

APL Achievement Awards and Prizes

Erin M. Richardson and Kelly K. Livieratos



ABSTRACT

In the book celebrating the 75th anniversary of the Johns Hopkins University Applied Physics Laboratory (APL), the author remarked, “Over the decades, APL has pushed through innumerable scientific, engineering, technical, and technological barriers. Staff members have been awarded numerous patents for their unclassified work, and more than 30 companies have spun off from APL technologies and products—six in just the past two years.” Impressive as it is, this sentiment covers only some of the remarkable achievements of APL’s talented staff members. To formally recognize the exceptional contributions of its staff, for more than 30 years APL has conducted an annual awards program celebrating inventions, innovations, publications, and other accomplishments. This article presents the history of APL’s achievement awards and prizes, highlights the most recent esteemed winners, and lists the names of past award winners.

HISTORY OF THE AWARDS PROGRAM

The Johns Hopkins University Applied Physics Laboratory (APL) first presented its formal awards program in 1986 to recognize work published in the preceding year. Administered by the editorial board of the *Johns Hopkins APL Technical Digest*, the program sought to inspire and recognize scholarship through publication in the professional literature. Walter Berl, who was *Digest* editor-in-chief at the time and for whom a publication award was later named, was well aware of the difficulty in crafting an exceptional piece of writing: “[It] is hard work. Few authors approach it with happy anticipation because it requires much discipline to transform refractory data into believable results, to convert shadowy concepts into robust theories, and to extract from a welter of fractious ‘facts’ the few nuggets of valuable discoveries.”¹ At its launch, the program included five categories:

- I. Published articles by authors who had not previously published in technical journals
 - II. Articles published in the *Johns Hopkins APL Technical Digest*
 - III. Articles published in unclassified refereed journals or proceedings
 - IV. Articles published in classified publications with limited distribution
 - V. Contributions in the form of books and articles written for general, but technically sophisticated, audiences
- A sixth category, “an award for producing an unusual assemblage of distinguished publications during a professional career at APL,”¹ was soon added.

The nomination process entailed the heads of the Lab's technical departments nominating works published the previous year; they could put forward up to two works in each category. The *Digest* editorial board, which could nominate additional publications, scored the submissions and selected winners, basing their choices on both significance and clarity, with greater weight placed on the importance of the work in advancing the particular field or the Lab's mission. These nomination and selection processes continue today.

Soon after the program's inception, the editorial board introduced what is now known as the Lifetime Achievement Award "to honor career staff members who have achieved distinguished publication records."² Walter Berl described additional changes to the 1988 program: "The large category that includes articles published in unclassified refereed technical journals or proceedings was divided into two sections, one dealing with research topics, the other with developmental topics in engineering and applied research; and awards were given to organizers of technical conferences who were also responsible for editing the published proceedings."³ Berl did not mention another important change that had occurred the previous year: the award for best paper in the *Digest* was renamed the Walter G. Berl Award in his honor.

Recognizing that some staff members were making critical contributions that might not have immediate paths to publication, APL management introduced a new set of prizes in 1989. Named for former

APL Assistant Director for Research and Exploratory Development Robert W. Hart, the R. W. Hart Prizes for Excellence in Independent Research and Development (IRAD) recognize important advances in science and technology, with prizes awarded in two categories: best research project and best development project. By awarding these prizes, APL management sought "both to signify the importance of the IRAD program to the long-term future of the Laboratory and to reward achievements in high-quality innovative projects."⁴ The nomination and selection process persists today: nominations are solicited from each technical department, and a panel judges the projects on their quality and significance to APL.

In 1990, the publication awards program expanded once again to include a category for articles submitted to the *APL Technical Review*, the classified companion journal to the *Digest*, which made its debut in 1987. The awards program continued unchanged until 1993, when the number of publication categories reverted to six, with the categories for articles in the *Digest* and the *Technical Review* combined and the separate category for classified papers eliminated.

An exciting addition to the program came in 2000 with the first presentation of the Invention of the Year Award, which celebrates the top technology from the previous year. To select the winning inventions, members of a comprehensive panel comprising technical and business consultants, technology transfer professionals, and intellectual property attorneys judge invention dis-

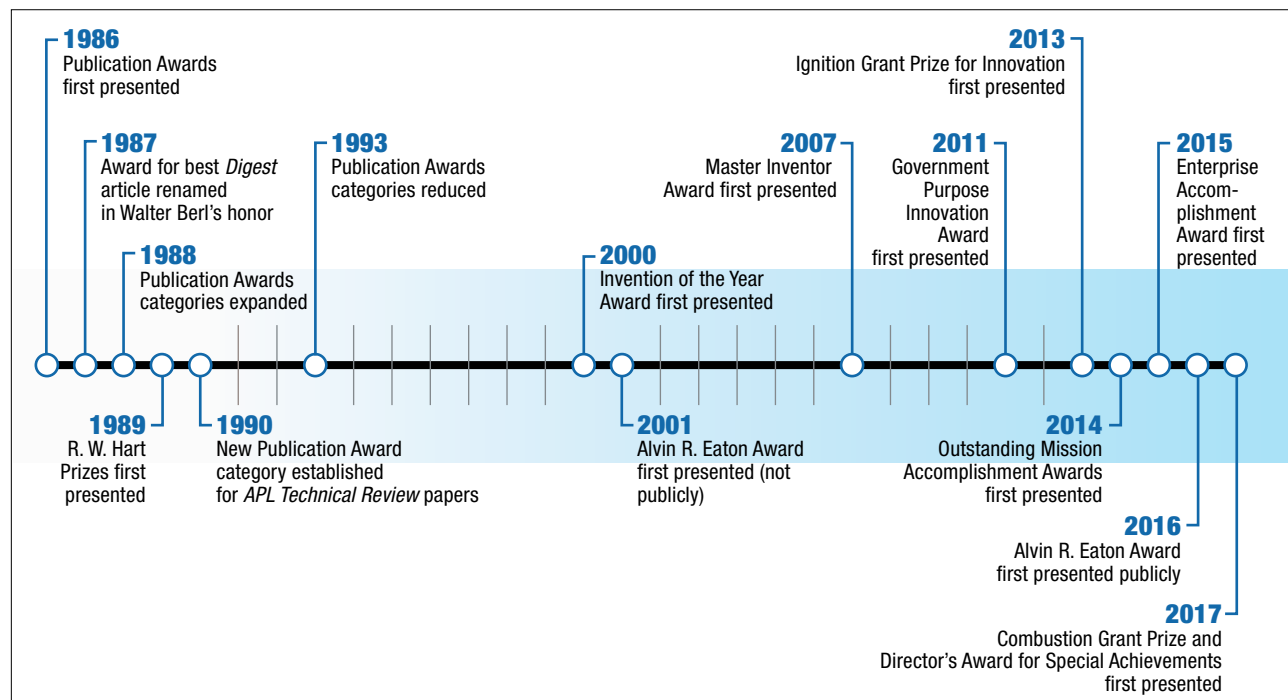


Figure 1. Evolution of APL's achievement awards program. As the Lab and its work have evolved, the program has continually expanded to recognize the changing contributions and accomplishments of APL's staff members.

closures for their creativity, novelty, improvement over existing technology, commercial benefit, and anticipated benefit to society.

To recognize 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. To date, only 27 people have qualified for this award in the history of the Laboratory. The first Government Purpose Innovation Award, in recognition of an invention that meets a critical sponsor need, was presented in 2011.

In recent years, to position the Lab to respond to increasingly intricate national challenges and to capitalize on rapid technological advances, APL's leaders have introduced several initiatives to encourage innovation at the Lab. As it has done throughout its history, the awards program expanded to reward excellence as part of these initiatives. New in 2013 was the Ignition Grant Prize for Innovation. This award "provide[s] APL staff with a way to explore innovative ideas outside of their traditional work assignments. Open to all APL staff, challenges are posted during several cycles held throughout the year and ideas are submitted for solutions. The winning ideas from each cycle are determined by popular vote, and the finalists receive funding to develop their ideas. The Management Forum narrows the field of awarded grants to a top few nominees, and staff vote for the top award on the basis of each idea's creativity and potential for impact."⁵

The following year, APL introduced the Outstanding Mission Accomplishment Awards, with two categories: one for a current challenge and one for an emerging challenge. In a process similar to that for APL's other awards, a panel comprising APL managers and executives solicits nominations of the previous year's technical accomplishments. The panel judges submissions on technical excellence and potential impact.

APL leadership recognized that staff members also excelled on projects not directly associated with sponsored programs, so it presented the first Enterprise Accomplishment Award in 2015. This award celebrates administrative initiatives with the greatest impact on APL's operations and culture of innovation. And, finally, in 2017, two new awards were presented. The Combustion Grant Prize recognizes excellence in the previous year's Combustion Grants program, which is an ongoing opportunity to win funding for innovative, high-risk, high-impact technical ideas; and the Director's Award for Special Achievements recognizes significant accomplishments that are outside the scope of the other award categories.

