

# BALA

SCIENCE + INNOVATION



# FIRM INFORMATION

**Bala's mission** focuses on **People, Environment** and **Social Justice**.

We are built on relationships first—Relationships with our staff, clients and business partners. Bala's culture creates an environment for relationships to thrive and careers to flourish, helping our employees and clients achieve their personal and professional goals.

Our passion and thought leadership for sustainability coupled with ideation focuses on creating an improved quality of life – for people and the environment. We create meaningful relationships and spaces that connect all people.

**41**  
YEARS IN  
BUSINESS

**200+**  
EMPLOYEES

**5**  
OFFICES

## OFFICE LOCATIONS

PHILADELPHIA, PA  
*(Headquarters)*  
1285 Drummers Lane  
Wayne, PA 19087

NEW YORK, NY  
1 William Street,  
2nd Floor  
New York, NY 10004

BOSTON, MA  
52 Temple Place  
Boston, MA 02111

BALTIMORE, MD  
8140 Corporate Drive  
Suite 150  
Baltimore, MD 21236

WASHINGTON, DC  
1515 Wilson Boulevard,  
Suite 710  
Arlington, VA 22209

## POINTS OF CONTACT

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# EXPERTISE & SERVICES

## Expertise

Bala's expertise in the life sciences market includes new construction, expansion, conversion and renovation projects, as well as modernizations to adapt spaces to new technologies and ever evolving scientific research.

The rapidly changing technologies and scientific methods have increased demand for sustainable modular designs that are flexible and resilient to minimize operational disruption as future modifications are implemented. We apply this approach to any design whether it involves research, vivarium, clean, and small scale production/manufacturing spaces.

As part of the design process, Bala works with Lab Personnel, Architects and Owners to program the spaces and build criteria that forms the foundation of the design.

Projects are delivered in a multitude of ways, including early release packages, design assist and design build. Speed to market approaches have become more prevalent to accommodate supply chain issues.

The resulting designs are safe, flexible and resilient environments that use less energy and are capable of handling multiple functions, including the use of hazardous materials.

## Services

- Lab Conversion Facility Assessments
- Energy Analysis & Lifecycle Costing
- Sustainable Design
- Facility Programming and Lab Equipment Matrix Development
- Process and instrumentation Diagrams (P&IDs)
- Air Dilution Analysis
- Computational Fluid Dynamics
- Photometric Analysis
- Environmental Room Design
- Hazop Analysis
- MEP/FP Design
- Structural Design
- Technology, Security, A/V Design
- Commissioning
- Critical Systems Testing



# DESIGN EXPERIENCE

Our experience includes a wide variety of life science spaces, technologies and systems. We work with our partners to develop innovative solutions to satisfy their varying program requirements. Additionally, flexible designs create nimble facilities that are easily adapted for new science/technologies without significant capital investments in the future.

## TYPES OF R&D

- Academic Research & Teaching
- Commercial Research & Development
- Clinical Research & Development
- Small Scale Production

## SYSTEMS

- Fume Hood Exhaust
- Radioisotope Exhaust
- High Purity Compressed Gas
- Purified RODI Water
- Liquid Nitrogen Distribution for Cryogenic Freezers

## R&D FEATURES

- Incubator Laboratories
- Radiochemistry
- CLIA Labs
- Dry Laboratories for Lithium Research
- cGMP Laboratories
- cGMP Warehouse, including high bay cold/freezer rooms
- Pyrophoric Materials Laboratories
- NMR Room
- Intrinsically Safe Laboratories
- Clean Rooms (ISO 5, 7, 8 & 9)
- Robotics Laboratories
- Autoclaves/Sterilizers, Glass Wash and Cage Wash
- Vivarium Holding (small and NHP) Rooms
- Quarantine Isolation Rooms

# UNIQUE LAB TYPES

## OFFICE TO LAB CONVERSION

Speed to market is key for office to lab conversions. A thorough evaluation of the space, the costs and program requirements is critical for project success. Some unique considerations include:

- » Multi-tenant space needs differ from single-tenant.
- » Urban high-rise buildings present unique challenges.
- » Floor to floors heights present potential limitations.
- » Identify the capacity of on site utilities.
- » Modular or flexible designs offer the resiliency needed for incubator labs.

