APL Achievement Awards and Prizes

Erin M. Richardson

ABSTRACT

For more than three decades, the Johns Hopkins University Applied Physics Laboratory (APL) has celebrated the accomplishments of its staff members with an annual awards program. At its inception, the program recognized staff members' exceptional contributions to the scientific community via publication. While these publication awards are still presented today, the awards program has evolved to include new prizes recognizing extraordinary achievements in research and development and sponsored programs and, most recently, efforts that illustrate the Lab's focus on transformative innovations. Awards are presented in a formal ceremony on APL's campus in Laurel, Maryland. This article details the 23 awards presented this year; they represent but a portion of the critical contributions APL staff members made in 2017 and highlight exceptional examples of the Lab's focus on collaboration, world-class expertise, and game-changing impact.

INTRODUCTION

With the theme Be Bold, APL's annual awards ceremony took place on 24 April 2018 on the Lab's campus in Laurel, Maryland. The ceremony recognized staff members' best publications, research and development projects, inventions, innovations, and other accomplishments in 2017. In all, more than 600 APL staff members were nominated in 128 entries for the program's 23 awards, and more than 100 staff members were recognized for winning entries. For the most part, awards were presented in the order in which they were established, beginning with the publication awards and ending with the Boldies, the program's newest awards recognizing boldness. They are described in that same order in this short article.

PUBLICATION AWARDS

Administered by the editorial board of the *Johns Hopkins APL Technical Digest*, the publication awards program aims to inspire and recognize scholarship through publication in the professional literature. Awards were first presented in 1986, and the nomination and selection process remains the same: Departments and sectors may submit up to two nominations in each category. Judges consider the works' significance and clarity, giving considerably greater weight to the significance of the work in advancing science, engineering, or the mission of the Laboratory.

Of the body of work published in 2017, 35 publications involving 138 APL staff members were nominated, and 7 publications, one in each category, took honors. This

year's program included a new category for outstanding conference paper; this award category was added in recognition that presenting at conferences is an important element of APL's Centennial Vision to be at the center of a vibrant innovation ecosystem.

In addition to the seven publications recognized this year, the most prestigious of the publication awards, the Lifetime Achievement Award, was conferred. This award honors an author's career of achievement through a substantial body of publications that are significant in terms of peer recognition, prizes, citation frequency, or influence on the innovation ecosystem. This award is not given every year, and in fact, before this year's ceremony, it had not been presented since 2013.

R. W. HART PRIZE

The R. W. Hart Prize for Excellence in Independent Research and Development—first presented in 1989 and named for former APL assistant director for research and exploratory development Robert W. Hart—recognizes significant contributions that advance science and technology through independent research and development. Sectors and departments recommend candidates, and the Management Forum judges the nominations on their quality and importance to APL. Prizes are awarded in two categories: best research project and best development project. This year the sectors and departments nominated 17 projects involving 34 staff members for research and 48 staff members for development.

AWARDS FOR INVENTIONS

The Invention of the Year Award was first presented in 2000 to encourage new technology and innovation at APL. To identify the top technology from the preceding year, an independent review panel of technical and business consultants, technology transfer professionals, and intellectual property attorneys judges invention disclosures. The judges assess inventions' creativity, novelty, improvement to existing technology, commercial potential, and probable benefit to society. APL's Office of Technology Transfer reported a record-breaking 355 inventions disclosed this past year. Of these, the forum selected 10 inventions representing 38 staff members as finalists and ultimately narrowed the field to one winner.

The winners of the Invention of the Year Award might one day go on to achieve Master Inventor status. This honor recognizes those inventors who have been awarded at least 10 U.S. patents for their APL work. Lab management first presented the Master Inventor Award in 2007. This year's winner is only the 28th person to qualify for this award in the history of the Laboratory.

The first Government Purpose Innovation Award, recognizing an invention that meets a critical sponsor need, was presented in 2011. Selected by a team of technical leaders from across the Lab who are acquainted with APL's technology transfer practices, finalist inventions are judged on their novelty and potential impact to the sponsor community. This year's program included 12 entries involving 32 staff members.

