

WindEEE Dome

Unique Facility, Unique Experience

Horia Hangan





WindEEE Dome

Funded : April 2009

Design : December 2010

Construction : Sept. 2011- Sept. 2013

Commissioned : September 2014

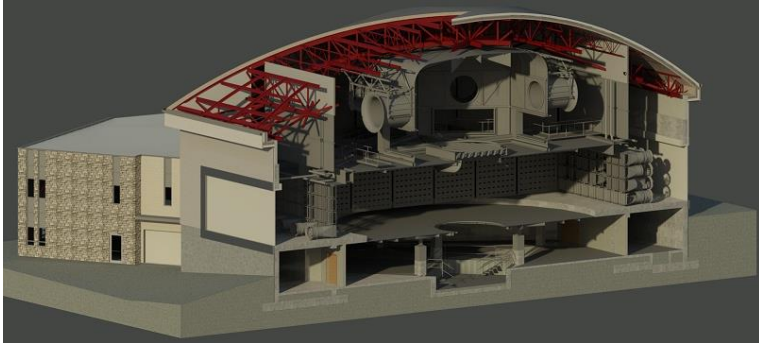
Operational : October 2014



WindEEE Research Institute

Founded: July 2011

Renewed: July 2014-2019



Unique infrastructure

- can do what wind tunnels cannot
- large scale testing
- versatility

Unique Expertise

- best wind engineering group
- experiments and simulations
- fluids, structures, mechanical
- risk, business, policy

Qualified

- EU funding partner
- US: NIST and NIHERI (NSF)
- Global Research Infrastructure

Wind Engineering : Tornadoes and Downbursts



Wind Energy : Topography and Forest effects



PEIWEE 2015

WEICan + Cornell + DTU + WindEEE

RB scanning + WindEEE short range LiDARs

escarpment

wakes

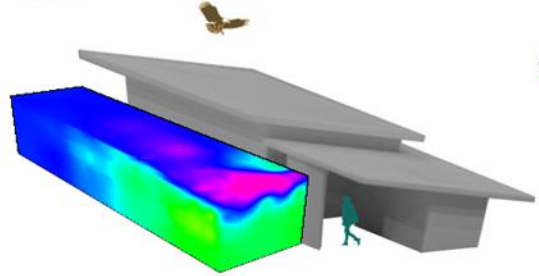
ocean-land transition

canopy effects

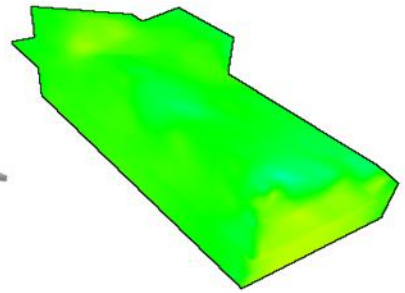
Wind Environment: Sustainable development



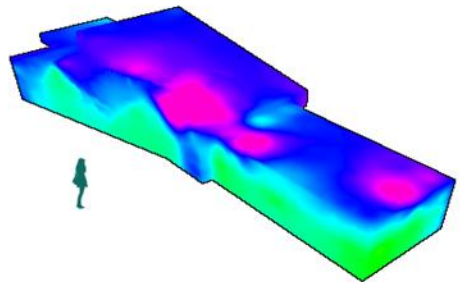
spine



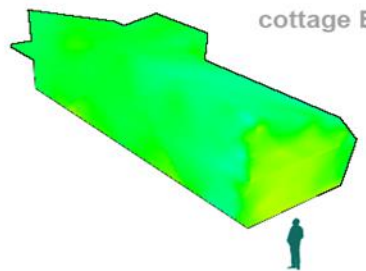
cottage A



community building



cottage B



Wind Education : Local



SHAD : immersive program of lectures, workshops, projects and activities

“... [the WindEEE event] was the highlight of the SHAD-Western program ...”

Quazi Rahman



Green Energy Doors Open

2015 - 2018

Wind Education : Global



BBC : Wild Weather

CBC : The Nature of Things

Weather Network : Storm Hunters

Blink Films : Missing Evidence

Canadian Geographic

Vice Media / Motherboard

Wired Magazine

and more ...

Wind Tech : Conference Series

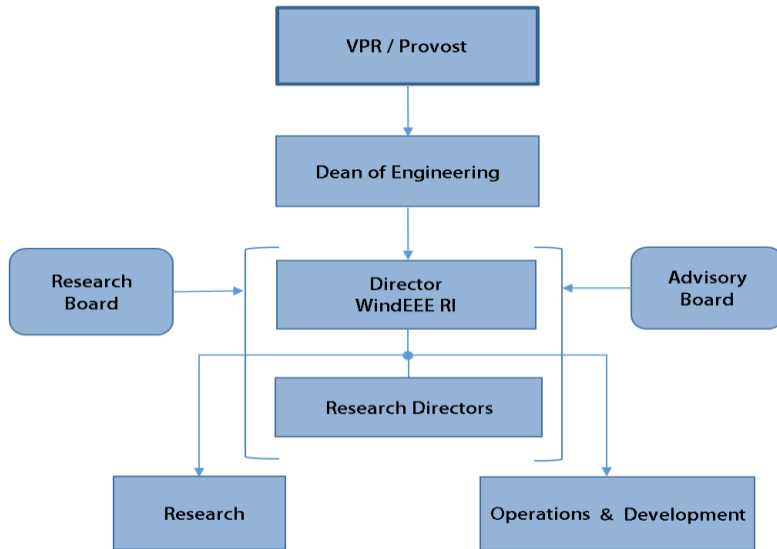
International Conference on Future Technologies in Wind Energy



