

RECOGNIZING EXCELLENCE: C. “NAT” NATARAJ, PhD

In Villanova University’s history, only three College of Engineering faculty have been recognized with the University’s prestigious Outstanding Faculty Research Award. The first was Moeness Amin, PhD, director of the Center for Advanced Communications. Ahmad Hoorfar, PhD, director of the Antenna Research Laboratory, was the second. And, in 2013, C. “Nat” Nataraj, PhD, professor and chair of the Department of Mechanical Engineering, and the Mr. and Mrs. Robert F. Moritz Sr. Endowed Chair in Engineered Systems, became the third recipient of this highly competitive award.

Research

A member of the Villanova College of Engineering faculty since 1988, Dr. Nataraj is known internationally for his work in the area of dynamic systems and nonlinear dynamics. In 2002, he helped found the University’s Center for Nonlinear Dynamics and Control (CENDAC) and served as its inaugural director until 2007. CENDAC is home to the Dynamic Systems Laboratory, where Dr. Nataraj conducts research on modeling, control and diagnostics of nonlinear systems for a range of industries, including health care and the military. Other areas of scholarship for which he is recognized include unmanned vehicles, robotics and rotor dynamics.

Given his areas of expertise, Dr. Nataraj has received many grants throughout the years from sources including the National Science Foundation, National Institutes of Health, the Defense Advanced Research Projects Agency and the Office of Naval Research. This academic year alone, he has been awarded more than \$620,000 in

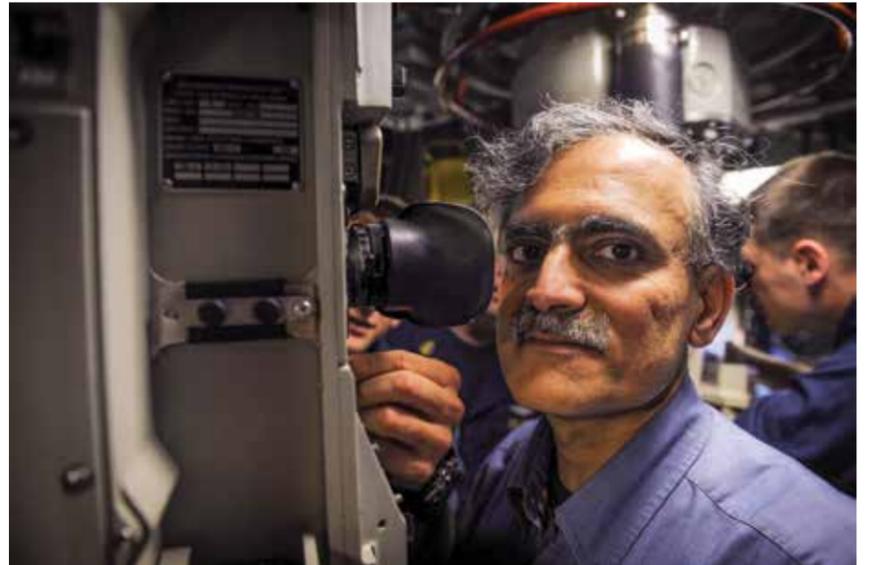
research funding. This financial support will be essential as he and a team of Mechanical Engineering students prepare to represent the United States in the first-ever RobotX Challenge in October 2014 in Singapore. His years advising the Autonomous Surface Vehicle team played a large role in Villanova being selected for this new competition. You can read more about the “monumental effort” involved with RobotX in the article “Villanova-FAU Team to Represent the U.S. in International Robotics Competition,” found in our News Archives at engineering.villanova.edu.

“I am deeply honored to have received this recognition for my work, particularly given the number of deserving faculty members who also were nominated.”

—C. Nataraj, PhD, recipient of the Villanova University Outstanding Faculty Research Award

In the Classroom

Throughout his more than 25 years with the College, Dr. Nataraj has taught a dozen different courses and has supervised 30 undergraduate researchers, 25 master’s research theses and seven doctoral candidates. Today, he primarily teaches graduate courses in Nonlinear Dynamics, Rotor Dynamics and Vibration Analysis. Ali Jalali, one of Dr. Nataraj’s doctoral students, is working on the integration of physics-based modeling and machine-learning techniques in the design of clinical decision support systems. He describes his advisor as a great research mentor: “Dr. Nat helps you understand the big



C. Nataraj, PhD, professor and chair, Department of Mechanical Engineering, was selected as one of nine faculty members from institutions across the country to ride on the USS Pasadena, a nuclear submarine.

