



SUMMARY OF WORKSHOP ON QUANTUM RECRUITMENT IN THE FEDERAL GOVERNMENT

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About the National Quantum Coordination Office

The National Quantum Coordination Office (NQCO) coordinates Quantum Information Science activities across the U.S. federal government, industry, and academia. Legislated by the National Quantum Initiative Act of 2018 and established within the White House Office of Science and Technology Policy, the NQCO oversees interagency coordination of the NQI Program and QIS activities; serves as the point of contact on Federal civilian QIS activities; ensures coordination among the consortia and various quantum centers; conducts public outreach, including the dissemination of findings and recommendations of the National Science and Technology Council Subcommittee on Quantum Information Science and the NQI Advisory Committee; promotes access to and early application of the technologies, innovations, and expertise derived from U.S. QIS activities, as well as access to quantum systems developed by industry, universities, and Federal laboratories to the general user community. More information is available at <https://quantum.gov/>

About the Laboratory for Physical Sciences Qubit Collaboratory

The Laboratory for Physical Sciences (LPS) Qubit Collaboratory (LQC) is a national Quantum Information Science Research Center hosted at the Laboratory for Physical Sciences at the University of Maryland, College Park. The LQC pursues disruptive qubit research, innovative workforce development programs, and deep, collaborative partnerships to tackle some of the hardest open problems in quantum information science and technology. More information is available at <https://www.qubitcollaboratory.org/>.

About the Workshop on Quantum Recruitment in The Federal Government

On August 30, 2021, the Laboratory for Physical Sciences (LPS) Qubit Collaboratory (LQC), with support from the White House Office of Science and Technology Policy (OSTP) National Quantum Coordination Office (NQCO), organized a closed virtual workshop on Quantum Recruitment in Government.

Participants included representatives from Air Force Research Laboratory (AFRL), Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), Army Research Laboratory (ARL), LPS, Department of Defense (DOD), Johns Hopkins University Applied Physics Laboratory (APL), Lawrence Livermore National Lab (LLNL), MITRE Corporation, NQCO, Naval Research Laboratory (NRL), National Institute of Standards of Technology (NIST), National Science Foundation (NSF), National Security Agency (NSA), Office of the Director of National Intelligence (ODNI), and OSTP.

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Executive Summary

On August 30, 2021, the Laboratory for Physical Sciences (LPS) and the White House Office of Science and Technology Policy (OSTP) held a virtual workshop on the recruitment of individuals with quantum information science (QIS) expertise into government service.

The United States is facing a workforce shortage in QIS that is acutely felt by Federal agencies. The workshop focused on challenges and best practices for recruiting and retaining the talent needed to ensure the Federal Government has ample awareness of and expertise in QIS challenges and opportunities. Approximately forty individuals from a variety of Federal agencies, industry, academia, federally funded research and development centers (FFRDCs), and university affiliated research centers (UARCs) participated in the workshop.

Several common challenges to recruitment were voiced during the workshop:

- Industry salaries in QIS are higher than corresponding Federal salaries, affecting recruitment and retention.
- Slow Federal hiring processes often result in candidates taking other opportunities.
- Misconceptions about government work keep people from considering government careers.

Potential solutions that were discussed included:

- Leveraging all available and existing authorities to support recruitment and reduce time to hire.
- Increasing compensation in QIS to be more competitive with the private sector. This potentially could include out-of-cycle pay adjustments and the ability to counter private sector offers, while being mindful of pay compression.
- Proactively explaining the non-salary benefits of government work, such as retirement benefits, work-life balance, job stability, and engagement with cutting-edge research.
- Reducing hiring timelines for positions requiring security positions by leveraging creative inter-departmental and inter-agency partnerships to hire individuals to work on relevant projects while they await completion of the security clearance process.
- Allocating resources for recruitment, such as networking at conferences, speaking at colleges and universities, attending career fairs, engaging with K-12 educational institutions, and the public; especially among underrepresented groups.

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Workshop Overview

Industry, academia, and the U.S. Government currently face a shortage of talent in quantum information science (QIS). Recognizing that there are unique challenges to recruiting talent for public service, the Laboratory for Physical Sciences (LPS) Qubit Collaboratory (LQC) and the White House Office of Science and Technology Policy (OSTP) National Quantum Coordination Office (NQCO) held a workshop to discuss quantum recruitment in government.¹ The workshop brought together approximately forty participants from a variety of Federal government agencies, industry, academia, federally funded research and development centers (FFRDCs), and university affiliated research centers (UARCs).

