



Prof. Darryll J. Pines

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Dr. Darryll J. Pines currently serves as the Nariman Farvardin Professor of Engineering and Dean of the A. James Clark School of Engineering. A position he has held since January of 2009. As dean, Pines has led the development of the Clark School's bold [2020 strategic plan](#). He achieved notable successes in key areas such as improving teaching in fundamental undergraduate courses; raising student retention and graduation rates; achieving success in national and international student engineering competitions; giving new emphasis to sustainability engineering and service learning; promoting STEM education among elementary, middle, and high school students; increasing the impact of research programs; expanding innovation and entrepreneurship activities; and expanding philanthropic contributions to the school. Today, as a result of investments in targeted recruitment, advising, STEM outreach, and the Clark School's signature [Keystone Engineering Education Program](#), the school's one-year undergraduate retention rate and five-year graduation rate is 91 percent and 75% respectively, which ranks in the *Top 10* among public flagship universities in the United States.

Undergraduate Engineering Education

Because of the Clark School's focus on experiential out of the classroom learning experiences, students have participated in numerous national and international competitions including the American Helicopter Society's *Igor Sikorsky Human Powered Helicopter Challenge*, the Dept. of Energy's *Solar Decathlon*, and Elon Musk's *Hyperloop* competitions. The Clark School's Human Powered Helicopter Team named [Gamera](#) holds the current world record for flight duration. The university's 2011 [Watershed](#) and 2017 *reACT* teams placed 1st and 2nd respectively in the *Department of Energy's-DOE Solar Decathlon* competitions. In addition, the Clark School partnered with the College of Computer, Mathematical and Natural Sciences-(CMNS) in 2016 to enter the *Hyperloop Pod Design* competition and placed 5th overall out of 30 competition teams. The Clark School's [Engineers Without Borders-EWB chapter](#) is considered one of the nation's best, and the *Engineering Sustainability Workshop-ESW* launched by Pines has become a key campus event. Pines has testified before Congress about the importance of K-12 STEM education for all students, and created the *Top 25 Source Schools* program which recognizes State of Maryland high schools for exemplary performance in preparing students for careers in engineering. At a national level, Pines is currently leading an initiative to pilot a first-of-its-kind, nationwide, pre-college course on engineering principles and design. The pilot program, [Engineering For US All \(E4USA\)](#), will test the effectiveness of a standardized educational curriculum across multiple states. The course, made possible through a \$4 million NSF grant, is intended to eventually provide the equivalent of placement credit for an introductory college course. In addition, Pines served as the 2015 chair of the National Academy of Engineering-NAE [Frontiers in Engineering Education-FOEE](#) Symposium which recognizes faculty from around the United States for their innovations in engineering education.

Research Impact and Faculty Accomplishments

At \$187 million (includes CS/UMIACS), the school's research expenditures are at a record high, and during Dean Pines' tenure the school has been ranked as high as 18th among all institutions in the *US News and World Report Graduate Rankings* in 2011. During his time as Dean, there have been several notable successes by Clark School faculty including one faculty member being recognized with the *National Medal of Technology and Innovation* bestowed by President Obama, 9 faculty/alumni (Schneidermann, Mosleh, Anderson, Busalacchi, England, Van Wie, Bowcutt, Hubbard, Pines) being inducted into the *National Academy of Engineering (NAE)*, 41 junior faculty received *NSF CAREER*

Awards, and 5 faculty being recognized with a Presidential Early Career Awards for Scientists and Engineers-PECASE (Jones, Waks, Bergbreiter, Paley, and Rotkowitz).

Under Pines leadership, the college established 5 new interdisciplinary research centers and institutes including, Maryland Energy Innovation Institute (MEII), Robert E. Fischell Institute for Biomedical Devices, Maryland Transportation Institute (MTI), Quantum Technology Center (QTC)-jointly with Physics, and Maryland Robotics Center. All of these new centers have visionary leaders and are building the foundation for research excellence in these technical areas.

Innovation and Entrepreneurship

Expanded innovation and entrepreneurship activities within the college's Maryland Technology Enterprise Institute has resulted in the university becoming a [NSF I-Corp Program Hub](#) for university startups in which Pines was a co-PI on the NSF grant, and a *Top 10 entrepreneurship program* as recognized by *Entrepreneurship Magazine/Princeton Review*. In addition, the Clark School launched the *first ever* student run incubator on a university campus in the United States called the [Startup Shell](#) with access to space and resources for student-lead startups. The student lead incubator has led to several successful startups including [M3D](#), and the Food Recovery Network. In addition, the college and its students were instrumental in launching two unique experiential learning opportunities involving two Hackathons; one called Bitcamp and other called Technica, which was the first all-female and non-binary hackathon on a university campus. These hackathons have helped generate a renewed spirit of innovation and creativity.

