

At PPPL THIS WEEK

WEDNESDAY, MAY 20

Colloquium

4:15 ♦ MBG Auditorium

[The Electrical System of the Heart](#)

Professor David J. Callans, M.D., Hospital of the University of Pennsylvania

UPCOMING

MONDAY, MAY 25

Memorial Day

Lab Closed

Please note: The PPPL Weekly will not be published on May 25 due to the Memorial Day holiday. The next issue will be on June 1.

WEDNESDAY, MAY 27

Colloquium

2 p.m.-3 p.m. ♦ MBG Auditorium

**Advanced Simulation for
Technology Innovation and
Science Discovery**

Scott Stanton, ANSYS, Inc.

FRIDAY, MAY 29

**Tours of PPPL for Princeton
University Reunions**

10 a.m. and 1:30 p.m.

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PPPL physicist wins Early Career Research Program grant to develop tools to eliminate impurities in fusion plasmas

By Jeanne Jackson DeVoe

Physicist Luis Delgado-Aparicio, of the U.S. Department of Energy's (DOE) Princeton Plasma Physics Laboratory (PPPL), has won a highly competitive Early Career Research award sponsored by the DOE's Office of Science. The five-year grant of some \$2.6 million will fund Delgado-Aparicio's research aimed at eliminating a key barrier to developing fusion power as a safe, clean and abundant source of electric energy.



Luis Delgado-Aparicio
(Photo by Claudia Cisneros)

Delgado-Aparicio said he is delighted to receive the grant. "It's a research and development process that will last for five years but it's a program that will certainly have an impact in our field," he said. "I'm very, very excited about it."

Fusion occurs when a super-hot, electrically charged gas called plasma is heated to temperatures hotter than the sun and becomes hot and dense enough to force atomic nuclei to fuse together and create a burst of energy. Delgado-Aparicio's research focuses on the impurities that migrate from the interior walls and plasma-facing components of a fusion facility — or tokamak — into the plasma. These impurities are tiny particles that can cool the plasma and halt or slow the fusion reaction. Delgado-Aparicio is developing a process to enable researchers to pinpoint and analyze the impurities and quickly flush them out of the plasma.

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Service luncheon recognizes long-term PPPL employees

By Jeanne Jackson DeVoe



Some of PPPL's long-time staff members at PPPL's Service Recognition Luncheon. From left to right: William Wei-Li Lee, Rich Hawryluk, and Roscoe White, who have been at PPPL for 40 years; Joe Winston, who has worked at the Lab for 45 years; and Tom Provost, who has been a PPPL employee for 50 years.

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Early Career Research Program

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Ridding plasmas of these impurities is becoming increasingly vital as experiments utilize longer pulses to produce more sustained fusion energy. "It's a very important question: What's going to happen when we try to confine a plasma for several minutes, hours, days or even months?" Delgado-Aparicio said. "We need to create a mechanism to mitigate the presence of these very troublesome impurities or to flush them from the core of the plasma."

Tackling this problem will be crucial for ITER, the international fusion experiment under construction in the south of France, and the National Spherical Torus Experiment-Upgrade (NSTX-U), which is completing a nearly three-year upgrade at PPPL. Part of the ITER interior will be made of the heavy metal tungsten, a source of highly-charged impurities that can quickly radiate away heat from the core plasma. And researchers in Princeton will replace the carbon-coated walls of the NSTX-U with a full-metal wall made of tungsten or molybdenum in the next five years.

Delgado-Aparicio and David Gates, a principal research physicist at PPPL, recently proposed an answer to a mysterious problem in plasma physics called "the density limit" that also centers on impurities and prevents fusion reactors from operating at maximum efficiency. The researchers found that tiny, bubble-like magnetic islands form in the plasma and collect impurities. These islands not only cool the plasma but act like shields that block out added power that is pumped into the tokamak. If these islands grow too large, the electric current that heats and confines the plasma collapses and the plasma flies apart. One goal of Delgado-Aparicio's research is to find methods to prevent these disruptions by minimizing the loss of energy caused by the impurities. These methods could achieve better performance in fusion reactors by ensuring that the maximum amount of energy goes into fusion reactions

Third winner at PPPL in the last three years

Delgado-Aparicio, of Montgomery Township, New Jersey, was one of 44 winners of an Early Career award nationwide and the third researcher at PPPL to win the honor in as many years. Physicist Brian Grierson won a grant last year for research into the mechanisms that govern the formation and maintenance of the hot edge of fusion plasmas. Ahmed Diallo, leader of the pedestal structure and control topical science group for the NSTX-U, won a grant in 2013 for research on the plasma edge.

