

[November Meeting: Wednesday, Nov. 9th at 6:30 PM](#)

High-Specific-Power Machines and Drives for Aircraft Propulsion



Dr. Kiruba Haran

Associate Professor of Electrical Engineering
University of Illinois at Urbana-Champaign
Power and Energy Systems

Date: Wednesday, Nov. 9th, 2016

Time: 6:30 PM - 8:30 PM

Location: University of Illinois
4070 Electrical and Computer Engineering Building (ECEB)
306 N Wright St*
Urbana, IL 61801

*(*The adjacent street is incorrectly labeled S Wright St. on Google Maps; however, the street is, in fact, N Wright St. The building is just south of University Ave., on the east side of Wright St.*)*

Agenda

6:30 – 6:45 PM: Sign-in and Meet & Greet (Refreshments provided)

6:45 – 7:45 PM: Seminar – Tech Talk by Prof. Haran

7:45 – 8:15 PM: Q&A

8:15 – 8:30 PM: Wrap-up and Meeting End

For questions contact the CILS Chair, Tim O’Connell, at <tim.oconnell@ieee.org>

[Central Illinois Section Web-site](#)

Abstract:

The global aviation industry emitted 781 million tons of CO₂ in 2015, a number which is expected to grow as air travel grows rapidly in emerging markets. Without the intervention of new policies, global aircraft emissions are projected to triple by 2050. Ambitious goals have been set by the aerospace industry for the next three generations of commercial transport aircraft to ensure sustainability of the industry. This includes a better than 70% reduction in aircraft fuel burn, along with significant reduction in noise and other emissions. These challenging goals require the development of disruptive technologies beyond the current trends in the aviation industry.

One approach being explored to meet these targets is the use of electric/hybrid-electric propulsion. Studies show that commercial transport aircraft with a 'turboelectric distributed propulsion system' is able to reduce the mission fuel burn by 70-72% on an intercontinental mission without compromising payload, range or cruise speed. This is accomplished by using an electric propulsion system that decouples the power producing parts of the system from the thrust producing parts. Fifteen electric motor driven turbofans were mounted on a continuous nacelle and two large turbo-generators located at the wing tips were employed. Small electric aircraft are already being produced and offered commercially, but significant challenges prevent scaling up of the technology to commercial aviation. Megawatt scale electrical machines and drives with specific power better than 6 kW/kg will be required to make these systems viable.

This talk will describe the application space and key enabling technologies being explored.

