Effective Repurposing to Create a Scientific Workplace and Learning Environment for the Future

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**Mark Searls**  AIA  
*Design Principal*  
*Flad Architects*

With more than 22 years experience, Mr. Searls understands the specific interests of faculty and administrators as well as the general requirements for design leadership in a collaborative process. He has designed facilities for numerous academic institutions, including renovation and new-build projects for laboratory environments, residence halls, centers for the arts and student learning centers. Mr. Searls’ approach to design evolves from a specific project vision and expresses the unique needs and aspirations of clients and their communities.

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**Leslie Saunders**  AIA, ACHA, LEED AP  
*Senior Planner*  
*Flad Architects*

Mr. Saunders brings more than 30 years of architecture and planning experience specializing in projects for institutional clients in 27 states and on four continents. With five years of experience in a client role as the Director of Capital Planning for The Georgia Institute of Technology, he perceives a problem and its solutions from the viewpoints of both the planner/designer and the planner/user. While at Georgia Tech, Mr. Saunders oversaw the planning and design for over 1.5 million square feet of academic and research space, including both new construction and major renovations.

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**Steven Shaw**  AIA, LEED AP  
*Project Architect*  
*Flad Architects*

As a project architect, Mr. Shaw brings more than 12 years of experience serving clients throughout academia, healthcare, the private sector, and both state and federal government. The scope of his designs ranges from classroom and graduate-level research space for large academic institutions to high-level research laboratories for NASA and the DoE. His detailed and diverse knowledge positions him to be involved in all aspects of project phases, from user meetings, through construction modifications and to final facility reviews.
AGENDA

- Planning Drivers
  - Conditions and Circumstances that Inform and Influence Decision-Making
  - Scientific Workplaces and Learning Spaces

- Renovating & Repurposing
  - Challenges & Strategies
  - Opportunities
  - Adventures in Renovation

- Case Studies
  - Observations / Trends
  - Project Review
planning drivers:

- conditions and circumstances that influence decision-making
  - external
  - internal
  - program
- scientific workplaces and learning spaces
PLANNING DRIVERS

Conditions and Circumstances that Inform and Influence Decision-Making

- **External influences**
  - System or governmental mandates
  - Available funding, funding sources, funding cycles
  - Historic preservation groups and interests
  - Codes, rules, regulations, and standards
  - Alumni groups and sentiments
  - The neighbors
PLANNING DRIVERS

Conditions and Circumstances that Inform and Influence Decision-Making

- Internal influences
  - Recruitment and retention – students and faculty
  - New, anticipated programs
  - Aged buildings and building systems
  - Available funds – majors, minors, MMR, delegated authority, PPV
  - Increasingly-deferred maintenance
  - “50-year” buildings housing 10-year programs
  - More students, fewer class sections
  - Silo-thinking
• **Programming considerations**
  • **Fit analysis**
    • Is this building appropriate for the anticipated use?
      – Structural bay spacing
      – Floor-to-floor heights
    • Will the programmed area actually fit in the building?
      – Net usable area vs. assignable area vs. building gross area
      – The “renovation factor” – 15%, for some existing buildings
  • **Campus context**
    • Is the proposed use consistent with the Master Plan?
    • Is the building historic? *(or approaching 50 years?)*
PLANNING DRIVERS

Conditions and Circumstances that Inform and Influence Decision-Making

- **Programming considerations**
  - **Phasing**
    - Is the building empty?
    - Multiple phases = more $$, longer time to occupancy.
  - **Swing space**
    - Where do the current occupants go?
      - Temporarily? Permanently?
      - Are these relocations accounted for in the budget?
  - **Budget**
    - What is (or is not) included?
    - Over how many fiscal years?
    - Is renovation truly less $$ than new? **Good value?**
PLANNING DRIVERS