AWARDS FOR INNOVATION

To position the Lab to respond to increasingly complex national challenges and to capitalize on rapid technological advances, APL's leaders have introduced several initiatives to encourage innovation across the Lab. One of these initiatives, Project Catalyst, offers staff members three funding opportunities for bold, high-risk, and transformational ideas that will ensure our nation's preeminence in the 21st century. Staff members submit ideas in response to challenges posted during several cycles throughout the year. Peers vote on the submissions, and finalists receive funding to develop their ideas.

The inaugural Project Catalyst award, the Ignition Grant Prize for Innovation, was presented for the first time in 2013 for the project judged to be most creative and to have the greatest potential impact. This year, there were 10 entries involving 37 staff members. The Combustion Grant Prize for Innovation, first presented in 2017, recognizes high-risk, high-impact technical ideas. Considered this year were 17 completed grants involving 84 staff members. And, finally, presented for the first time this year was the Propulsion Grant Prize for Innovation, honoring ideas that were selected for their third year of funding.

AWARDS FOR OUTSTANDING ACCOMPLISHMENTS

The Outstanding Mission Accomplishment Award, first presented in 2014, recognizes major achievements in mission-oriented programs and projects. Awards are given in two categories: a current challenge and an emerging challenge. For both types, a review team of top managers and executives from APL's sectors and mission areas solicits nominations for technical accomplishments in sponsored programs during the previous year. A program has to have achieved a significant milestone within the previous fiscal year to be eligible. The panel judges entries on technical excellence and potential impact. This year, there were 11 nominations involving 98 staff members.

The Outstanding Enterprise Accomplishment Award, first presented in 2015, recognizes the enterprise accomplishment with the greatest impact on APL's operations and culture of innovation. The winner is selected by a joint panel of APL's operations executives and managing executives. This year, the panel selected from 8 nominations involving 67 staff members.

THE ALVIN R. EATON AWARD

This Alvin R. Eaton, or ARE, Award has been presented annually since 2001 but was not presented publicly during the awards ceremony until 2016. It honors staff members who have spent much of their careers leading remarkable achievements that we cannot talk about. The awardee is selected by APL's director and assistant director for programs.

DIRECTOR'S AWARD FOR SPECIAL ACHIEVEMENT

Sometimes a major accomplishment is outside the usual award categories. The Director's Award for Special Achievement recognizes such accomplishments. This award was first presented in 2017, and Lab management proudly presented it again this year.

THE BOLDIES

And, finally, emphasizing the theme of this year's awards program—and indeed a theme permeating all of APL—are the newest awards, the Boldies. This year Lab management brought together a team of technical leaders and contributors and asked them what they would recommend to increase APL's boldness. This group, Team Bold, proposed instituting two formal awards to celebrate boldness.

The Bumblebee Award recognizes improbable designs that had remarkable results, much like APL's historic Bumblebee program, whose name was inspired by a quote attributed to aviation pioneer Igor Sikorsky:

> According to recognized aerotechnical tests the bumblebee cannot fly because of the shape and weight of his body in relation to the total wing areas. BUT, the bumblebee doesn't know this, so he goes ahead and flies anyway.

The Noble Prize celebrates work that was not fully successful but taught us a lot—kind of a play on Nobel Prize and noble failure. The team selected the winners from 8 nominations involving 59 staff members.

CONCLUSION

APL's awards program continues to grow to recognize the diverse contributions APL staff members make to solving the nation's most complex challenges. Not only do the awards represent APL's best in meeting today's challenges, but they also demonstrate the Lab's ever-evolving capacity to be bold and innovative in the face of future challenges. The following pages display the award winners' names, along with titles and brief descriptions of their publications, research and development efforts, inventions, innovations, and other outstanding accomplishments.

Erin M. Richardson, Business, Communications, and Facilities Department, Johns Hopkins University Applied Physics Laboratory, Laurel, MD

Erin Richardson is an editor in the Creative Communications Group and managing editor of the *Johns Hopkins APL Technical Digest*. She received a B.A. in English and writing from Loyola College in Maryland (now Loyola University Maryland). She has experience in all facets of editing, publication development, and production management, having worked as a journal production manager, a project manager, and a conference managing editor before joining the Lab. Erin is a member of ACES: The Society for Editing. Her e-mail address is erin.richardson@jhuapl.edu.

