

Committee on Energy and Commerce
U.S. House of Representatives
 Witness Disclosure Requirement - "Truth in Testimony"
 Required by House Rule XI, Clause 2(g)(5)

1. Your Name:	Christopher Monroe		
2. Your Title:	Professor of Physics, University of Maryland; Co-Founder and Chief Scientist, IonQ, Inc.		
3. The Entities You are Representing:	University of Maryland IonQ, Inc. National Photonics Initiative		
4. Are you testifying on behalf of the Federal, or a State or local government entity?	Yes	No	
5. Please list any Federal grants or contracts, or contracts or payments originating with a foreign government, that you or the entity(ies) you represent have received on or after January 1, 2015. Only grants, contracts, or payments related to the subject matter of the hearing must be listed.	<ul style="list-style-type: none"> • Intelligence Advanced Research Projects Activity BAA-15-10 (4/2016-11/2021), \$10,500,000 • Army Res. Lab. W911NF-12-R-0011-02 (6/2015-1/2020), \$922,000 • Air Force Office of Scientific Research AFRL-AFOSR-2016-0007 (9/2016-9/2021), \$423,000 • Army Research Office MURI ONR-15-FOA-0011 (9/2016-9/2021), \$1,250,000 • Air Force Office of Scientific Research MURI ONRBAA13-022 (7/2014-7/2019), \$1,250,000 • Air Force Office of Scientific Research MURI ONRBAA12-020 (7/2013-7/2018), \$1,560,000 		
6. Please attach your curriculum vitae to your completed disclosure form.			

Signature: _____

Date: 16 May, 2018

Christopher R Monroe

Curriculum Vitae

Joint Quantum Institute and Department of Physics
University of Maryland
College Park, MD 20742
www.iontrap.umd.edu

Office: [REDACTED]
Labs: 301-405-4494/7617/7618/7619

Education

- 1992 Ph.D., Physics, University of Colorado, Boulder, CO (Advisor: Carl Wieman)
1987 S.B., Physics, Massachusetts Institute of Tech., Cambridge MA (Advisor: Michael Feld)

Positions

- 2015– Distinguished University Professor, University of Maryland
2014– Fellow, Center for Quantum Information and Comp. Science (QuICS), University of Maryland
2007– Bice Zorn Professor of Physics, University of Maryland
2007– Fellow, Joint Quantum Institute (JQI), NIST and University of Maryland
2006–2007 Director, NSF Physics Frontier Center on Ultrafast Science, University of Michigan
2006–2007 Professor, Electrical Engineering and Computer Science Department, University of Michigan
2003–2007 Professor, Physics Department, University of Michigan
2000–2003 Associate Professor, Physics Department, University of Michigan
1995–2000 Adjunct Lecturer, Physics Dept., University of Colorado
1994–2000 Staff Physicist, National Institute of Standards and Technology (NIST), Boulder
1992–1994 NRC Postdoctoral Researcher, NIST, Boulder CO (Mentor: David Wineland)

Fellowships and Awards

- Member, National Academy of Sciences (2016)
American Physical Society Arthur Schawlow Prize for Laser Science (2015)
University of Maryland College of Science Distinguished Faculty Award (2014)
Fellow, American Association for the Advancement of Science (2012)
Scientific American “50” Research Award (2006)
University of Michigan Faculty Distinguished Research Award (2005-2006)
Fellow, American Physical Society (2005)
Fellow, UK Institute of Physics (2002)
Distinguished Traveling Lecturer, American Physical Society Division of Laser Science (2002–)
American Physical Society I.I. Rabi Award (2001)
International Quantum Communication Award, Tamagawa University, Japan (2000)
US Presidential Early Career Award for Scientists and Engineers (1997)
National Research Council Postdoctoral Fellowship (1992-1994)
University of Colorado Feldkamp Award for Graduate Research (1990)

Service

Committees

- American Physical Society Div. AMO Physics (DAMOP): **Chair** (2010), Chair-Elect (2009), Vice-Chair (2008).
American Physical Society Topical Group on Quantum Information: Executive Committee (2008-2010).
American Physical Society Committee on Meetings: **Chair** (2005), Member (2003-2004).
National Academy of Sciences Committee on AMO science (CAMOS): **Chair** (2012-2015), Member (2009-2011).
National Academy of Sciences Committee on AMO science (AMO2010 decadal report, 2005-2006).