The workshop began with OSTP Deputy Director for National Security Dr. Jason Matheny² highlighting the importance of sustained Federal investments in both people and research. He noted the continued recruitment of talent is of the utmost importance to ensure the United States leads the next generation of technologies and has the technical talent to stay at the forefront of new and emerging areas.

Dr. Charles Tahan,³ Assistant Director for QIS at OSTP, remarked that the need for the workshop exists because of the government's continuing role in growing QIS through decades of investments. He described current initiatives to address the talent shortage through educational and workforce development programs, such as the National Q-12 Education Partnership and activities authorized under the NQI Act, along with Federal working groups focusing on workforce development for QIS.

Dr. Heather Lewandowski, of the University of Colorado and JILA, gave the keynote address. She summarized her research on hiring challenges in QIS and highlighted opportunities to increase recruitment at Federal research facilities by providing hands-on experiences to students, developing stronger partnerships with universities and quantum centers, and upskilling the existing workforce.

A series of invited speakers then shared their organizations' best practices for recruitment, the effectiveness of their activities, and their main obstacles to recruitment. Next, a panel shared personal stories of how they chose careers in government, followed by a panel of hiring experts who discussed what is being done and what can be done to improve recruitment. The workshop ended with an open discussion.

The workshop identified three common barriers to government recruitment and retention in QIS:

1. **Compensation.** Industrial salaries in QIS are higher than corresponding government salaries, affecting both recruitment and retention.
2. **Delays.** Slow hiring process in government can result in candidates taking other opportunities.
3. **Lack of Awareness.** Misconceptions about government work keep people from considering government careers.

Below are highlights from the workshop that focused on each issue, best practices, and potential paths forward.

¹ "Quantum" specifically refers to QIS, defined in the National Quantum Initiative (NQI) Act as, "The use of the laws of quantum physics for the storage, transmission, manipulation, computing, or measurement of information."

² Dr. Matheny is the Deputy Assistant to the President for Technology and National Security, Deputy Director for National Security for OSTP.

³ Dr. Tahan is the Assistant Director of QIS at OSTP, Director of NQCO, and Chief Scientist and Chief of QIS at LPS.

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1. Compensation

A consistent barrier shared by participants for recruitment and retainment in QIS was the pay differential between industry and the Federal government. Attendees gave several examples of people leaving Federal services for higher wages in industry. One attendee remarked, “In some cases, we just can’t compete with the private sector [salary].” Another attendee stated that lack of competitive pay comes back as the biggest reason why candidates do not accept government job offers.

During the workshop, one participant discussed a survey of their employees that determined salary was not the primary reason people decided to work for the government. Instead, mission, broad innovation opportunities, freedom to pursue interesting work, work-life balance, and highly-competitive benefits were top considerations. Another attendee remarked that finding people who are good fits, who would find the jobs rewarding, are better hires long-term than those solely focused on pay. As noted by a panelist, “The way benefits are explained for Federal jobs is not transparent. Government salaries may be lower than industry, but how do you quantify the value of benefits?” The general sense was that the government can recruit and retain in QIS more effectively by promoting these values, and the overall compensation packages (including retirement benefits⁴, health care⁵, parental leave⁶, etc.).

“This person is staying because [he/she] wants to serve [his/her] country and work for the [agency],” but such commitment to mission “can only last so long.”

Attendees did discuss the importance of increasing compensation to be more competitive with the private sector, including options like out-of-cycle pay adjustment, granting the ability to counter offers from industry, and including mission and benefits in job postings as potential actions to support recruitment and retainment.

2. Delays

Another common barrier discussed was the inefficiencies related to hiring. Several attendees voiced comments such as, “We recently lost a candidate because it simply took too long,” and “time for [the agency] to make an offer [was too long]. Industry has beat us to the punch more than once.”

Furthermore, the long hiring process can make it hard for candidates to plan their moves. Here, participants mentioned, “candidates feel unsure about moving without having an offer letter yet,” “when the offer letter does suddenly arrive, it’s right before the start date,” and the “main issue is whether [candidates] want to pick up and move their family across the country. Challenges to getting a security clearance [have] delayed and derailed people the most.”

