



## CENTER FOR BRAIN SCIENCE AND ZHANG LAB

**GOLD**

Harvard University Northwest Labs, 52 Oxford Street, Cambridge, MA 02138

The Zhang Lab and the Center for Brain Sciences (CBS) Lab are located on the third floor of the Harvard University Northwest Labs Building at 52 Oxford Street in Cambridge, Massachusetts. Along with several other labs located within the Northwest Labs Building, the Zhang Lab was a fit-out that set a goal to achieve LEED for Commercial Interiors (LEED-CI) v3 Gold certification.

The 3,130 square foot lab is used by students and faculty to investigate causal, developmental, functional, and evolutionary aspects of animal behavior. This includes analyzing genetic, neural and psychological mechanisms underlying behavior, as well as their evolutionary consequences in terms of speciation and diversification. Research is conducted both in the Zhang laboratory as well as field populations.



Because of the resource intensity of lab science and the unique conditions and requirements in each individual lab within the Northwest building, lab sustainability approaches must be made from both a building wide perspective, as well as a granular perspective aimed at identifying local opportunities at the lab level. FAS Green Labs Program initiatives, with the support of paid lab sustainability representatives, help mitigate resource intensity, while respecting the resource demands of science.

**Zhang CBS Lab**

Photo: Burt, Hill Architects, 2010

### PROJECT HIGHLIGHTS

#### LEED® Facts

Zhang/CBS Lab

Harvard Faculty of Arts and Sciences

2010



Location.....	Cambridge, MA
Rating System.....	LEED-CI v3
Certification Achieved.....	Gold
Total Points Achieved.....	71/110

Sustainable Sites.....	19/22
Water Efficiency.....	0/11
Energy and Atmosphere.....	25/36
Materials and Resources.....	6/14
Indoor Environmental Quality.....	12/17
Innovation and Design.....	6/6
Regional Priority.....	3/4

**23%**

reduction in potable water consumption compared to EPA Act of 1992 baselines

**78%**

of all construction and demolition waste was diverted from landfills.

**72%**

of construction materials and furniture were manufactured within 500 miles of the project location.

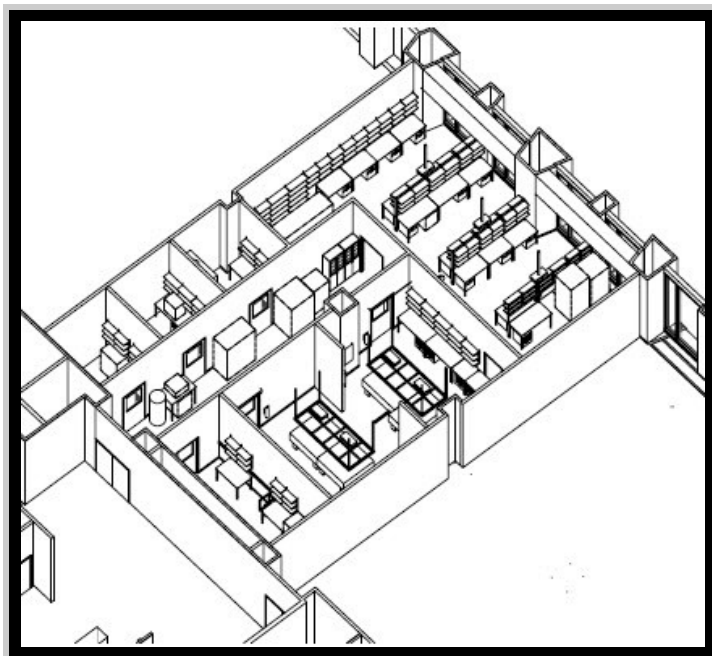
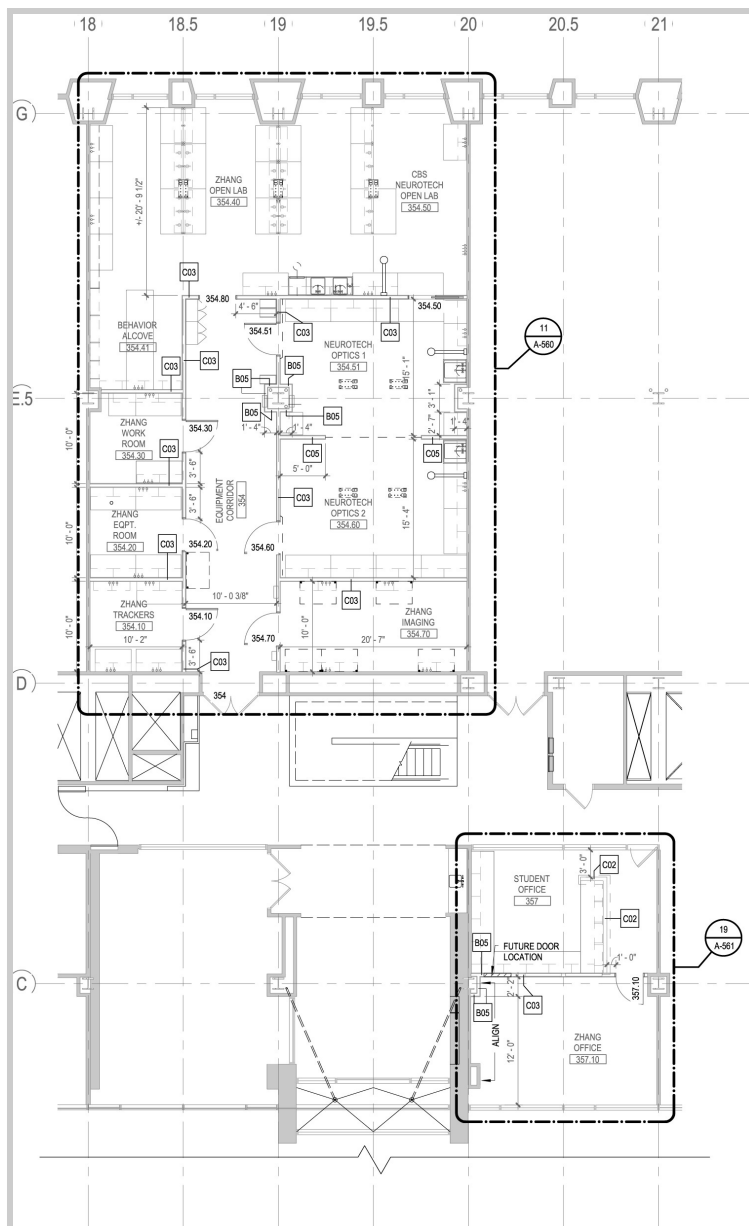
**16%**