Boards

- Max Planck Institute for Quantum Optics, Scientific Advisory Board (2018–)
CalTech Institute for Quantum Information and Matter, Advisory Board (2018–)
Center for Quantum Technology, National University of Singapore: Technical Advisory Board (2018–).
National Academies of Sciences Intelligence Science and Technology Experts Group (ISTEG) (2015–)

DoD Advisory Board for Quantum Sciences and Engineering at ARL, AFRL, and NRL (2015–).
JILA and Univ. of Colorado NSF Physics Frontier Center External Advisory Board (2014–).
Center for Quantum Information, Tsinghua University, Beijing, China: International Advisory Board (2012–).
Institute for Quantum Computing, University of Waterloo, Canada: Scientific Advisory Committee (2010–).
Networked Quantum Information Technology Hub, Oxford University, UK: Scientific Advisory Committee (2013–).
Physics and Engineering Physics Department, Stevens Institute of Technology: External Advisory Board (2009–).

Editorial

Nature: Quantum Information: Editorial Board (2015–).
Journal of Optics B: Editorial Board (2003-2007), Advisory Board (2008-2012).
Journal of Quantum Information (Rinton Press): Editorial Advisory Board (2000–)

Research Interests

I am an experimentalist in the areas of quantum computing, quantum communication, atomic, molecular, and optical physics, and quantum optics. My research interests include:

Quantum Information and Entanglement. Quantum information science exploits the properties of quantum superposition and quantum entanglement to store and process information in ways that are not possible classically. I have a longstanding interest in the fabrication of quantum hardware using atoms and photons, natural carriers of quantum information. This includes the design and realization of elementary entangling quantum logic gates between nearby atoms, the quantum networking of remotely-located atoms with photons, and the scaling to much larger numbers of atomic quantum bits with advanced microfabricated atom trap array and photonic structures.

Cold Atomic Physics. Atoms can be localized to nanometer precision with electromagnetic fields and laser cooling techniques. My interest in this area involves the use of laser radiation to prepare, characterize, and exploit nearly-pure quantum states of internal (electronic) and external (motional) degrees of freedom of cold atoms and ions in order to generate controllable interactions and quantum entanglement for studies of quantum many-body systems.

The Interface between Atomic and Condensed Matter Physics. My group has led the development of atomic quantum simulators that can emulate intractable Hamiltonians that are found in contexts such as quantum magnetism and strongly-correlated condensed matter. We have also developed the use of microfabricated semiconductor structures for confining individual atomic ions in free space, while also characterizing the electrical noise processes of semiconductor and other electrode materials using single atoms as sensitive probes.

Ultrafast Control of Cold Atoms. I am actively pursuing the use of ultrafast ($\sim 10^{-12}$ s) optical techniques for the manipulation and control of cold atomic systems and the generation of multi-atom entangled quantum states. Ultrafast control eliminates sensitivity to slower decoherence processes, and represents a new regime of ultracold atomic physics.

Foundations of quantum mechanics. I have a longstanding interest in foundational aspects of quantum mechanics, from quantum measurement, quantum decoherence, and alternative interpretations of quantum mechanics, to the general phenomenon of quantum entanglement and various forms of Bell's Inequalities. I am interested in quantum metrology and the border between quantum and classical physics as system complexity grows. I enjoy conveying quantum tenets to younger students and the public, with heavy reliance on analogies from the visual and musical arts.

Research Grants

External grants totaling \$40 million to my university research group since 2000, from federal agencies (DARPA, IARPA, NSF, ARO, AFOSR, ONR)

Invited Presentations

160 invited talks at conferences and workshops; 160 academic colloquia and seminars
15 sets of lectures at academic summer schools on Quantum Science and Atomic/Optical Physics
5 public lectures on the Physics of Music, the Physics of the Piano, and Music and Quantum Physics

Mentoring

5 Research Scientists, 32 postdoctoral researchers, 40 grad. students, 16 undergrad. students, 2 high school students

Publications

154 refereed publications with >30,000 citations, 10 publications with >1000 citations each, "h"²=70
For complete list of publications, see <http://iontrap.umd.edu/publications/>