All of these awards and prizes are conferred during an annual ceremony attended by APL management and staff; local leaders often attend as well. One award, however, was not presented publicly until 2016: the Alvin R.

Eaton Award. "Named in honor of the late aerodynamics pioneer whose designs formed the basis for modern guided missile weapon systems, this award recognizes Laboratory staff members who have made transformative innovations to national security in areas and programs in which the U.S. government has placed exceptionally restrictive security measures."⁶

WINNERS

APL's awards program continues to evolve to recognize the variety of contributions APL staff members make, and the awards ceremony continues to be an anticipated event. According to the press release describing the 2017 program, "442 APL staff members were named in 106 nominated entries for the 18 awards, and 99 staff members were recognized for winning entries. Those entries represented a small portion of the critical contributions APL made for the nation in 2016, and highlighted a few outstanding examples of the Lab's focus on collaboration, world-class expertise, and game-changing impact."⁷ The names and photos of these winners are displayed on the following pages, accompanied by short descriptions of their inventions, projects, accomplishments, and publications. Following the list of the most recent winners is a list of past winners.

CONCLUSION

In the book celebrating APL's 75th anniversary,⁸ Michael Hankin, chair of APL's board of managers, reflected, "As we mark this important milestone in the history of this great enterprise, we reflect proudly on the Lab's many past achievements and look forward confidently to the new challenges and opportunities we will face together." APL's awards program has recognized and will continue to recognize and reward the very best of these accomplishments.

REFERENCES

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- ⁴Maier-Tyler, L. L., "APL Awards for Publications, Research and Development, and Inventions for 2002," *Johns Hopkins APL Tech. Dig.* 24(4), 388–393 (2003).
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- ⁷Brown, G., "Lab Celebrates Innovations and Accomplishments at APL Achievement Awards," Press Release, JHU/APL, Laurel, MD (10 May 2017).
- ⁸Banham, R., *Defining Innovations: A History of the Johns Hopkins University Applied Physics Laboratory*, JHU/APL, Laurel, MD (2017).



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Jacob D. Couch, winner of the Publication Award for Author's First Paper in a Journal or Proceedings.

2017 PUBLICATION AWARDS

(for work published in 2016)

Author's First Paper in a Journal or Proceedings

For "An Investigation into a Circuit Based Supply Chain Analyzer for FPGAs," *Proceedings of the 26th International Conference on Field Programmable Logic and Applications*, Lausanne, Switzerland, pp. 1–9 (2016).

Ensuring integrity of FPGA devices used to repair mission-critical systems is of vital importance to many government agencies. Device impurity could be from the manufacturing process, device age, or tampering. The paper describes APL's unique method for integrity determination among replacement FPGAs, which would lead to improved system reliability.

Jacob D. Couch, Senior Professional Staff, Asymmetric Operations Sector; and John Arkoian (non-APL staff)

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

For "Van Allen Probes Mission Overview and Discoveries to Date," *Johns Hopkins APL Technical Digest* **33**(3), 173–182 (2016).

The Van Allen Probes have revolutionized our understanding of Earth's inner magnetosphere and radiation belts and have led to over 225 publications and various breakthroughs. A healthy flight system and payload, and remaining propellant to support operations well into 2019, should provide numerous new science discoveries well into the future.

Elena Y. Adams, Senior Professional Staff, Space Exploration Sector (SES); **Nicola J. Fox**,



Pictured from left to right: Elena Y. Adams and Aleksandr Y. Ukhorskiy, winners of the Walter G. Berl Award.

Principal Professional Staff, SES; **Kristin A. Fretz**, Senior Professional Staff, SES; and **Aleksandr Y. Ukhorskiy**, Senior Professional Staff, SES

Outstanding Research Paper in an Externally Refereed Journal Publication

For "Individual Finger Control of a Modular Prosthetic Limb Using High-Density Electroencephalography in a Human Subject," *Journal of Neural Engineering* **13**(2), 1–13 (2016).

This paper outlines the use of high gamma neural signals from the hand region of the motor cortex of the brain, recorded through an implanted electroencephalography electrode array, to control the finger movements of the Modular Prosthetic Limb.



Pictured from left to right: Brock A. Wester, Matthew S. Fifer, and Robert S. Armiger, winners of the Publication Award for Outstanding Research Paper in an Externally Refereed Journal Publication.

Guy Hotson (non-APL staff); David P. McMullen (non-APL staff); **Matthew S. Fifer**, Senior Professional Staff, Research and Exploratory Development Department (REDD); **Matthew S. Johannes**, Senior Professional Staff, REDD; **Kapil D. Katyal**, Senior Professional Staff, REDD; **Matthew P. Para**, Senior Professional Staff, REDD; **Robert S. Armiger**, Principal Professional Staff, REDD; William S. Anderson (non-APL staff); Nitish V. Thakor (non-APL staff); and **Brock A. Wester**, Senior Professional Staff, REDD



Pictured from left to right: David J. Lawrence and Patrick N. Peplowski, winners of the Publication Award for Outstanding Research Paper in an Externally Refereed Journal Publication.

For “Remote Sensing Evidence for an Ancient Carbon-Bearing Crust on Mercury,” *Nature Geoscience* **9**(4), 273–276 (2016).

Analysis of data from five MESSENGER instruments shows that Mercury’s low reflectivity results from the planet’s crust composition, which contains several percent carbon. This result is consistent with the formation of Mercury’s first crust from graphite floating on a magma ocean and helps to explain why Mercury is rich in volatile materials.

Patrick N. Peplowski, Senior Professional Staff, Space Exploration Sector (SES); **Rachel L. Klima**, Senior Professional Staff, SES; **David J. Lawrence**, Principal Professional Staff, SES; **Carolyn M. Ernst**, Senior Professional Staff, SES; **Brett W. Denevi**, Senior Professional Staff, SES; **Elizabeth A. Frank** (non-APL staff); **John O. Goldsten**, Principal Professional Staff, SES; **Scott L. Murchie**, Principal Professional Staff, SES; **Larry R. Nittler** (non-APL staff); and **Sean C. Solomon** (non-APL staff)



Pictured from left to right: Matthew D. Sharp, Thomas R. Clark Jr., and Jean H. Kalkavage, winners of the Publication Award for Outstanding Development Paper in an Externally Refereed Journal.

Outstanding Development Paper in an Externally Refereed Journal

For “Wideband Photonic Compressive Sampling System,” *Journal of Lightwave Technology* **34**(11), 2848–2855 (2016).

The paper describes techniques for identifying arbitrary wideband RF signals using sub-Nyquist sampling. The techniques are experimentally validated using the exceptionally wideband capabilities of photonic hardware to enable reconstruction of multiple signals covering up to 5 GHz of instantaneous bandwidth anywhere in the 0.1- to 50-GHz band.

Thomas R. Clark Jr., Principal Professional Staff, Air and Missile Defense Sector (AMDS); **Jean H. Kalkavage**, Associate Staff, AMDS; and **Matthew D. Sharp**, Senior Professional Staff, Force Projection Sector

Outstanding Special Publication

For “The Solar Probe Plus Mission: Humanity’s First Visit to Our Star,” *Space Science Reviews* **204**(1), 7–48 (2016).

The Solar Probe Plus spacecraft (recently renamed Parker Solar Probe) will visit our own star, the Sun, repeatedly traveling to within 9 solar radii of its surface. This mission will enable us to solve a 50-year-old mystery: how the corona is heated and how the solar wind and solar energetic particles are accelerated.

Nicola J. Fox, Principal Professional Staff, Space Exploration Sector (SES); **M. C. Velli** (non-APL staff); **S. D. Bale** (non-APL staff); **Robert B. Decker**, Principal Professional Staff, SES; **Andrew S. Driesman**, Principal Professional Staff, SES; **R. A. Howard** (non-APL staff); **J. C. Kasper** (non-APL staff); **James D. Kinnison**, Principal Professional Staff, SES; **Martha B. Kusterer**, Senior Professional Staff, SES; **David Lario Loyo**, Senior Professional Staff, SES; **Mary Kae Lockwood**, Principal Professional Staff, SES; **D. J. McComas** (non-APL staff); **Nour E. Raouafi**, Senior Professional Staff, SES; and **A. Szabo** (non-APL staff)



Pictured from left to right: Nour E. Raouafi, Andrew S. Driesman, and James D. Kinnison, winners of the Publication Award for Outstanding Special Publication.

