

Title: Conceiving, Founding, Connecting and Reaching Outwards

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Abstract:

# Talk Overview

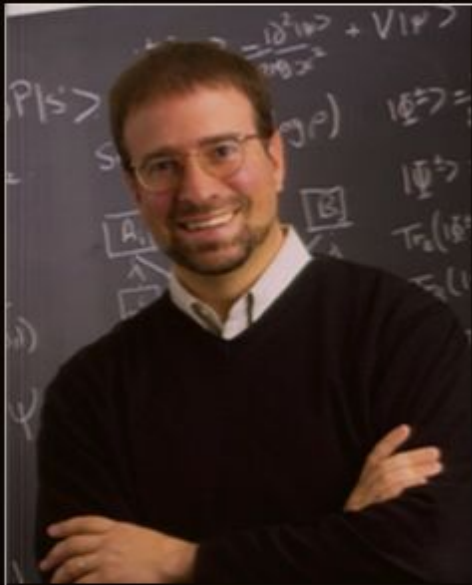
- What have we done and why?
  - The why
  - The what
- Where are we going?
- What does it mean for you?

# Talk Overview

- What have we done and why?
  - The why
  - The what
- Where are we going?
- What does it mean for you?

# What have we done and why?

## ➤ Origins



Howard  
Burton



Mike  
Lazaridis

# What have we done and why?

## ➤ Historic Opportunity

- ◆ “Making a Difference”
- ◆ Rethinking all previous assumptions



# What have we done and why?

## ➤ Formulating a Plan

- ◆ My travels
- ◆ The concerns
  - Flexibility
  - Dynamism
  - Students



# What have we done and why?

## ➤ The Mandate:

...independent, resident-based research institute devoted to foundational issues in theoretical physics at the highest levels of international excellence. We strive to create a lively and dynamic research atmosphere where many approaches to fundamental questions, ***both orthodox and unorthodox***, are pursued simultaneously and where a balance between ***formal and phenomenologically-oriented*** research is established. We are further determined to interact constructively with the surrounding academic community whenever possible, particularly with regards to the inclusion of ***graduate students***, and are equally determined to promote a world-class ***outreach program*** to disseminate the mysteries and wonder of the physical world to the general public throughout Canada and beyond.

# What have we done and why?

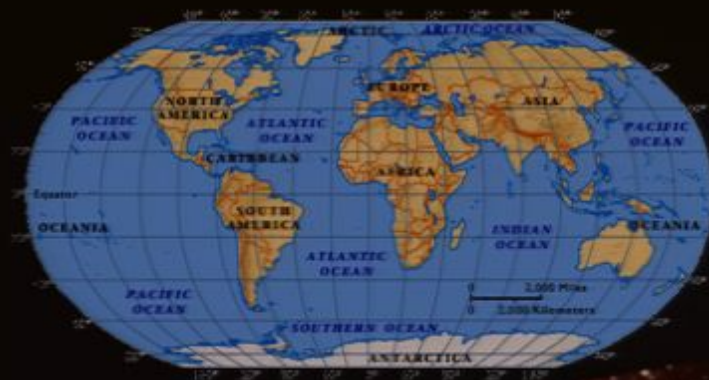
## ➤ The Meta-Mandate:

- ◆ Keep investigating fresh, flexible and productive approaches to research and outreach
- ◆ Never believe own press; always look critically and objectively at achievements and possibilities from the perspective of the highest international standards

# What have we done and why?

## ➤ Milestones

- ◆ Mike and I meet – August, 1999
- ◆ Appointment of Board – October, 1999
- ◆ Institutional Travels – January-June, 2000



# What have we done and why?

## ➤ Milestones

- ◆ Public Announcement of PI – October, 2000
- ◆ First Meeting of SAC – March, 2001
- ◆ Research Operations Begin – October, 2001



# What have we done and why?



## ➤ Milestones

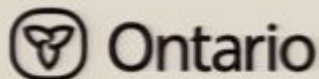
- ◆ First Public Lecture (Penrose) - October, 2001
- ◆ In-Class Student Programs Begin – January, 2002



# What have we done and why?

## ➤ Milestones

- ◆ Awarding of CFI Grant – January, 2002
- ◆ Awarding of ORDCF Grant – May, 2002
- ◆ Announcement of Federal and Provincial Support – June, 2002



Ontario



Canada  
Foundation for  
Innovation



**NSERC  
CRSNG**

**Canada**

# What have we done and why?

## ➤ Milestones

- ◆ Monthly Public Events Series Begins – October, 2002
- ◆ ISSYP Begins – August, 2003
- ◆ Einstein Plus Teachers' Workshop Begins – August, 2004



