

April , 2012



Quantum Information and Computation

选校指南[更新]

量子非线性光子学实验室 qnp.sjtu.edu.cn



We Share the Quantum Cake

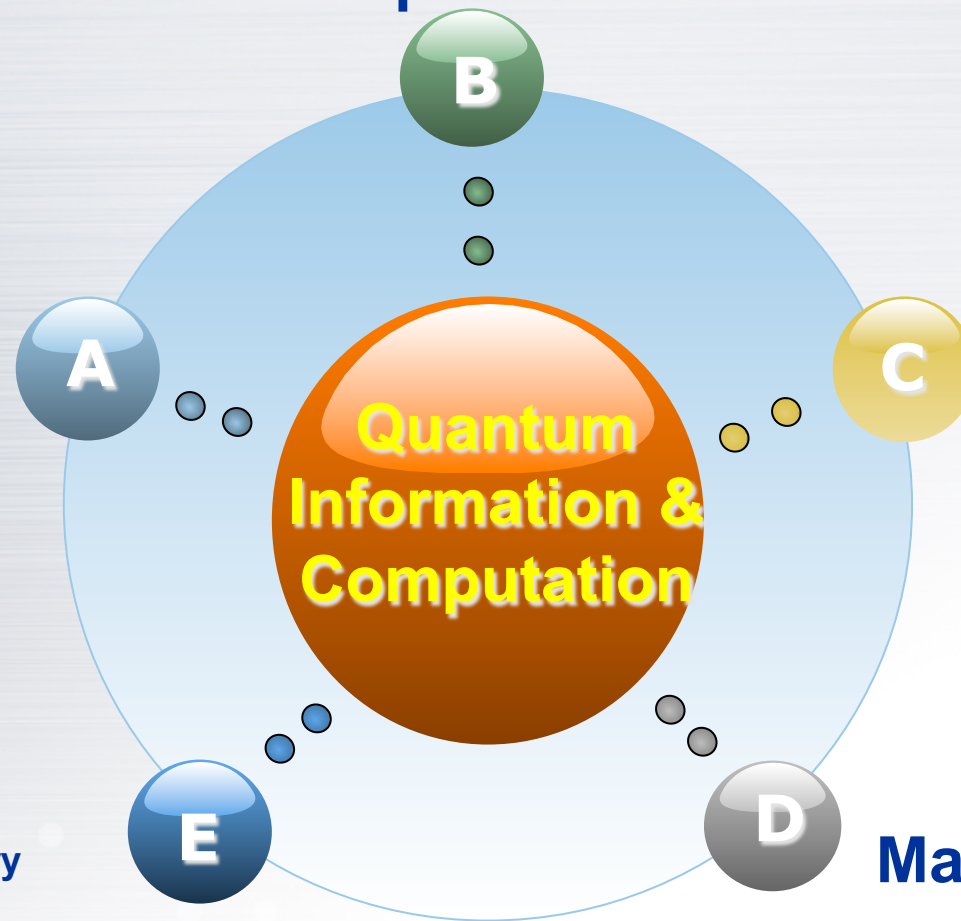
Computer Science

Physics

**Electrical
Engineering**

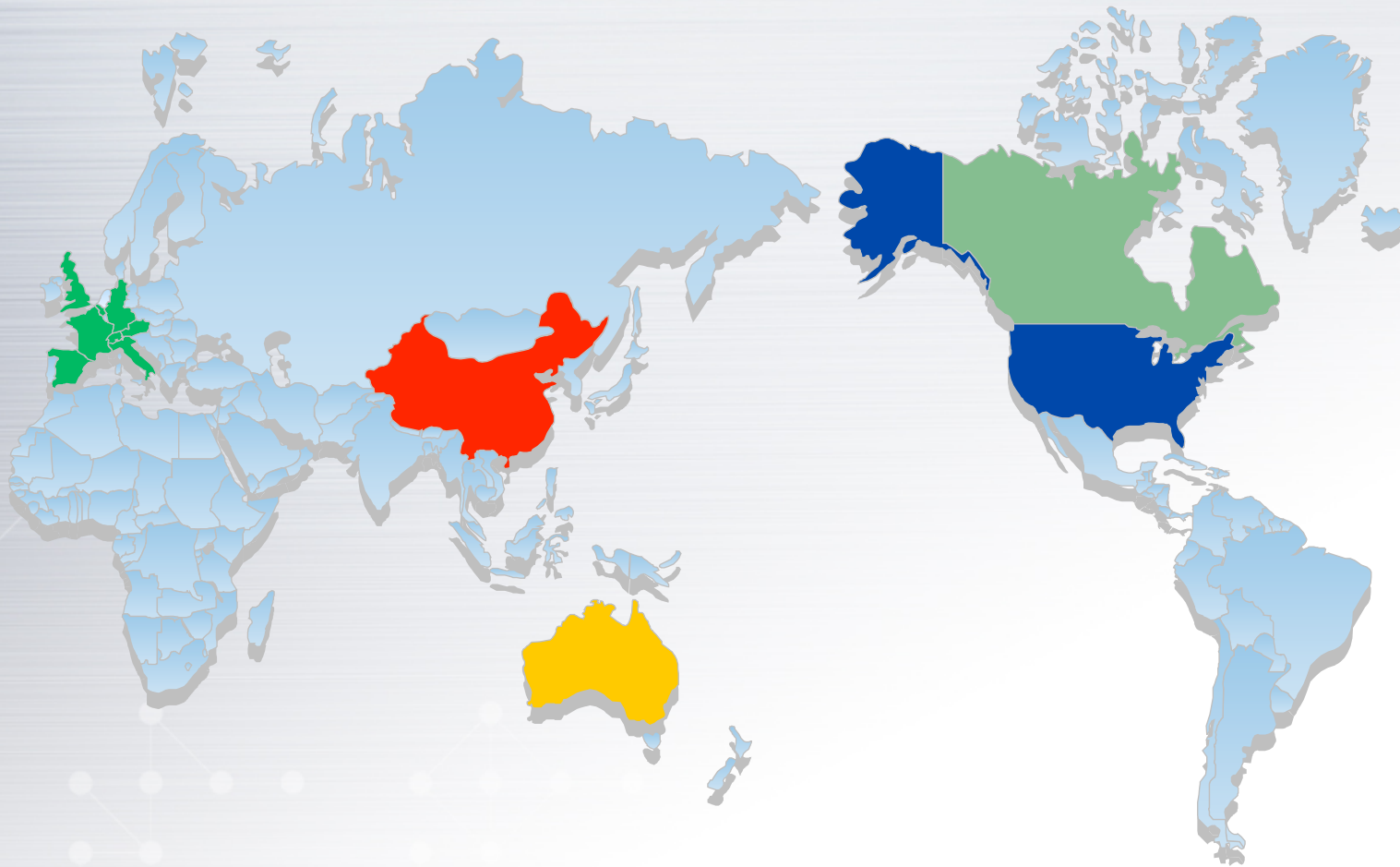
Chemistry

Mathematics





Map of the Quantum World





目录

- ❖ 一些牛校（MIT, caltech, stanford, berkeley...）

- ❖ Computer Science领域

- ❖ Physics领域

- ❖ Electrical Engineering领域

- ❖ 几个量子信息中心

- ❖ 其他国家（Australia、Canada、Europe）

- ❖ 一些建议



一些牛校



Caltech@America



John Preskill

John D. MacArthur Professor of Theoretical Physics

Division of Physics, Mathematics, and Astronomy



H. J. Kimble

Valentine Prof. and Prof. of Physics



Leonard J. Schulman

