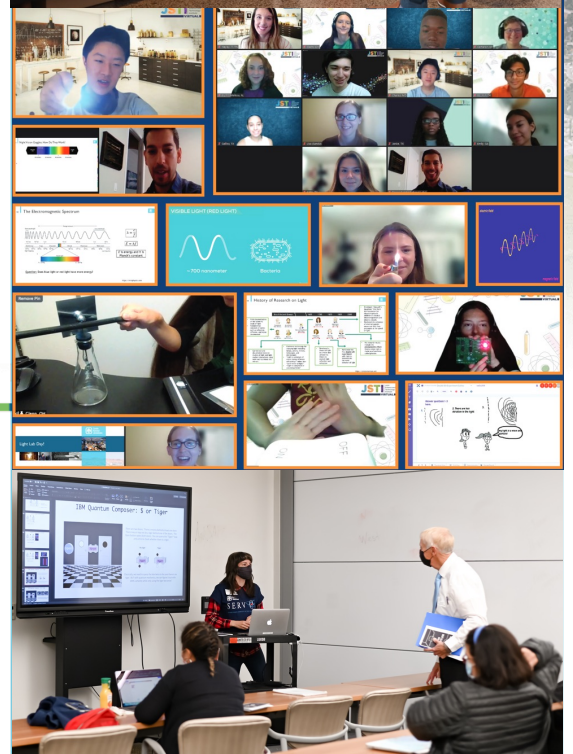
Building a Quantum-Ready Workforce



Megan Ivory

Sandia National Laboratory Physicist

Session Chair

Quantum New Mexico Symposium

April 1, 2022

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The Big Picture

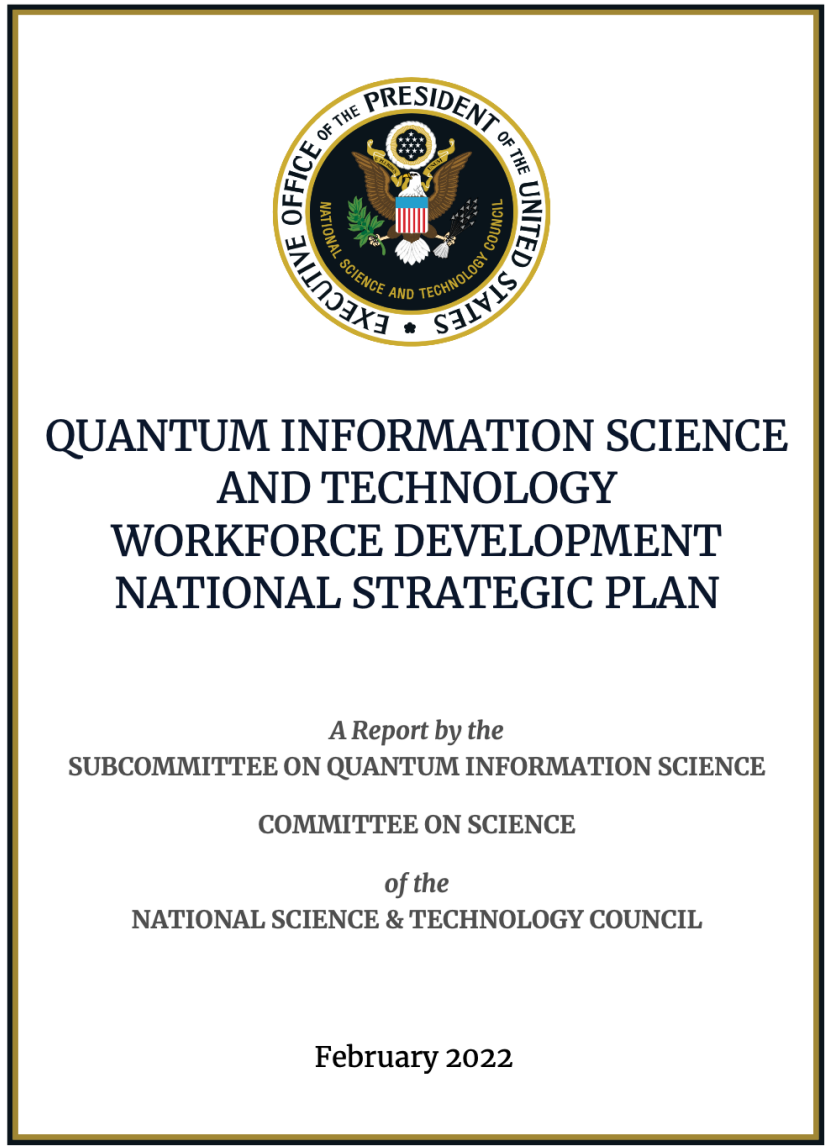
Applications	Quantum Systems	Engineering Technology	Workforce
Quantum Sensing: Atomic clocks, magnetometers, gravimeters, inertial navigation	Atomic Qubits: Trapped ions, Rydberg atoms	Compact vacuum systems, laser technology, integrated photonics, control software and electronics, fabrication technology	PhD Physicists Mechanical Engineers Electrical Engineers Vacuum Engineers Cryo Engineers Photonics Engineers Fabrication Engineers Software Engineers Chemists Mathematicians Algorithm Developers Technicians Project Managers IP/Patent Lawyers Entrepreneurs
Quantum Computing: Quantum annealing, Noisy intermediate-scale quantum (NISQ), Logical qubits	Superconducting Qubits: Josephson junctions, Transmon qubits, Flux qubits	Dilution refrigerators, microwave electronics, fabrication technology, superconducting materials	
Quantum Communication: Quantum key distribution, quantum repeaters	Emerging Qubit Technology: Photonic qubits, Semiconductor quantum dot qubits, Nitrogen-vacancy diamonds	Frequency conversion (uwave – telecom), Low SWaP-C devices, Assembly-level languages	