reduction in lighting power density (watts/square foot) below the code standard



## PROJECT OVERVIEW

### ZHANG/CBS LABORATORY FLOOR PLAN & LEED BOUNDARY

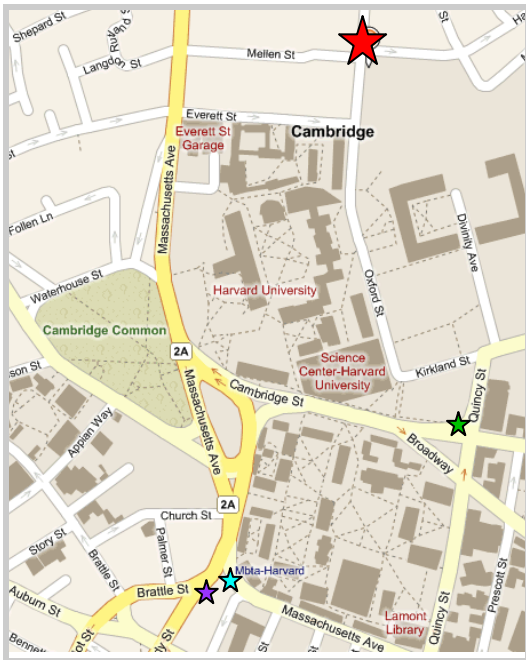


**Zhang/CBS Laboratory**  
Photo: Axonometric View, Burt Hill Architects, 2009.

## PROJECT TEAM

<b>Owner</b>	Harvard University Faculty of Arts and Sciences
<b>Project Manager</b>	John Hollister <i>Harvard University</i>
<b>Architect</b>	Burt, Hill Architects
<b>Contractor</b>	Shawmut Construction
<b>HVAC Engineer</b>	Bard, Rao + Athanas
<b>Commissioning Authority</b>	EMA Energy Management Associates, Inc.
<b>Sustainability Consultant</b>	Harvard University Green Building Services

# SITE



- To encourage alternatives to driving, all occupants of the Northwest Labs building have access to Harvard's comprehensive **Commuter Choice 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.
- Bicycle racks are provided around all sides of the building, encouraging bicycle transportation.
- 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.