PUBLICATION AWARDS (for work published in 2017)

Author's First Paper in a Journal or Proceedings

For "Two-Dimensional Laser-Induced Ablation Modeling with Integrated Melt Flow and Vapor Dynamics," *Journal of Laser Applications* **29**, 022212 (2017).

The parameters that govern laser ablation caused by a laser striking a substrate are not yet well understood. The computational framework DEIVI, for directed energy illumination and visualization, greatly enhances our understanding by combining the relevant physical processes in a fully two-dimensional, coupled multi-physics model with temperature-dependent properties.

Carolyn Sawyer, Space Exploration Sector

Outstanding Paper in the *Johns Hopkins APL Technical Digest* (The Walter G. Berl Award)

For "Maximizing MESSENGER's Science Return with Technologies and Innovation," *Johns Hopkins APL Technical Digest* **34**(1), 71–87 (2017).

The technological advances and innovations on the MESSENGER mission enabled an APL-led team to conduct science expected of a NASA flagship mission on the constrained budget of the Discovery Program. Three generations of extended missions addressed science that could not have been imagined during MESSENGER's development.

Stewart Bushman, Space Exploration Sector (SES); **Andrew Calloway**, SES; **Rob Gold**, SES; **Daniel O'Shaughnessy**, SES; and **Dipak Srinivasan**, SES

Outstanding Paper in the *Johns Hopkins APL Technical Digest* (The Walter G. Berl Award): From left to right are Stewart Bushman, Rob Gold, and Andrew Calloway. Not pictured: Daniel O'Shaughnessy and Dipak Srinivasan.

Outstanding Research Paper in an Externally Refereed Journal Publication

For "Quantum Error-Correction Failure Distributions: Comparison of Coherent and Stochastic Error Models," *Physical Review A* **95**, 062338 (2017).

An in-depth comparison between different types of error models—coherent versus stochastic—is performed. The investigation highlights the need for caution when choosing an adequate quantum error-correction routine, which is an essential step for successful fault-tolerant quantum computation.

Jeffrey Barnes, Research and Exploratory Development Department (REDD); **Dave Clader**, REDD; and **Dennis Lucarelli**, REDD

Outstanding Development Paper in an Externally Refereed Journal Publication

For "Dual Satellite-Aided Planetary Capture with Interplanetary Trajectory Constraints," *Journal of Guidance, Control, and Dynamics* **40**(3), 548–562 (2017).

The capturing of a spacecraft into the Jovian system is a balance between the time of flight, orbit insertion maneuver magnitude, mass delivered, capture orbit period, radiation dose, and mission complexity. This paper introduces the analytical tools to seed a multiple-shooting algorithm to determine the high-fidelity solution space for the Europa mission.

Amanda Haapala Chalk, Space Exploration Sector (SES); **Martin Ozimek**, SES; **Christopher Scott**, SES; and **Fazle Siddique**, SES

Outstanding Research Paper in an Externally Refereed Journal Publication: From left to right are Jeffrey Barnes and Dave Clader. Not pictured: Dennis Lucarelli.

Outstanding Professional Book

For *NASA/ESA/ASI Cassini-Huygens Owners' Workshop Manual*, Haynes, Somerset, UK (2017).

A summary of the Cassini-Huygens mission to the Saturn system provides a historical account and insights into how the spacecraft was designed and operated. The book also discusses the major scientific findings of the mission.

Ralph Lorenz, Space Exploration Sector

Outstanding Special Publication

For "Cell-Free Synthetic Biology for Environmental Sensing and Remediation," *Current Opinion in Biotechnology* **45**, 69–75 (2017).

The field of cell-free synthetic biology aims to harness essential components of living cells to implement applications *in vitro*. This article assesses state-of-the-art developments that can pave the way toward

Outstanding Professional Book: Ralph Lorenz.

Outstanding Special Publication: Dave Karig.

Lifetime Achievement Publication Award: Rob Gold.