Professor of Computer Science



Stanford@America



Yoshihisa Yamamoto

**Professor of Applied Physics &
Electrical Engineering,**

Stanford University

**Professor of Quantum Information
Science,**

National Institute of Informatics

Quantum Information Science Group

Hideo Mabuchi's Group from Caltech

<http://minty.stanford.edu/hmabuchi/>

XQIT@MIT



Seth Lloyd—Principal Investigator
Professor of Mechanical Engineering
and Professor of Engineering
Systems
Research Laboratory of Electronics



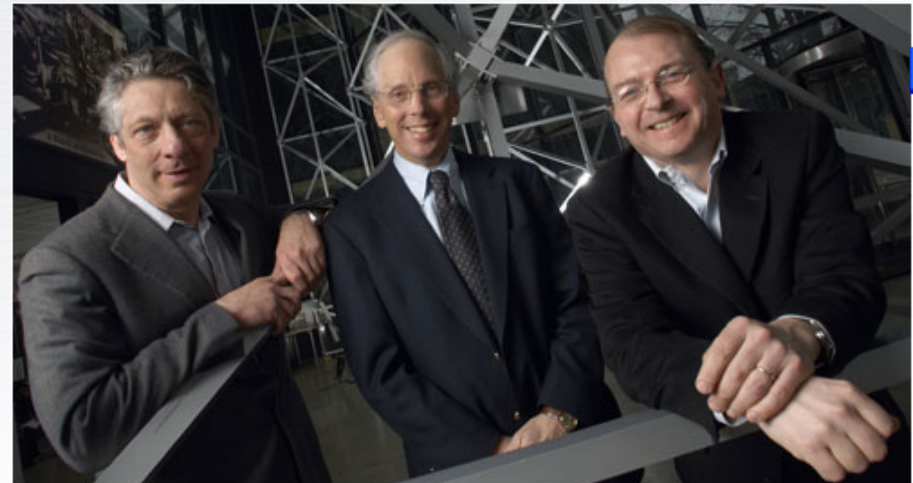
<http://www.rle.mit.edu/xqit/>



Jeffrey H. Shapiro—Co-Principal
Investigator Julius A. Stratton Professor
of Electrical Engineering Director,
Research Laboratory of Electronics