- ★ Northwest Labs Building
- ★ MBTA Bus Stops
- ★ Harvard University Shuttle Bus Stops
- ★ MBTA Subway Station



**Bike Racks at North West Labs Building**  
Photo: Andrea Trimble, OFS, 2010.

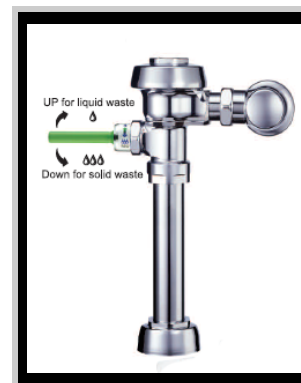
# WATER EFFICIENCY

Water-efficient and low-flow fixtures were installed in the Northwest Labs building in order to achieve a **23%** reduction of potable water consumption below standard fixtures.

## FIXTURES IN NORTHWEST LABS

Differences in the Flush & Flow Rates		
Fixture Type	Zhang/CBS Lab Flush & Flow Rates	Standard Fixtures
Water Closet [GPF]	1.1	1.6
Water Closet [GPF]	1.6	1.6
Urinal [GPF]	0.5	1.0
Shower [GPM]	2.0	2.5
Restroom Sink [GPM]	0.5	0.5
GPF - Gallons Per Flush	GPM - Gallons Per Minute	

**SYMMONS®**  
Euro-Flo Hand Shower  
2.0 gpm



**SLOAN®**  
UPPERCUT Dual-Flush Flushometer  
UP 1.1 gpf, DOWN 1.6 gpf





## ENERGY EFFICIENCY

Harvard 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 main goal of this renovation project.

### MECHANICAL SYSTEMS

Efficient HVAC systems were designed in order to reduce unnecessary energy and resource consumption.

**Building Automation System:** All automatic temperature controls are direct digital control (DDC). Automatic controls provide energy savings based on system zoning, scheduling, occupied/unoccupied setbacks and demand control ventilation. This system monitors all the carbon dioxide (CO<sub>2</sub>) sensors throughout the building and modulates the air handling unit return, exhaust and outdoor air dampers as required to maintain the CO<sub>2</sub> set point for demand control ventilation.

**Demand-Control Ventilation** CO<sub>2</sub> sensors in each space provide demand control ventilation, which means the space is ventilated based on actual occupancy.

### ELECTRICAL SYSTEMS

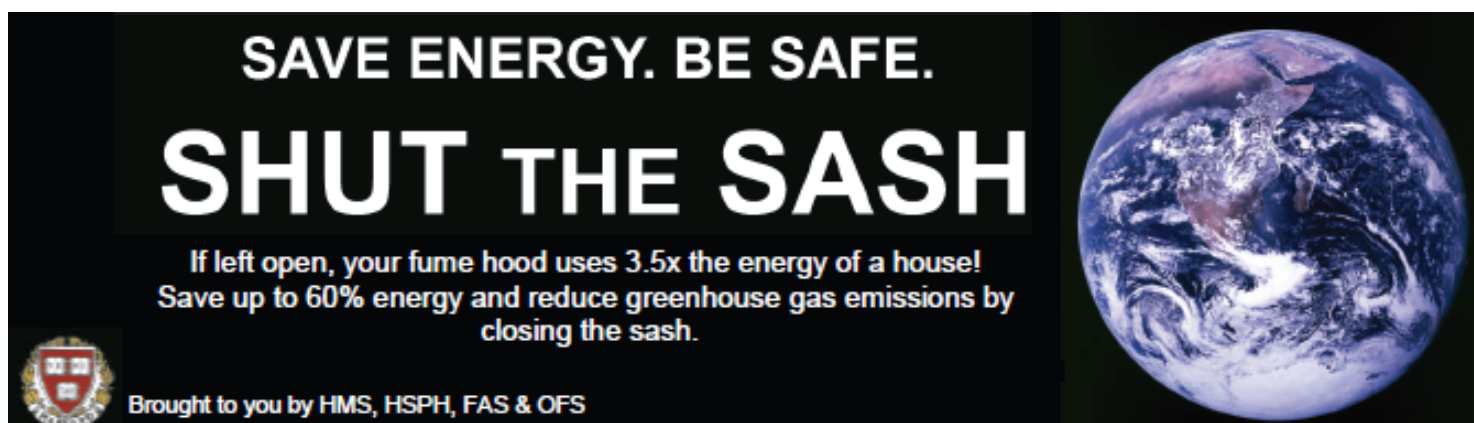
Efficient lighting systems were designed in order to reduce unnecessary energy consumption.

