The 2017-2018 academic year marked another successful round of Living Lab projects, many of which spanned multiple terms. The program engaged undergraduate and graduate students across disciplines and worked with both returning and new faculty. From partnering with a single student working on an independent study to involving 35 students in a class, the projects produced a variety of innovative designs, proposals, and analyses that support campus sustainability efforts.

Living Lab projects offer a variety of benefits. Operational staff receive high-quality, innovative, and creative student work. For faculty, Living Lab projects provide easy-to-access applied learning opportunities supported by University staff and stakeholders. For students, projects result in professional experience and transferable skills acquired through experiential education. Lastly, everyone involved gains an appreciation of sustainability initiatives on campus!

BY THE NUMBERS

136 Students
11 Faculty
7 Classes
15 Projects
4 Internships
9 Academic Departments Involved

To learn more and see how you can get involved in the PSU Living Lab program visit our website or email livinglab@pdx.edu.

>> pdx.edu/sustainability/living-lab

The rammed earth wall was completed in August 2017 with observations and structural testing occurring throughout the 2017-2018 school year by civil engineering students.
PROJECTS

NEW PARTNERSHIPS WITH THE COLLEGE OF URBAN & PUBLIC AFFAIRS

- Undergraduates in an urban design and community development course observed use patterns and proposed activities to activate the block of SW Montgomery between SW 6th & Broadway Avenues. Students will continue exploring and designing ways for this block to reach its potential as a pedestrian and bike-friendly green street.

- Graduate students in a transportation planning course analyzed data from the Campus Planning/Transportation commuter survey, examining alternative commute frequencies and spatial patterns.

PSU CLIMATE ACTION PLAN EXAMINED

- Students in a climate change risks and adaptation course reviewed and assessed numerous higher education climate action plans, including PSU’s plan. Recommendations were presented at a final workshop, which was attended by staff from the Living Lab team and CSO. This discussion provided an opportunity to examine the role of students in the planning process, as well as resilience, adaptation, and financing considerations.

- The results and recommendations of this project were shared with additional campus stakeholders to launch an effort to update and revise PSU’s climate action plan.

Environmental Engineering student, Michelle Dawson, collecting a water sample from an ASRC well for testing.
PROJECTS

CONTINUOUS ENGAGEMENT WITH ENGINEERING CAPSTONES

• Civil engineering students designed a “floating bus island” stop for SW Broadway to consolidate two existing stops near the PSU campus. The design considered City and Trimet requirements, as well as pedestrian, bike, and vehicle safety and visibility.

• Working with FPM and Emergency Management staff, civil engineering students conducted a high level analysis of PSU wells to assess their suitability as a potable water resource in the case of a serious earthquake. This project identified several other potential Living Lab projects to enhance emergency preparedness on campus.

GREEN BUILDING INTERNSHIP

• For a third year running, the Green Building Internship brought together architecture and engineering disciplines to identify improvement opportunities in campus buildings. This year’s interns focused on occupant comfort and energy performance in the Karl Miller Center. Using surveys and sensors, interns examined and tracked performance of passively versus mechanically cooled spaces. This research will continue, but has already resulted in building system improvements, recommendations for optimizing class schedules and valuable insights to consider in future campus buildings.

INDEPENDENT STUDIES & CAPSTONES

• Individuals and small student groups are finding opportunities to take on Living Lab projects as an independent study or in fulfillment of a degree requirement like a thesis, masters project, or capstone.

• Projects completed in this way included developing a GIS mapping technique for landscaping beds; assessing renewable energy procurement options; studying bird habitats on campus; and conducting a feasibility assessment of solar + battery storage.
PROGRAM DEVELOPMENTS

PROGRAM ASSESSMENT

A student assessment will be launched in the 2018-2019 school year. The Living Lab team is developing an IRB proposal before collecting assessment data.

PROGRAM OUTREACH

New outreach channels were identified and pursued this year including presentations to other institutions, promotion of the program at departmental faculty meetings, and a video highlighting stories and experiences from participants in the program. Progress was made on expanding the suite of staff partners, including conversations with PSU Athletics, Conference & Events, Campus Rec, and the Smith Memorial Student Union Operations team.

JOINT MANAGEMENT

The Living Lab management team honed each departments’ role within the group, working collaboratively to scope projects with staff and recruit faculty and student participation. With a new hire in Campus Sustainability, overall program coordination shifted to CSO.

