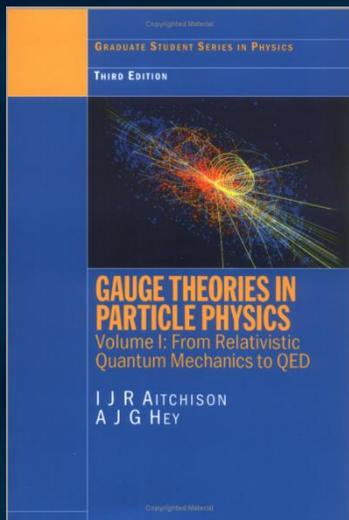
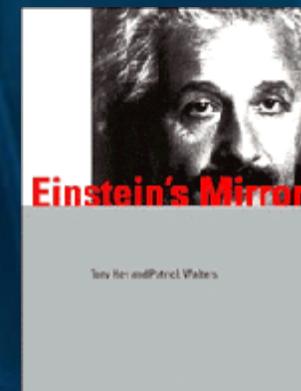
- Physicist
- Bongo drummer
- Painter
- Juggler
- Safecracker
- Prankster
- Observed Tuvan national holidays



# Reflections of Feynman



Research Councils UK



Commander of the British Empire

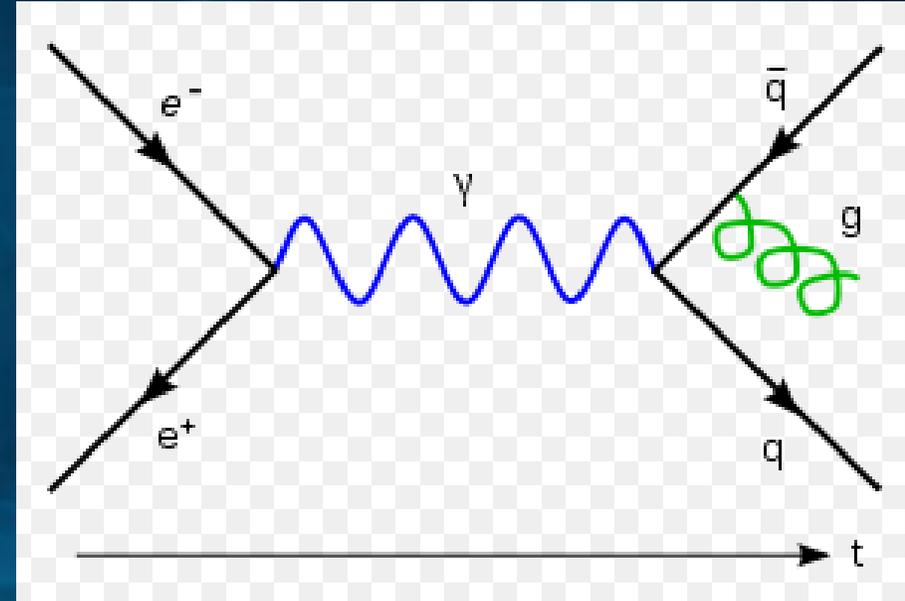


# What made Feynman's Lectures unique?

- “I would drop everything to hear him lecture on the municipal drainage system”  
David Mermin, Cornell
- “No matter how difficult the subject – from gravity through quantum mechanics to relativity – the words are sharp and clear. No stuffed shirt phrases, no ‘snow jobs’, no obfuscation”  
Irving Bengelsdorf, LA Times
- “I shall include details of anecdotes which are of no value scientifically nor for understanding the development of the ideas. They are included only to make the lecture more entertaining”  
Feynman in his Nobel Lecture

# Feynman diagrams

- In quantum field theory a Feynman diagram is an intuitive graphical representation of a contribution to the transition amplitude.
- Each Feynman diagram represents a term in a perturbative expansion of the transition amplitude between the initial and the final states of a quantum system.
- Antiparticles are represented as particles going 'backwards in time'!



In this Feynman diagram, an electron and positron annihilate, producing a virtual photon that becomes a quark-antiquark pair. Then one radiates a gluon.

