

The World's Pool of Knowledge Just Got Deeper.

Adam Smith (<https://viterbischool.usc.edu/author/adamgsmi/>) | May 12, 2017

After a half decade of research, newly minted USC Viterbi Ph.D.s don the cardinal and gold hoods



FROM LEFT TO RIGHT, THE FINALISTS OF THE 2017 BEST DISSERTATION AWARD – THE WILLIAM F. BALLHAUS, JR. PRIZE FOR EXCELLENCE IN GRADUATE ENGINEERING RESEARCH: MARY GERTRUDE GUTIERREZ; NIKOS KALLIGERIS; FEI FANG; AND HOOMAN ABEDIASL. PHOTO BY: VICTOR LEUNG

[Please click here if you wish to see a photo album of the ceremony.](#)

<https://www.flickr.com/photos/uscviterbi/sets/72157680620041583>

Last June, [Fei Fang](https://feifang.info/) took her first ride on the Staten Island Ferry.

She was one of about 66,000 passengers that day, boarding one of the five, orange ferries going from Manhattan to Staten Island. Nearby, in the waters of Upper New York Bay, she could see two small patrol ships with M240 Bravo machine guns.

What Fang knew – that the other 66,000 passengers didn't know – was that it was her algorithm, guiding where those patrol ships would go, that was key to keeping them all safe.

Today, after five years of Ph.D. research, Fang was awarded the best USC Viterbi dissertation award for 2017 – the William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research. (<https://viterbigrad.usc.edu/news-and-events/graduate-awards/the-william-f-ballhaus-jr-prize-for-excellence-in-graduate-engineering-research/>).

At the 2017 USC Viterbi Ph.D. Hooding and Awards Ceremony, Dean Yannis C. Yortsos congratulated Fang and scores of newly hooded Ph.D.s. The May 11 event at USC's Bovard Auditorium was the culmination of a half-decade or more of immersive research in topics ranging from tsunamis, socially assistive robots and biological imaging.

As Yortsos noted: "You will join a very select few: According to the most recent U.S. census data, just over 1 percent of the U.S. population holds a Ph.D. One of them, by the way, is a fellow by the name of Andrew Viterbi, who 50 years ago created the Viterbi Algorithm (<https://viterbischool.usc.edu/news/2017/03/viterbi-algorithm-50/>) – the "killer app" behind digital communications, voice recognition and DNA sequencing among others."



DEAN YANNIS C. YORTSOS SPEAKS AT THE 2017 USC VITERBI PH.D. HOODING AND AWARDS CEREMONY. PHOTO BY VICTOR LEUNG





2017 Commencement PhD Video

from USC Viterbi

02:58



[2017 Commencement PhD Video \(https://vimeo.com/217048348\)](https://vimeo.com/217048348) from [USC Viterbi \(https://vimeo.com/uscviterbi\)](https://vimeo.com/uscviterbi) on [Vimeo \(https://vimeo.com\)](https://vimeo.com).

For Fang, who worked alongside [Professor Milind Tambe \(http://teamcore.usc.edu/tambe/#home\)](http://teamcore.usc.edu/tambe/#home) in USC Viterbi's [Teamcore Lab \(http://teamcore.usc.edu/\)](http://teamcore.usc.edu/), she feels fortunate to see her research having real world impact in security and sustainability: aiding the U.S. Coast Guard and even protecting endangered tigers in Malaysia.

In a world with limited security resources – whether it's Coast Guard ships, U.S. air marshals, police or park rangers fighting poachers – Fang explored how best to deploy them. In the case of the Staten Island Ferry, the two Coast Guard patrol ships – vigilant of a U.S.S. Cole style attack – cannot be everywhere at once, and additional vessels cost upwards of \$1 million. Unlike, say LAX, where Tambe's lab also schedules security patrols, the Coast Guard is protecting five moving targets across one of the busiest waterways in the world.

Nevertheless, the Coast Guard has been impressed. Said Fang, "Professional mariners said that there is an apparent increase in U.S. Coast Guard patrols – even though they have the same number as before."

For Fang, who begins a new life this fall as an assistant professor at Carnegie Mellon University, she felt a surge of pride that day aboard the ferry: "When the patrol boats did a sudden U-Turn, deep in my heart, I knew it was my algorithm at work."





FEI FANG, WINNER OF THE THE WILLIAM F. BALLHAUS, JR. PRIZE FOR EXCELLENCE IN GRADUATE ENGINEERING RESEARCH. HER RESEARCH HAS LEAD TO IMPROVED COAST GUARD SECURITY OF THE STATEN ISLAND FERRIES.

Nikos Kalligeris (<http://coastal.usc.edu/kalligeris/>), Ph.D. '16, another finalist for the best dissertation award, was born and raised in a coastal town in Crete, sailing the Aegean on a small dinghy and his father's 34-foot boat, called Orizon.