EVALUATING IMPACT

Whether a project was conceptual or analytical, anticipated deliverables were reviewed with project partners early in the process for each project. Moving forward, the team aims to continue improving its process to develop, communicate, and document outcomes and impacts.

Using a poll-mounted camera, GIS students explored ways to map PSU landscaping beds.
<table>
<thead>
<tr>
<th>Title / Topic</th>
<th>Project Type</th>
<th>Academic Partners</th>
<th>Staff Partner(s)</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Building Interns</td>
<td>Summer Internship</td>
<td>Architecture, Engineering</td>
<td>Capital Projects &amp; Construction</td>
<td>Occupant comfort and building performance study of Karl Miller Center</td>
</tr>
<tr>
<td>PSC Solar + Storage Feasibility Study</td>
<td>Masters Capstone</td>
<td>Engineering &amp; Technology Management</td>
<td>Capital Projects &amp; Construction Emergency Management</td>
<td>Assessment of solar plus battery storage for Peter Stott Center for energy management and emergency response needs</td>
</tr>
<tr>
<td>PSU Climate Action Plan Evaluation</td>
<td>Course project</td>
<td>Environmental Science &amp; Management</td>
<td>Campus Sustainability Office</td>
<td>Conduct in-depth review of PSU &amp; other institutions’ Climate Action Plans to identify opportunities for improvement</td>
</tr>
<tr>
<td>Campus Bird Habitat Inventory</td>
<td>Independent Study</td>
<td>Biology</td>
<td>Facilities &amp; Property Management, Campus Sustainability Office</td>
<td>Research campus bird habitats and species present on campus to inform land use management</td>
</tr>
<tr>
<td>Transit &amp; Commuter Survey Data Analysis</td>
<td>Course Project</td>
<td>Urban Studies &amp; Planning</td>
<td>Transportation &amp; Parking Services, Campus Planning Office</td>
<td>Analyze recent and historical data to understand faculty, staff, and student commute patterns and behaviors</td>
</tr>
<tr>
<td>SW Montgomery Futures Exploration</td>
<td>Course Project</td>
<td>Urban Studies &amp; Planning</td>
<td>Campus Planning Office</td>
<td>Design partial closure scenarios for block of SW Montgomery between 6th &amp; Broadway</td>
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<tr>
<td>Campus Tree Inventory</td>
<td>Course Project</td>
<td>Environmental Science &amp; Management</td>
<td>Facilities &amp; Property Management, Campus Sustainability Office</td>
<td>Expand and improve existing inventory data and estimate ecosystem benefits from campus urban forest</td>
</tr>
<tr>
<td>Landscape Plant Inventory, phases I &amp; II</td>
<td>Course Project; Independent Study</td>
<td>Geography</td>
<td>Facilities &amp; Property Management</td>
<td>Expand and implement methodology for mapping campus landscaping beds</td>
</tr>
<tr>
<td>Emergency Wells Analysis</td>
<td>Undergraduate Capstone Group</td>
<td>Engineering</td>
<td>Facilities &amp; Property Management</td>
<td>Analysis of campus wells and opportunities for a backup water pump and generator for campus resiliency</td>
</tr>
<tr>
<td>Floating Bus Island</td>
<td>Undergraduate Capstone Group</td>
<td>Engineering</td>
<td>Transportation &amp; Parking Services, Campus Planning Office</td>
<td>Analysis and design of a “floating bus stop” on SW Broadway to accommodate pedestrian, bus, and bicycle traffic</td>
</tr>
<tr>
<td>Offsite Renewable Options, phase II</td>
<td>Masters project</td>
<td>Environmental Science &amp; Management</td>
<td>Campus Sustainability Office</td>
<td>Assess renewable energy procurement and development options for PSU</td>
</tr>
<tr>
<td>Karl Miller Center Passive Design Study</td>
<td>Undergraduate Honors Thesis</td>
<td>Architecture</td>
<td>Facilities &amp; Property Management</td>
<td>Surveys and analysis of performance (temperature and CO2) and comfort of new passive side of KMC</td>
</tr>
<tr>
<td>Stormwater Management - Rainworks Challenge</td>
<td>Course project</td>
<td>University Studies</td>
<td>Facilities &amp; Property Management</td>
<td>Assess select campus stormwater management sites per EPA rainworks challenge</td>
</tr>
</tbody>
</table>

2017-2018 LIVING LAB PROJECT MATRIX