Edward H. Farhi
Professor of Physics
Director, Center for Theoretical Physics



Optical and Quantum Communication Group@MIT



Jeffrey H. Shapiro

Director

Research Laboratory of Electronics
and

Julius A. Stratton Professor of Electrical Engineering
Department of Electrical Engineering and Computer Science
Room 36-419

77 Massachusetts Avenue
Cambridge, MA 02139

jhs@mit.edu

617.253.4179—Tel

617.253.1301—Fax

Optical and Quantum Communications Group

[Group Background](#) | [Group Website](#)

Keywords

optical and quantum communication, optical propagation, sensing systems, radar, atmospheric optical communications, teleportation, entanglement



Other Groups@MIT



Peter W. Shor

Morss Professor of Applied Mathematics
Computer Science and Artificial Intelligence Laboratory



Isaac Chuang

Associate Professor of Physics;
Associate Professor of Electrical Engineering and Computer
Science

Quanta Group

Other people & research group at MIT

<http://qis.mit.edu/people.php>

<http://www.rle.mit.edu/xqit/people.htm>

qis.mit.edu
quantum information science @ mit



UC Berkeley @ America

K. Birgitta Whaley

Professor of Chemistry

whaley group

Topological Things

Optical Lattices

Quantum Control

Quantum Nanosuperfluids and Bose-Einstein Condensates



Applied Science and Technology @ UC Berkeley

Getting accepted is very very hard!

Berkeley Quantum
Information & Computation
Center



Harvard @ America

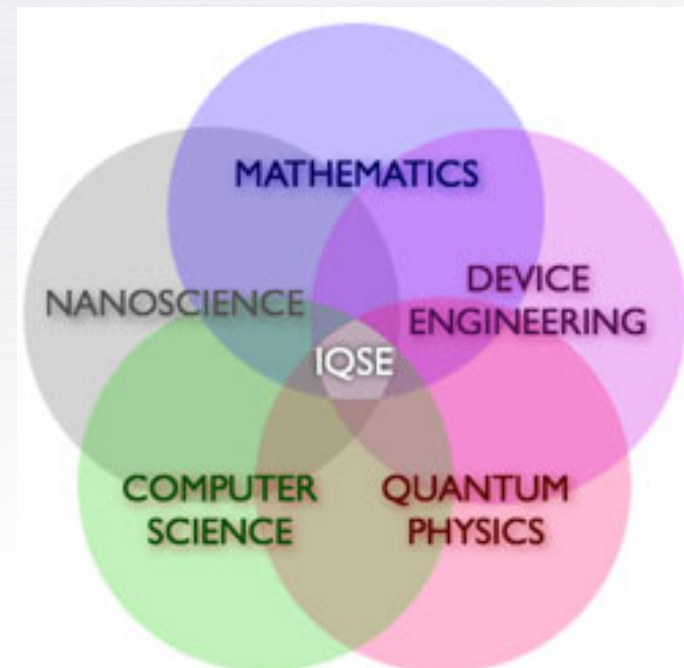


Institute for
Quantum Science
and Engineering



Institute for Quantum Science and Engineering (IQSE) is a new Harvard Science and Technology Initiative, established in 2006, supported by the Provost's Office and the Faculty of Arts and Sciences.

The Mission of the IQSE is to foster cross-disciplinary research and education in new areas at the intersection of nanoscience, atomic physics, device engineering and computer science, that in various ways seeks to apply principles of quantum mechanics to advanced technologies



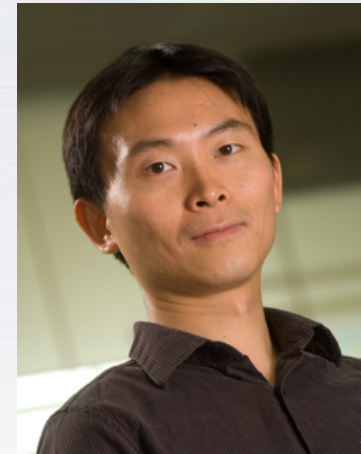


CS 领域目标学校



University of Michigan @ America

- ❖ Yaoyun Shi (施尧耘, 施堯耘)
- ❖ Associate Professor of CS department
- ❖ Ph.D., Princeton, 2001; B.S., Beijing University, 1997.
- ❖ Research Interests: quantum information processing and theory of computation.
- ❖ My research aims to understand the inherent power and limitations of various information processing technologies, especially those based on principles of quantum mechanics.