News is bittersweet

Delgado-Aparicio said it was bittersweet when he first received news of the award. He learned of it in April while in the airport on his way to visit his ailing father in Lima, Peru. "It was difficult to be happy because half my brain was occupied by my dad," he said. He phoned his parents about the award and his father, a former Peruvian congressman who was also named Luis Delgado-Aparicio, died half an hour later, shortly after his son boarded the airplane to visit him.

Delgado-Aparicio and his 10-year-old son Mateo were back in Lima for a memorial service for his father when DOE announced the Early Career recipients on May 6. He said he is now better able to both remember his father fondly and take pleasure in the award. "I begin to feel happier about his life" Delgado-Aparicio said. "He was an enthusiast of the work I was doing. He was a great supporter in my life. I feel very happy to have had him in my life and I'm sure he was ecstatic to hear about the prize."




Physicists Delgado-Aparicio, left, and David Gates.

Delgado-Aparicio earned a bachelor's degree in physics from the Pontificia Universidad Catolica del Peru, and a master's degree in astrophysics from Princeton University in 2001. He earned a second master's in physics from Johns Hopkins University and received his PhD in physics from Johns Hopkins in 2007. He joined PPPL in 2009 and spent three-and-a-half years as a visiting scientist at MIT before returning to PPPL in the summer of 2013.

A complex diagnostic tool

Delgado-Aparicio plans to study how the impurities react with the plasma by using a complex x-ray diagnostic that will show exactly what happens to the plasma when the impurities are introduced. The device will reveal not only the size and location of the impurities, but also the kind of energy they radiate, which will pinpoint the sources as well as the properties of how impurities are transported in fusion plasmas. The diagnostic will also show how the impurities affect the energy and temperature of the plasma.

This information will provide a guide for removing the impurities, Delgado-Aparicio said. One solution could be to change how the impurities are transported into and through the plasma. For example, researchers might use a tangential neutral beam to heat the plasma to an extremely high temperature to change the way impurities are transported and steer them away from the core of the plasma. The neutral beam would also speed the movement of the plasma, creating a centrifugal effect to spin the impurities away from the plasma's center. Another solution could be to create perturbations within the plasma to force the impurities out.

Delgado-Aparicio plans to test his diagnostic on NSTX-U. He also plans to conduct experiments on the Alcator C-Mod tokamak at MIT; the DIII-D tokamak at General Atomics in San Diego, and the Tokamak à Configuration Variable (TCV) in Lausanne, Switzerland. 

Service Luncheon

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Like many at PPPL, Tom Provost and Joe Winston have worked at the Laboratory through most of their lives as experiments have come and gone, the staff has shrunk and expanded, and their own families have grown to include children and then grandchildren.

Provost and Winston are a bit unusual because they came to PPPL for their first jobs as teenagers, and aside from stints



Tom Provost

in the military for both, they essentially never left. Provost has worked at PPPL for 50 years and Winston for 45 years. They were among 80 PPPLers who were honored at a special Service Recognition Luncheon on May 11, the first of its kind. Human Resources' Kate Harkness and a new special events committee organized the event.

Deputy Director for Operations Adam Cohen, who served as emcee at the event, thanked the employees attending the luncheon in the NSTX-U Control Room Annex for their years of hard work and service. Together, their decades of work amount to hundreds of years "of dedication to this Laboratory in making fusion a reality," Cohen said.

While long-term employees are not uncommon at PPPL, such long-standing service is very unusual nationwide. Only 5 percent of professional employees nationwide stay at their jobs for 10 or more years, according to a 2014 survey by the U.S. Bureau of Labor Statistics.

Tom Provost: 50 years

Provost, a senior vacuum technician, grew up in the Trenton area and came to the Laboratory straight out of high school. When he came to the Lab in 1964, mini skirts were in fashion, the Beatles were popular, and there were protests against the Vietnam War.