## ACADEMIC

Academic research & teaching laboratory needs differ from commercial lab spaces. Some unique aspects of academic labs include:

- » Labs are designed for many and frequently changing users.
- » Labs accommodate a multitude of functions.
- » Institutional standards must be incorporated into the designs.
- » Labs often require upgrades of older systems

## CLEAN SPACES

Clean lab spaces prioritize resiliency, reliability, safety, and energy efficiency. Clean spaces require increased airflow, hazops reviews and must be designed for each clients unique clean space standards. Utilizing prefab construction or systems can reduce costs and installation timelines.



# ENGINEERING THE PATH TO INNOVATION

BIO PHARMACEUTICAL  
MATERIALS SCIENCE

PHARMACEUTICAL  
AGRICULTURE

BIO TECHNOLOGY  
LIFE SCIENCES





# FEATURED PROJECTS

# COMBINING TOP-PERFORMING LABORATORY SPACE WITH SUSTAINABLE DESIGN

## CONFIDENTIAL LIFE SCIENCE CLIENT

**SERVICES** MEP/FP Engineering, IT Infrastructure, Security, Audiovisual

580K

leased office + lab space

116K

lab space

464K

office space

This Confidential Life Science's Client is leasing a new 16-story building that will include office and laboratory spaces as well as amenities such as a conference center floor, kitchen, dining areas, and a large fitness center.

Bala was able to utilize the outside air provided by the base building systems to accommodate the additional makeup air requirements for these spaces. The workplace floors are served by a highly efficient active chilled beam heating and cooling system. During design, a Computational Fluid Dynamics (CFD) model was performed in order to study the effect on occupant comfort from heating via the active chilled beam. This justified a cost savings by implementing a triple glazed curtain wall system and eliminating the need for baseboard heating. As another cost savings strategy, which also lowered the amount of overall embodied carbon utilized on the project, Bala designed a 6-way control valve system for the perimeter heating and cooling system. This allowed the design to optimize the heating and cooling capacity of the active chilled beams while minimizing the size of the beams and the associated piping systems.

### PROJECT HIGHLIGHTS

- VAV laboratory air systems
- Fully Metered Systems
- Pursuing LEED Gold
- Advanced stand by demand response power systems
- Sustainable design approach applied to cGMP laboratories
- Utilized central air systems and local HEPA filter modules to achieve high air change rate while minimizing fan power
- Modular lab gas and purified water distribution provides flexible infrastructure that will minimize future reprogramming of laboratory spaces to meet demands of evolving technology and research.

# B. LABS AT CIRA CENTRE

Philadelphia, PA

**SERVICES** MEP/FP Engineering



50K

initial incubator space

120K

size of space

1.5-2

CFM/SF

20

watts/sf

Powered by the Pennsylvania Biotechnology Center, B. Labs is an innovation and research space dedicated for start-up life science companies right in the heart of Philadelphia's world class academic and healthcare institutions.

The incubator space encompasses three floors that are positioned to be leased as suites, individual rooms or linear bench space. The laboratory spaces are comprised of a mixture of biology and chemistry labs with varying fume hood and biosafety

cabinet densities. Shared support spaces include walk in cold room, refrigerator/freezer rooms, centrifuge, glasswash, and collaboration spaces.

Laboratories designed as modular/flexible spaces to accommodate future modifications without major disruptions to the MEP Systems. Centralized laboratory waste neutralization treatment systems and purified water loop provided to several tenants.

## CREATIVE SOLUTIONS

- Office to lab conversion in a high-rise building
- Multiple chemical control zones/floor
- Maintained conventional ceiling heights with low floor to floor height
- Modular and flexible MEP systems to accommodate future changes
- Shared supply/exhaust, lab waste and purified water loop systems
- Fully metered systems
- Lower level exhaust discharge proven by windwake analysis
- Mechanical systems sized to integrate with base building infrastructure while meeting laboratory demands:
  - Air systems sized to satisfy equipment exhaust and minimum air changes
  - VRF supplemental cooling system to minimize supply air demand
  - Utilize existing condenser water system



switchboards, providing a highly resilient electrical service for the facility. Prior to this project, the building housed office tenants.