Columbia @ America

❖ Joseph F. Traub

- ❖ He was Head of the Computer Science Department at Carnegie-Mellon University 1971-1979 and Founding Chairman of the Computer Science Department at Columbia University 1979-1989.
- ❖ His numerous honors include election to the National Academy of Engineering in 1985, the 1991 Emanuel R. Piore Gold Medal from IEEE, and the 1992 Distinguished Service Award, Computer Research Association. He is a Fellow of the American Association for the Advancement of Science, the Association for Computing Machinery, and the New York Academy of Sciences.





Oxford @ British

- ❖ Bob Coecke

- ❖ Professor of Quantum Foundations, Logics and Structures
- ❖ Fellow, Wolfson College



- ❖ Samson Abramsky

- ❖ Professor of Quantum Foundations, Logics and Structures
- ❖ Fellow, Wolfson College
- ❖ He is a Fellow of the Royal Society (2004), a Fellow of the Royal Society of Edinburgh (2000), and a Member of Academia Europaea (1993).





Penn State Univ @ America

- ❖ Sean Hallgren
 - ❖ Associate Professor of CSE department
 - ❖ PECASE Award
 - ❖ Quantum Computing
-
- ❖ Adam D. Smith
 - ❖ Associate Professor of CSE department
 - ❖ Quantum cryptography, and quantum information theory

Both from the theoretical computer science group of PSU



Department of Electronic Engineering
SJTU



UCSB @ America

Computer Science Department:

Wim van Dam

Associate Professor

Research Interest: **quantum information,
quantum communication, nonlocality,
number theory, algebraic geometry**



Center for Spintronics and Quantum Computation

<http://www.csqc.ucsb.edu/index.html>



Rutgers @ America

- ❖ Mario Szegedy
- ❖ Professor in Computer Science,
- ❖ Rutgers University
- ❖ received the Goedel Prize twice





Mcgill University @ Canada

❖ The cryptography and quantum information lab

❖ Claude Crepeau (权威)

- Professor

❖ Patrick Hayden

- Associate Professor
- Canada Research Chair in the Physics of Information
- Sloan Research Fellowship



Others @ America

- ❖ University of Central Florida: [group](#) (涵盖物理、EE、CS等)
- ❖ Northwestern University: [Lance Fortnow](#)
- ❖ University of Connecticut: [Alexander Russell](#)
- ❖ University of New Mexico: [Cris Moore](#)
- ❖ Chinese University of Hong Kong: [Shengyu Zhang](#)



物理领域目标学校

UIUC@America



Paul G. Kwiat

**John Bardeen professor of Physics and
of Electrical and Computer Engineering**

APS fellow; OSA fellow



Department of Electronic Engineering
SJTU



Kwiat Quantum Information Group@UIUC

<http://research.physics.uiuc.edu/QI/Photonics/index.html>

Fundamental Studies

Tests of Nonlocality

Precision Optical Measurements

QND Detectors

Optical Quantum Information

Processing Resources

Sources of Entanglement

Single-Photon Source

Frequency Upconversion and State Transduction

Single-Photon Detectors

Waveguides and Adaptive Optics

Quantum Random Number Generation

Quantum Information Processing

Applications

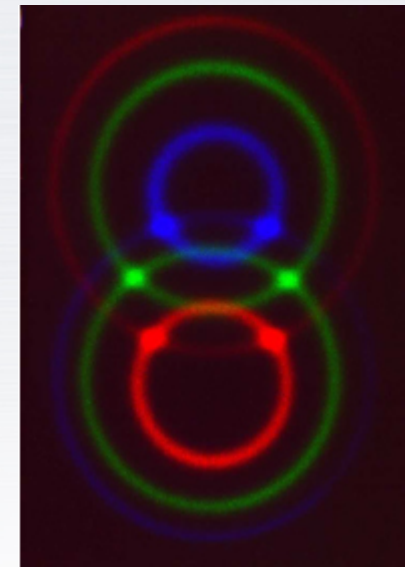
State Creation, Remote Preparation, and Distillation

State Characterization

Hyperentanglement-enhanced Quantum
Communication

Counterfactual Quantum Computation

Relativistic Quantum Cryptography





UCSB @ America

Physics Department:

Dirk Bouwmeester

物理实现大牛组

Quantum Optics and Quantum Information Group

Mark Sherwin Research Group: Quantum Dot (Semiconductor)

