



IEEE SSCS/CASS Atlanta Joint Chapter Invited Seminar

Title: From flatland optics to protein NMR and Neurotechnology

Speaker: Professor Donhee Ham

Affiliation: Applied Physics and Electrical Engineering at Harvard University.

Abstract: This talk will consist of 3 parts: 1) While one of the most celebrated physics of graphene is the behavior of its individual electrons as massless particles, they exhibit a collective inertia when moving together. I will discuss our recent measurement of this mass of massless graphene electrons, and its ultra-subwavelength applications at THz frequencies; 2) NMR spectroscopy is a paramount analytical tool available in biology & medicine with its power to elucidate structure & function of biomolecules at atomic resolution. In particular, its use in structural biology and pharmaceutical screening has proven enormously fruitful. But it is inherently a slow technique, while the workload of modern biology and medicine continues to increase. I will discuss our program for ultrahigh-throughput biomolecular NMR exploiting silicon chips; 3) Finally, I will discuss our CMOS-nano-bio intracellular interface array (collaboration with Professor Hongkun Park of Harvard Chemistry and Physics) and its neurotechnology applications.

Speaker Biography (http://ham.seas.harvard.edu/drupal/?q=donhee_ham): **Donhee Ham** is Gordon McKay Professor of Applied Physics and EE at Harvard University. Ham earned a B.S. degree in physics from Seoul National University, where he graduated summa cum laude with the Presidential Prize, ranked top 1st across the College of Natural Sciences, and with the Physics Gold Medal. Following a 1.5-year military service in the Korea Army, he went to Caltech for graduate training in physics. There he worked on gravitational astrophysics under Prof. Barry Barish while in physics, and later obtained a Ph.D. in EE winning the Charles Wilts Prize awarded for the best thesis in EE. His doctoral work examined the statistical physics of electrical circuits. He was the recipient of the IBM Doctoral Fellowship, IBM Faculty Partnership Award, IBM Research Design Challenge Award, and was the fellow of the Korea Foundation of Advanced Studies. He shared Harvard Hoopes prize with William F. Andres. He was recognized by MIT Technology Review as among the world's top 35 young innovators in 2008 (TR35). Ham was selected as a Harvard Yearbook Favorite Professor 4 years in a row (2011-2014), and was one of 8 Harvard Thinks Big speakers in 2012 (8 Harvard faculty chosen by college-wide votes). Ham's work experiences include IEEE Distinguished Lecturer for the Solid-State Circuits Society, Caltech-MIT LIGO, IBM Watson Research, Consulting Visiting Professorship at POSTECH, Distinguished Visiting Professorship at Seoul National University, IEEE conference technical program committees including the IEEE ISSCC, advisory board for the IEEE ISCAS, and various US, Korea, and Japan industry, government, & academic technical advisory positions. He served as a guest editor for the IEEE Journal of Solid-State Circuits and was a co-editor of CMOS Biotechnology with Springer. He is an associate editor for IEEE Transactions on Biomedical Circuits and Systems.



Seminar Time: 1:30PM-3:00PM on Aug 17th 2015 **Seminar Location:** TSRB 1st Floor Auditorium, Georgia Tech.

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