

## NSF IUCRC WHIP IAB MEETING

Meeting Location: FIU Campus, MARC Third Floor, STARTUP FIU

Meeting Minutes for October 24-25, 2019

### October 24

Meeting began 8:00AM: Welcoming Remark by FIU Leadership:

- Ken Furton, Provost and Executive Vice President
- Andres Gil, Vice President for Research and Economic Development and Dean of the University Graduate School
- Richard Olson, Director Extreme Events Institute and International Hurricane Research Center: IUCRC is a launch pad providing exciting careers and opportunities for students. The program stresses the importance of industry relationships.

8:30AM Introductions, Preamble, Non-Disclosure Agreement, State of WIP

- Introductions: See Attachment A for listing of all meeting attendees.
- Preamble: Kishor Mehta read aloud the anti-trust preamble. See Attachment B for verbiage.
- Non-Disclosure Agreement: Kishor Mehta reiterated the importance of all members and guests to sign the provided NDA and reminded participants that information presented at meeting is not for general distribution.
- WHIP Presentation given by Kishor Mehta including Vision, Mission and Marketing efforts. Please see Attachment C for the slides.

9:10AM Comments by NSF Program Director Dr. Greg Reed (by remote connection)

- Please refer to Attachment D for the slides. Additional points/comments included:
  - Industry partners' funds are being leveraged to the fullest
  - The same membership agreement has been used by various IUCRC Centers and a long list of industry partners. There should be no need to redline the document.
  - IUCRC is a five-year program. Over that period NSF funding will be phased out with more funds coming from industry.
  - Networking is extremely important
- Question from University of Alabama: When will the new solicitation come out?
  - Answer from Gregory Reed: Not sure, NSF working hard to complete.
- Question from Berkshire Hathaway: Is it possible for private industry to contribute towards research capacity?
  - Answer from Gregory Reed: Private industry can contribute in-kind resources, but it will not count towards the required membership fees.

9:40 Comments by Site Directors (Delong Zuo, TTU and Ioannis Zisis, FIU)

- Please refer to TTU presentation provided in Attachment E.
- Question from Walter P Moore: Are there comparison of results between the different facilities?

- Answer from Delong Zuo: Provided an example of a comparative tornado study between TTU and Iowa State
- Please refer to FIU presentation provided in Attachment F.
- Question from audience Have you tested PV panels?
  - Yes. FIU has testing ground mounted PV panels for industry. Georgia Tech has also assessed roof mounted systems
- Question from audience: Have you thought about including wildfire testing in facility?
  - Answer: NO
- Question from audience: Can you control temperatures within the facility?
  - Answer: No. It is an open jet facility.
- Question: How is it funded?
  - Private industry, state and federal funding helped fund the initial facility. NSF NHERI funding subsidizes the Federal Rate Tool through the WOW Recharge Center.
- Question: Have you tested vegetation?
  - Answer: Yes. FIU has tested green roof technology and was involved with the Bossco Verticale located in Italy.

10:10AM Comments by Denis Gray (Assessment Coordinator)

- Please refer to presentation provided in Attachment G
- Question: Can you provide feedback for long-term project?
  - Answer: The presumption can be for two-year projects.
- How should industry coordinate annual membership fees with two-year projects?
  - Industry signs a commitment letter of intent. The industry funds are all poled together, and research projects are assigned by the Board. Industry partners have a 90-day notice to cancel their participation. The expectation is that awarded projects will have all the necessary funds to complete research. Mentorships are assigned to the awarded projects and typically consist of two mentors from two separate companies per project. The company risk is very low.
- Question from NOAA AOML: Can federal agencies participate in the program?
  - Answer: 15% of all IUCRC memberships are national labs including NASA, NIST and US Army. There may be regulatory issues with the partnership. The mechanism typically used to acquire funds through a federal pathway is an IUCRC Interagency Agreement (IAA) Requests with NSF.

10:30AM Networking Break

11:00AM Project Updates

Doug Smith, TTU: Refer to Attachment H for presentation.

- Question from Berkshire Hathaway: Have you thought about converting to another platform to aid in industry transfer?
  - Answer: When using DesignSafe managed data MATLAB is used. There is also the ability to convert between languages.
  - Kevin McGrath suggested the team consider using Python.