2017 R. W. HART PRIZES (for efforts in 2016)

Best Research Project

For “Intelligent Systems: Noninvasive Brain–Computer Interface Development (NiBCI)”

The team developed two novel coherent, optical imaging techniques that support the vision of a noninvasive brain–computer interface. These techniques provide substantial improvements over existing portable approaches and support applications in both national health and DoD environments.

Principal participants **David W. Blodgett**, Principal Professional Staff, Research and Exploratory Development Department (REDD); **Kevin C. Baldwin**, Principal Professional Staff, Force Projection Sector (FPS); **Joseph A. Duperre**, Senior Professional Staff, Asymmetric Operations Sector (AOS); **Michael J. Fitch**, Senior Professional Staff, REDD; **Scott M. Hendrickson**, Senior Professional Staff, REDD; **Clare W. Lau**, Senior Professional Staff, AOS; **Carissa L. Rodriguez**, Senior Professional Staff, REDD; **Clara A. Scholl**, Senior Professional Staff, REDD; and **Erich C. Walter**, Senior Professional Staff, REDD



Pictured from left to right: Scott M. Hendrickson, Joseph A. Duperre, David W. Blodgett, and Carissa L. Rodriguez, winners of the R. W. Hart Prize for Best Research Project.

Best Development Project

For “Atmospheric Entry and Descent Technology and Analysis for Design”

This project established APL as a credible leader for programs involving spacecraft atmospheric entry, descent, and landing technologies, both to Earth and to other planetary bodies. In addition to the new APL capability resulting from the project, the organizational relationships have grown and led to subsequent funded activities.

Primary contributors **Kenneth E. Hibbard**, Principal Professional Staff, Space Exploration Sector (SES); **Douglas S. Adams**, Senior Professional Staff, SES; **Clint T. Apland**, Senior Professional Staff, SES; **Stephen C. Chan**, Senior Professional Staff, Air and Missile Defense Sector (AMDS); **Gary A. Holtzman**, Senior Professional Staff, SES; **Calvin A. Kee**, Senior Professional Staff, SES; **John M. O’Neil**, Principal Professional Staff, AMDS; **Stergios J. Papadakis**, Principal Professional Staff, Research and Exploratory Development Department; **Ryan T. Stevens**, Senior Professional Staff, AMDS; and **Kenneth R. Turner**, Senior Professional Staff, SES



Pictured from left to right: Kenneth R. Turner, Stergios J. Papadakis, and Kenneth E. Hibbard, winners of the R. W. Hart Prize for Best Development Project.

2017 INVENTION OF THE YEAR AWARD

(for disclosures in 2016)

For “Modified Anti-cancer Responsive Theranostic (SMART)”

Using nanoplastforms, APL developed a novel method of delivering and controlling diagnostic, drug delivery, and therapeutic compounds. Using this method, nanoparticle structures can be functionalized to increase efficacy, improve administration options, and minimize side effects of many previously problematic compounds.

Lance M. Baird, Senior Professional Staff, Research and Exploratory Development Department (REDD); and **Xiomara Calderon-Colon**, Senior Professional Staff, REDD



Xiomara Calderon-Colon, winner of the Invention of the Year Award.

2017 ALVIN R. EATON AWARD

(for efforts in 2016)

Awarded for his significant contributions in exploiting the tools of materials and optical sciences for creating novel coating materials and systems that address important signature science and directed energy weapon protection challenges for land, sea, undersea, and air platforms. Keith’s resourcefulness, technical innovation, and personal dedication to highly classified science and technology activities continue to impact ongoing and emerging DoD programs.

Keith S. Caruso, Principal Professional Staff, Research and Exploratory Development Department



Keith S. Caruso, winner of the Alvin R. Eaton Award.

2017 MASTER INVENTOR AWARD

Awarded for his 10 issued U.S. patents related to sensor integration systems while employed at APL. He is the 27th person to receive this award in the history of the Laboratory.

Russell P. Cain, Principal Professional Staff, Research and Exploratory Development Department



Russell P. Cain, winner of the Master Inventor Award.

2017 GOVERNMENT PURPOSE INNOVATION AWARD (for innovation in 2016)

For “High-Temperature, Oxidation-Resistant Silicide Coatings for Industrial-Scale Refractory Structures in Oxidizing Atmospheres”

Success of hypersonic flight systems hinges on the development of oxidation-resistant materials that can survive the significant aerothermal loads experienced during these flights. This technology uses industrial-scale methods to chemically bond high-temperature, oxidation-resistant



William Mark Buchta, winner of the Government Purpose Innovation Award.

materials to the flight vehicle—mitigating failures normally associated with mechanically adhered coatings.

William Mark Buchta, Senior Professional Staff, Research and Exploratory Development Department (REDD); and **Dajie Zhang**, Senior Professional Staff, REDD

2017 IGNITION GRANT PRIZE FOR INNOVATION (for innovation in 2016)

For “Tactical Use of the Microsoft HoloLens”

The team developed and demonstrated a next-generation capability for collaborative 3D visualization of tactical data for situational awareness. The ability to represent and augment content in this way not only demonstrated the potential of this technology to improve warfighting capability but also established a key capability and set of tools at APL.

Elizabeth M. Bathrick, Senior Professional Staff, Air and Missile Defense Sector; **Jeffrey A. Dunne**, Principal Professional Staff, Asymmetric Operations Sector (AOS); **Sean M. Kain**, Associate Professional Staff, AOS; and **Blake A. Schreurs**, Senior Professional Staff, AOS



Pictured from left to right: Jeffrey A. Dunne and Blake A. Schreurs, winners of the Ignition Grant Prize for Innovation.

2017 OUTSTANDING MISSION ACCOMPLISHMENT AWARDS (for accomplishments in 2016)

Current Challenge

For “PAPERSPOCK/RODENT”

Challenged with a highest-priority joint urgent operational need, APL developed and deployed a game-changing system for electronic warfare, information operations, and military information support operations, providing unprecedented



Pictured from left to right, back row: Warren E. Zander, Hunter A. DeJarnette III, Aaron D. Kunz, and Paul M. Fritschen; front row: Mary Ann M. Saunders, Aaron M. Correa, Eric W. McGinnis, and Miller L. Wilt, winners of the Outstanding Mission Accomplishment Award, Current Challenge.

capability and force protection functionality to deployed combat forces. The team applied innovative techniques and agile processes to deliver a critical warfighting capability credited with saving lives and accomplishing missions.

Aaron M. Correa, Senior Professional Staff, Asymmetric Operations Sector (AOS); **Hunter A. DeJarnette III**, Associate Professional Staff, AOS; **Paul M. Fritschen**, Associate Professional Staff, AOS; **Aaron D. Kunz**, Senior Professional Staff, AOS; **Eric W. McGinnis**, Associate Professional Staff, AOS; **Kurt A. Rice**, Principal Professional Staff, AOS; **Mary Ann M. Saunders**, Associate Professional Staff, AOS; **Matthew L. Spisso**, Senior Professional Staff, AOS; **Miller L. Wilt**, Associate Professional Staff, AOS; and **Warren E. Zander**, Senior Professional Staff, AOS

Emerging Challenge

For “CLUTCHSHOT”

CLUTCHSHOT is a joint Office of the Secretary of Defense and Office of Naval Operations program to deploy a limited operational capability to leverage nontraditional sensor systems in support of targeting missions well beyond the horizon of the engaging units. The project leverages, and will transition, APL’s real-time upstream data fusion system, the Dynamic Time Critical Warfighting Capability (DTCWC), to meet several critical program requirements.

Marshall H. Alworth III, Senior Professional Staff, Force Projection Sector (FPS); **Raphael T. Austin**, Senior Professional Staff, Air and Missile Defense Sector (AMDS); **Christopher W. Baumgart**, Principal Professional Staff, FPS; **Kenneth Dewayne Brown**, Senior Professional Staff, FPS; **Jonathan T. DeSena**, Senior Professional Staff, FPS; **Jeffrey M. Gilbert**, Principal Professional Staff, AMDS; **Glen A. Long**, Principal Professional Staff, FPS; **Andrew J. Newman**, Principal Professional Staff, FPS; **Kathleen A. Newtonson**, Senior Professional Staff, FPS; and **Michael J. White**, Senior Professional Staff, FPS



Pictured from left to right: Michael J. White, Raphael T. Austin, and Andrew J. Newman, winners of the Outstanding Mission Accomplishment Award, Emerging Challenge.



Pictured from left to right, back row: Robert C. Fleming, Chinmay H. Amin, Robin G. Rude, Douglas W. Manning, and Nikunj R. Patel; front row: Mary L. Virtue, Manjula Ganapathi, and Nagakavitha Bajamahal, winners of the Enterprise Accomplishment Award.