Center for Spintronics and Quantum Computation

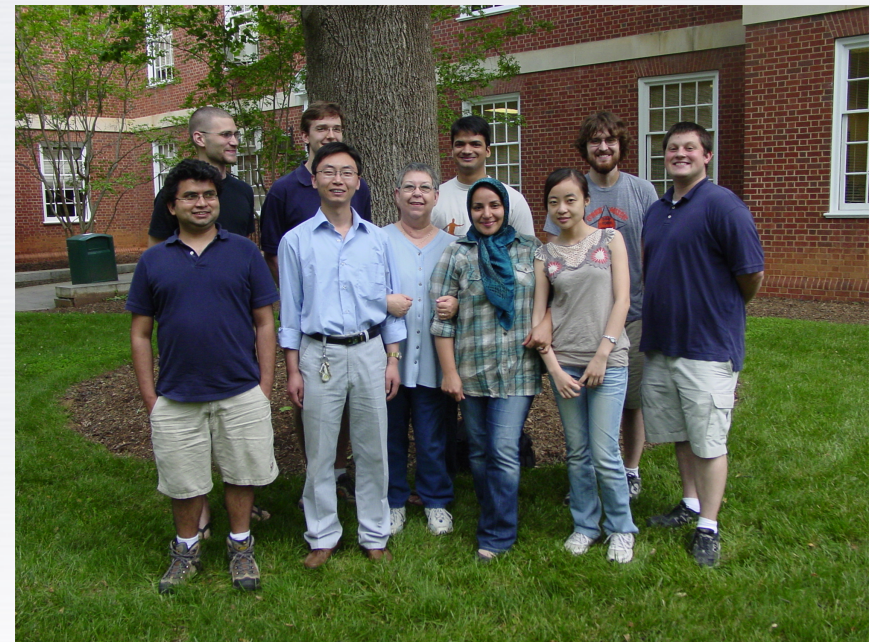
<http://www.csqc.ucsb.edu/index.html>



University of Virginia @ America

❖ Prof. Olivier Pfister's

Quantum Fields and Quantum
Information group





University of Queensland @ Australia

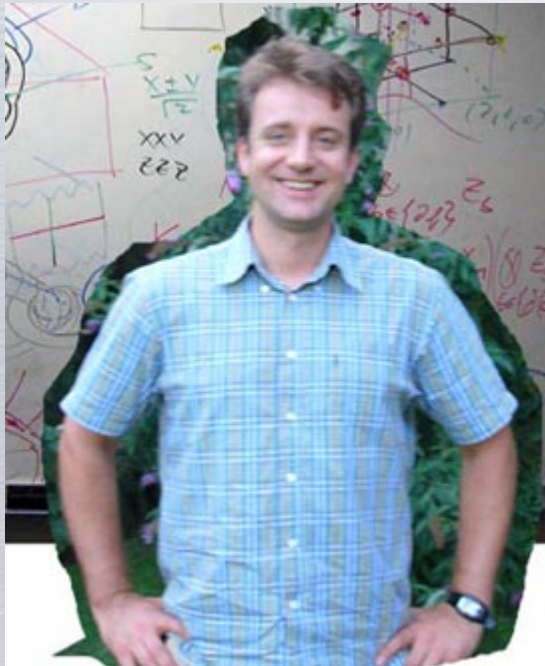


ANDREW G. WHITE

Professor
University of Queensland
Program Manager Linear Optics Quantum
Computation - Experimental,
Centre for Quantum Computer Technology
[Quantum Technology Lab](#)

APS fellow (2010); OSA fellow (2009);
Australian Academy of Science (2010)

UBC @ Canada



Robert Raussendorf

Associate Professor (Jan. 2008)

Department of Physics and Astronomy

University of British Columbia

Quantum Computing: one-way quantum
computer



Dartmouth @ America

❖ Theory

- ❖ Professor Blencowe's research interests are primarily within mesoscopic physics, in particular nanometer-to-micrometer scale systems that possess quantum electronic, mechanical, and electromagnetic degrees of freedom.
- ❖ Professor Viola's research focuses on theoretical quantum information physics and quantum engineering. Current emphasis is on developing strategies for robustly controlling realistic open quantum systems, and on investigating fundamental aspects related to many-body quantum dynamics, entanglement and quantum randomness.

❖ Experiment

- ❖ Professor Rimberg's research focuses on radio-frequency and microwave techniques to investigate quantum phenomena in such nanostructures as quantum dots and single-electron transistors. The group has active collaborations with the University of Wisconsin and NIST Boulder.
- ❖ Professor Ramanathan's research addresses the challenge of controlling and measuring quantum phenomena in large many-body systems by exploring the quantum dynamics of solid state spin systems. The group has active collaborations with the Institute for Quantum Computing at the University of Waterloo, Harvard University and MIT.



Louisiana State University @ America

Jonathan P. Dowling

Hearne Professor of Theoretical Physics
Co-Director, Hearne Institute for Theoretical Physics

Americal Association for the Advancement of Science, Fellow

American Physical Society, Fellow

Institute of Physics, Fellow

Optical Society of America, Fellow

[Quantum Sciences & Technologies Group](#)

[Horace C. Hearne Jr. Institute for Theoretical Physics](#)

[Department of Physics & Astronomy](#)

[Louisiana State University](#)

Principal areas of research concern quantum science and technologies, including: quantum electrodynamics, quantum optics, quantum information theory, photonic band-gap materials, and foundations of quantum mechanics. Current research work focuses on linear optical approaches to quantum information processing, metrology, and imaging; cavity quantum electrodynamics; and photonic band-gap structures for thermal emissivity control.