Despite his lifetime love of the sea, he also learned a deep and abiding respect for the waves. Once, en route to a regatta with his father, Kalligeris encountered a terrible storm with 40-knot winds. They stubbornly refused to turn back, and the ship's main mast paid the cost.

Under the direction of Professors Patrick Lynett (<http://coastal.usc.edu/plynett/>) and Costas Synolakis (<https://viterbi.usc.edu/directory/faculty/Synolakis/Costas>) in the USC Coastal Engineering Group (<http://coastal.usc.edu/>), Kalligeris studied even more powerful waves – tsunamis. Specifically, the tsunami induced currents and eddies that wreak havoc on ports. Consider the story of the Maersk Mandraki, a 285-meter freighter moored to the port of Salalah in Oman. Following the 2004 Indonesian mega-tsunami (https://en.wikipedia.org/wiki/2004_Indian_Ocean_earthquake_and_tsunami), the Maersk Mandraki was torn free, spinning out of control for several hours. Miraculously, it avoided collision with other ships and harbor structures, but it dramatized the impact of even distant



tsunamis. The 2004 tsunami originated over 3,000 miles away – near the Indonesian island of Sumatra – but it underscored the potential danger to say, the California coastline, from events like the 2011 Tōhoku earthquake and tsunami.

In his Ph.D. dissertation, entitled “Tsunami-induced turbulent coherent structures,” Kalligeris studied the the generation and evolution of tsunami-induced eddies. The experimental and analytical results of his research may provide insight on how these eddies affect our coastal infrastructures and make harbors in tsunami-prone areas safer in the future.



NIKOS KALLIGERIS, AGE 14, OFF THE COAST OF HIS NATIVE CRETE.

As Yortsos noted to the 161 newly minted Ph.D.s: “The world is being re-created and re-imagined, like never before – with an astonishing speed, at an exponential pace, in front of our very eyes. And it is engineers and visionaries like you and your work that drive this re-imagination.”

Here are the 2017 winners of important Ph.D. awards:

BEST DISSERTATION



Department of Aerospace and Mechanical Engineering

Yangyang Huang

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Department of Biomedical Engineering

Yu Chen

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Mork Family Department of Chemical Engineering and Materials Science

Mary Gertrude Gutierrez*

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Qr N v r Ye Ä Ö kZ Gy GÖK GÖü G

Sonny Astani Department of Civil and Environmental Engineering

Nikos Kalligeris*

GYÄÖ N ö ÖK Äü GK ÇÄ v Ä GÖ ÄQr DG ÖG Ä Äv Ä

Department of Computer Science

Fei Fang**

G r y l v KY! KKV GY v öb Đy l Ä r ö GN v r v k! Y v Gü Ä v ö DGü Ä v Ä ä l N GY

Ming Hsieh Department of Electrical Engineering

Hooman Abediasl*

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Ren Chen

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- * finalist, William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research
** winner, William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research

BEST RESEARCH ASSISTANT

Department of Aerospace and Mechanical Engineering

Hanliang Guo

Department of Astronautical Engineering

Randall Scott Hughes



Department of Biomedical Engineering

Travis Peterson

Mork Family Department of Chemical Engineering and Materials Science

Renuha Asaithambi

Shanyuan Niu

Sonny Astani Department of Civil and Environmental Engineering

Ali Ghahramani

Jiachen Zhang

Department of Computer Science

Wolfgang Hoenig

Brandon Schlinker

Haifeng Xu

Amulya Yadav

JENNY WANG EXCELLENCE IN TEACHING AWARD

Lauren Crawford, Environmental Engineering Ph.D.

Roberto Martin del Campo Vera, Electrical Engineering Ph.D.

Olivia Evanson, Industrial & Systems Engineering Ph.D.

Wolfgang Hoenig, Computer Science Ph.D.

Shanie Liyanagamage, Biomedical Engineering Ph.D.

Qianru Qi, Petroleum Engineering Ph.D.

Edward Wagner, Mechanical Engineering Ph.D.

William Yu, Astronautical Engineering Ph.D.

Department of Aerospace and Mechanical Engineering

Edward Wagner

Department of Astronautical Engineering

William Yu

Department of Biomedical Engineering

Shanie Liyanagamage

Mork Family Department of Chemical Engineering and Materials Science

Qianru Qi



Sonny Astani Department of Civil and Environmental Engineering

Lauren Crawford

Department of Computer Science

Wolfgang Hoenig

Ming Hsieh Department of Electrical Engineering

Roberto Martin Del Campo Vera

Daniel J. Epstein Department of Industrial and Systems Engineering

Olivia Evanson

MING HSIEH INSTITUTE SCHOLARS

Ming Hsieh Department of Electrical Engineering

Yu Cao

Pradipta Ghosh

Erick Moen

Guodong Xie

Yihang Zhang

UNIVERSITY AWARDS

Student Recognition Award

Travis Peterson

Elaine Schaertl Short

Joycelyn Yip

Viterbi Undergraduate Research Mentoring Award

Si Shen

Elaine Schaertl Short

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