2017 ENTERPRISE ACCOMPLISHMENT AWARD (for accomplishments in 2016)

For “Warehouse Inventory Management System (WIMS) Implementation”

This system provides an automated web-based and mobile solution that allows for the effective and efficient storage, delivery, and tracking of items used by APL staff members for sponsored and nonsponsored work. This implementation also allows APL staff to dynamically determine and update the (real-time) status of stored sponsor program equipment.

Chinmay H. Amin, Senior Professional Staff, Information Technology Services Department (ITSD); **Nagakavitha Bajamahal**, Senior Professional Staff, ITSD; **Jessica H. Chase**, Associate Professional Staff, Business and Communication Services Department (BCSD); **Robert C. Fleming**, Senior Professional Staff, ITSD; **Manjula Ganapathi**, Senior Professional Staff, ITSD; **Douglas W. Manning**, Senior Professional Staff, ITSD; **Gregory J. Miller**, Principal Professional Staff, ITSD; **Nikunj R. Patel**, Associate Professional Staff, ITSD; **Robin G. Rude**, Principal Professional Staff, BCSD; and **Mary L. Virtue**, Administrative Support Staff, BCSD

2017 COMBUSTION GRANT PRIZE FOR INNOVATION (for innovation in 2016)

For “Custom Acoustic Meta-materials for the Blood Brain Barrier”

They constructed computational models and used APL’s additive manufacturing center to create customized impedance-matching meta-material layers for better ultrasonic transmission through aberrating tissue layers. This advance may allow much more effective treatment of brain disorders.

Jacob W. Alldredge, Senior Professional Staff, Research and Exploratory Development Department (REDD); and **Matthew K. Brinkley**, Senior Professional Staff, REDD



Jacob W. Alldredge, winner of the Combustion Grant Prize for Innovation.

For “Meteors on Demand”

The team investigated a revolutionary means to provide a covert, secure, and reliable communication path via a proven communication technique with signals reflecting off the ionized trails of meteors plunging through the atmosphere. Their system concept provides on-demand, secure communication using artificial meteors propelled from orbiting small satellites to stir up ion trails that reflect VHF communication signals from the transmitter to recipients well beyond the horizon.



Eliud Bonilla, Senior Professional Staff, Air and Missile Defense Sector; **Ian M. Hughes**, Associate Professional Staff, Space Exploration Sector (SES); **Andrew A. Knuth**, Associate Professional Staff, SES; **Ryan H. Mitch**, Senior Professional Staff, SES; and **Larry J. Paxton**, Principal Professional Staff, SES

Pictured from left to right: Ryan H. Mitch, Andrew A. Knuth, and Eliud Bonilla, winners of the Combustion Grant Prize for Innovation.

2017 DIRECTOR’S AWARD FOR SPECIAL ACHIEVEMENT (for achievements in 2016)

For “Assured Space Operations Game Technical Analysis (Also Known as The Space Game)”

Assured space operations are critical to our national security. While the United States currently has a competitive edge, it is critical to understand current and future capabilities and how our potential adversaries may seek to limit our operations. APL’s assured space operations analysis team assessed the strengths and weaknesses of future architecture options, identified the value of enhanced capabilities, and illustrated implications for future senior leaders when faced with challenges in space. Most of the present senior civilian and military leaders in space policy and national security attended the gaming event, and it was very well received.

Thomas M. Falk, Senior Professional Staff, National Security Analysis Department (NSAD); **Michael N. McIntyre**, Senior Professional Staff, NSAD; **Johnathan A. Pino**, Associate Professional Staff, NSAD; **Peter J. Sharer**, Principal Professional Staff, Space Exploration Sector (SES); **Fazle E. Siddique**, Senior Professional Staff, SES; and **Susan D. Smith**, Senior Professional Staff, NSAD



Pictured from left to right: Michael N. McIntyre, Thomas M. Falk, Susan D. Smith, Fazle E. Siddique, and Johnathan A. Pino, winners of the Director’s Award for Special Achievement.

PUBLICATION AWARD WINNERS, 2000–2016

Refer to the *Johns Hopkins APL Technical Digest* website, <http://www.jhuapl.edu/techdigest/>, for a complete list of winners dating to 1986.

2000 (for work published in 1999)

Outstanding First Paper in a Classified or Unclassified Publication

Simon G. Shepherd, Raymond A. Greenwald, and J. Michael Ruohoniemi, "A Possible Explanation for Rapid, Large-Scale Ionospheric Responses to Southward Turnings of the IMF," *Geophys. Res. Lett.* 26(20), 3197–3200 (1999).

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

Peter F. Scholl, Marisa A. Leonardo Lalekos, Micah A. Carlson, Miquel D. Antoine, Timothy J. Buckley, and Ana M. Rule, "The Development of Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry for the Detection of Biological Warfare Agent Aerosols," *Johns Hopkins APL Tech. Dig.* 20(3), 343–351 (1999).

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

Harold E. Gilreath, Andrew S. Driesman, William M. Kroshl, Michael E. White, Harry E. Cartland, and John W. Hunter, "Gun-Launched Satellites," *Johns Hopkins APL Tech. Dig.* 20(3), 305–319 (1999).

Honorable Mention: **O. Manuel Uy, Russell P. Cain, Bliss G. Carkhuff, Richard T. Cusick, and Bob E. Wood**, "Miniature Quartz Crystal Microbalance for Spacecraft and Missile Applications," *Johns Hopkins APL Tech. Dig.* 20(2), 199–213 (1999).

Outstanding Research Paper in an Externally Refereed Publication

Andrew F. Cheng and Olivier S. Barnouin-Jha, "Giant Craters on Mathilde," *Icarus* 140, 34–48 (1999).

Honorable Mention: **Jeffrey L. Hanson and Owen M. Phillips**, "Wind Sea Growth and Dissipation in the Open Ocean," *J. Phys. Oceanogr.* 29, 1633–1648 (1999). **James D. Franson and Todd B. Pittman**, "Quantum Logic Operations Based on Photon-Exchange Interactions," *Phys. Rev. A* 60(2), 917–936 (1999).

Outstanding Development Paper in an Externally Refereed Publication

Allan P. Rosenberg, "A New Rough Surface Parabolic Equation Program for Computing Low-Frequency Acoustic Forward Scattering from the Ocean Surface," *J. Acoust. Soc. Am.* 105(1), 144–153 (1999).

Honorable Mention: **Raúl Fainchtein, Doran D. Smith, and John A. Marohn**, "Mechanical Modulation of Sample Magnetization in Magnetic Resonance Force Microscopy," *J. Appl. Phys.* 86, 4619–4625 (1999). **J. Robert Jensen and Robert S. Bokulic**, "Highly Accurate, Noncoherent Technique for Spacecraft Doppler Tracking," *IEEE Trans. Aerosp. Electron. Syst.* 35(3), 963–973 (1999).

Special Publications Award

M. Lee Edwards and Sheng Cheng, "Microwave Amplifiers," in *Wiley Encyclopedia of Electrical and Electronics Engineering*, pp. 28–53, John Wiley & Sons, New York (1999).

Honorable Mention: **Joseph A. Miragliotta and Dennis K. Wickenden**, "Nonlinear Optical Properties of Gallium Nitride," Chap. 8, in *Semiconductors and Semimetals*, Vol. 57, J. I. Pankove and T. D. Moustakas (eds.), Academic Press, San Diego, pp. 319–370 (1999).

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2003 (for work published in 2002)

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2004 (for work published in 2003)

Lifetime Achievement Award

Stamatis M. Krimigis, in recognition of his outstanding scientific and programmatic leadership, and his seminal contributions to our understanding of the energetic particle environment in interplanetary space, from the Sun to the edge of the heliosphere, and in the magnetospheres of every major planet.

Author's First Paper in a Peer-Reviewed Journal

Marc A. Camacho, "SATRACK Tests Missile Accuracy," *IEEE Instrum. Meas. Mag.* 6(2), 37–45 (2003).

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Walter W. Rice, *How To Prepare Defense-Related Scientific and Technical Reports: Guidance for Government, Academia, and Industry*, Wiley Interscience, Hoboken, NJ (2007).

Outstanding Special Publication

Harry K. Charles Jr., "The Wirebonded Interconnect: A Mainstay for Electronics," Chap. 3, in *Micro- and Opto-Electronic Materials and Structures: Physics, Mechanics, Design, Reliability, and Packaging*, Vol. 2, E. Suhir, Y. C. Lee, and C. P. Wong (eds.), Springer, pp. 71–120 (2007).

2009 (for work published in 2008)**Lifetime Achievement Award**

Edmond C. Roelof, in recognition of his outstanding scientific leadership in space plasma physics and of his seminal contributions to our understanding of the Sun's corona, the interplanetary medium, planetary magnetospheres, and energetic neutral atom imaging.

