At a university, minds come together to join and augment the flow of knowledge. This is ideally not a simple unidirectional flow but a pan-directional and cross-disciplinary flow to and from student, faculty, staff, professionals, the public and the physical and philosophical worlds that are studied.

Our site demonstrates an example of a confluence of diverse flows. There is traffic on Speer, pedestrians on bike and foot, students traveling from campus to downtown and even weather patterns that converge to make a very unique and exciting site. Many types of flow converge through the site. If these flows are forced together, or fought against without regard for their diverse characteristics, turbulence will inevitably occur. If, however, they are recognized and reconciled, they can be brought to flow together and through the site to the benefit of the college and the community.

Our design takes into account these diverse flows and their confluence to produce an environmentally friendly zero net energy building that is a gateway for the town of Denver and acts to help bridge the campus with downtown.
Chimney Effect Ventilation
Much like a termite mound, the hot air rising out the top pulls cooler air in along the ground. Our building curves with the arc of the sun, along this curve a series of solar chimneys arranged to catch the sun rays. The air in the tubes heats and rises, gaining speed as it heats it is then vented from the top, powering a daries machine wind turbine as it exits. This pulls air into the tubes from the plenum above the occupied space. The plenum, in tum, pulls air from the space which pulls air from under the raised floor system. This ventilation alone, can cause some cooling effect, aiding in the body’s natural evaporative cooling system.

Evaporative Cooling
Based on the principle of water evaporating and cooling the air during the summer we will use a rotating wind scoop on the cooling atrium to catch prevailing south winds. The wind flows into the scoop through a wet cooling pad which cools and humidifies the air. The cold moist air drops into the atrium flowing over the vegetated elevator core which is watered by the bleed off water from the evaporative cooler. This cool air is then pulled into the raised floor system and to the occupied space.

Absorption Cooling
In the event that temperatures or humidity exceed the levels of effectiveness for the evaporative cooler, another method of using heat for cooling is added by using an absorption cooler. Evacuated tube solar thermal collectors on the roof create hot water for domestic hot water, some of this heat can be pumped to absorption chillers. Absorption chillers use heat to drive a chemical condenser compared to a c.c. which uses electricity to drive a mechanical condenser. The absorption chiller provides cold water which is then piped to the wind tower to pre-cool and dry the incoming air before it hits the evaparation pads. as the air is pre-cooled, excess moisture condenses out of it. this water can then be used to augment the evaporative cooler.

Venturi Ventilation
During the heating season, instead of air being vented out of the top of the solar chimneys, it is brought in at the bottom from below grade at roughly 50F. As the air rises up the solar chimney, it is mixed with the hot air that is being captured in the tube. Dampers at the top of the chimney would close capturing the warm air during the winter. A secondary shaft in the solar chimney coupled with fan will pull air into a raised floor system where it enters the occupied space and exits through a ceiling plenum. The ceiling plenum is vented to a utility shaft in the core which is connected to the wind scoop at the top of the atrium which un-locked in the winter to rotate with the wind maintaining an orientation away from the wind at all times. As the wind flows around the scoop it creates a low pressure on the leeward side which pulls air out of the scoop.

Solar Thermal Radiant Heating
In addition to using the heated air provided by ventilation, a solar thermal tube system on the roof will provide hot water that will pumped to the floors to radiate heat into the occupied spaces. Because they are thermally isolated by a vacuum (much like a thermos), evacuated tube solar thermal collectors are very effective.
UCD College of Architecture and Planning Floor Plans

1. Lobby/Common Area
2. Retail
3. Visualization/Prototyping Lab
4. Quiet Lounge
5. Cafe
6. Research Lab/Office
7. Studio
8. Reception/Visitor Area
9. Deans Office
10. Administration Office
11. Staff Office
12. Kitchen/Supplies
13. Classrooms
14. Main Lecture
15. Faculty Offices
16. Department Chairs Office
17. Associate Chair Office
18. Outdoor Green Roof/Patio
19. Student Activities
20. Shared Office
21. High Tech Conference