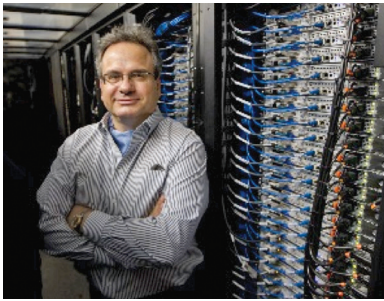


Fall 2015

Dear Aeronautics and Astronautics Alumni and Friends,



Charbel Farhat

It gives me great pleasure to write you again and provide a summary of the major departmental news and events for the past academic year.

Faculty Search Update

After hiring five great assistant professors during the last five years, we have made two additions to our faculty this year. We have hired **Mac Schwager**, BS '00, as an assistant professor to increase our footprint in controls and expand it in the area of robotics. We have also re-hired Professor **Ilan Kroo**, BS '78, PhD '83, to maintain our excellence in design.

Mac earned his Stanford undergraduate degree in mechanical engineering, with a minor in mathematics. Then, he worked as an automation engineer for Applied Materials Inc., during which time he was based in Horsham, UK. In 2003, he entered graduate school at MIT in the Department of Mechanical Engineering. He earned an MS degree in 2005, working with Dr. Anuradha Annaswamy on adaptive control with safety guarantees for autonomous aircraft. He completed a PhD degree in 2009, working with Professor Daniela Rus in CSAIL on multi-robot deployment for sensor coverage. From MIT, Mac moved to the University of Pennsylvania, where he worked as a postdoctoral researcher jointly with Professor Rus and Professor Vijay Kumar in the GRASP lab. From July 2011 through December 2011, he was a visitor at UC Berkeley in the Hybrid Systems Lab of our former colleague Professor Claire Tomlin. In January 2012, he was appointed an assistant professor in the Department of Mechanical Engineering at Boston University, where he established his reputation in distributed algorithms for coordination, estimation, and learning in groups of robots and animals, and stayed there until he accepted our offer this summer.

Ilan does not need introduction to anyone who is into aerodynamics and aircraft configurations. After joining our faculty in 1985 and working with us for 26 years, he left us in 2011 to become the CEO of Zee, focusing his energy on creating an entirely new aircraft and changing personal aviation. I am delighted to announce that this summer, the department has re-hired Ilan as a full professor. Since July 1, he has been back with us full time.

With six new hires in the last five years and Ilan back, the department has reasserted its strength in aircraft design and embarked on contributing to shaping the future of autonomous systems, cyber safety for transportation, distributed space systems, and, of course, aircraft design.

SoE Future: Planning the Next 20 Years

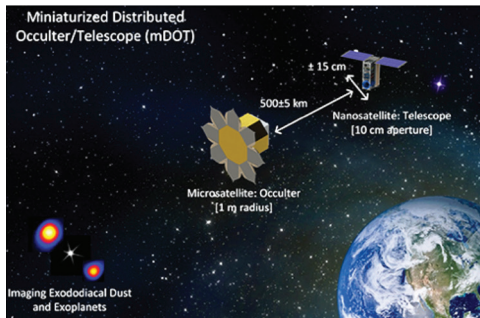
This past year, the School of Engineering launched a task force charged with developing the roadmap for the school's future over the next 10 to 20 years. The roadmap addresses the many facets that contribute to a great school, including faculty hiring and development, research themes and centers, space and facilities,

education and outreach, and how the school works with the rest of the university. To assist this task force in determining how to see the future of our school as a whole, every department has developed plans and aspirations for its future. Ours center on the four aforementioned strategic thrusts:

- **Autonomous systems**, with emphasis on trustworthy autonomy; integrated ground, air, and space systems; and system autonomy at multiple scales.
- **Cyber safety for transportation**, with attention to digital authentication for satellite messages.
- **Future aircraft design**, where we plan to rethink aircraft configurations and advanced technologies for a better future.
- **Distributed space systems**, with a new vision based on fractionated buses, femto-satellites, and smart dust.

The KACST/Stanford Center of Excellence in Aeronautics and Astronautics (CEAA)

As I wrote last year, the King Abdulaziz City for Science and Technology (KACST) established in the department the Collaborative for Aeronautics and Astronautics to strengthen KACST's research, development, and educational infrastructure in aerospace technologies and space physics. Our research projects in this newly established research center of excellence have focused on topics



of pressing concern that furthermore are aligned with the Kingdom of Saudi Arabia's global push to raise its technological profile. They have included developing new "green propellants"; performing synergistic experimental and numerical studies of winged flight of birds to enhance the flight characteristics of micro air vehicles and design better flapping robotic wings; and improving the safety of small aircraft by developing automatic stall/spin recovery of fixed-wing and autonomous aircraft.

This summer, we partnered with KACST and Stanford's Hanson Experimental Physics Lab (HEPL) on a new space venture. On Oct. 1, we launched together a new research effort within the KACST/Stanford CEAA focused on Miniaturized Distributed Autonomous Space Systems for Future Science and Exploration. The objectives of this first-of-a-kind, 10-year space technology and science research program are twofold: to develop a multi-purpose reconfigurable precise distributed space system based on microsatellite platforms, and to demonstrate its unprecedented capabilities in areas such as Earth gravimetry, gravitational waves detection, and on-orbit servicing.