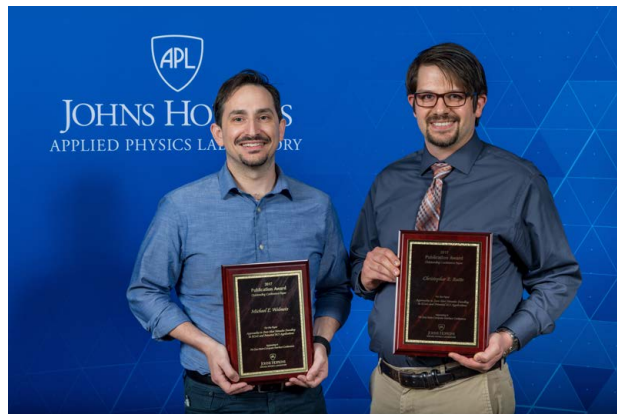fieldable sensing and remediation applications of cell-free systems.

Dave Karig, Research and Exploratory Development Department
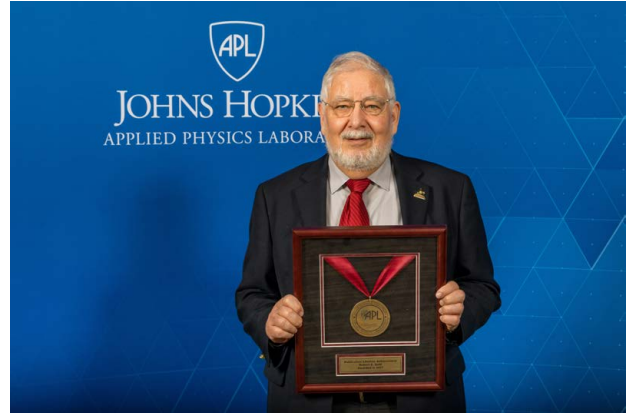
Outstanding Conference Paper

For "Approaches to Zero-Shot Stimulus Decoding in ECoG (Electrocorticography) and Potential BCI (Brain-Computer Interface) Applications," 7th Graz Brain-Computer Interface Conference (GB-CIC2017), Graz, Austria, 18–22 September 2017.

Recent findings by APL and the Johns Hopkins School of Medicine, presented at the 7th Graz Brain-Computer Interface Conference, suggest that machines may one day be able to decode conceptual human thought in a variety of rehabilitative and military applications.

Christopher Ratto, Force Projection Sector; **Matt Roos**, Research and Exploratory Development Department (REDD); and **Michael Wolmetz**, REDD

Lifetime Achievement Publication Award

For a substantial body of publications that are significant in terms of peer recognition, prizes, citation frequency, or influence on the innovation ecosystem.

Rob Gold, Space Exploration Sector

R. W. HART PRIZES (for efforts in 2017)
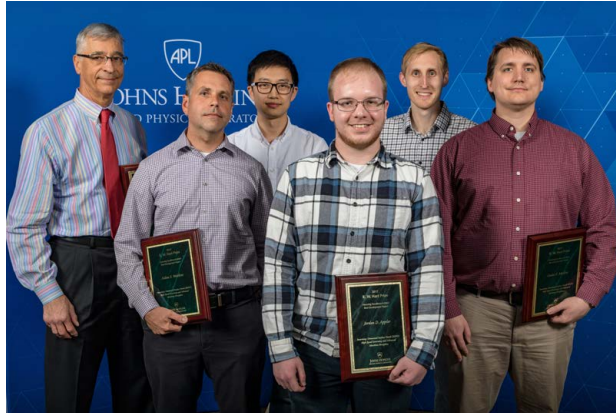
Best Research Project

For "Inference Under Uncertainty"

Galileo is a mixture-model–based algorithm that provides clustering of data that matches or surpasses the best current algorithms in accuracy and scales to perform much more efficiently on very large data sets. It also provides anomaly detection, classification, and link inference capabilities.

Principal participants **Philip Graff**, Asymmetric Operations Sector (AOS); **Matt Kinsey**, AOS; **Jeff Lin**, AOS; and **Cetin Savkli**, AOS

Outstanding Conference Paper: From left to right are Michael Wolmetz and Christopher Ratto. Not pictured: Matt Roos.

R. W. Hart Prize for Best Research Project: From left to right are Cetin Savkli and Philip Graff. Not pictured: Matt Kinsey and Jeff Lin.

R. W. Hart Prize for Best Development Project: Back row from left to right are James Horris, Da Xu, and Michael Hannan. Front row from left to right are Adam Watkins, Jordan Appler, and Galen Mullins. Not pictured: Mark Gaither, Lee Schloesser, and Paul Stankiewicz.