# What have we done and why?

## ➤ Milestones

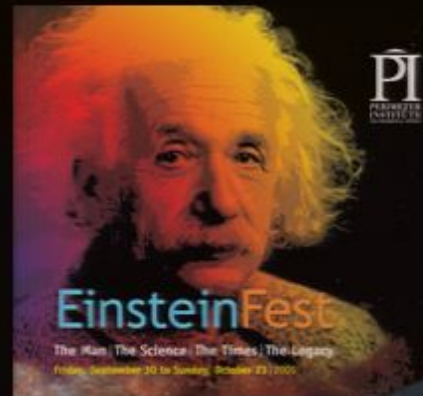
- ◆ Grand Opening of New Building – October, 2004



# What have we done and why?

## ➤ Milestones

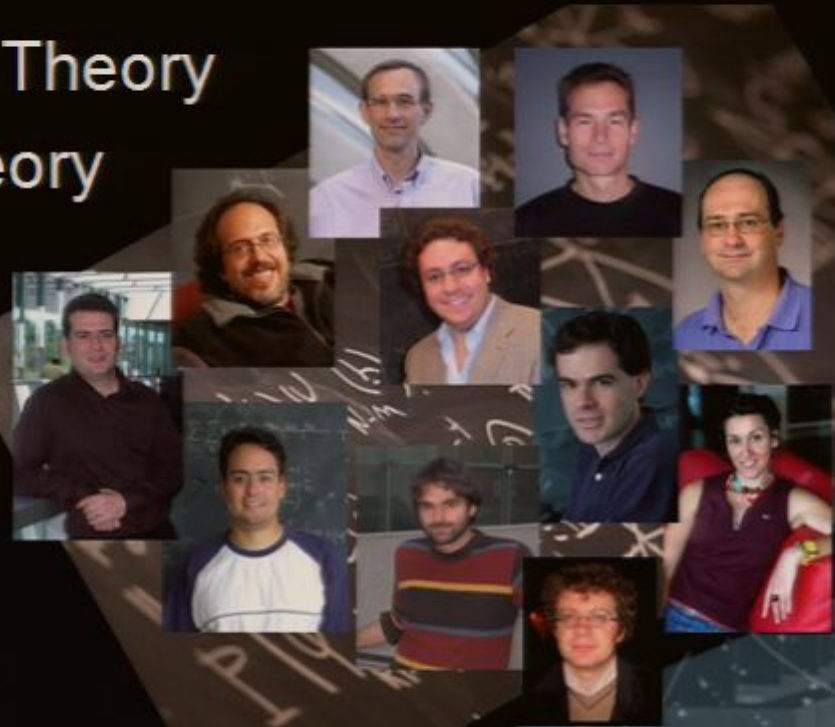
- ◆ Event Horizons Begins – January, 2005
- ◆ EinsteinFest – October, 2005
- ◆ Announcement of Additional Provincial Support – March, 2006



# What have we done and why?

## ➤ Research Today - Areas

- ◆ Foundations of Quantum Theory
- ◆ Quantum Information Theory
- ◆ Quantum Gravity
- ◆ Superstring Theory
- ◆ Particle Physics
- ◆ Cosmology



# What have we done and why?

## ➤ Research Today – Researchers on site

- ◆ Full-Time Faculty - 8
- ◆ Part-Time Faculty - 8
- ◆ Postdoctoral Fellows - 20
- ◆ Long Term Visitors - 11
- ◆ Students – 13

# What have we done and why?

- Research Today – Conferences, Workshops and Courses
  - ◆ Weekly colloquia, talks and seminars at PI (5)
- 2006 Events (3 already held, 7 in development)
  - ◆ Introduction to Quantum Gravity Course – January-February, 2006
  - ◆ Superstring Cosmology Mini-Course - January-February, 2006
  - ◆ Mathematical Aspects of Quantum Adiabatic Approximation Workshop – February, 2006
  - ◆ Theory CANADA II – June, 2006
  - ◆ International Conference in Honour of Abner Shimony – July, 2006
  - ◆ Cosmology Conference – June, 2006