# A Word from Bill Gates

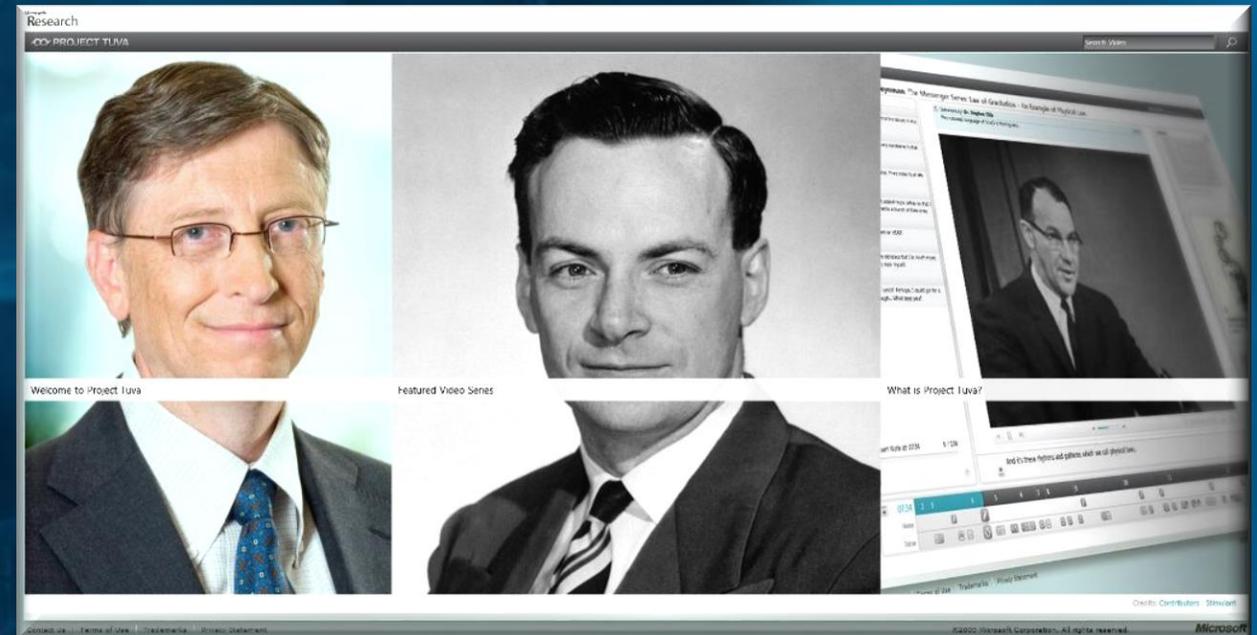
*video*

Bill Gates  
Chairman  
Microsoft

# Project Tuva

## Microsoft Research Enhanced Video Player

- The seven “Messenger Lectures” were filmed at Cornell University and broadcast by the BBC over a period from November 9th through November 19th, 1964
- The ‘Microsoft Research Enhanced Video Player’ adds a set of rich features to augment the user’s experience when viewing the lectures
- Uses Microsoft Silverlight 2.0 web streaming



# Project Tuva

*demo*

Curtis Wong  
Principal Researcher  
Microsoft Research

# *Surely You're Joking, Mr. Feynman*

*“The stories in this book were collected intermittently and informally during seven years of very enjoyable drumming with Richard Feynman. I have found each story by itself to be amusing, and the collection taken together to be amazing: That one person could have so many wonderfully crazy things happen to him in one life is sometimes hard to believe. That one person could invent so much innocent mischief in one life is surely an inspiration! “*

Ralph Leighton

# Some Final Thoughts About the Conference

# A Few Thoughts and Observations

## Advanced Computing and Computer Science Makes It Possible

- Environment
  - To really make a difference we need to focus on research into the *causes* of environmental change rather than just working on documenting the *results and effects* of climate change
- Health
  - There are a lot of people working in the area of cell phones as a tool for Healthcare – *every country* has an emerging sector with a need for healthcare solutions—even the richest countries in the world.
- Education and Scholarly Communications
  - Enhanced Video Player to improve the accessibility of complex topics
  - Scholarly Communication assets are exciting the academic community
  - Enthusiasm for using robotics to teach computer science principles
- Digital Heritage / eHeritage
  - Important to preserve our cultural heritage

# Q&A

# Demo Winner

- Design Expo
- 45 stickers, the next highest was 24
- Authors:
  - **Carnegie Mellon, Department of Design**  
Shelley Evenson, Bruce Hanington <> Monica Gonzales- Office Design
  - **Central Academy of Fine Arts, Media Lab, Beijing, China**  
Jun Fei <> Dave Vronay-ATC Beijang
  - **Art Center College of Design, Pasadena, California**  
Karen Hoffman, Brian Boyl <> Craig Hally-XDR
  - **Universidad Iberoamericana, Mexico Citye, Vin**  
Jorje Meza Aguilar, Ariel Mendez <> Andy Cargile, Vincent Ball
  - **Dundee University, Scotland, UK**  
Graham Pullin, Jon Rogers <> Richard Banks-Microsoft Research
  - **New York University, Interactive Telecommunications Program**  
Nancy Hechinger <> Lili Cheng, Microsoft Research
  - **University of Washington, Interaction Design Division**  
Axel Roesler <> Georg Petschnigg-Pioneer Labs