Growing Demand for a Quantum-Ready Workforce

Challenges:

1. Understanding the technical needs of the ecosystem
2. Increasing exposure at high school and undergrad level
3. Attracting and retaining talent
4. Developing a more diverse QIST workforce

QIST WORKFORCE DEVELOPMENT



EXECUTIVE OFFICE OF THE PRESIDENT OF THE UNITED STATES
NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

QUANTUM INFORMATION SCIENCE AND TECHNOLOGY WORKFORCE DEVELOPMENT NATIONAL STRATEGIC PLAN

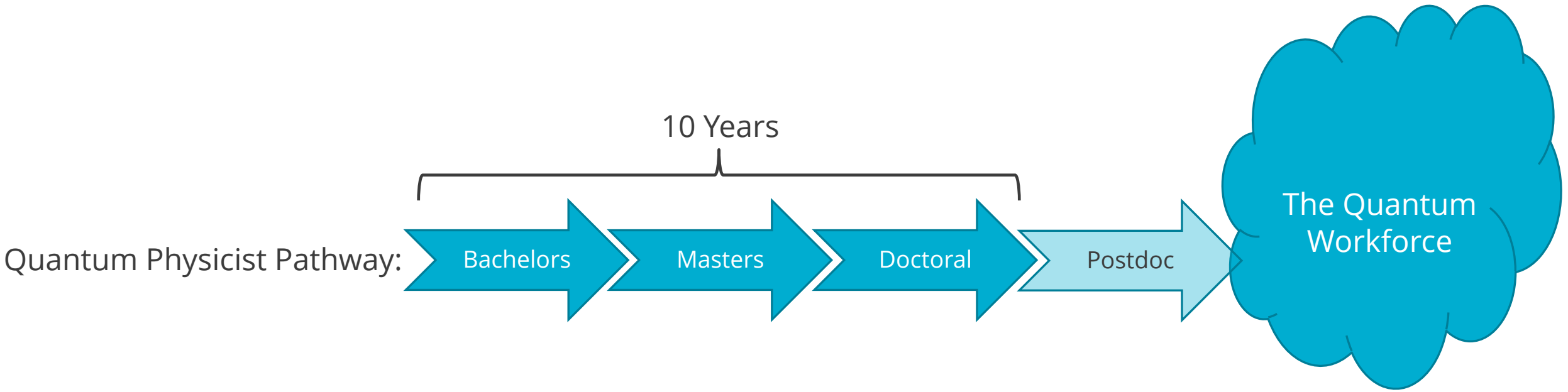
A Report by the
SUBCOMMITTEE ON QUANTUM INFORMATION SCIENCE