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Sean R. O'Connor, "Wideband Adaptive Feedforward Photonic Link," *IEEE J. Lightw. Technol.* 26(15), 2810–2816 (2008).

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Andrew S. Rivkin, *Asteroids, Comets, and Dwarf Planets*, Greenwood Press, Santa Barbara, CA (2009).

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2011 (for work published in 2010)**Author's First Paper in a Peer-Reviewed Journal**

Jason J. Benkoski, Ryan M. Deacon, H. Bruce Land, Lance M. Baird, Jennifer L. Breidenich, Rengaswamy Srinivasan, Guy V. Clatterbaugh, Pei Yui Keng, and Jeffrey Pyun, "Dipolar Assembly of Ferromagnetic Nanoparticles into Magnetically Driven Artificial Cilia," *Soft Matter* 6, 602–609 (2010).

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Philippe M. Burlina, Chad R. Sprouse, Daniel F. DeMenthon, Anne Jorstad, Radford R. Juang, Francisco Contijoch, Theodore Abraham, David Yuh, and Elliot McVeigh, "Patient-Specific Modeling and Analysis of the Mitral Valve Using 3D-TEE," *Proc. International Conf. on Information Processing for Computer Assisted Surgical Intervention*, Lecture Notes in Computer Science (LNCS), Vol. 6135, pp. 135–146 (2010).

2012 (for work published in 2011)**Lifetime Achievement Publication Award**

Harry K. Charles Jr. Dr. Charles is an internationally recognized contributor to the world's body of technical literature, having published more than 200 articles and presentations in various fields including antiferromagnetism, solar cells, microelectronics, electronic materials, and biomedical devices. His most significant contributions lie in the microelectronics arena, especially wire bonding and advanced soldered interconnect.

Author's First Paper in a Peer-Reviewed Journal or Proceedings

Patrick N. Peplowski, Larry G. Evans, Steven A. Hauck II, Timothy J. McCoy, William V. Boynton, Jeffery J. Gillis-Davis, Denton S. Ebel, John O. Goldsten, David K. Hamara, David J. Lawrence, Ralph L. McNutt Jr., Larry R. Nittler, Sean C. Solomon, Edgar A. Rhodes, Ann L. Sprague, Richard D. Starr, and Karen R. Stockstill-Cahill, "Radioactive Elements on Mercury's Surface from MESSENGER: Implications for the Planet's Formation and Evolution," *Science* 333(6051), 1850–1852 (2011).

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

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Elizabeth P. Turtle, Jason E. Perry, Alex G. Hayes, Ralph D. Lorenz, Jason W. Barnes, Alfred S. McEwen, Robert A. West, Anthony D. Del Genio, John M. Barbara, Jonathan I. Lunine, Emily L. Schaller, Trina L. Ray, Rosaly M. C. Lopes, and Ellen R. Stofan, "Rapid and Extensive Surface Changes Near Titan's Equator: Evidence of April Showers," *Science* 331(6023), 1414–1417 (2011).

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David H. Scheidt and Kevin M. Schultz, "On Optimizing Command and Control Structures," *Proc. 16th International Command and Control Research and Technology Symp.* (2011).

2013 (for work published in 2012)**Lifetime Achievement Publication Award**

Keith Raney. Dr. Raney is a world-recognized expert in space-based radar design and ocean science. During his time at APL, he published nearly 100 scientific articles that have been cited nearly 1400 times. He was the design architect for APL's Mini-RF hybrid-polarimetric radar on India's Chandrayaan-1 and NASA's Lunar Reconnaissance Orbiter.

Author's First Paper in a Peer-Reviewed Journal or Proceedings

Xiomara Calderón-Colón, Zhiyong Xia, Jennifer L. Breidenich, Daniel G. Mulreany, Qiongyu Guo, Oscar M. Uy, Jason E. Tiffany, David E. Freund, Russell L. McCally, Oliver D. Schein, Jennifer H. Elisseeff, and Morgana M. Trexler, "Structure and Properties of Collagen Vitrigel Membranes for Ocular Repair and Regeneration Applications," *Biomaterials* 33(33), 8286–8295 (2012).

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Jeffrey D. Barton, "Fundamentals of Small Unmanned Aircraft Flight," *Johns Hopkins APL Tech. Dig.* 31(2), 132–149 (2012). Michael C. Gross, Patrick T. Callahan, and Michael L. Dennis, "A Fiber Laser Photonic Frequency Synthesizer: Concept, Performance, and Applications," *Johns Hopkins APL Tech. Dig.* 30(4), 287–298 (2012). Bryan Jacobs, Chad N. Weiler, Jeffrey P. Maranchi, Chad R. Sprouse, Dennis G. Lucarelli, and Brian G. Rayburn, "All-Optical Computing Using the Zeno Effect," *Johns Hopkins APL Tech. Dig.* 30(4), 346–360 (2012).

Outstanding Research Paper in an Externally Refereed Publication

Ryan N. Mukherjee, Chad R. Sprouse, Aurélio Pinheiro, Theodore Abraham, and Philippe M. Burlina, "Computing Myocardial Motion in 4-Dimensional Echocardiography," *Ultrasound Med. Biol.* 38(7), 1284–1297 (2012).

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Rengaswamy Srinivasan, "Monitoring Dynamic Thermal Behavior of the Carbon Anode in a Lithium-Ion Cell Using a Four-Probe Technique," *J. Power Sources* 198, 351–358 (2012).

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2014 (for work published in 2013)**Author's First Paper in a Journal or Proceedings**

Grant K. Stephens, Mikhail I. Sitnov, J. Kissinger, N. A. Tsyganenko, R. L. McPherron, Haje Korth, and Brian J. Anderson, "Empirical Reconstruction of Storm Time Steady Magnetospheric Convection Events," *J. Geophys. Res. Space Phys.* 118(10), 6434–6456 (2013).

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

Christopher E. Bradburne, Lucy M. Carruth, John H. Benson, Jeffrey S. Lin, Ashok Sivakumar, and Ruth A. Vogel, "Implementing Genome-Informed Personalized Medicine in the US Air Force Medical Service via the Patient-Centered Precision Care Research Program," *Johns Hopkins APL Tech. Dig.* 31(4), 333–344 (2013).

Outstanding Research Paper in an Externally Refereed Publication

David J. Lawrence, William C. Feldman, John O. Goldsten, Sylvestre Maurice, Patrick N. Peplowski, Brian J. Anderson, David Bazell,

Ralph L. McNutt Jr., Larry R. Nittler, Thomas H. Prettyman, Douglas J. Rodgers, Sean C. Solomon, and Shoshana Z. Weider, "Evidence for Water Ice Near Mercury's North Pole from MESSENGER Neutron Spectrometer Measurements," *Science* 339(6117), 292–296 (2013).

Outstanding Development Paper in an Externally Refereed Publication

Christopher R. Ratto, Kenneth D. Morton Jr., Leslie M. Collins, and Peter A. Torrione, "Bayesian Context-Dependent Learning for Anomaly Classification in Hyperspectral Imagery," *IEEE Trans. Geosci. Remote Sens.* 52(4), 1969–1981 (2013).

Outstanding Professional Book

Jack L. Burbank, Julia Andrusenko, Jared S. Everett, and William T. M. Kasch, *Wireless Networking: Understanding Interworking Challenges*, Wiley-IEEE Press, Hoboken, NJ (2013).

Outstanding Special Publication

Matthew S. Moses, Michael D. M. Kutzer, Hans Ma, and Mehran Armand, "A Continuum Manipulator Made of Interlocking Fibers," *Proc. 2013 IEEE International Conf. on Robotics and Automation*, Karlsruhe, Germany, May 6–10, 2013, IEEE, pp. 4008–4015 (2013).

2015 (for work published in 2014)

Author's First Paper in a Journal or Proceedings

Matina Gkioulidou, "The Role of Small-Scale Ion Injections in the Buildup of Earth's Ring Current Pressure: Van Allen Probes Observations of the 17 March 2013 Storm," *J. Geophys. Res.* 119(9), 7327–7342 (2014).

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

Ronald J. Vervack Jr., Jeng-Hwa Yee, William H. Swartz, Robert DeMajistre, and Larry J. Paxton, "The MSX/UVISI Stellar Occultation Experiments: Proof-of-Concept Demonstration of a New Approach to Remote Sensing of Earth's Atmosphere," *Johns Hopkins APL Tech. Dig.* 32(5), 803–821 (2014).

Outstanding Research Paper in an Externally Refereed Publication

Brian D. (David) Clader, "Quantum Networking of Microwave Photons Using Optical Fibers," *Phys. Rev. A* 90(1), 012324-1–012324-9 (2014).

