APL's Discovery Program: Guest Editor's Introduction

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ABSTRACT

This issue of the Johns Hopkins APL Technical Digest *focuses on the Johns Hopkins University Applied Physics Laboratory (APL) Discovery Program, a 2-year rotational opportunity for new college graduates that consists of four rotation assignments spanning multiple technical areas across the Laboratory. In addition to featuring reflections from program alumni and host supervisors and an overview of the program's training component, the issue highlights the technical contributions of some of the staff members who have been part of the program or are currently part of it. The articles in this issue showcase the core competencies of APL but also truly highlight the core tenets of the Discovery Program: broad exposure, career foundations, and professional connections. The articles amplify how the Discovery Program accomplishes its vision of a persistent, collaborative, and innovative network of impactful staff who will lead us into the future. Some of the staff members in the Discovery Program will enable APL's future defining innovations.*

OVERVIEW OF THE DISCOVERY PROGRAM

Motivation

APL is built on its ability to provide core capabilities to its sponsors. These include strategic systems test and evaluation; submarine security and survivability; space science and engineering; combat systems and guided missiles; theater air defense and power projection; information technology (command, control, communications, computers intelligence, surveillance, and reconnaissance/information operations); simulation, modeling, and operations analysis; and mission-related research and development. APL is able to deliver innovative solutions in these diverse areas by hiring, acculturating, and developing the talented individuals who make up its staff. One of APL's staff development programs is the Discovery Program, a 2-year rotational program for select recent college graduates that consists of four rotation assignments spanning multiple technical organizations across the Laboratory.

Rotational programs are not uncommon. More than 500 companies across the globe offer rotational programs of some sort, and US civilian government employees can participate in numerous rotational staff programs.[1] Nearly 60% of professionals aged 22–30 noted that a company's rotational opportunities were a compelling reason to consider the organization for employment.[2]

Thus, after careful consideration, in 2014 APL recruited and hired its first staff members for the Discovery Program. These individuals made up the Discovery Program Cohort 2015. From the outset, it was determined that these staff members would be newly degreed full-time staff members who would experience the breadth of APL's mission, contributing individually to solving the nation's most critical challenges while developing professional networks and establishing foundational career behaviors. This focus on early-career staff members enables APL to not only discover innovative solutions to today's most complex challenges but also solve the future challenges that will face our nation.

History

The Discovery Program has its origins in the Lab's Associate Technical Staff Program,[3] which introduced new scientists and engineers to APL's culture and work. The program, which began in 1959, featured a project, an overview of APL's various mission areas via technical courses, and then final placement within a technical group. The program morphed several times over its lifetime of more than 30 years. For example, in 1967, the program's individual research project was replaced with a group project on a systems engineering problem, and the original program's 6-month duration was shortened to 10 weeks in the 1980s. The technical courses also changed along with changes in technology. Through all the program's iterations, the goal remained the same: to help staff members transition from students to technical APL professionals. The Associate Technical Staff Program ended in the early 1990s.

As the Laboratory grew in both size and scope, its leadership began thinking about how to leverage the best elements of some of its historical staff development programs, such as the Associate Technical Staff Program. Elements of this program were reimagined in the form of several new programs, including the Discovery Program. Other programs include the APL Staff Orientation Program, which is designed to familiarize new staff members with the vision, characteristics, and operational perspective of the Laboratory to assist them in expediting their individual contributions to the work of APL. The Strategic Education Program aims "to strengthen the science and technology base of APL staff through the delivery of high-quality technical courses tailored to strategic APL needs."[4] The Building Leaders, Acceleration Science and Technology (BLAST) innovation initiative targets early-career staff, encouraging collaboration and harnessing APL's culture of innovation to tackle challenging technical problems relevant to the Lab and its sponsors.[5]

While these programs share many similarities, each has a unique focus. For the Discovery Program, that focus is on creating opportunities for breadth while developing a foundation for depth in one or more technical skills. The Discovery Program aims to enhance the academic competencies and capabilities of those selected for the program and, thus, provide them with the tools to set a professional foundation. APL focuses on systems engineering across all its mission areas, and as noted by former Lab director Alexander Kossiakoff, true systems engineers are developed as a result of harnessing technical depth and applying it over time across many domains.[6]

Achieving the Vision—Hiring, Rotations, Career Development, and Final Placement

Hiring

Discovery Program staff members are selected through the competitive hiring process from thousands of applications every year. Many—100 to 200—potential candidates are interviewed annually for just 20 positions. These candidates are newly degreed with bachelor's, master's, and doctoral degrees in multidisciplinary fields. No cohort is exactly the same in technical competency. The program hires to fulfill the needs of the Laboratory in the given year, selecting staff across numerous majors, as shown in Figure 1. The Discovery Program leadership team aims to balance the needs of the more than 100 technical teams across APL's sectors and departments.

