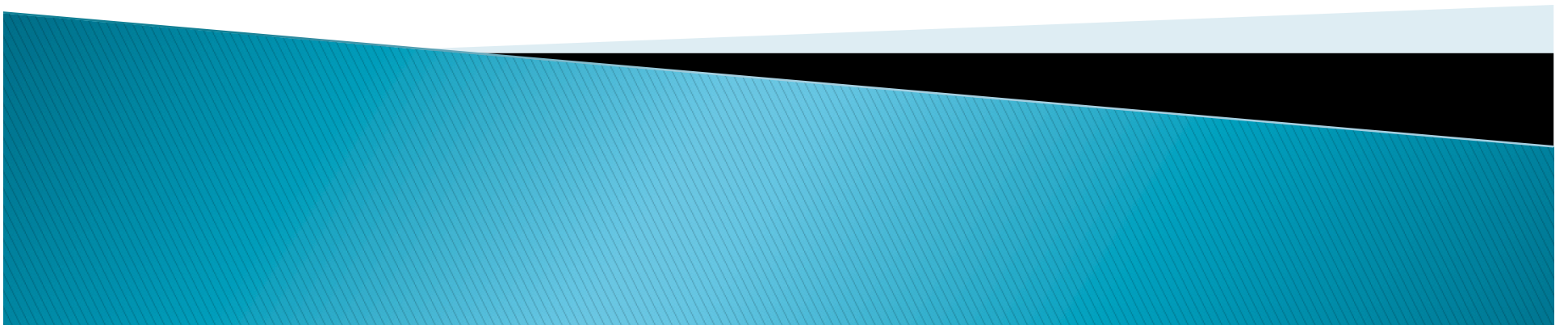


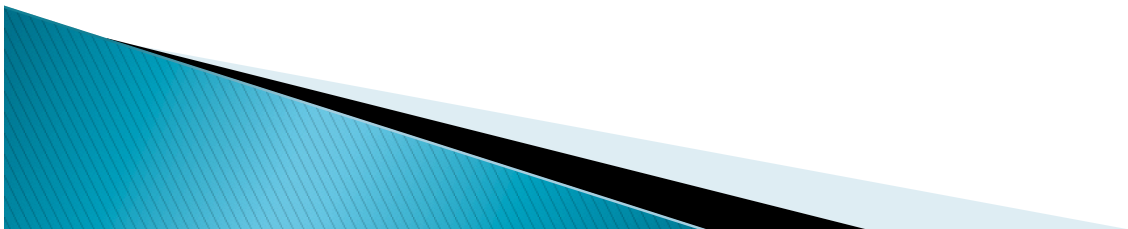
# ECE Capstone Project Proposals

Design for the ExCEL Building  
Jordan Binns



# Engineering Centre for Experiential Learning (ExCEL)

- ▶ Proposed Engineering Student Centre
  - Enhance the undergraduate experience
  - In the pre-design phase
- ▶ Two Main Goals
  - Increase Experiential Learning
  - Create a Highly Sustainable Building
- ▶ Student Involvement is Highly Desired
  - Building designed by students, for students



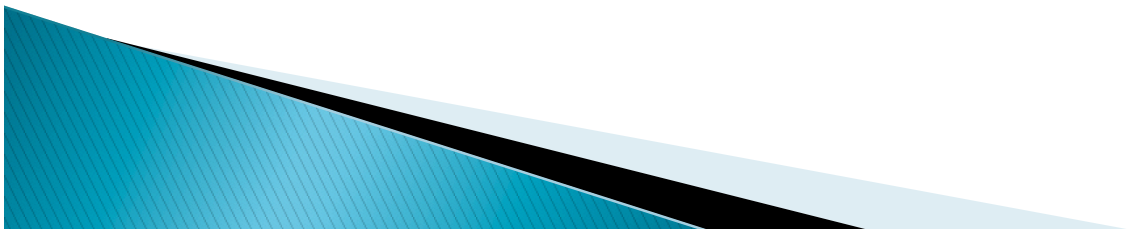
# Capstone Proposals

- ▶ The projects revolve around:
  - Sustainable Building Technologies/Design
  - Supporting Undergraduate Students
  - Enhancing Experiential Learning
- ▶ Proposed 3 problems for ECE students
  - Energy Load Display
  - Occupancy Tracking and Heat Load Calculation
  - Restricted Room Access
- ▶ We are considered a client
  - We will offer input on proposal, monthly progress updates, final report, etc.



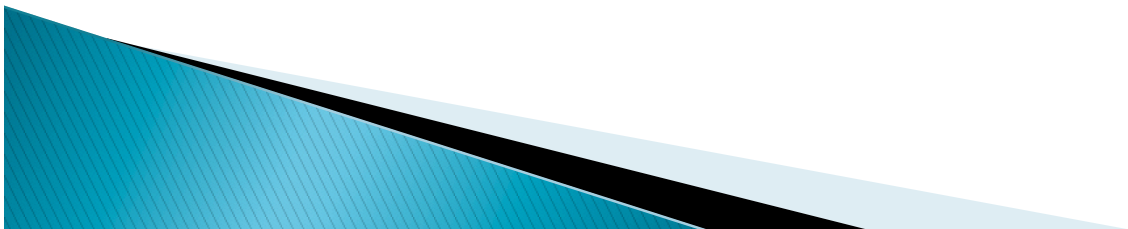
# Energy Load Display

- ▶ Comprehensive sensor array to estimate total energy and water usage
  - Electric submeters (AC and DC), flow meters, heat flux sensors, pyranometers, temperature sensors, humidity sensors etc.
- ▶ Data will be collected, stored and displayed
  - Displays will be on the internet and throughout the building
- ▶ **Design a system that will display the information to students**