Outstanding Development Paper in an Externally Refereed Publication

Eric J. Adles, Michael L. Dennis, Timothy P. McKenna, Joseph E. Sluz, Raymond M. Sova, and Radha A. Venkat, "Blind Optical Modulation Format Identification from Physical Layer Characteristics," *J. Lightw. Technol.* 32(8), 1501–1509 (2014).

Outstanding Professional Book

Ralph D. Lorenz, *Dune Worlds: How Windblown Sand Shapes Planetary Landscapes*, Springer-Verlag, Berlin, Heidelberg (2014).

Outstanding Special Publication

Nicola J. Fox, *The Van Allen Probes Mission*, Springer, New York (2014).

2016 (for work published in 2015)

Author's First Paper in a Journal or Proceedings

William R. Gray Roncal and Dean M. Kleissas, "An Automated Images-to Graphs Framework for High Resolution Connectomics," *Front. Neuroinform.* 9, article 20 (2015).

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

Ralph D. Lorenz and Jennifer L. Mann, "Seakeeping on Ligeia Mare: Dynamic Response of a Floating Capsule to Waves on the Hydrocarbon Seas of Saturn's Moon Titan," *Johns Hopkins APL Tech. Dig.* 33(2), 82–94 (2015).

Outstanding Research Paper in an Externally Refereed Publication

Alan Brandt and John R. Rottier, "The Internal Wavefield Generated by a Towed Sphere at Low Froude Number," *J. Fluid Mech.* 769(4), 103–129 (2015).

Outstanding Development Paper in an Externally Refereed Publication

Kaushik A. Iyer and Douglas S. Mehoke, "Interplanetary Dust Particle Shielding Capability of Spacecraft Multilayer Insulation," *J. Spacecr. Rockets* 52(2), 584–594 (2015).

Outstanding Professional Book

David C. Challener, *A Practical Guide to TPM 2.0: Using the New Trusted Platform Module in the New Age of Security*, Apress, New York (2015).

Outstanding Special Publication

Erin N. Hahn and W. Sam Lauber, *Legal Implications of the Status of Persons in Resistance*, United States Army Special Operations Command, Ft. Bragg, NC (2015).

R. W. HART PRIZE WINNERS, 2000–2016

Refer to the *Johns Hopkins APL Technical Digest* website, <http://www.jhuapl.edu/techdigest/>, for a complete list of winners dating to 1989.

2000 (for efforts in 1999)

Excellence in Development: Timothy J. Cornish, Harry K. Charles Jr., and Paul D. Wienhold, "Fabricating Complex Reflector Structures for Use in Time-of-Flight Mass Spectrometers."

Honorable Mention: Henry A. Kues Jr., Paul R. Schuster, Matthew G. Bevan, and Carl V. Nelson, "Drowsy Driver Detection System."

2001 (for efforts in 2000)

Excellence in Research: Fernando J. Pineda, Peter F. Scholl, Amy K. Karlson, Miquel D. Antoine, Jeffrey S. Lin, Bernard F. M. Collins, and Nancy E. Woods, "Novel Approaches in Defense Bioinformatics."

Honorable Mention: James C. Spall, Daniel C. Chin, Stacy D. Hill, John L. Maryak, David R. Stark, David W. Hutchison, and Laszlo Gerencser, "Stochastic Optimization and Control."

Excellence in Development: Joseph S. Lombardo, Howard S. Burkom, Richard A. Wojcik, and Fernando J. Pineda, "Automated Alerting for Bioterrorism Using Autonomous Agents." Patrick A. Stadter, Eric A. Olsen, and Mark S. Asher, "Improvement in Relative Navigation Algorithms for Formation Flying."

2002 (for efforts in 2001)

Excellence in Research: David P. Silberberg, Amy K. Karlson, Jessica L. Pistole, and Rosemary A. Daley, "A Simplified Approach for Accessing Large Repositories of Heterogeneous Information."

Excellence in Development: Kenneth V. Kitzman, "Advanced Infrared Sensors and Classification Techniques in Ballistic Missile Defense Target Discrimination."

2003 (for efforts in 2002)

Excellence in Research: Andrew B. Feldman, Jeffrey S. Lin, Plamen A. Demirev, Miquel D. Antoine, Rengaswamy Srinivasan, Hassan M. Saffarian, Timothy J. Cornish, Sean P. Murphy, N. Kumar, D. Sullivan, P. Scholl, R. A. Gasser Jr., and D. Kongkasuriyachai, "Malaria Detection Program."

Excellence in Development: Donald E. Maurer, "Efficient Radar-to-IR Correlation and Bias Estimation."

2004 (for efforts in 2003)

Excellence in Research: John R. Gersh, Amy K. Karlson, Bessie Y. Lewis, Jaime Montemayor, and Christine D. Piatko, "Visualization of Complex Conceptual Structures."

Excellence in Development: Bradley G. Boone, Bernard E. Kluga, Jonathan R. Bruzzi, Daniel V. Hahn, Karl B. Fielhauer, and Donald D. Duncan, "New Optical Sensor/Weapon Network."

2005 (for efforts in 2004)

Excellence in Research: Stephen M. Scorpio, Alan Brandt, Eric A. Ericson, Charles E. Schemm, Ricardo C. Blackett, and Joseph E. Hopkins Jr., "Surface Wake Modeling."

Excellence in Development: William G. Bath, Geoffrey L. Silberman, Bradford S. Weir, Frank W. Hsu, Ariel M. Greenberg, Sze-Ping Kuo, Ralph L. Gootee, and John Samsundar, "Air Defense Interoperability."

2006 (for efforts in 2005)

Excellence in Research: Steven M. Babin, Howard S. Burkom, Andrew B. Feldman, Jeffrey S. Lin, and Sean P. Murphy, "Data Fusion and Hypothesis Evaluation for Syndromic Surveillance."

Honorable Mention: Robert Bamberger Jr., Robert W. Chalmers, Christopher P. Chiu, Osama I. Farrag, Robert C. Hawthorne, Steven J. Marshall, Todd M. Neighoff, David H. Scheidt, and Jason A. Stipes, "Autonomy Enterprise Thrust—Cooperating Unmanned Vehicles."

Excellence in Development: Keith S. Caruso, Dale E. Clemons, David G. Drewry Jr., Don E. King, Michael P. Mattix, Jennifer L. Sample, Michael E. Thomas, and Dennis C. Nagle, "High Temperature Structures and Thermal Management Systems."

2007 (for efforts in 2006)

Excellence in Research: James C. Mayfield, Paul McNamee, Christine D. Piatko, Richard S. Cost, Wayne L. Bethea, Paul A. Frank, Clayton R. Fink, Markus E. Dale, Eric C. King, and Robert T. Hider Jr. ("Sandy"), "Distributed Information Systems."

Excellence in Development: Andrew J. Newman, Jonathan T. DeSena, Cameron K. Peterson, and Gregg A. Harrison, "Tactically Responsive Intelligence, Surveillance, and Reconnaissance Management (TRIM)." Keith J. Rebello, Robert Osiander, David A. Kitchin, Robert Henrick, Charles B. Cooperman, S. John Lehtonen, Allen C. Keeney, and Francisco Tejada, "MEMS Hydrophones for Beamforming Applications."

2008 (for efforts in 2007)

Excellence in Research: Alan F. Becknell, Nathan A. Hagan, Robert S. Pilato, Kelly A. Van Houten, Plamen A. Demirev, Miquel D. Antoine, Timothy P. Lippa, Joshua L. Santarpia, Timothy J. Cornish, Jonathan W. Boyd, and Neal A. Baker, "Detection of Low-Vapor-Pressure Materials."

Honorable Mention: Charles C. Young, Emily E. Seay, Terry E. Phillips, and Sarah L. Grady, "Isotachophoretic Method for the Simultaneous Purification of DNA and Protein."

Excellence in Development: Salvador H. Talisa, Hedi A. Krichene, Keir C. Lauritzen, Cesar A. Lugo, Erica B. Simcoe, Joseph E. Sluz, and George G. Veticad, "Digital Array Radar Technology."

Honorable Mention: Scott E. Wunsch, Keith S. Caruso, Artemas P. Herzog, Jeffrey H. Smart, Allen T. Hayes, Jeffrey P. Cullina, and W. Lloyd Luedeman, "Appliqué Technology for Undersea Warfare." Jeffrey J. Dumm, Michael P. Boyle, Myron Z. Brown, John P. Clancy, Matthew R. Feinstein, Allan R. Jablon, Glenn S. Gealy, and David A. Grunschel, "High-Fidelity Antenna Pattern Modeling with Lidar Characterization."

