Building Information, Inhabitant, Interaction and Intelligent Integrated Modeling (**BI^{5}M**)

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Challenge:

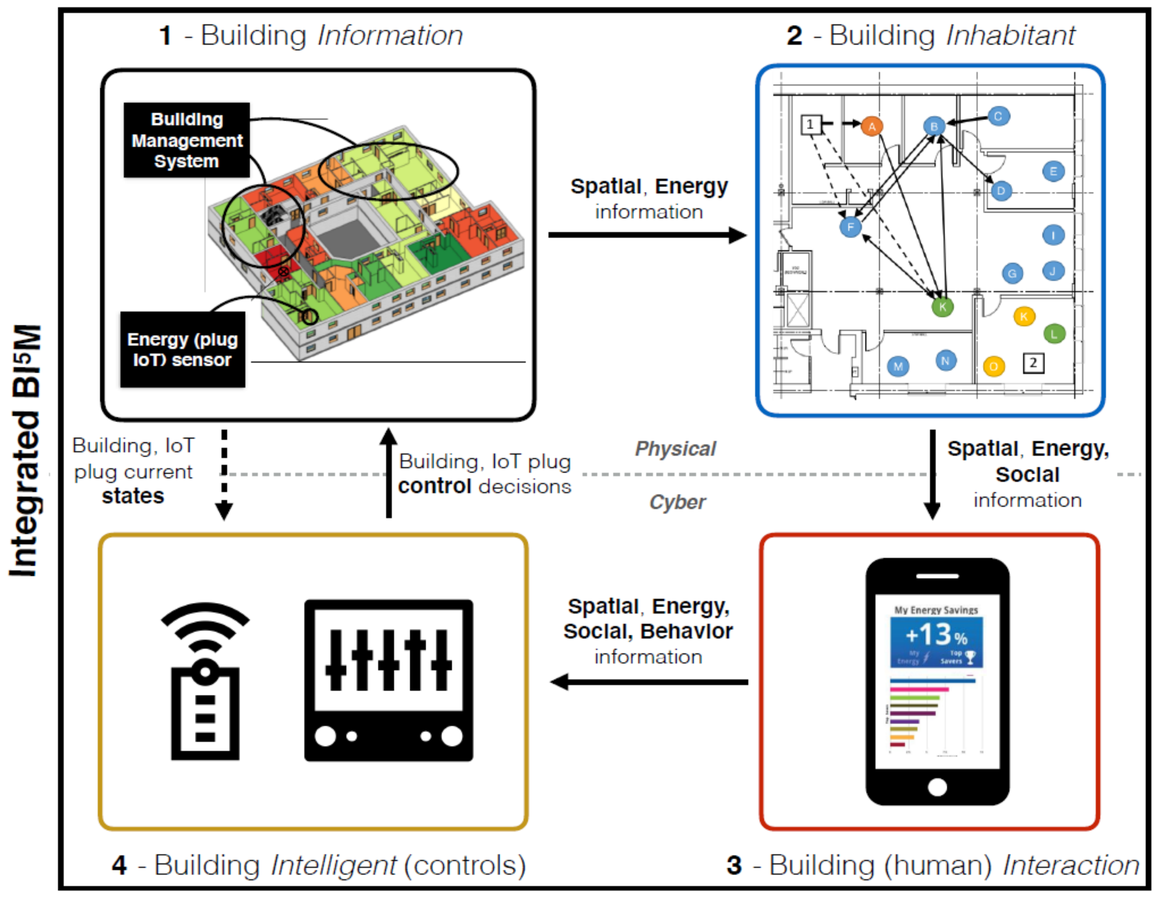
Our buildings are broken…expensive, bad for the environment, low satisfaction

$400B ANN for power, heating, and cooling

Largest producers of environmental emissions

Low occupant comfort and satisfaction

We require a new CPS control paradigm that encompasses buildings & occupant behavioral dynamics



Solution: *BI^{5}M*

Integrated approach that levereges two-way relationships between building systems and occupant dynamics to combine physical building ***information*** with cyber ***inhabitant*** and (building-human) ***interaction*** models and enable ***intelligent*** conrol of buildings

Scientific Impact:

- \+ New integrated CPS farmeworks and models for linking spatial, energy, social and behavior data
- \+ Classification and AR-feedback models extend to other CPS where physical – human boundary is critical
- \+ Global building occupant behavior database
- \+ Fast human-in-the-loop control systems
- \+ Digital Twins that capture multi-dimentionalities of interactions

Broader Impact:

- ▲ Enhance occupant satisfaction + productivity + health
- ▼ Reduce energy + emissions of building sector

Engage participating subjects, students, facilities and start-ups locally, nationaly, and internationally

Dollar by Shashank Singh, Feedback by Cuby Design, Factory by Nicholas DeForest, Autonomous Car by Effach, Transmission Tower by Stephen Plaster, Subway by Dan Hetteix, Green city by Chameleon Design, Learning by Gregor Cresnar from the Noun Project

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