After working in the warehouse for several months, he became a technician trainee and then a technician. He worked at PPPL for two years before being drafted by the Army. He served as a combat engineer in Munich, Germany, and came back to the Lab in 1968, where he worked on several small experiments at the B Site, including a small stellarator called the "A2 machine."

After working in cryogenics for 14 years, Provost helped establish the vacuum prep lab for the Poloidal Divertor Experiment (PDX) from the late 1970s to the mid 1980s, when it was converted to the Princeton Beta Experiment. He then worked on the Tokamak Fusion Test Reactor (TFTR), and has since worked on gas injectors and other projects related to high-vacuum technology on the National Spherical Torus Experiment (NSTX) and the National Spherical Torus Experiment Upgrade (NSTX-U).

The "go-to person" for vacuum systems

Robert Kaita, a principal research physicist at PPPL who has worked closely with Provost, said Provost has been the "go-to person at PPPL for vacuum systems." One of the many examples is Provost's work assembling the lithium

evaporator, a key apparatus for both NSTX and NSTX-U, Kaita said. "Not only is his knowledge comprehensive but he has a gift for creative solutions to difficult challenges," Kaita said. "What Tom did in its intricate assembly can only be described as artistry."

Provost is modest about his accomplishments. "It's been quite a few interesting projects and working with lots of interesting and agreeable people," he said. "It's been long-term employment that people won't be able to find in the future."

Provost lives in Robbinsville. Jeanne, his wife of 45 years, died last year. He has a daughter Katherine and son Michael, and five grandchildren. He enjoys repairing and assembling things at home as well as at work. In his spare time, he enjoys working on an old sports car and collecting and restoring old radios.

Joe Winston: 45 years

Joe Winston is a field supervisor at PPPL who grew up in North Carolina and Newark and came to the Laboratory in 1969 at age 18 through a technical school called the Kilmer Job Corps Center in Edison. President Richard Nixon was the president at the time and bellbottoms were the rage. Winston worked with the electronics department for two years before being drafted. He served four years in the Air Force working on avionics instruments such as altimeters and air speed indicators.



Joe Winston

When Winston returned from the Air Force in 1974, he became a machine technician and has been working with the machine-tech crew ever since. He worked to assemble PLT, TFTR, NSTX and now NSTX-U, and also supervises the crew that operates and repairs the machines.

Winston arrives at work at 5:45 a.m. and leaves at 3 p.m. and can often be found working on weekends. "It's exciting every day," he said. "I love it. I come to work looking for the challenges it presents. I'm a hands-on supervisor. I'm in the field with them every day."

Winston said he particularly enjoys passing along his knowledge to new employees. "Most of my enjoyment is teaching what I've learned over the years and watching them grow and take responsibility and demonstrate what they've learned and how well they can do the job."

Winston lives in Hamilton with his wife Melvera. They have a blended family with five grown children: Winston, Mcrae, Chanta, Chelsea, and Arlisa, and four grandchildren ranging in age from 3 to 21.

Not ready to retire

Winston said he has been asked whether he wants to retire and he always says no. "As long as I enjoy the work and the Laboratory wants me here, I'll stick around. I have a lot of junior technicians to bring along," he says. Besides, he adds, "I've been doing this for so long the people at work are like family – they are my second family."

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Service Luncheon

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The Service Recognition Luncheon also honored six people who have been working at the Laboratory for 40 years including William Wei-Li Lee. “It went too fast,” Lee said. “I got to work with a lot of interesting people and argue with them too. We learn a lot from the students, post docs, and colleagues. It’s been a very good experience for me.”

Other staff members honored for 40 years of service were: James Conover, Richard Hawryluk, Thomas Holoman, Jules Nemeth and Roscoe White.

35 years:

Thomas Carroll, Gary D’Amico, Diego DeBonis, John Dong, Richard McDonough, Colin McFarlane, Antonio Morgado, Lewis Morris, Westley Reese, A. Lane Roquemore, Dick Shoe.

30 years:

Eugene Baker, Joanne Bianco, Ray Camp, Tom Egebo, Eric Fredrickson, Charles Gentile, Harry Krotz, Steve Raftopoulos, Wayne Reiersen, Skip Schoen, Ken Silber, Tim Stevenson, Thomas Ward, Michael Zarnstorff, and Stewart Zweben.