University of Maryland @ America



Joint Quantum Institute

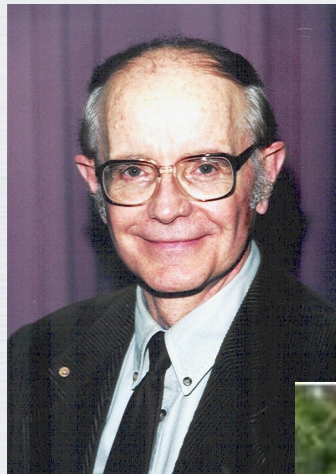
物理系有很多牛人！



TAMU @ America

❖ The Institute for Quantum Science and Engineering

❖ Marlan Scully



❖ M. Suhail Zubairy



Department of Electronic Engineering
SJTU



Others @ America

❖ University of Washington, Seattle: [Boris Blinov](#)

（以下涵盖物理、EE、CS等）

❖ Rice University: [Rice Quantum Institute](#)

❖ Michigan State University:
[INSTITUTE FOR QUANTUM SCIENCES](#)

❖ University of Wisconsin Madison: [group](#)

❖ Gatech: [Georgia Tech Quantum Institute](#)



EE 领域目标学校



Northwestern University@America



Prem Kumar

A T & T Professor of Information Technology

Electrical Engineering & Computer Science,

Robert R. McCormick School of Engineering and Applied Science

Professor, Electrical Engineering & Computer Science Department,

Physics and Astronomy Department, Weinberg College of Arts and Sciences

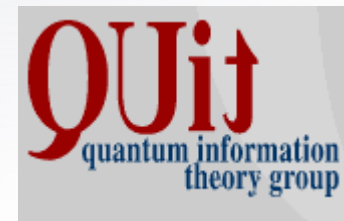
Director, Center for Photonic Communication and Computing

Faculty Advisor, NU Student Chapter of the Optical Society of America

Fellow, OSA (1996), APS (2000), IoP (2002), and IEEE (2003)

Current Research Projects

- Ultra-secure and Ultra-efficient Quantum Cryptographic Schemes for Optical Systems, Networks, and the Internet
- Quantum Information Technology: Entanglement, Teleportation and Quantum Memory
- Quantum Optics Research at Northwestern University
- Data Processing Modules using High-Nonlinearity Fiber for Advanced Optical Networking
- Nonlinear fiber-optics with picosecond pulses for all-optical WDM/TDM systems
- Squeezed-Light Generation in Lithium Niobate Waveguides
- QUANTIM: Quantum Images



Giacomo Mauro D'Ariano

<http://www.qubit.it/faq/faq.html>



Univ of Central Florida@America

Quantum Imaging Laboratory

<http://www.bu.edu/qil/>



BAHAA E. A. SALEH

Professor and Chairman

Dean of CREOL, The College of Optics and Photonics at the
University of Central Florida,

OSA fellow

[Quantum Entanglement and the Foundations of Quantum Mechanics](#)

[Entangled-Photon Generation and Properties](#)

[Entangled-Photon Interferometry](#)

[Quantum Information, Cryptography, and Communications](#)

[Quantum Imaging and Holography](#)

[Entangled-Photon Microscopy, Tomography, and Spectroscopy](#)

[Branching Processes and Noise in Avalanche Photodiodes](#)

[Fundamentals and Applications of Photonics](#)



Boston University @ America

- ❖ Alexander V. Sergienko
- ❖ Department of Electrical & Computer Engineering And Department of Physics
- ❖ OSA fellow, NSF Career Award



Quantum Communication & Measurement Laboratory



University of Toronto @ Canada



Hoi-Kwong Lo

Professor

Center for Quantum Information and Quantum Control

Department of Electrical and Computer Engineering & Department of Physics

Canada Research Chair in Quantum Information

主要做QKD



University of Maryland @ America



Edo Waks (Yamamoto的弟子)

Associate Professor, IREAP

Institute for Research in Electronics and Applied Physics

Joint Appointment: Electrical and Computer Engineering

Chia-Hung Yang, Professor

Department of Electrical and Computer Engineering, University of Maryland

Research topics:

- Quantum computing using single electron spins in semiconductor quantum dots
- Quantum transport in semiconductor quantum wires and their device applications
- Cryogenic atomic force microscope
- Si-based molecular beam epitaxy



University of Michigan @ America

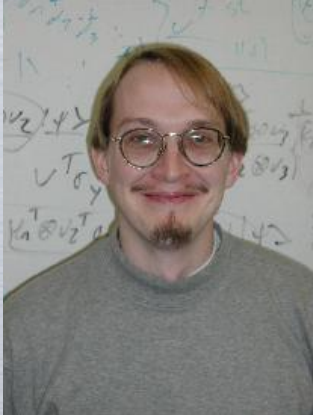
Igor Markov (Very nice person)

