The Pearson Lab, part of the Department of Earth and Planetary Sciences (EPS), is an approximately 2,900 sq. ft. lab on the ground floor of the Hoffman Building located at 24 Oxford Street in Cambridge, Massachusetts. The project is a complete renovation of an existing lab space to accommodate the specific needs of Ann Pearson, a newly tenured professor, and her lab group. Professor Pearson directs the Laboratory for Molecular Biogeochemistry and Organic Geochemistry. Recent research in the Pearson Lab focuses on understanding the origins of important environmental and taxonomic lipid molecular fossils.

EPS is committed to sustainability and to the reduction of greenhouse gas emissions; therefore, the Harvard University Green Building Guidelines and the LEED-CI rating system helped the project team develop sustainability goals and guide selection of materials as well as the mechanical, electrical and plumbing (MEP) systems installed.

To support Professor Pearson’s research activities, 3 variable air volume (VAV) chemical fume hoods were installed that significantly reduce exhaust rates when the sashes are closed. In addition, these hoods are be able to run at a face velocity of 80 feet per minute instead of 100 feet per minute – reducing airflow by 20% and conserving the energy that would have been required to condition that air.

The lighting design meets the researchers’ requirements without exceeding recommended lighting power limits. The design incorporates energy efficient fixtures and task lights, which leads to a 25% reduction in the lighting power density below code standards.

Throughout the entire space, DDC thermostatic sensors tie into the building’s control system, allowing temperature settings to be set back whenever those spaces are unoccupied.

**PROJECT HIGHLIGHTS**

**LEED® Facts**

Pearson Lab Renovation  
Harvard Faculty of Arts and Sciences  
2010 Renovation

<table>
<thead>
<tr>
<th>Category</th>
<th>Points Achieved</th>
<th>Total Points Achieved</th>
<th>Rating System</th>
<th>Certification Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Sites</td>
<td>4/7</td>
<td>35/57</td>
<td>Commercial Interiors v2.0</td>
<td>Gold</td>
</tr>
<tr>
<td>Water Efficiency</td>
<td>2/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy and Atmosphere</td>
<td>8/12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials and Resources</td>
<td>6/14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor Environmental Quality</td>
<td>10/17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation in Design</td>
<td>5/5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **25%** reduction in the lighting power density when compared to ASHRAE 90.1-2004 standards.
- **44%** reduction in the amount of water consumption compared to EPAct 1992 baselines.
- **20%** reduction in the air flow of lab fume hood by installing VAV fume hoods.
PROJECT OVERVIEW

PEARSON LAB FLOOR PLAN & LEED BOUNDARY

PROJECT TEAM

Owner: Harvard Faculty of Arts and Sciences
Project Manager: Harvard University Department of Earth and Planetary Sciences
Architect: Perkins + Will
Contractor: Wise Construction Corporation
HVAC Engineer: RW Sullivan
Commissioning Authority: Harvard Green Building Services
Sustainability Consultant: Harvard Green Building Services

Photo: Green Building Services, 2010.
SITE

To encourage alternatives to driving, all occupants of the Pearson Lab have access to Harvard’s CommuterChoice Program, which provides incentives and discounts for all modes of alternative transportation as well as carpooling and fuel efficient vehicles.

The building is located within walking distance to the Harvard Square MBTA stop, several bus lines, and the Harvard University Shuttle.

Three bicycle racks with a total capacity of 90 bicycles are fixed to the rear and front of the Hoffman building. The building’s cantilevered second floor provides some shelter against weather.

The building is located in a dense urban area, which allows occupants to walk and easily access amenities such as restaurants, banks, churches, and retail stores.

WATER EFFICIENCY

Pearson Lab space used fixtures such as the solar power electronic lavatory faucets, dual flush flushometers, low flow shower heads, and high efficiency urinal systems (HEU) to reduce domestic water usage by 44% over standard EPAct 1992 fixtures.

<table>
<thead>
<tr>
<th>Fixture Type</th>
<th>Pearson Lab Flush &amp; Flow Rates</th>
<th>EPAct 1992 Standard Flush &amp; Flow Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Closet [GPF]</td>
<td>Dual Flush 1.6 &amp; 1.1</td>
<td>1.6</td>
</tr>
<tr>
<td>Urinal [GPF]</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Bathroom Sink [GPM]</td>
<td>0.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Shower [GPM]</td>
<td>1.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Kitchen Sink [GPM]</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>GPF - Gallons Per Flush</td>
<td>GPM - Gallons Per Minute</td>
<td></td>
</tr>
</tbody>
</table>

Please print this project profile only if necessary. If printing is required, please print double sided and recycle when finished. Thank you!
ENERGY EFFICIENCY

The Faculty of Arts and Sciences has committed, along with Harvard University as a whole, to reduce greenhouse gas emissions 30% below 2006 levels by 2016, inclusive of growth. Therefore energy efficiency was a primary goal of this renovation project.

MECHANICAL SYSTEMS

Airflow Control System: The project specified the Siemens Venturi Air Valve which allows for fast-acting and precise control on all supply airflow. The valve to designed to respond within one second to changes in static pressure.

High Performance Fume Hoods installed as part of the project include Variable Air Volume (VAV) fume hoods which run at a maximum face velocity of 80 feet per minute instead of 100 feet per minute. This reduces air flow by at least 20% and conserves the energy that would have been required to condition the additional air in conventional models.

Occupancy and Temperature Sensors: For each room within the project boundary, occupancy sensors tied to the building’s control system modulate the supply air and maintain temperature set-points, allowing both to be set back whenever spaces are unoccupied. The type of space and the activities carried out within it dictate the appropriate occupied and unoccupied set-points for temperature.