25 years:

Raffi Nazikian, Steven Scott, and Bill Slavin.

20 years:

Andrea Moten, Maria Pueyo, Robert Sheneman, and Gretchen Zimmer.

15 years:

Ronald Beyer, Patricia Bruno, Michael Duco, Nikolai Gorelenkov, Robert Hitchner, Robert Horner, Marisol Ovalles, and Darren Thompson.

10 years:

Michael Barowsky, Rico Fernandez, Stefan Gerhardt, Sajjad Gilani, Paul Henderson, John Lacenere, Tom Levis, Kathleen Lukazik, Sean Rogers, and Jean Wernock.

5 years:

Neway Atnafu, Carol Ann Austin, Christopher Cane, Adam Cohen, Luis Delgado-Aparicio, Ahmed Diallo, Antonio Falcon, Brian Grierson, Maria Huber, Adam Kelley, Andrew Konca, Cindy Lasky, Michael Mardenfeld, Adam Maul, Jong-Kyu Park, Mario Podesta, Stewart Prager, Peter Sloboda, Peter Titus, Kelsey Tresemer, and Douglas Westover. 🍷



PPPLers enjoy some laughs at the luncheon in the NSTX-U Control Room Annex.



Roscoe White, left, and Mario Podesta, who has been at PPPL five years.



Members of the events committee who helped organize the luncheon. From left to right: Rich Torraca, Kate Harkness, Sue Hill, Deedee Ortiz, Terry Greenberg, Carol Ann Austin, Dana Eckstein, and Marianne Tyrell.



Adam Cohen served as emcee for the luncheon.

There's still time to sign up for PPPL's Bike Challenge

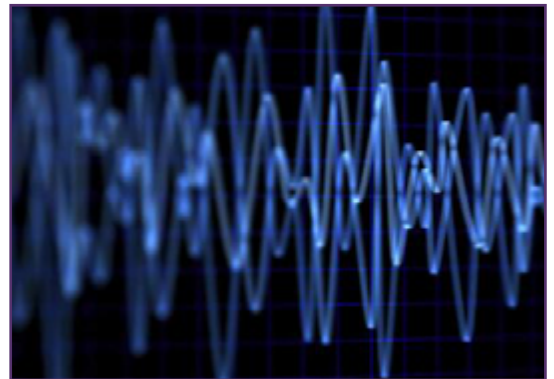
May is National Bike Month and PPPL's Bike Challenge has already gotten rolling with 40 PPPL'ers signed up for the Bike Challenge and five teams organized. With five teams, the group can handle up to 50 participants, so there's plenty of room for more bikers! So far, 32 of the 40 people have officially registered with their team on the Challenge website and PPPL has officially logged 44 bike trips for a total of 443 miles.

To sign up, go to <http://tinyurl.com/k6huwz7>. You'll be invited to join one of PPPL's teams and to register on the Bike Month Challenge website, which will track your bike rides during May, including trips outside of work!

For more information, please contact Rob Sheneman at ext. 3392.

COLLOQUIUM

The Electrical System of the Heart



Professor David J. Callans, M.D.
Hospital of the University of Pennsylvania

Wednesday, May 20

4:15 p.m. (coffee/tea at 4 p.m.), M.B.G Auditorium, Lyman Spitzer Building

PPPL Welcomes New Employees!



ANGELA BRELAND-JACKSON

Supervising procurement specialist

Business Operations/Procurement



CHANDA CARMICHAEL

Property administration coordinator

Engineering/Material Control



BREAKFAST 7 a.m. • 10 a.m.
CONTINENTAL BREAKFAST 10 a.m. • 11:30 a.m.
LUNCH 11:30 a.m. • 1:30 p.m.
SNACK SERVICE until 2:30 p.m.