COMMITTEE ON SCIENCE

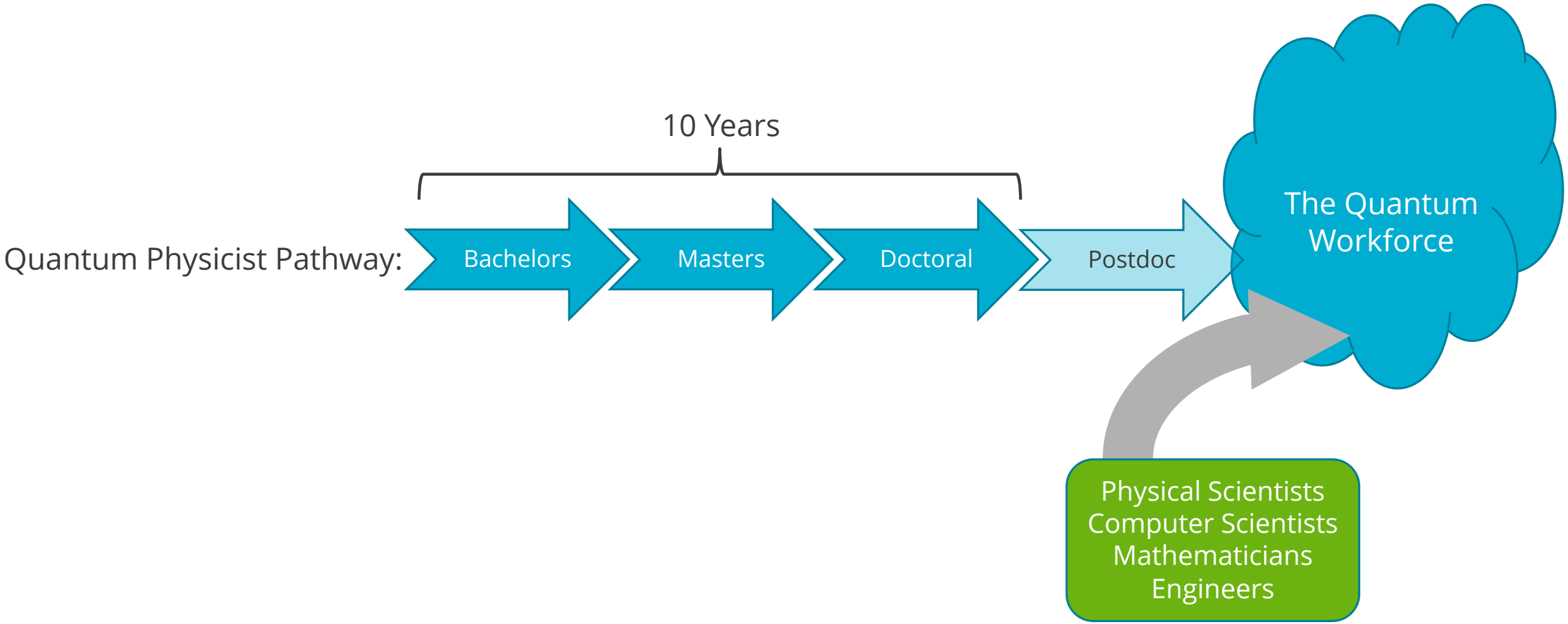
of the
NATIONAL SCIENCE & TECHNOLOGY COUNCIL