**Light Fixtures:** To reduce the amount of toxic material in the building, linear fluorescent lighting was chosen instead of compact fluorescent lighting wherever possible. Low mercury lamps were also specified and installed whenever this option was available.

Energy-efficient fluorescent lighting fixtures and lamps were carefully chosen and placed to reduce electricity consumption. Through these measures, the lighting power density (wattage) is reduced by **16%** below code-compliant fixtures.

**Occupancy Sensors:** Occupancy sensors are strategically placed throughout the project that sense the presence of people. Occupancy sensors turn off all room lighting upon room vacancy.

These occupancy control sensors also include a photocell in the sensor that will shut off fixtures if they sense enough daylight.



### Shut the Sash Campaign Signage

Signs such as the one above are distributed near fume hoods to remind occupants to reduce fume hood ventilation losses by closing fume hood sashes.

## INDOOR ENVIRONMENTAL QUALITY

FAS 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:** Shawmut Construction and its subcontractors maintained a safe and clean work environment and provided adequate ventilation during construction to minimize the accumulation of dust and debris. During the application of finishes, walk off mats at construction entrances were used to reduce the amount of dirt and dust tracked into the project interior. All finish materials and equipment were kept covered during delivery and storage on-site. Building materials were stored and installed to avoid moisture exposure. Smoking was also prohibited on or around the site.

**Thermal Comfort Survey:** Occupants will be surveyed about their thermal 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 Zhang/CBS Laboratory 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.
- **Floor Systems** This facility features CRI Green Label Plus certified carpets from Shaw and FloorScore certified rubber flooring from Armstrong.
- **Adhesives and Sealants and Paints and Coatings** All paints and adhesives used in the Zhang lab have low or zero volatile organic compound (VOC) compositions.

Product Category	Product & Manufacturer	VOC Content (g/l)	VOC Limit (g/l)	Standard
Paints & Coatings	➤ Benjamin Moore Interior Flat Coating; Eco Spec	0	50	GS-11
	➤ Benjamin Moore Interior Flat Coating; Dryfall	37	50	GS-11
Adhesives & Sealants	➤ Wood Substrate, Franklin International; PLAM Adhesive	4.4	30	SCAQMD Rule 1113
	➤ Rubber Floor Adhesive, Armstrong; S599 Floor Adhesive	14	60	SCAQMD Rule 1113
	➤ Rubber Floor Adhesive, Armstrong; S588 Floor Adhesive	0	60	SCAQMD Rule 1113

Benjamin Moore  
EcoSpec Paint  
Zero-VOC Paint



Sylvania Optron EcoLogic T-8 Bulbs  
Featuring low mercury content

**Low Mercury Lighting:** All fluorescent lighting featured in these spaces are selected for low mercury content. Overall, the facility is designed to include lamps that result in a 74.6 pictogram mercury/lumen-hour average content, 17% lower than the mercury content allowed to earn credit for reduced mercury content in the



Sierra Pine Arreis MDF  
Featuring no added urea-formaldehydes





## 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.

**75%** of the total material value consists of products manufactured locally (within 500 miles of project site).

**78%** of the on-site generated construction waste was diverted from landfills using a commingled collection and separation process.

**18%** of the total value of materials used in the project consist of materials with recycled content.

### ENVIRONMENTALLY PREFERABLE MATERIALS IN ZHANG/CBS LAB, NORTH WEST LABS BUILDING

- > Honed Metal Frames and Doors (De La Fontaine)  
25% pre-consumer, 20% post-consumer
- > LGMF (Dietrich)  
17% pre-consumer, 37% post-consumer
- > Gypsum Wall Board (USG)  
95% pre-consumer, 5% post-consumer
- > ACT Ultima #1911 (Armstrong)  
65% pre-consumer, 15% post-consumer

Material Name	Manufacturer	Distance between project & Manufacturer ( mi)
Metal Casework	Mott Manufacturing	466
Veneer Core	Columbia Forest Products	10
Wood Blocking	Armstrong	323



Zhang/CBS Lab  
Photo: Burt, Hill Architects, 2010

## ADDITIONAL RESOURCES

- > Harvard FAS, Center for Brain Science: <http://cbs.fas.harvard.edu/>
- > Harvard FAS, Green Program: <http://green.harvard.edu/fas>
- > Harvard FAS, Green Labs Program: <http://green.harvard.edu/fas/green-labs>
- > Harvard Green Building Services: <http://green.harvard.edu/green-building-services>
- > Harvard Green Building Resource: <http://green.harvard.edu/theresource>

