



## Sanjiv Singh

*CEO Near Earth Autonomy  
Consulting Professor, Carnegie Mellon University*

**Thursday, March 5th**

3:20-4:20 pm | 220 Hammond Building

## An Autonomy Stack for Aerial Vehicles

### ABSTRACT

Recent advances in batteries, motors and sensors allow consideration of tasks such as mapping, exploration, inspection, and transport - previously only the domain of ground vehicles - to be now conducted by aerial vehicles. While we have been able to automate flight scripted to stay clear of the environment for some time, operation in complex and unmapped environments is new. We might draw inspiration from biology to enable low-level behaviors, but there is a question of how to tie these elements into what we really want these machines to do - map, explore, and team. This is especially hard given the complexity in control and the constraints on computing and sensing.

In this talk, I will discuss how we might organize familiar capabilities in perception and motion planning to enable safe flight at high speeds in complex 3D environments. I will provide examples of implementations on aircraft ranging in scale from submeter drones to 10 meters (full-scale helicopters).

### BIO

Dr. Sanjiv Singh is an innovator, educator, and entrepreneur. He is currently a Consulting Professor at the Robotics Institute, Carnegie Mellon University and the CEO of Near Earth Autonomy, a start-up that develops autonomy for next-generation aircraft that will inspect infrastructure, deliver cargo, and transport people.

Dr. Singh started his career in 1985, working on the first autonomous ground vehicles to operate outdoors. Since then, he has led research and development efforts with applications in aviation, agriculture, mining, and construction. In 2010 he led a team that demonstrated the first autonomous full-scale helicopter capable of take-off, landing zone evaluation, and safe descent. In 2011 he led the autonomy effort for Transformer, DARPA's flying car program. From 2012-2017, he led the perception efforts for ONR's AACUS program that demonstrated high-performance autonomous flight for three classes of rotorcraft. He currently leads several autonomous aerial cargo transport and inspection projects. Dr. Singh obtained his Ph.D. in Robotics at Carnegie Mellon in 1995. He is the founding editor of the Journal of Field Robotics, a TEDx speaker, and a co-founder of 4 companies.

*Please join us for refreshments before the seminar, at 3:00pm in the Aero Cafe (225 Hammond).*