Finally, inefficiencies in procurement also make it challenging for researchers to carry out their scientific work, thus hurting recruitment and retainment. For example, with reference to an industry offer, the government employee may “consider [the industrial offer] because of the mountain of bureaucracy needed to get work done [in the government].”

⁴ <https://www.opm.gov/retirement-services/>

⁵ <https://www.opm.gov/healthcare-insurance/healthcare/>

⁶ <https://www.dol.gov/general/jobs/benefits/paid-parental-leave>

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Another important discussion point was the need for transparency about the hiring process. Several participants voiced opinions about the need for having regular contact with potential hires through the entire process and being transparent from the beginning that the length of the government hiring process is considerably longer than the industrial timeline.

“Don’t take it personally. Just because we’re slow doesn’t mean we don’t want you or industry wants you more.”

Attendees mentioned improving efficiencies by leveraging creative partnerships to speed up hiring, exploring lower entry level clearances so new hires can start more quickly, pursuing direct hire authorities for QIS, minimizing approvals for hires, ensuring no office becomes a bottleneck for onboarding, and continuing to minimize bureaucracy to change public perception about the impact of government work.

3. Lack of Awareness

The third common barrier to recruitment discussed was misconceptions about government work. As one participant noted, students pursue jobs that are known to them. Many have misconceptions about what it is like to work at a Federal lab, whether they will still have academic freedom or in the case of the Department of Defense, if they will be deployed or have to do combat training.

Many participants shared that their most effective recruiting tool was internship programs, postdoctoral programs, and other experiences for students to work in government settings. For example, the National Research Council (NRC) Postdoctoral Research Associateships Program was especially useful at the National Institute of Standards and Technology (NIST). In particular, NIST benefits from associates coming on as temporary Federal employees, and many of their permanent hires started through this program. Other examples include the Intelligence Community Postdoctoral Research Fellowship Program, which has been useful for recruitment; and the Air Force Research Laboratory (AFRL), which has cooperative internship programs with local universities, where undergrads will work at the lab for six months at a time, and some students return for multiple stints.

To create awareness about government service among science students, an effective practice is student outreach. Examples of student outreach discussed included (1) the “Life after JILA” colloquium series in which alumni of JILA share their career paths; (2) the annual Southwest Quantum Information and Technology (SQuInT) Workshop, where several national laboratories are members and their employees routinely speak; and (3) speaking at local chapters of the Society of Physics Students about the NSF Research Experiences for Undergraduates (REU) program, how to find the research opportunities, and how to apply. This last example helped draw one of the government speakers to Federal service.

Panelists recognized that the lack of awareness of government work disproportionately affects some communities. One participant said, “Misconceptions [about government work] increase among women and underrepresented minorities.” To broaden participation, it is necessary to raise awareness of government careers among younger students. Some ongoing examples include (1) AFRL’s summer STEM camps, where high school and sometimes middle school students participate; (2) Johns Hopkins Applied Physics Laboratory’s (APL’s) community outreach initiatives to K-12 students, including internship for high school students; and (3) the Q-12 Education Partnership, which is building a community of teachers and students around early quantum education.

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“[students] follow their professor’s footsteps in academia, or receive lots of marketing from industry, but the government option is largely unknown.”

Attendees mentioned efforts could be helped by allocating more resources for recruitment. Government organizations should be networking at conferences, speaking at colleges and universities, attending career fairs, engaging with K-12 educational institutions and the public, especially among underrepresented groups, pointing to other Federal resources like IntelligenceCareers.gov, and looking beyond USAJobs.gov to where universities and the private sector are posting jobs.

Conclusion and Future Areas to Explore

This workshop covered some of the challenges Federal agencies confront in the recruitment, hiring, and retention of QIS talent into the Federal workforce. These hiring challenges are not felt equally by all government organizations. Furthermore, variations in the work roles (researcher, program manager, policy analyst, etc.) and use of contractors (as opposed to Federal employees) affect the exact needs of each federal agencies.

Finally, during the workshop, additional ideas for further investigation were proposed for increasing engagement and recruitment. These include (1) developing a Quantum Reserve Corps, where researchers in the private sector maintain clearances and can be called upon to do special projects or reviews; (2) establishing a program for government scientists to rotate into industry; and (3) forging avenues for military personnel to transition into QIS careers in government.