2009 (for efforts in 2008)

Excellence in Research: I-Jeng Wang, Dennis G. Lucarelli, Philippe M. Burlina, Daniel F. DeMenthon, Anne A. Jorstad, and Anshu Saksena, "Information Fusion and Localization in Distributed Sensor Systems." Chad M. Hawes, Gregory S. Avicola, E. David Jansing, Michael E. Nord, and Rickey D. Chapman, "Exploitation of Synthetic Aperture Radar Data Products."

Honorable Mention: Dawnielle Farrar, David M. Lee, George L. Coles Jr., and Carl L. Carpenter, "Applications for Piezo Polymer Composites."

Excellence in Development: Joshua L. Santarpia, Shanna A. Ratanar-Shumate, Kelly Marie Brinkley, Jason J. Quizon, Nathan A. Hagan, Plamen A. Demirev, Albert J. Paul Jr., Evan P. Thrush, Thomas J. Buckley, Miquel D. Antoine, Neal A. Baker, and David A. Kitchin, "Environmental Changes on Biological Aerosol Particles."

Honorable Mention: George C. Ho, Glenn M. Mason, Gordon Bruce Andrews, Kenneth S. Nelson, Egidio J. Rossano, and James C. Hutcheson, "ULEIS Jr."

2010 (for efforts in 2009)

Excellence in Research: Stergios J. Papadakis, Andrew H. Monica, Noam R. Izenberg, George L. Coles Jr., and Robert Osiander, "Carbon Nanotube Triodes for Harsh Environment Electronics."

Excellence in Development: Brian K. Funk, Bohdan Z. Cybyk, Jeffrey D. Barton, David G. Drewry Jr., Alison K. Carr, Jonathan C. Castelli, Christopher P. Chiu, Austin B. Cox, Timothy M. Frey, Jeffrey S. Garretson, Sarah J. Haack, Andrew Lee, Brian E. McGrath, Erich H. Mueller, Garrick Orchard, and Ralph Etienne-Cummings, "Weaponized Small Unmanned Aircraft System (UAS) for Engaging Moving Urban Targets."

2011 (for efforts in 2010)

Excellence in Research: Andrew B. Feldman, Jeffrey S. Lin, Plamen A. Demirev, Ariel M. Greenberg, Sean P. Murphy, Keith J. Rebello, Thomas S. Mehoke, I. K. Ashok Sivakumar, Charles C. Young, Nathan A. Hagan, and Mekbib Astatke, "Applied DNA Sequencing Initiative."

Excellence in Development: Carlos E. Alfonso, William G. Bath, Ana Leticia F. Bento, Richard L. Bourgeois, Julie L. Farmer, Russell W. Garrett, Steven A. Kahn, Kathryn E. Mackey, Margaret A. McGarry, Adam J. Miller, Carol A. Nolf, and John H. Zouck, "Componentized Analysis Framework of Next-Generation Combat Systems Components."

2012 (for efforts in 2011)

Excellence in Research: Martin T. Ozimek and Christopher J. Scott, "Capture and Control about Planetary Satellites and Asteroids Using Dynamical Systems Theory."

Honorable Mention: Charbel G. Rizk, Arnold C. Goldberg, Kim Strohhahn, Seppo J. Lehtonen, and Matiwo H. Kafel, "Flexible Readout and Integration Sensor (FRIS)."

Excellence in Development: G. Scott Peacock, Derek C. Fulk, Kevin H. Gormally, Cory R. Lorenz, David N. Barsic, Melissa A. Jones, Robert M. Patterson, and William R. Gray, "Automated Passive Sonar Signal Processing; Development of Shallow Water Autonomous DCL Systems."

2013 (for efforts in 2012)

Excellence in Research: Joan A. Hoffmann, David M. Deglau, Stergios J. Papadakis, Thomas S. Mehoke, Ryan M. Deacon, and Brian M. Fisher, "Nanostructured Materials: Radiation Sensing Applications."

Excellence in Development: David H. Scheidt, Robert W. Chalmers, Christopher C. Olson, Jonathan C. Castelli, Dennis S. Patrone, Adam S. Watkins, Russell J. Turner, William L. Van Besien, William B. Fitzpatrick, Robert C. Hawthorne, Robert J. Bamberger Jr., Justin Thomas, Andrew J. Newman, Michael H. Biggins, Eliezer G. Kahn, Michael Lucks, Stephen S. Carr, and Nathan J. Abraham, "Organic Persistent Intelligence, Surveillance and Reconnaissance (OPISR)."

2014 (for efforts in 2013)

Excellence in Research: Kaushik A. Iyer, John J. Aiello, and O. Manny Uy, "High-Energy Laser (HEL) Effects on Space Systems and Materials."

Excellence in Development: David M. Van Wie, Jeffrey D. Barton, Cameron K. Peterson, Hans P. Widmer, Mark A. Oursler, Treven P. Wall, Brian L. Geesaman, Coire J. Maranzano, Daniel J. Silvera, and Edmund H. Nowicki, "Offensive Operations in an Anti-Access/Area Denial (A2AD) Environment." Raul Fainghtein, David M. Brown, Karen M. Siegrist, Ryan P. DiNello-Fass, Terry E. Phillips, Andrew H. Monica, and David M. Deglau, "Agile Infrared Scene Projector on Carbon Nanotubes."

2015 (for efforts in 2014)

Excellence in Research: William R. Gray Roncal, Dean M. Kleissas, and Mark A. Chevillet, "Machine Intelligence from Cortical Networks (MICRONS)."

Excellence in Development: Steven D. Jones, Jarriel D. Cook, Jerry R. Hampton, and Feng Ouyang, "Command and Control of Deeply Placed Capabilities (C2DEEP)."

2016 (for efforts in 2015)

Excellence in Research: Mark A. Chevillet, Michael E. Wolmetz, Matthew J. Roos, Christopher R. Ratto, and Carlos A. Caceres Garcia, "Neurally Integrated Computing."

Excellence in Development: Aaron T. Katz, "Enhanced Weapons of Mass Destruction Analytics."

INVENTION OF THE YEAR AWARD

2000 (for disclosures in 1999)

Craig Kelly, George Murray, and Manuel Uy, "Molecularly Imprinted Polymer Sensors for Food Safety Applications."

2001 (for disclosures in 2000)

David Silver, Andras Berta, Andras Berta, Adrienne Custak, and Jozsef Tozer, "Plasminogen Activator to Prevent Haze after Laser Vision Correction Surgery."

2002 (for disclosures in 2001)

John Murphy, Robert Osiander, and Jerry Williams, "Method and Apparatus for Imaging and Spectroscopy of Tumors and Determination of the Efficacy of Anti-Tumor Drugs."

2003 (for disclosures in 2002)

Plamen A. Demirev, Andrew B. Feldman, D. Kongkasuriyachai, N. Kumar, P. Scholl, and D. Sullivan, "Portable Malaria Screening and Diagnosis Method." Carol A. Sniegoski, "Software for Automated Medical Records Coding." Wayne A. Bryden, Scott A. Ecelberger, and R. Cotter, "Combined Chemical/Biological Agent Detection by Mass Spectrometry."

2004 (for disclosures in 2003)

Richard S. Potember and Wayne A. Bryden, "Hydroxyl Free Radical Induced Decontamination of Spores, Viruses and Bacteria in a Dynamic System." James D. Franson, Brian C. Jacobs, and Todd B. Pittman, "Method for Quantum Information Processing Using Single Photons and the Zero Effect." Jack C. Roberts, Paul J. Biermann, and Richard Reidy, "Strain-Rate Sensitive Flexible Armor with Laminated Composite Elements."

2005 (for disclosures in 2004)

Henry A. Kues and Eric J. Van Gieson, "Microwave/Radio Frequency Energy-Assisted Drug Delivery Device." Jerry A. Krill, "3-D Display with Walkthrough and 'Virtual Visitation' Features for Command and Control Centers, Teleconferencing and Personal Communication." Matthew G. Bevan, Bradley G. Boone, Ann G. Darrin, Donald D. Duncan, and Raymond M. Sova, "Apparatus and Method for Providing Secure Multi-Channel Optical Laser Communications."

2006 (for disclosures in 2005)

Protagoris N. Cutchis, "Electrode Array for Determination of Specific Axonal Firing Within a Peripheral Nerve." Joany Jackman and Nathan Boggs, "Use of Protein Detector Accessory with Exhaled Breath Condensate." Benjamin Barnum, Nathaniel Winstead, and Raymond Sterner, "Dust Storm Forecaster." Kim Strohhahn and Mark Martin, "Selection Circuit for Image Sensor and/or Position Sensing Detector."

2007 (for disclosures in 2006)

H. Bruce Land III, "Portable Arc Flash Protection System." Stergios J. Papadakis, "Nanoporous Nucleic Acid Sensor." Harry K. Charles Jr., Charles V. Banda, Arthur Shaun Francomacaro, Allen C. Keeney, and S. John Lehtonen, "Advanced Thin Flexible Micro-electronic Assemblies."