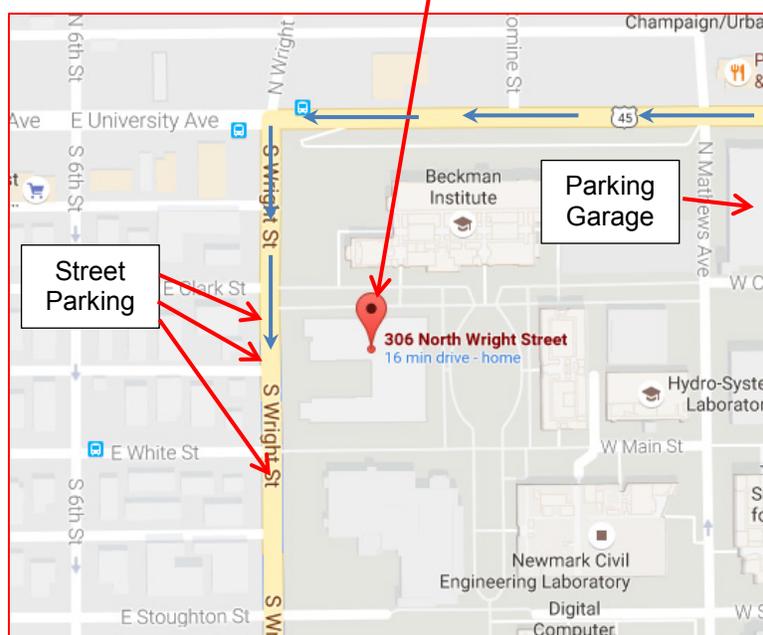
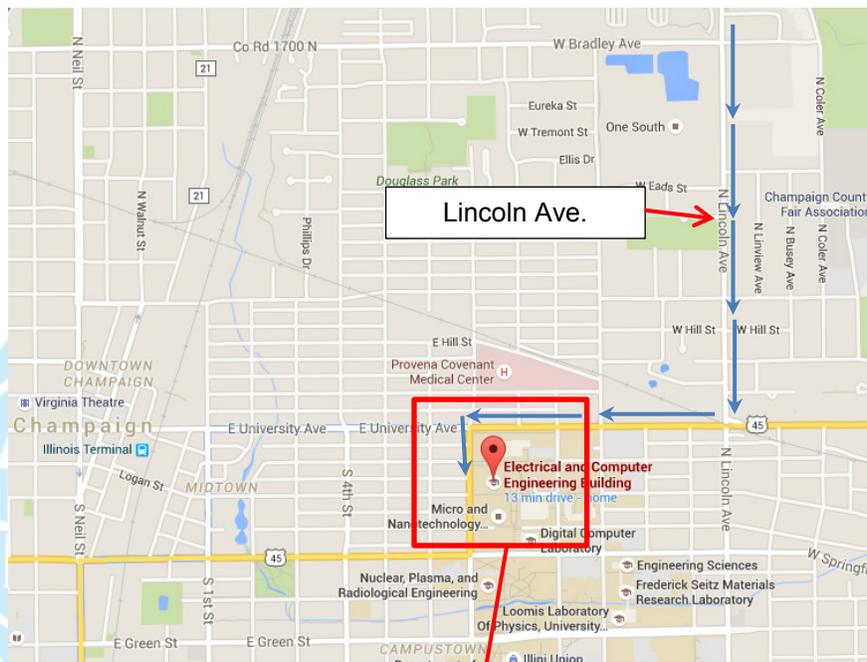
About the speaker:

Kiruba S. Haran obtained a PhD in Electric Power Engineering from the Rensselaer Polytechnic Institute, Troy, NY, in 2000. He spent 13 years as a senior engineer and manager of the research group developing advanced electrical machine technology at GE Research. He moved to the University of Illinois in 2014 as an Associate Professor and Associate Director of the Grainger Center for Electric Machinery and Electromechanics. His research focus in recent years has been on high specific power machines and drives for mobile applications, with both superconducting and non-cryogenic approaches. He serves on the Steering Committee of the IEEE Transportation Electrification Community, is the current Chair of the Electric Machinery Committee of IEEE-PES, and is an editor of the IEEE Transactions on Energy Conversion. He is a registered Professional Engineer in New York and is a Fellow of the IEEE.

Directions:

[Traveling to Champaign-Urbana via I-74]

- Take Exit 183 (Lincoln Ave) and head South on Lincoln
- From Lincoln, go West (Right) on University Ave. (US 45 / US 150) to Wright St.
- Go South (Left) on Wright St., and the ECEB will be on the left. Parking is available on the street and in parking garage two blocks east on Matthews.
- Until 8 pm, the ECE Building Main (East) Entrance should be open. Other entrances will likely be locked after 5 pm.



[Google Maps Link](#)

[ECE Building Map](#) (Room 4070 is on the 4th floor in the corner)

Click the link below for the full agenda and registration information:

[November 9th IEEE CILS Meeting Registration](#)

**** Refreshments will be provided ****



IEEE



IEEE Central Illinois Section (CILS)
 c/o Tim O'Connell
 5 Harmony Ct
 Savoy, Illinois 61874

SPECIAL ANNOUNCEMENT:

Our section is searching for a new Treasurer. Our current Treasurer, Byron Truax, has served us faithfully for many years, but he has decided to step down. If you or a colleague you know might be interested in serving us in this important role, please contact Tim at tim.oconnell@ieee.org.

As Treasurer, your duties would include managing our section's checking account, reimbursing our members' qualified purchases, submitting annual financial reports to IEEE, and attending and participating in our section's Executive Committee meetings. IEEE will provide you with training and support services to get you going, so no experience is required. Please consider serving your fellow members in this vital role that helps us keep our section alive!

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