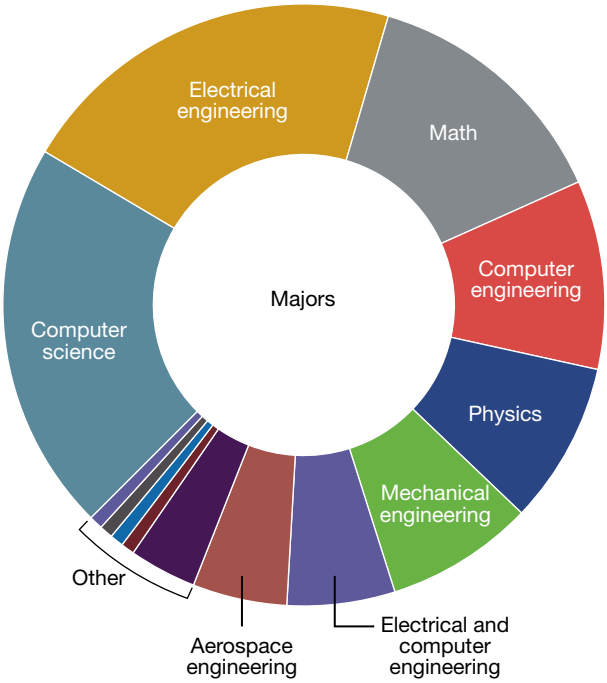

Figure 1. Breakdown of degree fields of staff members hired into the Discovery Program. Candidates are newly degreed with bachelor's, master's, and doctoral degrees in multidisciplinary fields. The program hires to fulfill the needs of the Laboratory and its more than 100 technical teams in the given year, selecting staff across many majors.

Rotations

Each staff member selected for the program follows a unique path. There are no "tracks," as each experience is tailored to the individual; to date no two staff members have experienced the same four rotations over the course of the program. Figure 2 highlights several examples of past rotational experiences.

To determine the rotational placements, the Discovery Program leadership team partners with staff members in the cohorts and the hosting technical teams. Staff members in the Discovery Program regularly engage in career coaching discussions with the program's leadership team. Not only do these regular conversations help to guide and enable professional growth, but they also provide valuable information for determining rotations. The Discovery Program leadership team also engages regularly with the hosting technical teams to determine the skill sets they need to ensure positive and impactful rotational experiences for all parties involved. For each 6-month rotation cycle, there are no more than 40 hosting opportunities. A Discovery Program leader in each host group ensures that there are resources for mentoring the team's existing staff as well as the Discovery Program staff member and also ensures that the Discovery Program staff member can expect to have a reasonable workload.

See the article by Ott et al., in this issue, for reflections from APL leaders who have hosted Discovery Program staff members in their groups.

Career Development

As mentioned, Discovery Program staff members are part of a cohort, and two cohorts run concurrently. The cohorts meet monthly with each other and the Discovery Program leadership team to learn about each other's work through 5-minute lightning talks. These interactions allow the staff members to gain insight into work happening across APL while also reinforcing the professional development skills they are honing during their rotational placements.

In between these program meetings and spending 90% of their dedicated work time contributing to solving sponsor challenges within their host groups, Discovery Program staff members receive foundational career mentoring and training. They complete a series of professional development training sessions, including an effective presentation course and a project introducing them to the APL innovation ecosystem. See the article by Nimtz and Diehl, in this issue, for more on the program's training component.

These experiences prepare staff members to engage immediately with sponsors and actively contribute to innovation, evidenced by Discovery staff members' nearly 120 intellectual property (IP) filings and patent disclosures and numerous proposals for research and development concepts and thought leadership opportunities.[7] During their time in the Discovery Program, most staff members—more than 60%—are heavily involved in APL's innovation ecosystem (Figure 3).