Best Development Project

For "Swarming Unmanned Surface Vessels: High Speed Swarming and Advanced Maritime Perception"

The team successfully developed and demonstrated an autonomous advanced maritime perception capability adaptable to a broad range of surface platforms and, with some modification, to the ground and undersea domains.
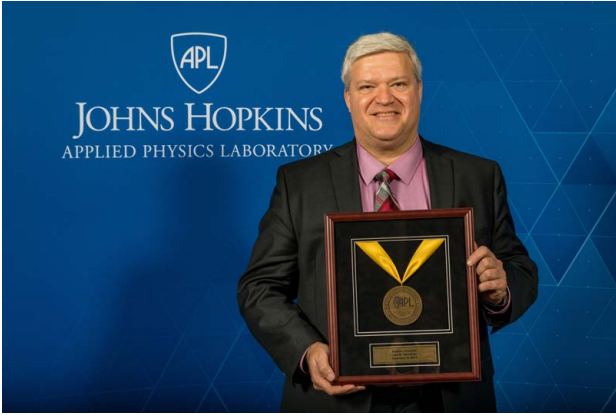
Jordan Appler, Force Projection Sector (FPS); **Mark Gaither**, FPS; **Michael Hannan**, FPS; **James Horris**, FPS; **Galen Mullins**, Research and Exploratory Development Department; **Lee Schloesser**, FPS; **Paul Stankiewicz**, FPS; **Adam Watkins**, FPS; and **Da Xu**, FPS

INVENTION OF THE YEAR (for disclosures in 2017)

For "Thiol-ene Based Polymer Electrolytes for Safe, High Performance Flexible Aqueous Batteries"

Invention of the Year Award: From left to right are Adam Freeman, Konstantinos Gerasopoulos, and Christopher Hoffman.

Master Inventor: Leo Gauthier.

Annual global lithium-ion battery production is expected to surge from 30 to 200 gigawatt hours despite being inherently dangerous. For safety, lithium-ion batteries require stringent packaging and thermal management systems—adding weight and rigid form factors. APL's approach provides a safe, flexible, and stretchable alternative.

Adam Freeman, Research and Exploratory Development Department (REDD); **Konstantinos Gerasopoulos**, REDD; and **Christopher Hoffman**, REDD
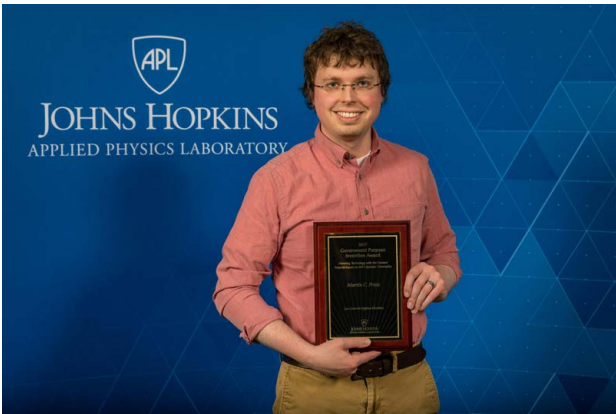
MASTER INVENTOR AWARD

For his 10 issued U.S. patents while employed at APL. He is the 28th person to receive this award.

Leo Gauthier, Air and Missile Defense Sector

GOVERNMENT PURPOSE INNOVATION AWARD (for innovation in 2017)

For "Low-Cost Air Defense Munition"

Government Purpose Innovation Award: Martin Priess. Not pictured: Robert Fry.

A directed warhead and optical fuze allow for much greater miss distance for a spinning gun-fired projectile by focusing the detonation in the direction of the target. This could provide a game-changing, affordable defense against swarms of hostiles.

Robert Fry, Force Projection Sector; and **Martin Priess**, Air and Missile Defense Sector

IGNITION GRANT PRIZE FOR INNOVATION

(for innovation in 2017)

For "Clone-A-Bone: Additive Manufacturing of Skull Bones"

The team applied state-of-the-art additive manufacturing technologies to produce mechanically accurate and biologically viable surrogates of bone for use in injury, biomechanical testing, and regenerative medical applications.