CO₂ Sensors: Similar to the temperature sensors, the CO₂ sensor located in the seminar room monitors the CO₂ levels and will increase or decrease the outdoor air supply based on the occupancy of the room at any given time.

Commissioning: The mechanical and electrical systems have been fully commissioned by a third party Commissioning Authority, which ensured that all energy-related systems were installed as designed and operating efficiently prior to occupancy.

ELECTRICAL SYSTEMS

Plug Loads: Energy Star equipment was selected for all equipment in the space, including computers and printers.

Light Fixtures: Energy-efficient and low mercury fluorescent lighting fixtures and lamps were carefully chosen and strategically located within each space to reduce electricity consumption while maintaining adequate lighting levels for each type of space.

Light Controls: Each space has overhead lighting controlled by multiple switches/zones and each desk has either under-counter task lights or desk lamps for multiple lighting levels based on occupant needs. Strategies that allow for increased personal control have been shown to increase occupant productivity and comfort while decreasing energy use by allowing lower levels of ambient lighting to be provided.

Light Sensors: Perimeter lighting fixtures are hooked up to sensors which adjust the amount of light based on the amount of natural light present in the space.

Pearson Lab Equipment
Photo: Green Building Services, 2010.
**INDOOR ENVIRONMENTAL QUALITY**

Harvard Faculty Arts and Sciences is committed to providing a healthy indoor environment for all occupants. The project team was careful to maintain healthy indoor air quality during construction and to also ensure the space is designed to promote healthy indoor air quality during occupancy.

**INDOOR AIR QUALITY DURING CONSTRUCTION:** To maintain the high indoor air quality, contractors were mandated to vacuum on a daily basis as well as to protect all vents and intakes. There were also sticky mats that employees stepped on when leaving the site.

**THERMAL COMFORT SURVEY:** Occupants will be surveyed about their comfort once per season. The Operations team will adjust the heating or cooling in the project space as needed.

Only Materials with **LOW OR NO VOC CONTENT** were used in the Pearson Lab project. Volatile Organic Compounds (VOCs) are chemical compounds and known carcinogens found in many construction materials that are considered detrimental to indoor air quality. Reducing the use of VOCs whenever possible improves indoor air quality and consequently occupant health and productivity.

- **COMPOSITE WOOD AND LAMINATE ADHESIVES** used in the renovation do not have any added urea formaldehyde.

- **ADHESIVES AND SEALANTS AND PAINTS AND COATINGS** Products used in the project include:

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Product &amp; Manufacturer</th>
<th>VOC Content (g/l)</th>
<th>VOC Limit (g/l)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paints &amp; Coatings</td>
<td>Eco Spec, Benjamin Moore</td>
<td>0</td>
<td>50</td>
<td>Green Seal GS-11</td>
</tr>
<tr>
<td></td>
<td>Benjamin Moore - EcoSpec Interior Primer - # 231</td>
<td>0</td>
<td>150</td>
<td>Green Seal GS-11</td>
</tr>
<tr>
<td></td>
<td>Armor Top - Floor Coating - Dur A Flex</td>
<td>74</td>
<td>150</td>
<td>SCAQMD Rule #1168</td>
</tr>
<tr>
<td>Adhesives &amp; Sealants</td>
<td>Latricrete - 253 Gold Thinset</td>
<td>0</td>
<td>50</td>
<td>SCAQMD Rule #1168</td>
</tr>
<tr>
<td></td>
<td>Borden Adhesive</td>
<td>1</td>
<td>70</td>
<td>SCAQMD Rule #1168</td>
</tr>
</tbody>
</table>

**Green Housekeeping:** Pearson Lab Participates in Harvard’s Facilities and Maintenance Operations (FMO) Green Cleaning Program, which uses 100% recycled paper products and Green Seal certified cleaning solutions, among other green housekeeping practices.

**Daylight and Views:** To provide a connection between indoor and outdoor environments, the regularly occupied spaces have access to daylight and views.

---

Materials & Waste

Selecting environmentally preferable materials and minimizing the amount of construction waste sent to landfill was important to the project. For the additional materials purchased, the project gave preference to low-emitting materials with recycled content and local manufacturing.

20% of the total material value consists of products salvaged or manufactured locally.

80% of the on-site generated construction waste was diverted from the landfill.

30% of the total value of materials used in the project consist of materials with recycled content.

Environmently Preferable Materials in the Pearson Lab

- **MarkerBoards (Claridge)**
  - 25% pre-consumer, 45% post-consumer
- **Dry Wall Framing (Dietrich)**
  - 37% pre-consumer, 17% post-consumer
- **CAPZ Ceiling (Armstrong)**
  - 80% pre-consumer, 0% post-consumer
- **TrackBoards (Claridge)**
  - 10% pre-consumer, 57% post-consumer

Examples of regional materials used in project:

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Manufacturer</th>
<th>Distance between project &amp; Manufacturer (mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hollow Metal Door Frames</td>
<td>DeLa Fontaine</td>
<td>8</td>
</tr>
<tr>
<td>Mecho Window Shades</td>
<td>Mecho</td>
<td>185</td>
</tr>
<tr>
<td>Corner Guards</td>
<td>Weiss Sheetmetal</td>
<td>17</td>
</tr>
</tbody>
</table>

Additional Resources

- **FAS Green Program**: [http://green.harvard.edu/fas/green-labs](http://green.harvard.edu/fas/green-labs)
- **FAS Green Labs Program**: [http://green.harvard.edu/fas/green-labs](http://green.harvard.edu/fas/green-labs)
- **Harvard Green Building Services**: [http://green.harvard.edu/green-building-services](http://green.harvard.edu/green-building-services)
- **Harvard Green Building Resource**: [http://green.harvard.edu/theresource](http://green.harvard.edu/theresource)