February 2022

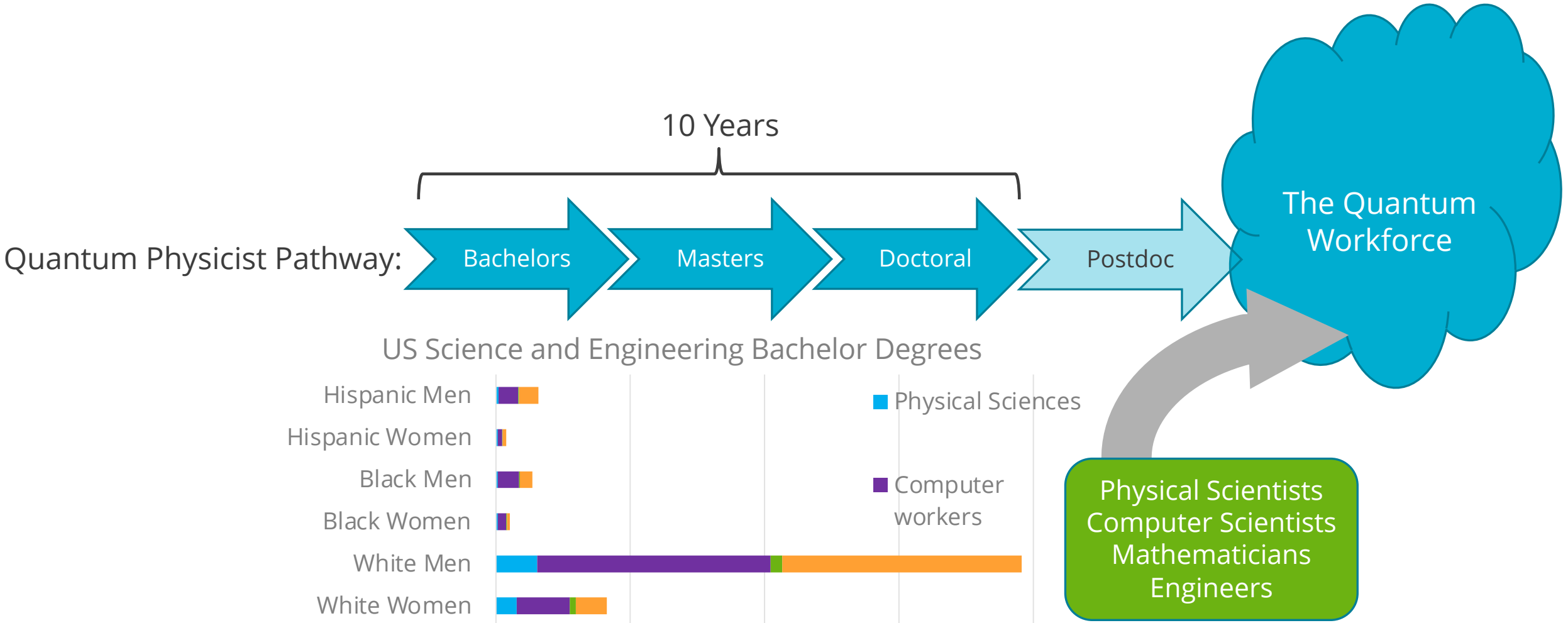
Quantum Career Pathways



Quantum Career Pathways



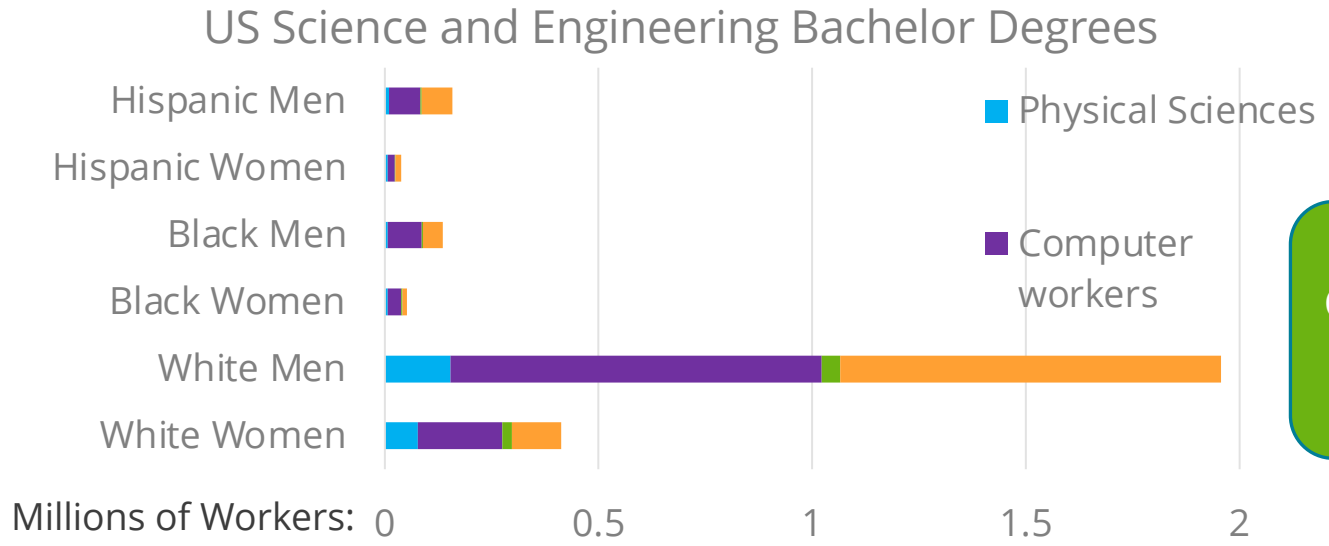
Quantum Career Pathways



Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Quantum Career Pathways

High School → Associates → Bachelors → Masters → Doctoral → Postdoc → The Quantum Workforce