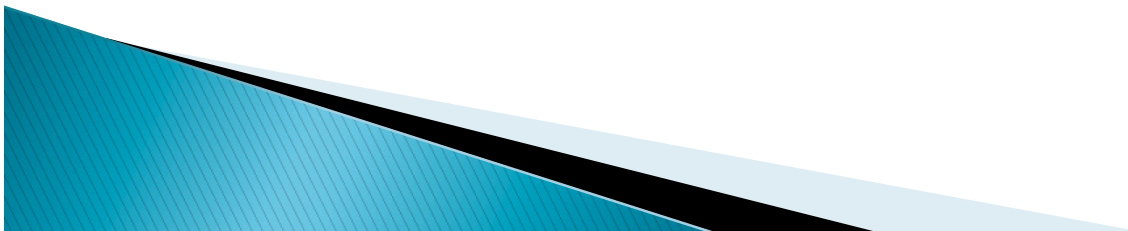
# Energy Load Display – Expectations

- ▶ Display must be cost effective and energy efficient
- ▶ Display must show data in real time and use historical data
- ▶ Display should make the data meaningful to students
  - Units, Dollar Amount, Comparisons to Other Buildings, Etc.
- ▶ Display may have a GUI to allow data manipulation



# Occupancy Tracking

- ▶ Building occupants are a substantial source of heat energy
- ▶ Would like to know the number of occupants
  - Helps to increase accuracy of data
  - Used in the future for load predicting HVAC system
  - Improve on state-of-the-art
  - Can show which rooms are occupied (cost permitting)
- ▶ **Design a cost effective system that will track the number of building occupants**



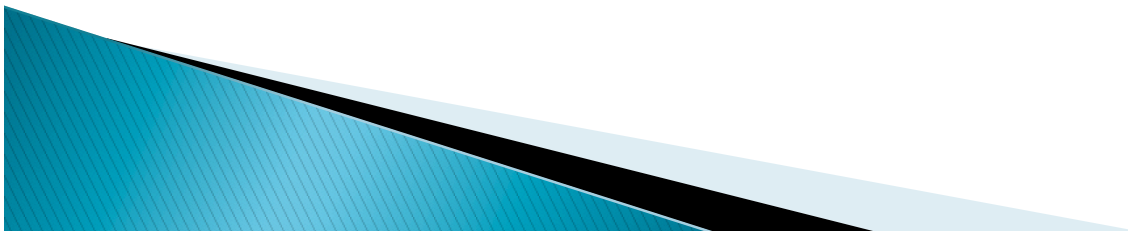
# Occupancy Tracking – Expectations

- ▶ The system must be unobtrusive
  - No Turnstiles!
- ▶ Must quantify and demonstrate the accuracy of your system
- ▶ Must have a plan to scale up your system
  - Must include costs
- ▶ May use the information to estimate heat load from occupants
- ▶ System may be as granular as you like
- ▶ The more information given the better
  - Temperature, Area Size, Room Occupancy, Etc.



# Restricted Room Access

- ▶ Building will support clubs and teams
- ▶ Contain storage areas, work shop, office space, etc.
- ▶ Must ensure that the stored items are safe
- ▶ Create a novel system to restrict access to specific areas





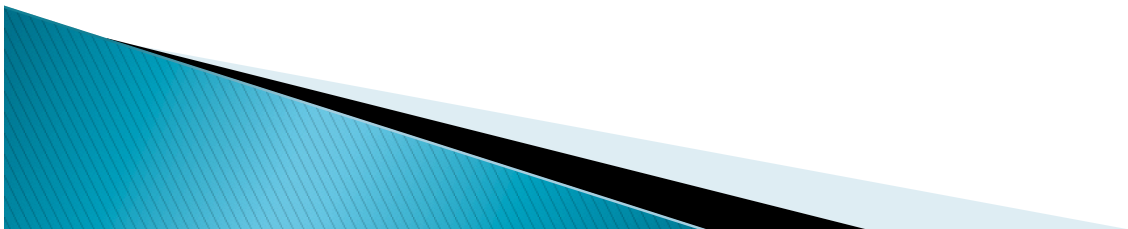
# Restricted Room Access – Expectations

- ▶ System must be cost effective
  - Key Card Access to Door is \$1500/door
  - Your solution must be significantly cheaper
- ▶ Access authorization and revocation should be as simple as possible
- ▶ Access should be tied to MacID or Student No.



# Conclusion

- ▶ Proposed to acknowledge all student involvement
  - Even if ideas are not incorporated
- ▶ Any other groups with a relevant idea can work with ExCEL
  - Energy Generation, Experiential Learning, Sustainable Building Design, Etc.
- ▶ For more information:
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  - Ext. 24209
  - ITB 112



# Questions?

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