Associate Professor of Electrical Engr. and
Computer Science (CSE Division)

Quantum Circuits Group

Quantum Information and Computation@UM

- Paul Berman (Physics)- quantum optics theory and QI
- Tony Bloch (Math)- quantum control theory
- Hui Deng (Physics)- semiconductor cavity QI
- Luming Duan (Physics)- quantum information and atomic theory
- Theodore Goodson (Chemistry)- photonic QI
- John Hayes (EECS)- quantum circuit architecture and synthesis
- Aaron Leanhardt (Physics)- cold atom QI
- Igor Markov (EECS)- quantum circuit simulation, synthesis and optimization
- Roberto Merlin (Physics/EECS)- semiconductor QI
- Georg Raithel (Physics)- laser-cooled Rydberg atom QI
- Yaoyun Shi (EECS)- theory of quantum information and computation
- Vanessa Sih (Physics)- semiconductor QI
- Duncan Steel (EECS/Physics)- semiconductor quantum dot QI
- Kim Winick (EECS)- quantum information theory



Todd A. Brun

Associate Professor of EE Depart.

Continuous Variable Quantum Information!



Daniel Lidar

**Professor of Electrical Engineering,
Chemistry and Physics**

**Quantum Computation and Open
Quantum Systems at USC**

APS fellow



Duke University@America



Jungsang Kim (Yamamotoの弟子)

Nortel Networks Assistant Professor

Research Group: MIST

Research Interests

- ❖ Quantum Information Science
- ❖ Advanced Semiconductor Photonic Devices
- ❖ Micro and Nano Fabrication Technologies
- ❖ Micro-Electromechanical Systems (MEMS) Technology
- ❖ Integrated Optical Systems
- ❖ Fundamental and Practical Limits of Sensors



Others @ America

- ❖ University of New Mexico: Carlton M. Caves
- ❖ Rochester University: Govind P. Agrawal ,
Joseph H. Eberly
- ❖ North Carolina State University: Ki Wook Kim,
Quantum Engineering
- ❖ Arizona University: Ivan B. Djordjevic, Poul Jessen



其他一些量子信息中心



University of Waterloo@Canada



<http://www.iqc.ca/>



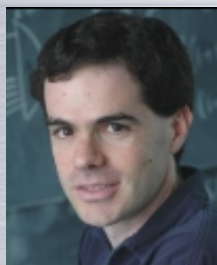
Norbert Lütkenhaus

- Professor
- Department of Physics
- University of Waterloo(University of Guelph)

连续变量**QKD**第一号人物



University of Waterloo@Canada



Daniel Gottesman
Quantum Codes



Michael Nielsen
Scientific publication



Oxford, Cambridge @ UK

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<http://www.qubit.org>

Oxford

[Andrew M. Steane](#)

[David Deutsch](#)

[Dieter Jaksch](#)

[Jonathan Jones](#)

[Keith Burnett](#)

[Ian Walmsley](#)

[QuNaT team:](#)

Benjamin, Browne, Kok, Lovett

[Axel Kuhn](#)

[Neil Johnson](#)

[Jason Smith](#)

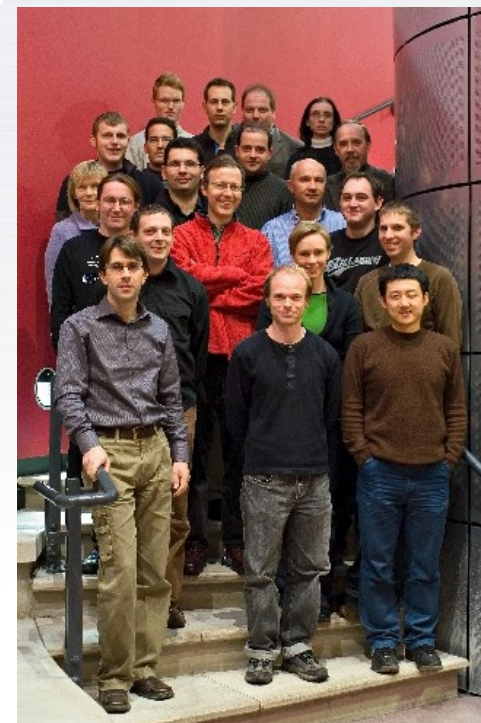
[QIP in the Materials Dept.](#)

[QIP in the ComLab](#)

Cambridge

<http://cam.qubit.org/>

New Group



Department of Electronic Engineering
SJTU



NUS @ Singapore

❖ Center for Quantum Technologies





其他国家（欧洲、澳洲）



Bristol University @ UK



<http://www.cs.bris.ac.uk/Research/QuantumComputing/>



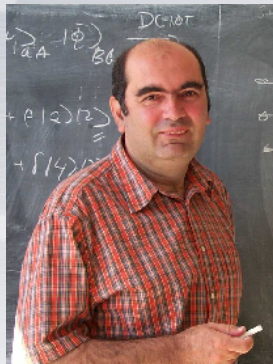
Jeremy O'Brien

Reader in Research

Department of Physics & Department of Electrical & Electronic Engineering

Centre for Quantum Photonics

A whole new centre ! Developing very fast.