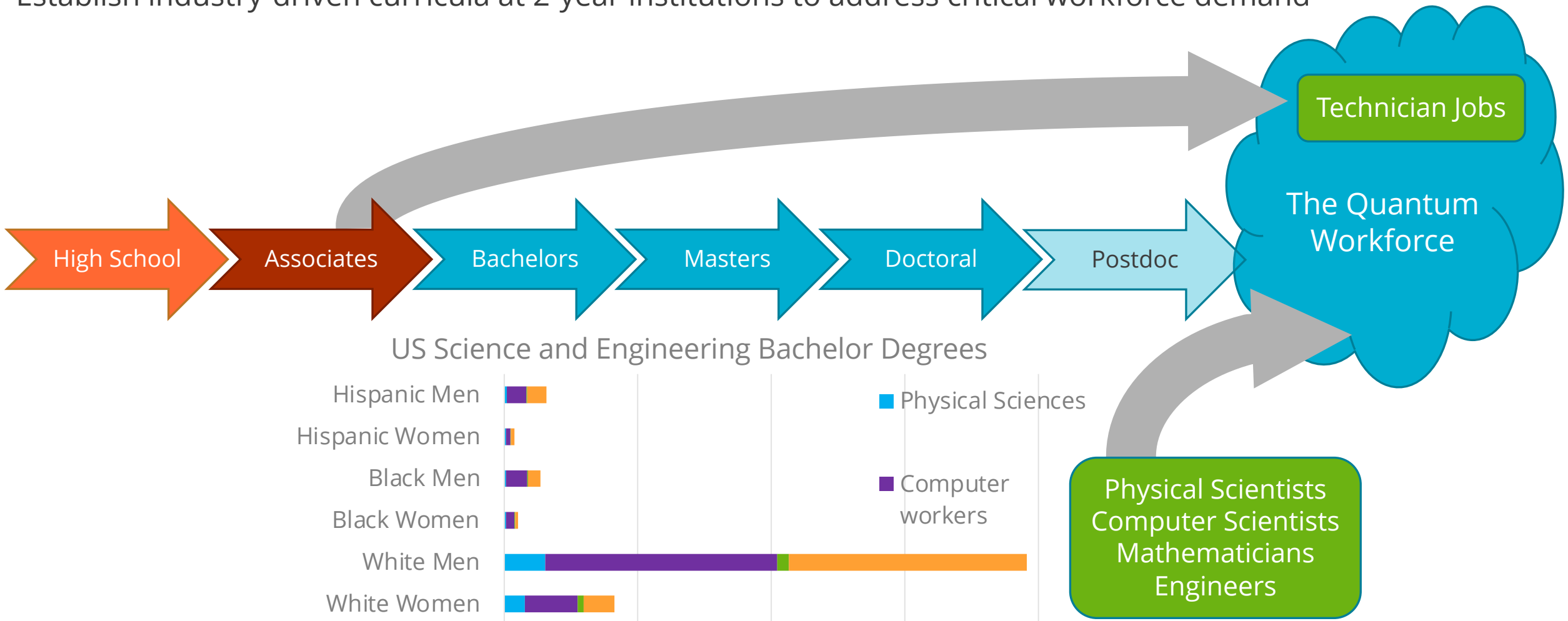
Physical Scientists
Computer Scientists
Mathematicians
Engineers

Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Quantum Career Pathways

QSTEP: Quantum Science Technologist Education Pathways

Establish industry-driven curricula at 2-year institutions to address critical workforce demand