2013 : Laramie, Wyoming, USA

2015 : London, Ontario, Canada

2017 : Boulder, Colorado, USA



Advisory Board

1st Annual Meeting : 2015.03

2nd Annual Meeting : 2016.02

3rd new: **Renewal of AB**: 2017.08

Research Meetings

1st Annual Meeting : 2014.12

2nd Annual Meeting : 2016.02

3rd Annual Meeting : 2017.06

new: **International Research Board**

2016-2017



5 Professors

3 Invited Professors

6 Postdoctoral Fellows

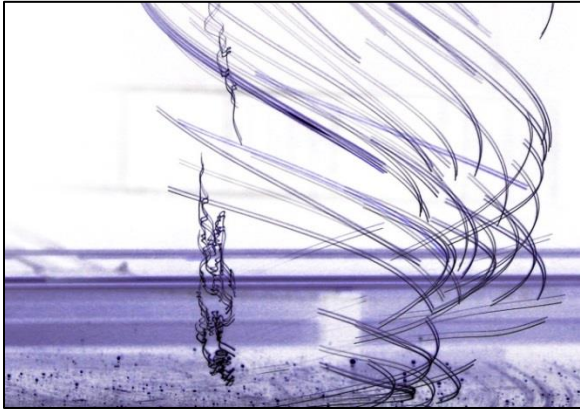
30 PhD Students

12 MSc Students

4 Exchange Students

5 Staff Members

2016-2017



Publications: 53

Conferences : 57

Research Grants: 1.75 M\$ (1.1M\$)

Graduate Fellows: 48



Western : > 20 researchers

- **Engineering** : Civil, Mechanical, Electrical
- **Science** : Geography, Applied Math.
- **Ivey School of Business**

External : > 30 researchers

- **Canada** : UVic, UBC, Saskatchewan, Windsor, Mac, Queens, Ottawa, Montreal, Concordia, Moncton
- **International** : Princeton, Cornell, Notre Dame, Raendseller, Texas Tech, Syracuse, Clarkson,, Wyoming, DTU, Dallas, Paris, Toulouse, Marseille, Hamburg, Genova, Milano, Porto Allegre

Asia

- **University of Tokyo**
- **Kyoto University**
- **Tongji University**
- **Beijing Tech. University**
- **IIT Roorkee**
- **IIT Kanpur**

Americas

- **Princeton University**
- **Cornell University**
- **MIT**
- **Notre Dame University**
- **Rensselaer PI**
- **Syracuse University**
- **Clarkson University**
- **Texas Tech University**
- **Florida International University**
- **Universidad Federal de Porto Alegre**
- **Universidad Federal de Rio de Janeiro**



European Union

- **Fraunhofer IWES and ICT - Germany**
- **E.ON Research Institute - Germany**
- **ONERA - France**
- **Meteo France - France**
- **Paris International Energy Research Institute**
- **CARNOT Institute**
- **International Energy Agency - France**
- **Risoe DTU – Denmark**
- **Politecnica di Milano**
- **University of Genova**
- **Centro Nacional de Energias Renovables – Spain**
- **Universitatea Politehnica Bucuresti**

WindEEE attempts to convert every commercial project into hybrid

	matches vision and mandate	aims towards sustainability
Academic	✓	
Commercial		✓
Hybrid	✓	✓



Insurance

- tornado effects on buildings

Transmission Lines:

- downbursts on transmission lines
- topographic effects

Manufacturing

- solar panels
- wind energy generators
- drones

Developers

- wind environment/engineering



European Research Council Advanced Grant 2016 : THUNDERR 741273

Detection, simulation, modelling and loading of thunderstorm outflows to design wind-safer and cost-efficient structures



Danish Council for Independent Research Grant No. DFF - 6111-00121

Single tree project



National Institute of Standards and Technology

Disaster Resilience (DR) Research Grants Program

Development of Tornado Design Criteria for Buildings and Shelters Subject to Tornado Induced Loads



Méxican National Council for Science and Technology

CONACYT-SENER

Uruguay National Council Program

CALDO-ANII



Project 111

Project for Innovation on Mitigating Wind-induced Disaster of Infrastructures Sensitive to Wind



Global Research Infrastructures

Group of Senior Officials on Global Research Infrastructures

Framework for a coherent and coordinated world-wide development and operation of global research infrastructures