Jason Benkoski, Space Exploration Sector; **Eddie Gienger**, Research and Exploratory Development Department (REDD); and **Alex Iwaskiw**, REDD

COMBUSTION GRANT PRIZE FOR INNOVATION (for innovation in 2017)

For "Near Field Electromagnetic Pulse (EMP) Weapon"

This project aimed to demonstrate a novel EMP weapon that is ideal for localized attacks. The project focused on demonstrating a reliable triggering device, capturing the EMP waveform, and simulating the effects of this waveform on traditional EMP circuit shielding.

Jacob Alldredge, Research and Exploratory Development Department (REDD); **Jacob Epstein**, REDD; and **Kyle McElroy**, REDD

Combustion Grant Prize for Innovation: Jacob Alldredge. Not pictured: Jacob Epstein and Kyle McElroy.

PROPULSION GRANT PRIZE FOR INNOVATION (for innovation in 2017)

For "Provenance" (tie)

We face a world in which synthetic bioweapons can be made to achieve strategic objectives with plausible deniability for the aggressor. This project aims to provide deterrence against the creation of designer bioweapons by standardizing and integrating technologies and procedures for detection, analysis, and attribution in the event of an attack.

Jessica Dymond, Research and Exploratory Development Department (REDD); **Jared Evans**, REDD; **Erin Hahn**, National Security Analysis Department; **Craig Howser**, REDD; **Thomas Mehoke**, REDD; **Justin Osborn**, Asymmetric Operations Sector; **Corban Rivera**, REDD; **Peter Thielen**, REDD; **Briana Vecchio-Pagan**, REDD; and **Joshua Wolfe**, REDD

Ignition Grant Prize for Innovation: From left to right are Alex Iwaskiw and Eddie Gienger. Not pictured: Jason Benkoski.

Propulsion Grant Prize for Innovation (tie): Back row from left to right are Joshua Wolfe, Corban Rivera, and Jared Evans. Front row from left to right are Peter Thielen, Jessica Dymond, Briana Vecchio-Pagan, and Thomas Mehoke. Not pictured: Craig Howser, Justin Osborn, and Erin Hahn.

Propulsion Grant Prize for Innovation (tie): Back row from left to right are Chad Hawes, Derik Thompson, and David Barsic. Middle row from left to right are C. J. Della Porta, Matthew Giarra, and Luke DeYoung. Front row from left to right are Frank Serna, Austin Dress, and Matthew Fall. Not pictured: Caleb Wang.

For "DeepMine" (tie)

This project addresses the need to rapidly find and identify deployed undersea objects, such as mines, that threaten ships, submarines, and critical infrastructures. The team is developing an artificial intelligence approach that could greatly increase search speed while reducing the number of systems needed to cover hundreds of square miles.

David Barsic, Force Projection Sector (FPS); **C. J. Della Porta**, FPS; **Luke DeYoung**, FPS; **Austin Dress**, FPS; **Matthew Fall**, FPS; **Matthew Giarra**, Asymmetric Operations Sector; **Chad Hawes**, FPS; **Frank Serna**, FPS; **Derik Thompson**, FPS; and **Caleb Wang**, FPS

OUTSTANDING MISSION ACCOMPLISHMENT AWARD (for accomplishments in 2017)

For Current Challenge

For "Quick Reaction Surveillance System"

APL is the lead integrator for the Quick Reaction Surveillance System program. After rapid modification of shipboard structures and installation of the Surveillance Towed Array Sensor System (known as SURTASS) twin-line acoustic subsystem on the platform of a foreign ally, the system exceeded all expectations in acoustic trials.

Daniel Barlow, Force Projection Sector (FPS); **Max Beck**, FPS; **Ray Cooke**, FPS; **Evan Gillett**, FPS; **Brendan Gotowka**, FPS; **Karl Kreatschman**, FPS; **Tom McIlroy**, FPS; **Javier Ortiz**, FPS; **Richard Shelsby**, FPS; and **David Shibilsky**, FPS
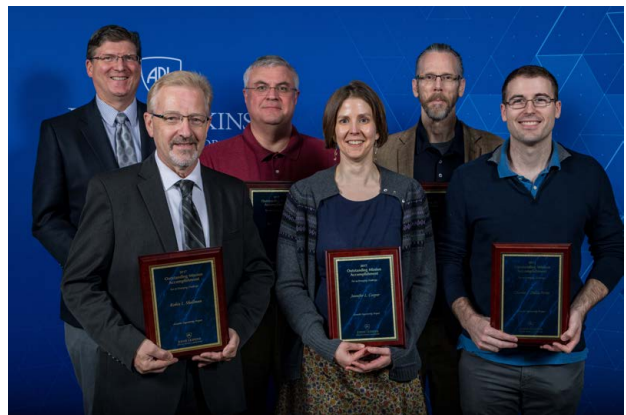