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Quantum Career Pathways

QSTEP: Quantum Science Technologist Education Pathways

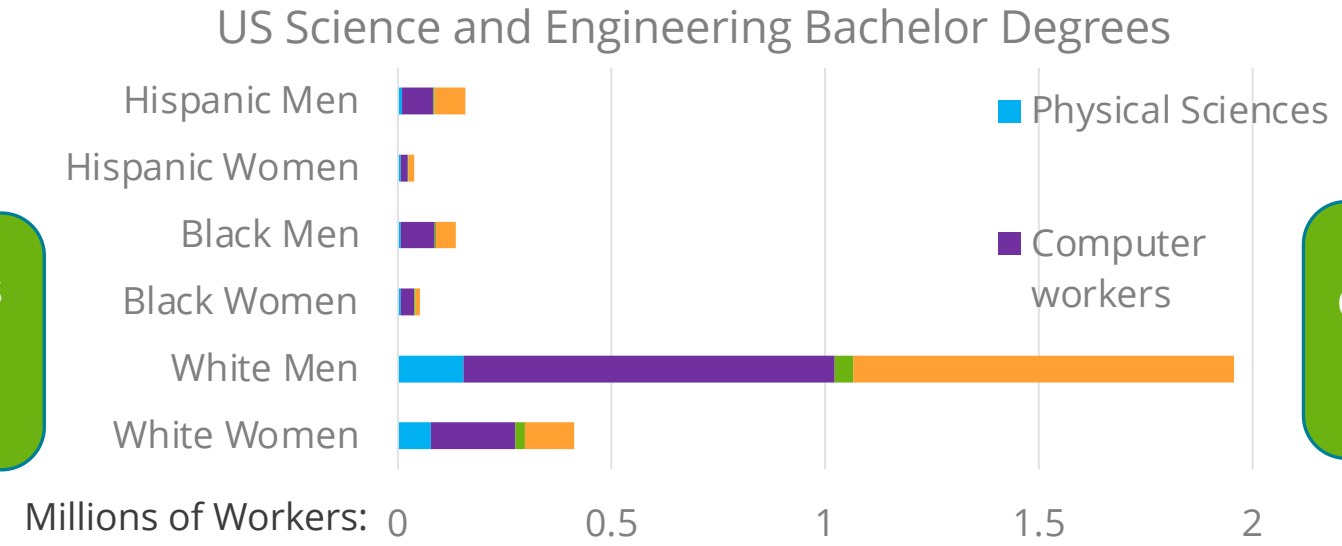
Establish industry-driven curricula at 2-year institutions to address critical workforce demand

High School → Associates → Bachelors → Masters → Doctoral → Postdoc → The Quantum Workforce

Technician Jobs

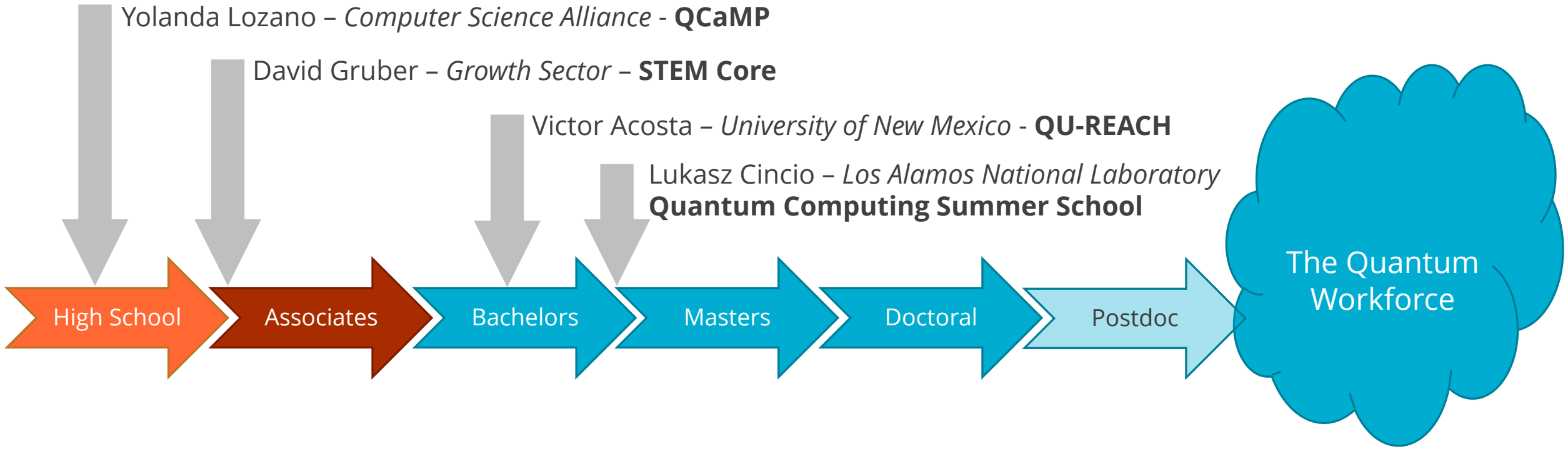
High School Camps
Bridge Programs
Teacher Support

Physical Scientists
Computer Scientists
Mathematicians
Engineers



Source: U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates

Today's Session



New Mexico's established excellence in QIST research, our ongoing workforce development programs within and throughout the state, and our diverse majority minority community make it an ideal state for addressing the nationally recognized challenges.

If you want to get involved: qnm@unm.edu