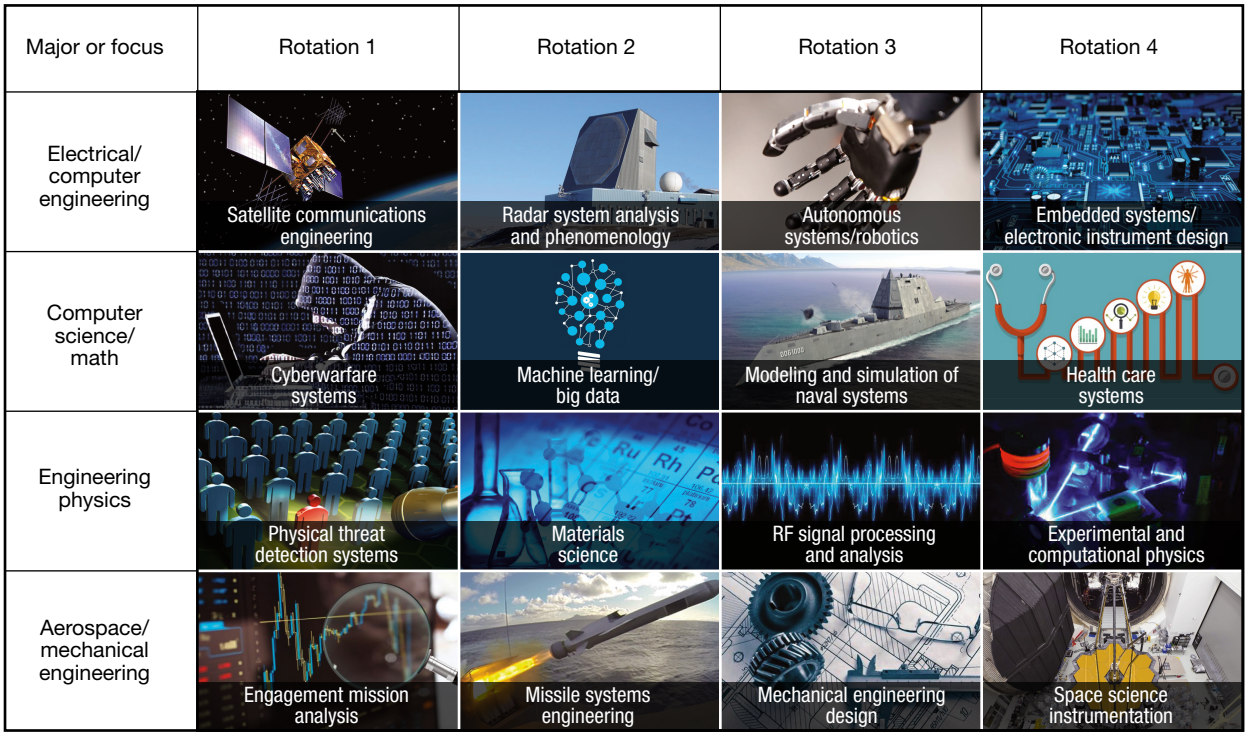

Figure 2. Example rotational assignments. Each experience is tailored to the individual; to date no two staff members have experienced the same four rotations over the course of the program.

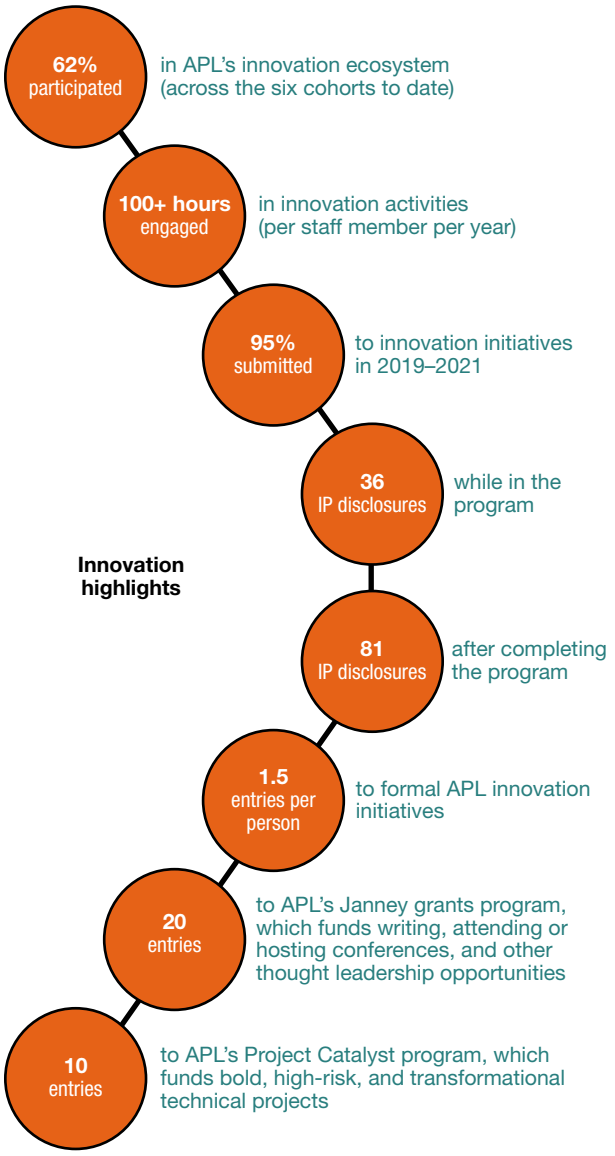

Figure 3. Discovery staff members' engagement in innovation for both sponsored projects and internal research and development.

