

# CAMPUS AS A LIVING LAB



*UBC seeks opportunities for synergies between operations, research and teaching, and sustainability. The green roofs and Fitness and Wellness Centre landscaping projects are examples that bring together faculty, staff, and the community to advance sustainable practices on campus and beyond.*

## Valley seeing green

While Keith Culver is known on campus as a busy multi-tasker— institute director, professor, advocate of the Okanagan valley as living lab—not many realize he has his administrative tentacles in many areas and has the reach of “a federating octopus.”

Management professor Culver directs the Okanagan Sustainability Institute (OSI), an academic unit that conducts research at the intersection of water, urbanization, and rurality. Part of his job is to gather researchers and community partners together and find solutions to sustainability challenges. Locally and globally.

By doing so, the OSI expands existing interdisciplinary, inter-faculty research into partnerships at all levels of government, industry, and NGOs.

“Our translational goal on top of long-term, long-return research partnerships is to turn our research into practice,” he says. In Culverian green-speak, he calls these practices “innovation blooms.”

“We often start small, with highly-engaged community partners, then we start transferring knowledge and bloom up through the valley and beyond—as you can see with our green roof working group.”

Within the OSI, the green roof working group is led by the School of Engineering’s Rehan Sadiq and Kasun Hewage. Using 10 experimental campus green roofs, Engineering and Biology researchers are working with local, private-sector partner EnCircle Design Build to investigate the quality of water running off a variety of types of green roofs.

Meanwhile, other well-established operating green roofs covered in sedum plants on the Engineering, Management and Education Building, the Reichwald Health Sciences Centre, and the Purcell Residence are “performing better than expected,” Hewage says. “We’re not doing much maintenance, and the roofs are self-surviving with Okanagan rain conditions.”

Low-impact developments such as LEED point-producing green roofs and walls—also known as “living” structures— can be found on the Vancouver campus and throughout the world. But what Sadiq and Hewage are pioneering is green-roof technology that uses inexpensive, locally available construction

and demolition waste as the soil medium, crushed for optimal weight and particle size. Instead of intensive roofs—“like a park, needing skilled labour and regular maintenance,” Hewage says—their focus is on relatively thin, lightweight, self-sustaining extensive roofs.

Factors include soil-layer materials such as concrete, drywall, bricks, sand, and wood chips, while minimizing structural weight and maximizing the quality of water run-off.

The PhD thesis for Sadiq and Hewage’s student Mohammadreza Dabbaghian is life-cycle asset management of green roofs. His NSERC-funded research on roof performance monitors such things as pH levels, turbidity, and the effect of coconut-fibre filtration on nitrate removal.

The “dream,” Sadiq says, is still theoretical: not just harvesting rainwater but improving it through the green-roof filtration process, using available cheap materials—for example, rice husks in Thailand—to absorb chemicals, creating potable water.

For now, the green-roof team is content to parlay its knowledge of material life cycles into industry and pan-university partnerships.

Collaborating with colleagues at UBC’s Vancouver campus, one recent bloom is part of a research contract with Haworth, an American office furniture and “organic workspaces” company that had net sales of \$1.38 billion in 2011. Sadiq and Hewage supplied a life-cycle assessment of Haworth’s Biowall—an environmental partition wall based on geopolymers instead of natural or synthetic gypsum—while the Sauder School did the market evaluation.

The contract was secured with Culver’s help, as was the September 2012 workshop with the Urban Development Institute’s Okanagan chapter, which toured the experimental and operational, commercial-scale roofs. Culver is also the key UBC node in Peachland’s New Monaco project, which aspires to use green roofs and be “the healthiest community in Canada.”

In a parallel turn to develop sustainable communities, Sadiq and Hewage—with cash commitments from five local industry partners—applied for a large federal Collaborative Research and Development grant. Not surprisingly, Culver’s connective tentacles had something to do with that, too. ●