This project has been designed and constructed in a number of phases. The first phase consisted of the conversion of approximately 150,000 SF of office space to support BSL2 type lab space. Subsequent phases have included the conversion of an additional 60,000 SF of office space and a study to convert an additional 15,000 SF. In total, almost half of the building will be able to support lab space. Infrastructure upgrades to the building included multiple

new rooftop air handling supply and lab exhaust systems, with energy recovery capability, multiple new standby generator systems, new hot water heating systems, new main electrical distribution throughout the building and new plumbing riser systems for lab waste, vent and non-potable water.

Bala has provided the design for the majority of the lab/office tenant spaces that are now supported by the new infrastructure. These spaces include BSL2 biology and chemistry spaces, vivarium spaces and NMR equipment spaces.

# 451 D STREET - OFFICE TO LAB

Boston, MA

**SERVICES** MEP/FP Infrastructure Upgrades Planning and Design  
Structural Planning and Design for Laboratory Systems

200K SF

office conversion

477K SF

building size

451 D Street consists of two connected buildings covering a full city block. The facility is unique in that the 1909 building is a terra cotta structure and the 1950 building is a poured concrete structure. In addition, the buildings come together at different elevations on each floor and are nine stories above grade and one story below grade. In the late 1990s and early 2000s, the building housed telecom service providers and “dot com” companies. This resulted in a very robust electrical and communications infrastructure, evident by incoming power supplied through three double ended



# LEHIGH UNIVERSITY

## Health, Sciences, and Technology Building

Bethlehem, PA



190K SF

building size

36K SF

lab and lab support spaces

231

benches for research

**SERVICES** Fundamental Commissioning  
Enhanced Commissioning

**CERTIFICATION** Pursuing LEED

As the largest facility on Lehigh's campus, the new Health, Science, and Technology (HST) building is set up in a 'Living Lab' configuration with a mixture of collaboration space throughout, promoting innovation in research and education. Other notable areas include a Population Health Data (PHD) warehouse, a data visualization lab, cafe, and a high tech media center for community gatherings.

Lehigh University is also known for their world-class electron microscopy and surface characterization tools which will be located within the basement of the new building.

## A REVOLUTIONARY ENVIRONMENT EMBRACING INTERDISCIPLINARY RESEARCH

### SUSTAINABILITY FEATURES

- Water Use Reduction
- Optimized Energy Management
- Energy Conscious Equipment
- AHUs with Energy Recovery Wheels
- Active Chilled Beams
- Heat Shift Chiller
- Optimized Building Management Controls with Trend Monitoring
- Construction Waste Management
- Seasonal Energy Economization
- Heat Exchangers
- Advanced Metering and Lighting Controls
- Laboratory Exhaust Air Heat Recovery



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This hub reflects  
an energetic and  
innovative spirit.

~ Stantec

**180 3RD AVENUE**  
Waltham, MA

**SERVICES** MEP/FP Engineering

**329K SF**  
building size

**310K SF**  
lab and support spaces

**19K**  
amenities

Set to be completed in 2023, this six-story building will become a beacon of innovation at City Point. Part of the design includes provisions to allow for flexible tenant improvements for lab clients.

The original design of the building was for a core/shell office with standalone rooftop units and did not include lab space. The switch to a 50/50 lab + office building came after design was finished and entailed adding additional shafts and rooftop units as well as exhaust air handler units to accommodate future lab tenants. The MEP design is flexible to allow the developer to market the entire building as potential lab space and not specific areas within the building.

Sustainability measures includes a PV Array to cover the entire top level of parking and will contribute to the power required for the building. Amenities include:





Tailored engineering solutions focused  
on User Experience, Sustainability,  
Equity, Integration, and Evolution.

BALA

PHILADELPHIA | NEW YORK | BOSTON | BALTIMORE | WASHINGTON, DC