In addition to its contributions to innovation at APL, the Discovery Program provides mentoring opportunities that benefit the entire Lab. Discovery Program staff members gain valuable career advice from their mentors. Hosting teams are able to train their up-and-coming leaders by providing them with mentees. Thus, staff growth and development is not limited to those staff members in Discovery Program cohorts but potentially extends to the more than 200 people these individuals will encounter throughout their 2-year adventures.

Final Placement

At the end of the 2-year program, based on the coaching sessions, feedback from the program cohorts, and input from the hosting technical teams, the Discovery Program leadership team determines a final placement for each staff member from one of the rotations. Figure 4 highlights how staff members from the 2015 to 2019 cohorts have been embedded across the organization after completing the program.

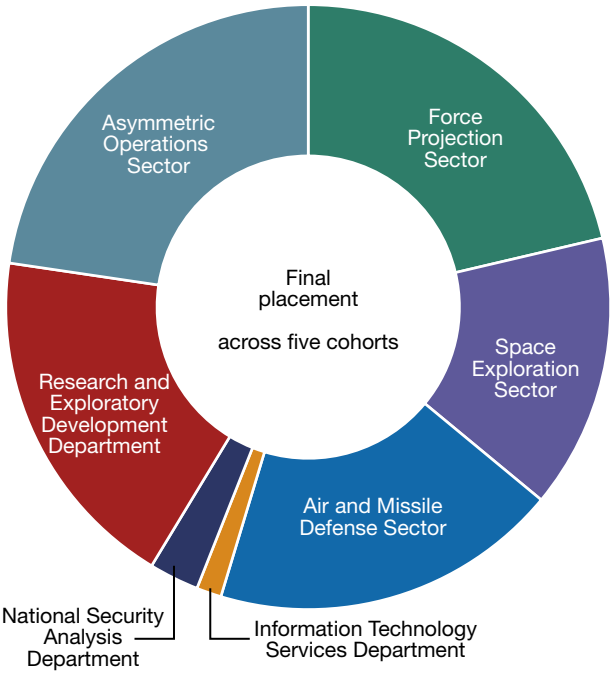

Figure 4. Placements across APL.

HIGHLIGHTS FROM THIS ISSUE

Like the rotations and placements, the 12 technical articles in this issue are broad in their focus and impact. These articles highlight a selection of work spanning all the domains APL supports, from innovative internally funded investigations into device signatures to frameworks for validation of models of strategic systems to the development of space systems using additive manufactured parts and more. These articles showcase the impact Discovery Program staff members have had while also highlighting the networks they have built. The final three articles are special features that focus on the impact of the program's third tenet—career foundations. Two of these articles offer reflections from some of the Discovery Program alumni and experienced host supervisors. The final article, from the vantage point of APL's Talent Services Department, discusses the program's training component and how professional careers are enhanced through both experiential and classroom learning.

CONCLUSION

Hiring, developing, and retaining talented staff is critical for any technical organization. The Discovery Program is one tool APL uses to meet these goals. Staff

members develop critical knowledge and skills and are placed in sectors and departments that are the best fit for both the organization and for the individual's continued career growth, enhancing APL's core competencies. In addition, the Discovery Program has been a model for other APL-wide initiatives for onboarding and developing its staff, such as the KEYS (Knowledge for Empowering Young Staff) program. The best practices cultivated within the Discovery Program enhance APL's development as an innovative organization. Through mentoring and developing Discovery Program staff members, APL is building a persistent, collaborative, and innovative network of impactful staff—a network that includes not only the 40 staff members in the Discovery Program annually but also all the staff members they encounter as mentors and colleagues. In the past 8 years that equates to more than 20,000 possible connections. This issue showcases the critical contributions of Discovery Program staff members and their APL colleagues who are working to realize APL's vision to be bold, do great things, and make the world a better place today and in the future.

ACKNOWLEDGMENTS: While the contributions and accomplishments discussed in this article and this issue are the result of Discovery Program staff members' hard work, a team of staff members behind the scenes made the program possible and are shepherding it into the future. The Discovery Program is a success today because of the phenomenal exploratory committee, led by John Bigelow, that established the program and the foundational work of Kathleen Baker and Carlyn Weaver as the initial supervisors. This program is efficient because of its talented administrative lead Eileena Garber. Furthermore, this program will continue to be an inspiration and guiding light for APL supervisors under its current leaders, Patrick Cox and Trena Lilly. I would be remiss if I did not mention the countless supervisors and staff members who have mentored and guided the Discovery Program staff members through their journeys. And, finally, the Research and Exploratory Development Department senior leadership team has been instrumental in guiding this effort.

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