- Question: Will the output show one loss number of a fragility function?
  - Answer: A dollar amount will not be assigned. From an engineering standpoint the outputs will show when a structure failed and what caused the failure.
- Question: How many roofing systems are included in the output?
  - Answer: 24 zones are available.
- Question: Are roofing materials considered?
  - Answer: 8 different roofing materials are considered.
- Questions: Is ADCIRC used for the surge calculation?
  - Answer: Not sure.
- Question: What wind data is used?
  - Answer: Mark Powell's H\*Wind
- Question: Are only residential properties considered?
  - Answer: yes
- Question: How could this project be used to further mitigation?
  - Answer: We provide a tool derived from wind engineering research to predict damage.
- Question: Where does the housing stock data come from?
  - Answer: The agent provides the data.

Amal Elawady and SJ, FIU: refer to Attachment I for the presentation

- Question: Do the standards need to be improved?
  - Yes. there is a need for a standard with holistic WIV and WDR simulation and testing.

Jean-Paul Pinelli, FIT: refer to Attachment J for the presentation

Arindam Gan Chowdhury, FIU: refer to Attachment K for the presentation

1:40PM IAB Members and Guests suggest projects and Discussion

- Kevin McGrath: GAF originally proposed a more complicated research project involving shear force on roof materials, different geometries, installation defects, and aging conditions. The currently approved project is scaled back dramatically and can serve as a baseline. GAF would like to see a second phase. Hail damage on roof shingle is also an important problem for GAF but be aware of ongoing research at IBHS. May involve home builders in the future.
- Ming Shiao: Examining PV roofing systems and how they affect roof performance
- Guido Lori: Holistic approach for design including the rating of different systems and the need to improve current standards. Used energy rating as an example of safe and convenient design solution that convince people to make better choices. Possible partnership with other research centers, architect/engineer associations. Performance-based wind engineering is still in its early stage.
- Kishor Mehta: The consortium needs to do a better job of attracting architectural firms. Peter Irwin made a comment the design firms typically have more short-term focus and don't see the importance of investing in fundamental research.
- AIR: Need a better fundamental understanding of how aging affects the vulnerability of a structure. IBHS suggests that there may be a chemistry process to accelerate aging. WDR also

needs to better address. A structure may still be standing after a storm but still considered a loss due to water interior damage. The wind performance of soffits should continue to be examined. Building performance subjected to subsequent wind events shall be examined. So is the relationship between building's downtime and its surrounding environment/ critical infrastructure.

- Berkshire Hathaway: Need to have a better understanding of losses and monitor on a real-time basis including a vision-based approach with before and after shots to see if progress is evolving over time. This is similar to 'Smart Structures' – how individual components behave over time. Based on its business practice, BH is more interested in the performance of individual facilities at given locations than a portfolio. Business interruption is also a major concern. How to incentivize mitigation actions through public policies?
- State Farm: Interested in hurricane wind field derived from Doppler radars. How to rate proximity of risk factors (e.g. trees) surrounding a building using satellites and drones? It may require standard data entry on roof age through regulations. And guidance is needed for tree fall risk, based on tree species, soil condition, and risk.

2:25PM University of Alabama

- Please refer to presentation in Attachment L
- The university plans to pursue an IUCRC in 2019

2:45PM University of Connecticut

- Please refer to presentation in Attachment M

3:10PM Guest project suggestions

- NIST: Need to better understand the drivers of losses. This will prevent hazards from becoming disasters. The consortium needs to know which problem to solve on a national level and what are the easiest solutions.
- WPM: Vibration of cladding as affected by building frequency shall be examined beyond the current building code
- WJE: Need real science to demystify the dynamic effect, water intrusion, and aging. Like to see the transition from wind loading characterization to structural testing. Like to see research on pre-engineered metal buildings as they are frequently damaged in hurricanes. Develop post-storm building assessment protocol
- IBHS: Method for identifying roof age and product? Power infrastructure's impact on buildings and communities as shown in California. Evaluation of sheathing products' performance
- Aris: Interested in mobile or manufactured homes
- SST: Asked the process for submitting projects for IAB to vote on. Answer: Faculty need to submit a project and can work with a company to write the actual proposal. The IAB then votes.
- Dennis Gray: Request WHP to develop a research roadmap
- Question: How does the fee structure work?

- Answer: The \$50,000 annual membership fee cannot be prorated. The research is decided by the IAB. Each company gets 50 points to place on proposed projects. Projects are for the Center and not for the individual company. Industry can also work directly with a research university outside of the Center, but full rates will need to be applied.