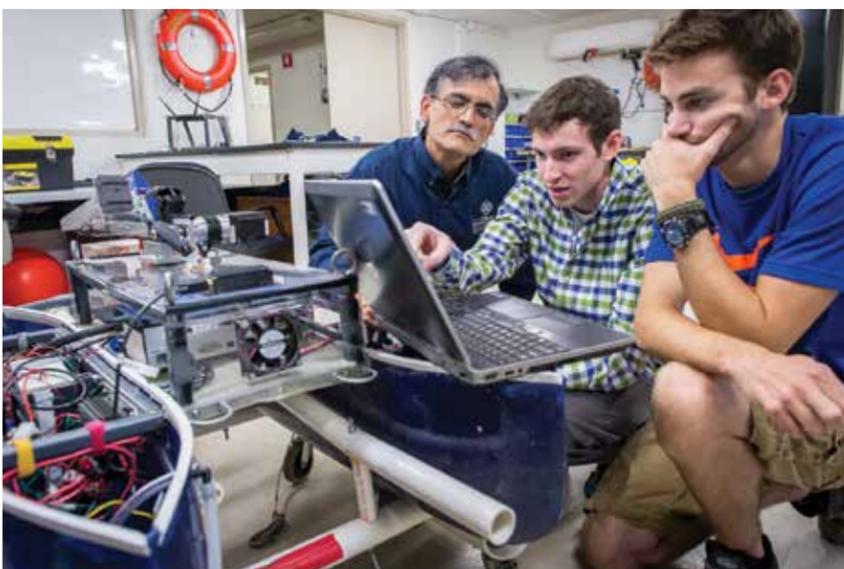
picture and then gives you the freedom to think critically and go deep into the problem. He spends a lot of time with his students and is available to discuss any obstacles we face.”

Outreach

In addition to his work with Villanova students, Dr. Nataraj also makes time in his increasingly busy schedule for STEM (Science, Technology, Engineering and Math) outreach. He leads the College’s efforts to host and facilitate the annual Marine Advanced Technology Education (MATE) regional competition, through which hundreds of high school and college students put handmade remotely operated vehicles to the test in a daylong competition on campus. He also has been active in the development of curricular materials for SeaPERCH, a system of instructional materials that K–12 teachers and students can use to build their own robots.

Industry Engagement

Within the engineering industry, Dr. Nataraj is an elected member of a number of prestigious technical societies and professional boards. He has been the chief organizer for many American Society of Mechanical Engineers (ASME) symposia throughout the past 15 years, including the largest conference in the world on rotor dynamics and control. He also has served on ASME’s Technical Committee on Vibration and Sound, and recently the Journal of Vibration and Control, International Journal of Advanced Robotic Systems and the Journal of Applied Nonlinear Dynamics invited him to join their editorial boards. Closer to home, Dr. Nataraj serves as chairman of the board of directors of the Turbo Research Foundation in Lionville, Pa., and as an elected member of The Franklin Institute’s Committee of the Sciences and the Arts.



Dr. Nataraj consults with Autonomous Surface Vehicle team members Anderson Lebbad ’16 MSME and Alexander Poultney ’14 ME.

The Outstanding Faculty Research Award

Outside of those who have been nominated, very few Villanovans are aware of the level of competition for the Outstanding Faculty Research Award. Not simply “a recognition,” award nominees are selected based on their lifetime achievements. Candidates must submit a detailed research statement, complete CV (Dr. Nataraj’s is 55-pages long), and hundreds or thousands of pages of supporting documentation going back through the nominee’s decades of research (more than 3,000 pages, in his case). In addition to the personal materials, eight international scholars submitted confidential letters of reference to the award committee on behalf of Dr. Nataraj. Finally, the committee pores through the material for each candidate and is faced with the very difficult task of selecting one of them to be the year’s award winner.

Gary A. Gabriele, PhD, Drosdick Endowed Dean, College of Engineering, applauded the committee’s selection: “This is a great honor for Dr. Nataraj and a well-deserved recognition of the innovative research he has been involved in at Villanova. The depth and breadth of his research, and the extensive involvement of undergraduate and graduate students in his work, are indicative of a very inquisitive and creative researcher who loves to share his passion for research with his students and colleagues.”

“Nat has been a great mentor to many young faculty and has been an excellent example of the teacher-scholar model that Villanova faculty strive to achieve.”

—Gary A. Gabriele, PhD, Drosdick Endowed Dean, Villanova University College of Engineering

In March, Falvey Memorial Library and the College of Engineering sponsored the Scholarship@Villanova/Outstanding Faculty Research Award Lecture, featuring Dr. Nataraj. His presentation, “Dynamic Systems: The Science of Machinery, Robots, Medical Diagnostics and Autonomy,” described some of the research that led him to win this prestigious award.