Philanthropy

In terms of philanthropy, the Clark School has led the university in fundraising, essentially achieving and surpassing its \$185 million Great Expectations campaign goal, going on to reach **\$240M** towards a campus goal of **\$1 Billion**. The *Great Expectations Campaign* fundraising concluded in December of 2013 and has resulted in two signature infrastructure projects on campus including the [Edward St. John Teaching and Learning Center](#), and [A. James Clark Hall](#) to allow for the growth in the field of bioengineering. In the current *Fearless Ideas Campaign*, the Clark School fundraising goal is just above **\$500M** with already more than 90% raised to date towards a campaign goal of **\$1.5 Billion**. Most notably, Pines and his leadership team were instrumental in securing a **\$219.5 million investment**—which was in 2017, the sixth largest gift ever to a public university—from the *A. James & Alice B. Clark Foundation*. The [Building Together: An Investment for Maryland](#) gift is funding need-based scholarships campus-wide, as well graduate fellowships, faculty positions, infrastructure, and other initiatives. One signature element of this investment is support for the [Emilio Fernandez IDEA Factory](#), an innovative building project that will create disruptive collisions between the disciplines and incubate transformative ideas that have a positive impact on people and society.

Diversity and Inclusion

Pines has also made *Diversity* at the student, staff and faculty level a hallmark of his tenure as Dean. Under his leadership and as a co-principal investigator, the university became an [NSF ADVANCE](#) grant recipient under the theme of developing “*A Culture of Inclusive Excellence*,” which is focused on improving work environments, retention, and advancement of tenured and tenure-track women faculty in ways that improve the culture for all faculty. At the engineering faculty level, the number of tenured/tenure-track women faculty has more than doubled from 18 to 37 out of 212 (17%), and the number of under-represented minority faculty has increased from 11 to 19 out of 212 (~10%). At the undergraduate student level, the number of enrolled women undergraduates has increased from 18% to 26.5%, and the number of enrolled underrepresented minority undergraduate students has grown from 9.5% to 16%. According to [Diverse Issues in Higher Education](#), the Clark School ranks among the top 10 in conferring the most B.S., M.S., and Ph.D. degrees to African-American students.

Aerospace Engineering Department (January 2006 to December 2009)

During Pines' leadership of aerospace engineering from 2006 to 2009, the department was ranked 8th and 6th overall among U.S. universities in the *U.S. News and World Report* graduate and undergraduate school rankings respectively. During this time the department had its highest research expenditure productivity totaling more than \$20M. Pines served as director of the *Sloan Scholars Program*-(1996-2011) and director of the *GEM Program*-(1999-2011). These two programs were responsible for the graduation of over **20 underrepresented minority PhDs** in engineering from the University of Maryland. As a result of these two programs, UMD graduated the highest number of URM PhDs in engineering in 2012. He also served as chair of the *Engineering Council*-(1999-2002), director of the *NASA CUIP Program* (2007-2013), and director of the *SAMPEX flight experiment program* (1998-2002).

DARPA Program Management (October 2003 to September 2006)

During a leave of absence from the University of Maryland from 2003 to 2006, Pines served as a Program Manager for the Tactical Technology Office and Defense Sciences Office at the (Defense Advanced Research Projects Agency (DARPA). While at DARPA, Pines initiated five new programs primarily totaling approximately \$80M related to the development of advanced aerospace technologies for the US military. These programs included:

1. Program Title: Sensor Dart

Program Scope: Develop an affordable air delivery system that is capable of delivering unattended ground sensors (UGS) out to a range of 45 to 75 km with precision emplacement accuracy of 50 m at 500 m spacing for situational awareness. First ever UGS delivered capable from a UAV. Memorandum of agreement signed with the Army for transitioning technology.

Performers: Sandia National Laboratory/Aerovironment.

Schedule: 10/04-7/06

Total Funding Level: \$13.5M

2. Program Title: Long Gun-Affordable Weapon

Program Scope: Development of a Low Cost expendable recoverable UAV/munition for Early Expeditionary Forces. System consists of a tri-mode VIS/LWIR/LLL sensor with laser spot recognition capability, a heavy fuel engine, a ducted fan and an carry multiple sensor fused weapons. Platform engineered to achieve 30 hr performance at altitude.

Performers: L3 Communication/Geneva Aerospace/UEL LTD.