	Monday May 18	Tuesday May 19	Wednesday May 20	Thursday May 21	Friday May 22
COMMAND PERFORMANCE Chef's Feature	Carved Turkey with Mashed Potatoes and Vegetable	Penne with Black Olives & Feta and Mixed Greens with Balsamic Vinaigrette	Chicken, Sausage, Shrimp Jambalaya	Garlic Rosemary Pork served with Braised Cabbage & Fried Pierogies	Outdoor BBQ Pulled Pork, Hot Dogs, Hamburgers, Corn on the Cob, Baked Beans, Macaroni Salad, Watermelon & Beverage
Early Riser	Blueberry Pancakes served with Sausage	French Toast Bread Pudding	2 Eggs Any Style served with Smothered Hash Browns	Bananas Foster French Toast	Sausage, Egg & Cheese Croissant
Country Kettle	Black Bean with Turkey	Minestrone	Beef Barley	Escarole, Chicken & Pasta	Navy Bean with Spinach & Tomato
Grille Special	Philly Cheesesteak served with French Fries	Shredded Pork Tacos with Pickled Red Onion and Slaw	Tuna Melt with Swiss & Tomato on Rye	Stuffed Baked Potato with Broccoli & Cheese	Fried Ravioli with Marinara Sauce
Deli Special	Pastrami & Cheddar Cheese on an Onion Roll	Hummus Bar	Corned Beef on Rye with Coleslaw, Swiss Cheese & Russian Dressing	Fried Flounder Torpedo with Bang Bang Sauce	Cobb Salad Wrap
Panini	Foot-Long Ball Park Frank served with Boston Baked Beans	Fried Eggplant, Salami, Fresh Mozzarella, Roasted Pepper & Pesto Mayo Ciabatta	Chicken, Mushrooms & Swiss Cheese Quesadilla	Broccoli, Spinach, Roasted Pepper, Onion, Mushroom, & Mozzarella Quesadilla with Chipotle Ranch	Roast Beef, Swiss, Spinach, Roasted Peppers & Honey Mustard

	Monday May 25	Tuesday May 26	Wednesday May 27	Thursday May 28	Friday May 29
COMMAND PERFORMANCE Chef's Feature	Memorial Day	Baked Ziti served with Garlic Bread	<small>CELEBRITY CHEF ANTHONY BOURDAIN</small> Steak au Poivre, Pommes Puree, Spring Asparagus, Blueberries with Lime Sugar	Mushroom Pork Chop served with Cheddar Broccoli Rice	English-Style Fish & Chips
Early Riser		Steak, Egg & Cheese Quesadilla	Egg & Cheese Scramble in a Pita	Eggs Benedict	Cranberry Pancakes served with Choice of Breakfast Meat
Country Kettle		Cajun Gumbo	Cheddar, Potato Chive	Split Pea with Ham	Black Bean Cilantro
Grille Special		Pepperoni Cheesesteak on French Bread	Chicken, Prosciutto, Provolone and Balsamic on a Kaiser	Homemade Chicken Tenders with Waffles and Spicy Maple Syrup	Grilled 4 Cheese, Tomato & Basil on Texas Toast
Deli Special		Beef Gyro	Turkey, Corned Beef, Swiss Cheese & Russian Dressing on Rye	Layered Tuna Club Sandwich	Teriyaki Chicken Sandwich and Asian Salad with Honey Ginger Dressing
Panini		Cuban Quesadilla with Ham, Turkey, Swiss, Pickles & Banana Peppers	Chicken Caesar Salad Pizza	Eggplant, Red Onion, Red Peppers and Fresh Mozzarella on French Bread	Ham & Pepper Stack

MENU SUBJECT TO CHANGE WITHOUT NOTICE

Menu Item is in keeping with American Heart Association (AHA) and U.S. Department of Agriculture (USDA) guidelines.

VEGETARIAN OPTION

WEEKLY

Editor: **Jeanne Jackson DeVoe** ♦ Layout and graphic design: **Kyle Palmer**
Photography: **Elle Starkman** ♦ Science Editor: **John Greenwald** ♦ Webmaster: **Chris Cane**

The PPPL WEEKLY is published by the [PPPL Office of Communications](#) on Mondays throughout the year except for holidays.

DEADLINE for calendar item submissions is noon on WEDNESDAY. Other stories should be submitted no later than noon on TUESDAY.

Comments: commteam@pppl.gov ♦ PPPL WEEKLY is archived on the web at: <http://w3.pppl.gov/communications/weekly/>.

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