# What have we done and why?

- Research Today – Conferences, Workshops and Courses
- 2005 Events (8) included:
  - ◆ Thematic Program on the Geometry of String Theory (in partnership with Fields) – Academic Year, 2004-2005
  - ◆ Interpretation of Quantum Mechanics: Current Status and Future Directions – January to April, 2005
  - ◆ Great Lakes Geometry Conference – April-May, 2005
  - ◆ 6<sup>th</sup> and 7<sup>th</sup> PI/UT/CITA Workshops – April & December, 2005
  - ◆ Complexity and Networks Seminar Series – May-June, 2005
  - ◆ Quantum Information, Computation and Logic Workshop – July, 2005
  - ◆ Evolving Laws – August, 2005
  - ◆ PI/APC Workshop on Cosmological Frontiers in Fundamental Physics – October, 2005

# What have we done and why?

## ➤ Research Today – Short Term Visitors

- ◆ Current academic year – 275 visitors
- ◆ Next year – 325 anticipated
- ◆ Building designed for collaboration and flexible visitor office space



# What have we done and why?

## ➤ Research Today – Graduate Students

- ◆ PI founded on a mandate to interact strongly with graduate students and be an attractor
- ◆ Partner with Canadian universities to increase numbers and quality of physics graduate students in Canada
- ◆ Summer schools, conferences and workshops tailored to graduate (and sometimes undergraduates)
- ◆ Possibility of limited scholarship program
- ◆ Undergrad research program launching Summer 2006

# What have we done and why?

- Research Today – Interaction with Surrounding Academic Community
  - ◆ IQC
  - ◆ CITA
  - ◆ Associate Member Program
  - ◆ Affiliate Member Program

# What have we done and why?

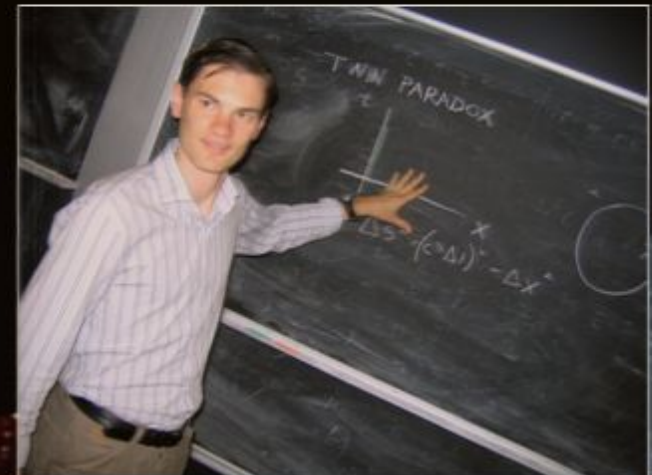
## ➤ Outreach Today – Programs for Students

### ◆ ISSYP

- High school students from Canada and around the world
- Expanded to two 14-day programs held at PI
- Includes lectures, mentorship, tours and cultural events

### ◆ Physica Phantastica

- Interactive classroom lectures in schools nationwide
- Topics include: *Quantum Theory*, *Electromagnetism*, and *Special Relativity*



# What have we done and why?

## ➤ Outreach Today – Programs for Teachers

- ◆ Einstein Plus
  - Expanded to two, week-long workshops held at PI
  - Focus on key concepts in modern physics
- ◆ Regional Teacher Workshops
  - Conducted on location nationwide
  - Fosters inspirational teaching



# What have we done and why?

- Outreach Today – Programs for General Public
  - ◆ Public Lectures
    - Monthly public lectures attract 600+ (WCI)
    - Speakers include Edward Witten, Leonard Susskind, Lisa Randall, Anton Zeilinger, Paul Steinhardt, Scott Tremaine
    - Topics include Canada's international scientific reputation, science in the media, history of science, quantum computing, superstring theory

# What have we done and why?

## ➤ Outreach Today – Programs for General Public

### ◆ Event Horizons

- Talks, performances and exhibitions
- Series includes Kronos Quartet, Pascal Rogé, Emanuel Ax, Emerson String Quartet, Bang on a Can, Juilliard String Quartet, Beux Arts Trio, Art Talks with Ed Burtynsky, Jim Dine.
- Post-performance interaction in the Black Hole Bistro



# What have we done and why?

## ➤ Outreach Today – Programs for General Public

### ◆ Open House

- October/04 one-day Open House attracted 8000+
- Included tours, interactive group discussions and lectures from Roger Penrose, Anthony Leggett, Margaret Geller, Steven Weinberg and other prominent scientists



# What have we done and why?

- Outreach Today – Programs for General Public
  - ◆ Festival
    - October/05 EinsteinFest attracted 28,000 international guests
    - Program celebrated life, science, times and legacy of Einstein through lectures, exhibits, interactive experiments and performances