Schedule: 10/04-10/07

Total Funding Level: \$12.5M

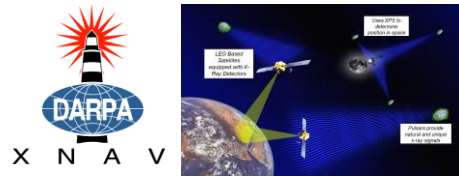
3. Program Title: X-ray Source Based NAVigation for Autonomous Position Determination (XNAV)

Program Scope: Develop a revolutionary navigation capability based on X-ray sources for autonomous time, position and attitude determination. The primary focus in on developing a payload that can track and observe X-ray sources with a WFOV camera for attitude determination and a NFOV instrument for timing and position determination. Memorandum of agreement signed with NASA to demonstrate technology. **XNAV was the First program** to develop the enabling technology to make autonomous navigation by the use of X-ray Pulsars practical. This was a major accomplishment. NASA's current **NICER** program is a reinvention of DARPA's XNAV Program.

Performers: Ball Aerospace Corp, LANL, APL, NIST, NRL, MIT, BNL.

Awards: Several Space Navigation Conference Best Paper Awards

Schedule: 6/05-10/09



Total Funding Level: \$50M

4. Program Title: Nano Air Vehicle (NAV)

Program Scope: Develop an affordable, lightweight, small nano-scale air vehicle systems for complex urban missions including outdoor to indoor reconnaissance and sensor emplacement.

Phase I Performers: Lockheed-Martin, AV Inc., Draper and Micropropulsion.

Phase II Performer: AV Inc.

Schedule: 3/06-12/10

Total Program Funding Level: \$29M

Awards: Winner of Awards and Recognition from Popular Science (2011) and Time Magazine (11/28/11) for one of the *Ten Inventions of the Year*. AV became final performer.

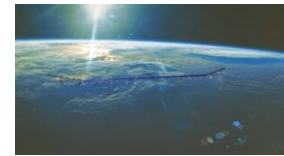
<http://www.time.com/time/covers/0,16641,20111128,00.html>

<http://www.popsci.com/bown/2011/awards>

<http://www.youtube.com/watch?v=a8ZbtZqH6Io>



5. Program Title: Nightowl-precursor to **Vulture**-Scope: Initiated some of the enabling technologies to develop a high altitude persistent stare platform that stay aloft for 5 years. Key enabling technologies include lightweight stiff and reliable structures, low Reynolds number and low mach number aerodynamics, efficient energy and propulsion systems and integrated system reliability. These seedlings were the precursor to the current **DARPA Vulture Program**. For his DARPA program management leadership and innovation, he was awarded the Department of Defense's **Distinguished Service Medal**.



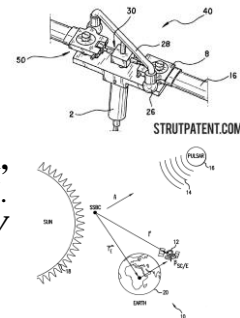
He has also held positions at the Lawrence Livermore National Laboratory (LLNL), Chevron Corporation, and Space Tethers Inc. At LLNL, Pines worked on the Ballistic Missile Defense Organizations-BMDO's *Clementine Spacecraft* program, which was the *first* spacecraft to *discover water near the south pole of the moon*. A replica of the spacecraft now sits in the National Air and Space Museum in Washington, DC.

Academic Scholarly Activities at University of Maryland (March 1995 to Present):

Pines' current research focuses on structural dynamics, including structural health monitoring and prognosis, smart sensors, and adaptive, morphing and biologically-inspired structures as well as the guidance, navigation, and control of aerospace vehicles. He is the co-author of *4 edited conference proceedings, 8 book chapters, over 80 journal articles and 180 plus conference/workshop papers*. He has approximately 5,000 citations and H-Index of 35. Dr. Pines also is the holder of *7 co-authored Patents* with his students and collaborators including:

Biomimetic mechanism for micro aircraft

Patent number: 6938853, Filed: March 14, 2003, Issued: September 6, 2005, Assignee: University of Maryland, College Park, Inventors: Darryll J. Pines, Felipe A. Bohorquez, Jayant Sirohi



Navigational System and Method Utilizing Sources of Pulsed Celestial Radiation, Suneel I. Sheikh, Darryll J. Pines, Kent S. Wood, Paul S. Ray, and Michael N. Lovellette, U.S. Patent No. 7,197,381 (27 March 2007). (**FIRST PATENT ON XNAV SYSTEM**)

Controllable miniature mono-wing aircraft

Patent number: 8366055, Filed: June 18, 2010, Issued: February 5, 2013