Outstanding Mission Accomplishment Award for Current Challenge: Back row from left to right are Brendan Gotowka, Javier Ortiz, and Daniel Barlow. Front row from left to right are Richard Shelsby and Max Beck. Not pictured: Ray Cooke, Evan Gillett, Karl Kreatschman, Tom McIlroy, and David Shibilsky.
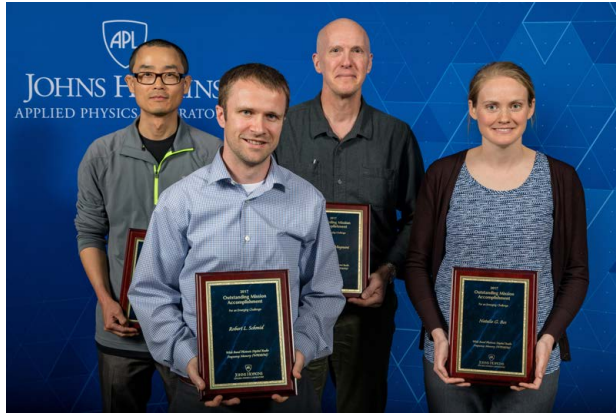
For Emerging Challenge

For "Acoustic Superiority Project" (tie)

The project involved exploring and demonstrating the benefits of an advanced acoustic sensor system for submarines. Such a sensor system will extend the detection range and improve the security, survivability, and lethality of the U.S. submarine force. Concepts being developed are ushering in a new future for acoustics in anti-submarine warfare.

Jennifer Cooper, Force Projection Sector (FPS); **C. J. Della Porta**, FPS; **Patrick Ferat**, FPS; **Lee Rogers**, FPS; **Iman Schurman**, FPS; **Cory Sheffer**, FPS; **Robin Shellman**, FPS; **John Sweeney**, FPS; and **Michael Thompson**, FPS

Outstanding Mission Accomplishment Award for Emerging Challenge (tie): Back row from left to right are Cory Sheffer, Lee Rogers, and Iman Schurman. Front row from left to right are Robin Shellman, Jennifer Cooper, and C. J. Della Porta. Not pictured: Patrick Ferat, John Sweeney, and Michael Thompson.

Outstanding Mission Accomplishment for Emerging Challenge (tie): Back row from left to right are Jay Song and Tim Magnani. Front row from left to right are Robert Schmid and Natalie Bos. Not pictured: Tom Clark, Jean Kalkavage, William Kirschner, Kristopher Lamont, Robert Landle, and Brian Stevens.

For "Wide Band Photonic Digital Radio Frequency Memory (WPDRFM)" (tie)

In this joint venture, the Air and Missile Defense and Force Projection Sectors successfully developed and delivered a prototype for the Next Generation Jammer Mid-Band program's risk-reduction efforts. This technology demonstrated a viable solution to countering advanced future threats operating at frequencies that extend into the millimeter-wave region and beyond.

Natalie Bos, Asymmetric Operations Sector; **Tom Clark**, Air and Missile Defense Sector (AMDS); **Jean Kalkavage**, AMDS; **William Kirschner**, Force Projection Sector (FPS); **Kristopher Lamont**, FPS; **Robert Landle**, FPS; **Tim Magnani**, FPS; **Robert Schmid**, AMDS; **Jay Song**, FPS; and **Brian Stevens**, FPS

OUTSTANDING ENTERPRISE ACCOMPLISHMENT AWARD (for accomplishments in 2017)

For "OPSLink: Closed Area and Information System Management Application"

The OPSLink application significantly improves the overall security and compliance posture for a classified processing environment by providing actionable intelligence to key personnel. It has quantitatively improved APL's annual Defense Security System assessment scores.