### 3:55PM Discussion of WHIP Center Moving Forward (Kevin McGrath)

- Please refer to Attachment N for the presentation.
- There may be opportunities to put proposals together that address climate change.
- Dramatic decay in hurricane intensity was seen recently after landfall.
- Berkshire: Insurance writes mostly on an annual basis. The climate change issue is not in the forefront. Insurance is challenged to think about parametric solutions.
- AIR: Concerns about storms are not about the greater frequency but intensity and dramatic slowdown as it approaches land. Insurance linked securities (ILS) is becoming a more popular vehicle to transfer risk. European Union requires insurers by law to report what exposures would look like with different climate scenarios.
- Aris: Most institutions do not know how to define resilience. There is confusion between what is considered a hazard and asset. The consortium could help firm-up definitions and standards.
- NIST: Intensity-duration-frequency curve (IDF curve) need to be designed to withstand longer precipitation events (i.e. Puerto Rico). Wind, rainfall, snowfall, and flood maps all need to be updated
- AIR and GAF: Wind field exposure maps are outdated. Perhaps the consortium can build something that could adapt to the changing environment? There could be an opportunity for the consortium, to make impactful updates.
- Gray: Each IUCRC should have one longer-term, overarching project that doesn't bring immediate benefit to its members

### 4:35PM Meeting Adjourn

### October 25

Meeting began at 8:30 am: Residual items from Day 1

- Question from AIR: Why is the planned deliverable for Project "WHIP2019\_06: Estimation of Interior Damage Due to Wind Driven Rain Ingress into Mid/High Rise Buildings" only a flow chart, which the industry cannot use directly?

Answer by Jean-Paul Pinelli, PI of the project at FIT: Due to the limited funding and time constraints, only the flow chart can be delivered. Follow-up research can result in more substantial deliverables.

Comments by AIR and other industry members: More details and code are needed to make the result of the project valuable. More mentoring from the industry members to the PIs is needed.

- Comments by industry members regarding project titled “Investigation of wind-driven rain and wind-induced vibrations effects on curtain wall systems”: The scope of the study very broad and the testing plan is very comprehensive. Given the time constraint, there is a need to prioritize the parameters to be investigated.  
Answer by Seung Jae Lee and Amal Elawady, PI of the project at FIU: The PIs will work with the mentor to identify the priorities of the study
- Suggestion by GAF and other industry members regarding projected entitled “Investigation of wind performance of roofing elements using full-scale experimentation”: The results of this project should be communicated to Douglas Smith, PI of Project entitled “Prediction of wind and surge damage to buildings by hurricane”.  
Answer by Arindam Chowdhury, PI of the project at FIU: The PIs at FIU will communicate with Doug Smith regarding the tests results; the PIs at FIU will also communicate with the industry to refine the test matrix.
- Question by AIR and other industry members regarding project entitled “Prediction of wind and surge damage to buildings by hurricane “: How can the result of the study be validated?  
Answer by Douglas Smith, PI of the project: The outcome of the project can be validated with the availability of more data, for example data from the state of Texas.  
The industry and university members agreed that more communications between the Industry members and the PIs of the projects are needed and that the form and frequency of the communications need to be formalized. It is agreed upon that Zoom meetings should be held every 3 months.

9:00 am: IAB Executive Session and Feedback from IAB to WHIP Leaders and Faculty

- Attendees: Eric Haefli (State Farm), Richard Krupar (Berkshire Hathaway), Guido Lori (Permasteelisa), Kevin McGrath (GAF), Karthik Ramanathan (AIR), Kishor Mehta, Director of WHIP-C, Delong Zuo, Site Director at TTU, Ioannis Zisis, Site Director at FIU, and Dennis Gray
- It is stated that IAB’s main role is to maintain and grow membership
- Center director will call for problem statements; IAB chair will distribute the problem statements to industry members.
- State farm agreement: It is recommended by GAF based on previous experience that a clause such as “the name and logo of State Farm shall not be used without prior written consent” should be included in the agreement. State Farm will explore possibility of including a clause like this in the agreement. This issue should be addressed in the agreement instead of the by law.
- Question and comments by State Farm: Is there a prorating option? IP issues should be addressed in the bylaw. The center will work to better address these issues.
- It is agreed that the membership should be between February 1 of the year and January 31 of the next year.
- Dennis Gray suggested that TTU can consider giving a letter to FIU to state that it attributes a membership to FIU.
- Kishor Mehta indicated that there has been no feedback from SCOOR since July 2019. Kishor Mehta will contact SCOOR again.
- It is agreed that every company will provide a backup contact to the center.

11:00 am Plans for the next meeting

- Kishor Mehta proposed having the next meeting on April 2-3 at the Dallas Fort Worth Airport. The possibility of having the meeting on earlier dates will be explored.