Faculty News

I am also delighted to share with you that our faculty continue to garner professional recognition and prestigious awards. Professor **Antony Jameson** was chosen to receive the 2015 Von Neumann Medal for his "pioneering contributions to computational fluid dynamics, particularly to advances in the study of compressible flow over aircraft and the optimal design of airfoils." This is the highest award given by the U.S. Association of Computational Mechanics. He also received the 2015 Pendray Aerospace Literature Award for "seminal and high-impact research papers in the field of computational fluid dynamics and aerodynamic optimization."

Professor **Charbel Farhat** was designated by the U.S. Navy as a Primary Key-Influencer and flew with the Blue Angels during Fleet Week 2014.



Consulting Professor **Scott Hubbard** was invited by the *Wall Street Journal* to contribute his article “Space: Definitely Not the Final Frontier,” which appeared in a special section titled “The Future of Everything: Leading thinkers, innovators and artists share their visions of where the world is heading.”

Students in the News

Last October, **Kathryn Haefner** and her 8-year-old gelding Columbus won the Amateur-Owner 3’3” Hunter Grand Championship at the National Horse Show.

Ben Hockman and Professor **Marco Pavone** were featured in *The Economist*, the *San Francisco Chronicle*, and several other national and international press outlets for their research on microgravity space rovers.

David Dawson won the 2015 AIAA Best Paper award from the institute’s Fluid Dynamics Technical Committee for his paper titled “Large Eddy Simulation of a Three-Dimensional Compression Ramp Shock-Turbulent Boundary Layer Interaction.”

Alumni in the News

Dewy Hodges, PhD ’69, was chosen by ASME to receive its 2015 Spirit of St. Louis Medal for “developing the theory and methodology for modeling the dynamics and aeroelasticity of composite helicopter rotor blades, highly flexible slender aircraft wings and wind turbine blades.”



Dewy Hodges, PhD '69

Commencement Highlights

We are proud of all of our students and wish to share with you some academic year-end highlights. At last year’s commencement, the department awarded 8 BS, 35 MS, and 15 PhD degrees. The department diploma ceremony, packed with proud family members and friends, took place on June 14 in the NVIDIA Auditorium in the new Jen-Hsun Huang Engineering Center.

- **Brendan Tracey** received the William Ballhaus Prize for the best doctoral thesis, titled “Machine Learning for Model Uncertainties in Turbulence Models and Monte Carlo Integral Estimation.” His advisor was Professor **Juan Alonso**. The Nicholas J. Hoff Award for the master’s student with the highest grade point average went to **Benjamin Grossman-Ponemon**. **David Manosalvas** received the Cannon Summer Fellowship for academic achievement and service to the department. This award is endowed by the Chiang family in memory of **Wen-Wei Chiang**, PhD ’86. **Colleen Rosania** received the Sharon Kay Stanaway Award. This award is named after the late **Sharon Kay Stanaway**, PhD ’88, beloved wife of our colleague Professor **Ilan Kroo**. It is presented annually to an exceptional graduate student who shares Dr. Stanaway’s interest and enthusiasm for aerospace engineering.
- Each year, the student chapter of the AIAA presents teaching awards. Once again, the Best Instructor Award was presented to Professor **Stephen Rock**. The Outstanding Course Assistant Award went to **Aditya Mahajan**.
- **Grace Fontanilla** was awarded this year’s Outstanding Staff Service Award. Grace is known as Mrs. Does It All. She is tireless, charismatic, and effective. No departmental task is beneath her, as she turns her passion into work.

Staying Connected

Please visit our website at aa.stanford.edu regularly for updated information about the department. From this site, you can link to many sources for detailed information about our faculty, students,

research programs, and teaching initiatives. I welcome your suggestions regarding the department's directions and activities. As a member of the Aero/Astro family, you are always welcome to visit when you are in the area.

I hope that you will remain active members of our alumni community by keeping us apprised of your activities, promotions, and whereabouts. You can log on to soe.stanford.edu/alumni/update.html to update your contact information. Or, if it is more convenient, please fill out the enclosed alumni news update form. Thank you for keeping in touch.

The Importance of Annual Giving

Finally, I would like to thank the many dedicated alumni and friends who provide for Stanford Engineering through annual giving. Each gift is important and makes a difference.

These are exciting times for us, with many challenges and opportunities on the horizon. Faculty hiring and support, student recruiting, and facilities development all benefit from the generosity of alumni to the department and to the Engineering Fund. Your participation enables us to award fellowships to our most outstanding new students, help new faculty set up their research and teaching programs, match funds for contracts and grants, and purchase equipment for our teaching laboratories.

I hope we can count on your annual gift to the department at whatever level you are able. Please use the enclosed response card or make your gift online at givingeng.stanford.edu. Thank you for your consideration and your support of the Department of Aeronautics and Astronautics at Stanford.

With best regards,

A handwritten signature in black ink, appearing to read 'Charbel Farhat', with a stylized flourish at the end.

Charbel Farhat
Vivian Church Hoff Professor of Aircraft Structures
Chair, Department of Aeronautics and Astronautics