Joseph Bennett, Force Projection Sector (FPS); **Brian Kilheffer**, FPS; **Lanli Liu**, FPS; and **Mark Sutton**, FPS

Outstanding Enterprise Accomplishment Award: From left to right are Lanli Liu, Mark Sutton, and Brian Kilheffer. Not pictured: Joseph Bennett.

THE ALVIN R. EATON AWARD

For supporting a variety of sponsored efforts across APL with strong technical skills, domain expertise, and an outstanding reputation in the intelligence community. He has enabled APL to make critical contributions in the detection, location, and identification of difficult threats.
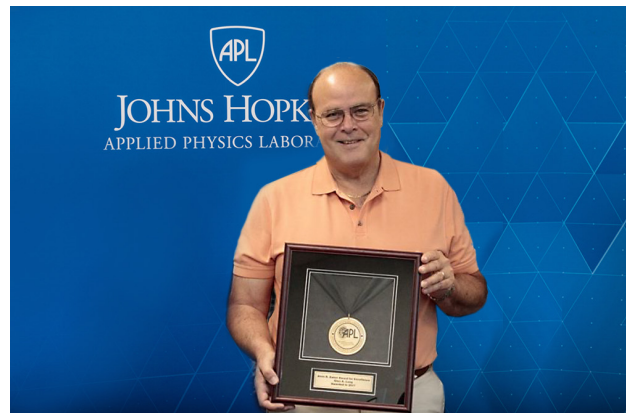
Glen Long, Force Projection Sector (FPS)

DIRECTOR'S AWARD FOR SPECIAL ACHIEVEMENT (for achievements in 2017)

For "Free-Space Optics Technology Demonstrator"

During the U.S. Navy's Trident Warrior Fleet Exercise 2017, the APL team successfully demonstrated high-bandwidth free-space optical communications between two moving ships, proving the operational utility of optical communications technology in the maritime environment.

Cheryl Beard, Air and Missile Defense Sector (AMDS); **Juan Juarez**, AMDS; **Dustin Nicholes**, Asymmetric

The Alvin R. Eaton Award: Glen Long.

Director's Award for Special Achievement: Back row from left to right are Cheryl Beard, Kathleen Perrino, James Riggins, Dustin Nicholes, Krunal Patel, and Juan Juarez. Front row from left to right are Katie Souza, Michelle O'Toole, and Hala Tomey. Not pictured: Radha Venkat.

Operations Sector (AOS); **Michelle O'Toole**, AMDS; **Krunal Patel**, AMDS; **Kathleen Perrino**, Research and Exploratory Development Department (REDD); **James Riggins**, AOS; **Katie Souza**, AOS; **Hala Tomey**, REDD; and **Radha Venkat**, Force Projection Sector

BUMBLEBEE AWARD (for boldness in 2017)

For "Corrosion Investigation of Additively Manufactured Alloys"

APL is leveraging additive manufacturing to invent the future of corrosion protection. Our researchers are disrupting the state of the art by moving from conventional surface treatments to building corrosion mitigation directly into the 3-D parts. This breakthrough increases the durability of ships and airplanes that are constantly exposed to weather.

Jeff Maranchi, Research and Exploratory Development Department (REDD); **Tim Montalbano**, REDD; **Cavin Mooers**, REDD; **Rengaswamy Srinivasan**, REDD; and **Steven Storck**, REDD

NOBLE PRIZE (for boldness in 2017)

For "A Novel Synthetic Strategy for the Production of High-Performance Fibers"

Bumblebee Award: Pictured from left to right are Rengaswamy Srinivasan, Steven Storck, and Tim Montalbano. Not pictured: Jeff Maranchi and Cavin Mooers.

The goal of this project was to develop a novel method for making high-performance fibers by designing a synthetic route that would allow for these polymers to be produced in multiple steps. The chemistry required to make intermediate polymers proved incredibly challenging, and ultimately attempts were unsuccessful. However, the team was able to produce a method for making liquid-crystal polymers using a stepwise procedure and built an apparatus to add to APL's in-house fiber synthesis capabilities.

Chris Hoffman, Research and Exploratory Development Department; and **James Johnson**, Asymmetric Operations Sector

Noble Prize: Pictured from left to right are James Johnson and Chris Hoffman.