Sandu Popescu

Professor of Physics

Interest: quantum non-locality



Imperial College @ UK



<http://www3.imperial.ac.uk/quantuminformation/qiic>

Physics:

**Quantum Information Theory in Institute
for Mathematical Sciences**

Professor Martin B. Plenio

Dr Jens Eisert

EE:

**quantum optics and quantum
information theory group**



Max Planck Research Group@ German

MAX PLANCK RESEARCH GROUP



Institute of Optics,
Information and Photonics
University Erlangen-Nuremberg



<http://kerr.physik.uni-erlangen.de/mpf/php/>

MAX PLANCK RESEARCH GROUP



Institute of Optics, Information and Photonics



TU Wien @ Austria



Atomchip Group



TECHNISCHE
UNIVERSITÄT
WIEN
VIENNA
UNIVERSITY OF
TECHNOLOGY

<http://atomchip.physi.uni-heidelberg.de/atomchip2/atomchip.php>

Complex Quantum Systems

CoQuS | Complex
Quantum
Systems



universität
wien

<http://www.coqus.at/>

Prof. Anton Zeilinger



© J. Godany

University of Vienna
Quantum Optics, Quantum Nanophysics, Quantum Information
& Austrian Academy of Sciences
Inst. f. Quantum Optics and Quantum Information
Boltzmannngasse 5
A-1090 Vienna

[anton.zeilinger\[at\]univie.ac.at](mailto:anton.zeilinger[at]univie.ac.at)



QUIC @ Belgium

Centre for Quantum Information & Communication

QUIC - Ecole Polytechnique - Université Libre de Bruxelles



Nicolas Cerf
Professor

**Quantum Information Theory, Quantum
Cryptography, Quantum Computation**



University of Geneva @ Switzerland



<http://www.gap-optique.unige.ch>



Professor Nicolas Gisin



Others @ Europe



Antonio Acín

Associate Professor (ICREA)

Projects:

Quantum information with continuous variables

Characterization and quantification of entanglement

Quantum information theory and condensed matter physics

Quantum cryptography and entanglement



<http://www.secoqc.net/html/structure/structure.html>

Multi-topics

University of Queensland @ Australia



GERARD J. MILBURN

Professor The University of Queensland.
Deputy Director Centre for Quantum Computer
Technology
Program Manager Quantum Information Theory
Federation Fellow Australian Government
[Quantum Computer Technology](#)

TIMOTHY C. RALPH

Associate Professor of Physics The University of Queensland
Centre Node Manager Queensland
Program Manager Linear Optics Quantum Computation - Theory
QEI Fellow



University of Sydney @ Australia



Stephen D. Bartlett

Senior Lecturer

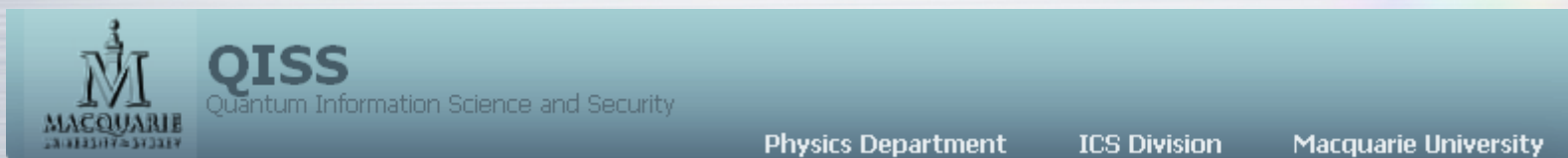
Quantum Information Theory group,
School of Physics, University of Sydney,
Sydney, Australia.

Quantum information theory; quantum computing; quantum cryptography; quantum control; optical demonstrations and implementations of QIP; foundations of quantum physics; statistical structure of quantum physics; mathematical physics

Group: Quantum Information Theory @ Sydney



Others @ Australia



<http://www.quantumscience.info/>

ANU Quantum Optics

<http://photonics.anu.edu.au/qoptics/>



<http://www.qcaustralia.org/home.htm>

University of Melbourne
University of New South Wales

Jason 澳洲奖学金搜索
<http://www.jason.edu.au>



Road Map of Going abroad





Siwei Zhu, April 26, 2008



Good Luck!