# Poster Winner

## A Microsoft Open Source Framework for Bioinformatics

Simon Mercer<sup>1</sup>, Michael Zyskowski<sup>2</sup> and Jared Jackson<sup>3</sup>

<sup>1</sup> Director of Health and Wellbeing, External Research, Microsoft Corporation, One Microsoft Way, Redmond, WA 98052

<sup>2</sup> Research Program Manager, External Research, Microsoft Corporation, One Microsoft Way, Redmond, WA 98052

<sup>3</sup> Research Software Development Engineer, External Research, Microsoft Corporation, One Microsoft Way, Redmond, WA 98052

The bioinformatics community has developed a strong tradition of open development, code sharing and cross-platform development to serve the typically heterogeneous environment of academic IT. Tools of choice are weakly-typed interpreted programming languages efficient for construction of parsers, overwhelmingly based on platforms common in the research community. While

Windows is well represented in the commercial life-sciences, academic researchers might use Microsoft Office for publications, presentations and administrative tasks but many choose non-Microsoft platforms for software development.



- 15 stickers, the next highest was 14
- Author: Simon Mercer, Michael Zyskowski, and Jared Jackson

## Design Expo

- Goals:
  - Awareness of trends/themes across students & international design community
  - Foster long term relationships with top design schools.
- 2009 Topic: New Ways of Working

# Conference Evaluation Forms

- Your comments and input are very, very important to us!
- This year's event reflects feedback from previous years:
  - More unscheduled time (deliberate reduction in lunchtime sessions)
  - Broad important theme topics to create appetite for cross disciplinary discussion
  - Session on technical direction and strategy at Microsoft – a look inside how challenges and technology combine to create product
- **What will happen next:**
  - A NetReflector survey link will arrive in your inbox
  - There will be a range of questions, from how your flight was to your ratings of the sessions that you attended
  - It won't take long to complete: fewer than 10 minutes!

# Closing the Microsoft Research Faculty Summit 2009

- Addressing World-Scale Challenges
- Computation as a powerful change agent in areas such as Energy, Environment, Healthcare, Education
- Collaboration and Community

The screenshot shows the Microsoft Research Faculty Summit 2009 website. At the top left is a logo for the 10th anniversary of the Faculty Summit. To its right is a paragraph of text. Below the logo is a section titled 'Addressing World-Scale Challenges' with a paragraph of text. At the bottom of the page is a list of 'Energy Sustainability', 'Addressing climate change', and 'Transformational improvement in healthcare' topics.

Microsoft Research Faculty Summit 2009

On July 13-14, 2009, the tenth Microsoft Research Faculty Summit brings together more than 400 thought-leaders from academia, government, and Microsoft to reflect on how current computing disciplines open new opportunities for research and development.

**Addressing World-Scale Challenges**

Computational approaches provide a powerful means for addressing previously unsolvable problems. Increasingly, computing technologies are what makes the difference in enabling new approaches applied to world-scale challenges in such diverse disciplines as medicine and healthcare, energy and the environment, and educational and social progress. In response to these significant global challenges, the Microsoft Research Faculty Summit 2009 investigates how computing technologies can best help scientists make progress in these important areas. Attendees will have the opportunity to participate in creative, open discourse on research topics.

**Identifying computational enablers** for solving critical social and scientific problems is a main theme for this year's faculty summit:

- **Energy Sustainability.** Discussions will focus on computing research challenges in data center efficiency and sustainability as well as computational issues related to reducing our carbon footprint.
- **Addressing climate change.** The sessions will examine how to develop greater understanding of climate dynamics through the evaluation of sensor network approaches, advanced data mining and visualization techniques, and improved computationally-driven climate models.
- **Transformational improvement in healthcare.** The availability and delivery of solutions for previously elusive healthcare challenges such as HIV-AIDS, diabetes, asthma, obesity, and aging are showing promising results through the collaboration of medical and computational researchers. Ubiquitous cell phone networks around the world are now opening the way to deliver a new level of health care in rural areas where no doctors are available.

**Faculty Summit 2009 Contents**

- Overview
- [Agenda Day 1](#)
- [Agenda Day 2](#)
- [Speaker Biographies](#)
- [FAQ](#)

**Related Links**

- [Faculty Summits at Microsoft Research](#)
- [Faculty Summit 2008 in Redmond](#)
- [Collaboration at Microsoft Research](#)

Thanks for Coming!

**Microsoft<sup>®</sup>**

*Your potential. Our passion.<sup>™</sup>*