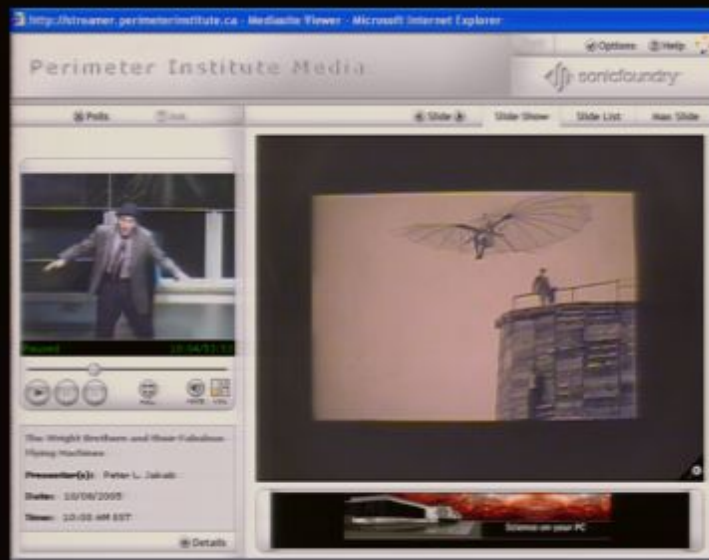
# What have we done and why?

- Outreach Today – Programs for General Public
  - ◆ Black Hole Sessions (Continuing Education)
    - Monthly drop-in sessions at PI
    - More technical, interactive discussions on various aspects of modern physics



# What have we done and why?

- Outreach Today – Programs for General Public
  - ◆ Website Materials and Programs



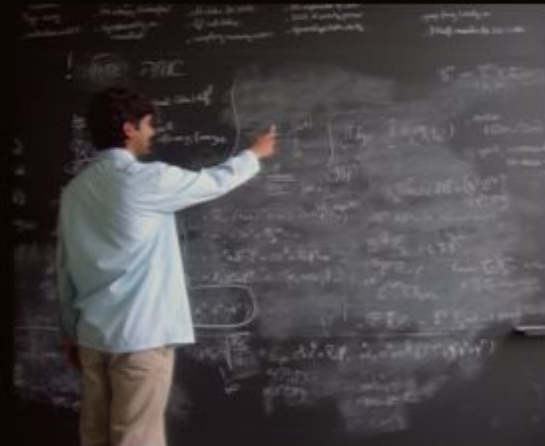
# What have we done and why?

- A word on funding, mechanics and government involvement
  - ◆ Private-public partnership (\$170-\$105)
  - ◆ Significant annual spend – future fundraising and endowment strategy
  - ◆ Government endorsement is more than just money

# Where are we going?

## ➤ Goals

- ◆ Becoming an international dominant force in fundamental theoretical physics research
- ◆ Become the international dominant brand in physics and science outreach



# Where are we going?

## ➤ Research Tactics

- ◆ Aggressively (but prudently) hire top faculty (25-30)
- ◆ Roughly 3:1 ration of pdf's to faculty
- ◆ Incorporation of students from a variety of means
- ◆ Vigorous conference and workshop program
- ◆ Develop meaningful international partnerships with other institutions

# Where are we going?

## ➤ Research Concerns

- ◆ Coherence of culture
- ◆ Ensuring quality and uniqueness (orthodox vs. unorthodox)
- ◆ Ensuring balance of formal and phenomenological



# Where are we going?

## ➤ Outreach Tactics

- ◆ Selectively expand programs and products internationally
- ◆ Products
  - DVD's, Teacher's manuals, "lessons in a box", website products, games, etc.
- ◆ Programs
  - Expand existing programs and add others ("Critical Conversations", continuing education, international physical phantastica, etc)
  - Linked to existing media and sophisticated and dominant website ("PI TV")
- ◆ Work coherently with public sector to increase international profile

# Where are we going?

## ➤ Outreach Concerns

- ◆ Maintaining focus
- ◆ Expanding resources
- ◆ Ensuring balance between outreach and research



# What does it mean for you?

## ➤ Royal Society

- ◆ General Awareness
- ◆ A possible model for sundry future organizations?
  - Clear mandate
  - International comparisons
  - Accountability
- ◆ Benefits of research focus – possible interaction
- ◆ Benefits of outreach – possible interaction

# What does it mean for you?

## ➤ OECD Diplomatic Group

- ◆ General awareness
- ◆ Possible international linkages with other research institutions
- ◆ Possible international linkages vis. outreach
  - ISSYP (recent UNESCO endorsement)
  - Einstein Plus
  - New Programs
- ◆ Harnessing philanthropy worldwide