2008 (for disclosures in 2007)

Russell A. Fink, "The Passive Forensic Identification of Networked TCP/IP." Zaruhi Mnatsakanyan, "Bayesian Information Fusion Network." Paul Bierman, Craig Leese, Jeffrey Maranchi, Rengaswamy Srinivasan, and Gary Peck, "Nanotube Battery."

2009 (for disclosures in 2008)

Lance M. Baird, Jason J. Benkoski, Andrew F. Mason, and Jennifer L. Sample, "Triggered Drug Release via Physiologically Responsive Polymers." Harry K. Charles Jr., Arthur Shaun Francomacaro, Allen C. Keeney, and Seppo John Lehtonen, "Ultra-Thin, Flexible Multichip Modules Using Standard Microelectronic Assembly Techniques."

2010 (for disclosures in 2009)

Plamen A. Demirev, Miquel D. Antoine, Andrew B. Feldman, Nathan A. Hagan, and Jeffrey S. Lin, "Mass Spectrometry-Based Method and System to Establish Drug Resistance/Susceptibility in Microorganisms: IsoMS-Drug-Array."

2011 (for disclosures in 2010)

Jason J. Benkoski, Hala J. Tomey, George L. Coles Jr., Morgana M. Trexler, Robert C. Matteson III, Chao-Wei Hwang, and Jon Resar, "Implantable Pressure-Actuated Drug-Delivery Systems and Methods."

2012 (for disclosures in 2011)

Harry A. Eaton and Douglas S. Wenstrand, "Ultra-Compact Multi-tasking Motor Controller."

2013 (for disclosures in 2012)

Jonathan D. Cohen, Ryan W. Gardner, Laura J. Glendenning, Sakunthala Harshavardhana, Robert T. Hider, Margaret F. Lospinuso, C. Durward McDonnell III, David M. Patrone, Dennis S. Patrone, Nathan S. Reller, Benjamin R. Salazar, and David P. Silberberg, "Apparatus and Method for Identifying Related Code Variants in Binaries."

2014 (for disclosures in 2013)

Andrew B. Feldman and Jeffrey S. Lin, "System and Method to Rapidly Design Viral Vaccines to Prevent Vaccine Failure."

2015 (for disclosures in 2014)

Jason E. Tiffany, "Vertically Grooved Electrode Wells for Nerve Growth Guidance to an Electrode Contact."

2016 (for disclosures in 2015)

Zhiyong Xia and Brad M. Ward, "Novel Water Filtration Membranes."

MASTER INVENTOR AWARD**2007**

Joseph L. Abita, Paul J. Biermann, Bliss G. Carkhuff, Harry K. Charles Jr., Timothy J. Cornish, Robert E. Fischell, Harvey W. Ko, Sverre Kongelbeck, Jerry A. Krill, John H. Kuck, Roger H. Lapp, John C. Murphy, George M. Murray, Carl V. Nelson, Eugene L. Nooker, Richard Potember, David W. Rabenhorst, Ralph O. Robinson Jr., Woodrow Seamone, Charles J. Swet, Gilber Wilkes II, and Theodore Wyatt

2009

Jack C. Roberts

2010

Micah A. Carlson

2014

Rengaswamy "Srin" Srinivasan

2015

Charles W. Kerechanin II

GOVERNMENT PURPOSE INNOVATION AWARD**2011** (for innovation in 2010)

John M. Klimek, "Naturally Occurring Indigenous Sound Emulation (NOISE)."

2012 (for innovation in 2011)

Joshua B. Broadwater, Craig J. Carmen, and Ashley J. Llorens, "Constrained Probability of False Alarm Classification."

2013 (for innovation in 2012)

William J. Geckle, "Airport Radar Counter-Terrorism Protection System."

2014 (for innovation in 2013)

Mason M. Baron, Gregory H. Barr, and James G. Cochran, "Aircraft and Sensor Product Geo-Registration in GPS-Denied Environments."

2015 (for innovation in 2014)

Patrick D. Allen and Steven A. Handy, "Deception for Defense: Applying Traditional Camouflage Techniques Adapted to Cyber Network Defense."

2016 (for innovation in 2015)

Timothy P. Magnani and Jay H. Song, "Advanced RF Jamming Techniques."

IGNITION GRANT PRIZE FOR INNOVATION**2013** (for innovation in 2012)

Daniel H. Simon and Paul J. Biermann, "Protecting Soldiers from Hearing Damage."

2014 (for innovation in 2013)

Robert Osiander, Kimberly M. Griffin, Robert A. Berardino, and Colin J. Taylor, "APL Maker Exploitation, Maker Movement or 'MEME.'"

2015 (for innovation in 2014)

Christopher J. Krupiarz, Nathaniel S. Parsons, David J. Edell, and William L. Van Besien, "SpaceDrone: Flying a Parrot AR Drone with APL Spacecraft Flight Software."

Tara K. Echlin, Mars J. Gralia, Bruce L. Ballard, Robert A. Berardino, James J. Bogard, Zaza Soriano, and Brian T. Taylor, "Development of an Arduino Course."

2016 (for innovation in 2015)

Jason O. Johnson, "Improved Personal Protective Equipment for Ebola Healthcare Workers."

OUTSTANDING MISSION ACCOMPLISHMENT AWARD

2014 (for accomplishments in 2013)

Current Challenge: Mason M. Baron, Weston R. Boyd, Daniel J. Christine, James G. Cochran, Michael A. Delaney, Scott D. Heitkamp, Larry W. Nemsick, Conor R. Scott, and Mark A. Swana, "Minotaur Mission Processor."

Emerging Challenge: Jeffrey C. Mitchell, William C. Hughes, Dwayne A. Hawbaker, Kenneth A. Plantz, Matthew J. Kazanas, and Lorenzo R. Brooks, "Naval Integrated Fire Control – Counter Air (NIFC-CA)."

2015 (for accomplishments in 2014)

Current Challenge: Amanpreet S. Johal, Amy K. Castner, Paul G. Velez, Eric C. Naber, David G. Katz, John P. Osborne, Emily Ronald, Rodney M. Jokerst, and Reuben A. Johnston, "The ALPHA Project."

Emerging Challenge: G. D. (Dan) Dockery, Donald E. Chesley, Charles L. Farthing, Christopher K. Barker, and Eric R. Thews, "Next-Generation Air and Missile Defense Radar (AMDR)."

2016 (for accomplishments in 2015)

Current Challenge: Awarded to the New Horizons Core Mission Team: Peter Bedini, Kerri B. Beisser, Michael R. Buckley, Alice F. Bowman, Andrew Calloway, Christopher B. Hersman, Mark E. Holdridge, Valerie A. Mallder, Gabe D. Rogers, and Harold A. Weaver Jr., "The New Horizons Mission."

Emerging Challenge: Preston C. Dunlap, Ashley J. Llorens, Thomas M. Falk, Ed Vince Doran, and Jeremy P. Sotzen, "Time-Critical Target Defeat."

ENTERPRISE ACCOMPLISHMENT AWARD

2015 (for accomplishments in 2014)

Kristopher A. Bell, Angelina H. Boampong, Catherine M. Colangelo, Steven F. Ferraro, Wendy S. Hess, Gregory C. Husted, Ann E. Kedra, Dennis O. Smith, Donald J. Vislay, and Susan L. Watkins, "Central Spark Implementation."

2016 (for accomplishments in 2015)

Thomas A. Heffner, Dennis O. Smith, David L. Nobles, Joshua D. Smith, and Donald A. Noyes, "The Design Thinking Corps: Embedding Design Thinking Throughout the Organization."

THE ALVIN R. EATON AWARD

2001 (for efforts in 2000)

Alvin R. Eaton

2002 (for efforts in 2001)

Lorenz J. Happel

2003 (for efforts in 2002)

Daniel G. Henderson

2004 (for efforts in 2003)

T. W. Jerardi

2005 (for efforts in 2004)

Thomas B. Criss

2006 (for efforts in 2005)

M. V. Cruz

2007 (for efforts in 2006)

William G. Bath

2008 (for efforts in 2007)

Glenn E. Mitzel

2009 (for efforts in 2008)

J. D. Phillips

2010 (for efforts in 2009)

Richard T. Roca

2011 (for efforts in 2010)

Louis A. Colangelo

2012 (for efforts in 2011)

Kenneth E. Verbrugge

2013 (for efforts in 2012)

David R. Lewis

2014 (for efforts in 2013)

Lisa A. Blodgett

2015 (for efforts in 2014)

John M. Brupbacher

2016 (for efforts in 2015)

Scott T. Radcliffe