Conditions and Circumstances that Inform and Influence Decision-Making

- Programming considerations
  - Functional goals and intent
    - Interdisciplinary programs
    - Changing approaches to teaching and styles of learning
  - Flexibility, adaptability
  - Improved utilization
  - Instructional technology
  - Sustainability
    - Georgia Peach Green Building System
    - LEED?
To collectively articulate likely trends in the evolution of scientific endeavor over the next twenty years, in order that the environments we plan and design will be effective in enhancing the potential of the occupants.
SCIENTIFIC WORKPLACES & LEARNING SPACES

SWOF Research Findings

- Achieving flexible lab space
- Characteristics of effective office work environments
- Aligning strategic business planning with appropriate facility responses
- Communications / global connectedness / IT
- Ownership of space – my space vs. our space

- Becoming more efficient / effective
  - Optimizing space, equipment, personnel
- Controlling costs / renovation / design-build / BIM
- Team size / lab size to drive innovation
- Reducing energy consumption in labs
- Relationships among lab / lab support / offices
renovating & repurposing:
challenges and strategies
opportunities
adventures in renovation
**RENOVATING & REPURPOSING**

**Challenges & Strategies: Existing Facilities**

- Evaluating what you have...
  - Components of each building have a different useful life span
Challenges & Strategies: Existing Facilities

- **Deal breakers**
  - Structural condition
  - Floor to floor heights and bay spacing
  - Shell condition
  - Legacy contamination or hazardous materials

- **Other potential risks**
  - Life safety features; fire protection, exit facilities, etc.
  - Unforeseen conditions
  - Preservation related mandates
  - Mechanical infrastructure
Challenges & Strategies: Phasing

- Swing space / relocations
  - Maximum utilization of existing facilities means little space available for swing
  - More, smaller moves resulting from limited swing space means more phases, more time, more cost
Challenges & Strategies: Phasing

- Concurrent operations
  - Need to maintain critical research operations
  - Need to maintain functions not easily or economically duplicated elsewhere
  - Security, safety, logistics issues

- Managing research interruptions
  - Clear communication with facility users and other stakeholders
  - Planning efforts early in design process
  - Systems configured to facilitate cut-overs
  - Specialized documentation included in contract documents
Opportunity: Optimize Functional Organization

- Create shared core lab facilities:
  - Cleanrooms
  - Characterization suites
  - Central refrigeration
  - Instrument processing
  - Measurement
  - Tissue culture
  - Imaging suites
  - Chemical storage
RENOVATING & REPURPOSING

Opportunity: Optimize Functional Organization

- Organize to encourage collaboration
  - Within a discipline
  - Interdisciplinary
Opportunity: Collaboration
Opportunity: Collaboration

- Existing floor plan – infill options
Opportunity: Collaboration

- Existing floor plan – infill options
RENOVATING & REPURPOSING

Opportunity: Collaboration
Opportunity: Enable Flexibility

- Overhead utility distribution
- Moveable furniture
- Increased ceiling heights
Opportunity: Improve Energy Efficiency

- **GOAL:** Reduce energy consumption
  - High performance building envelope
  - Appropriate HVAC system
    - Energy recovery
    - Reduce fan energy
    - Low friction drop ventilation systems
Opportunity: Improve Energy Efficiency

- Revise operating policies
- Occupant behavior drives energy use
case studies:
observations / trends
project review
Observations / Trends

Successful Projects

- Preserve the campus’ values of place

- Maximize new space consistent within the campus context

- Provide the best possible value for the Institution
Observations / Trends

Since 1998

60+ projects
8,500,000+ gsf

12% for Vacate / Demolition
47% for Renovation
49% for Addition
39% for New Construction

Existing Facilities
New Facilities
Since 1998

60+ projects

8,500,000+ gsf

Observations / Trends

VACATE / DEMOLITION

RENOVATION

ADDITION

NEW CONSTRUCTION

12%

47%

49%

39%

EXISTING FACILITIES

NEW FACILITIES

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CASE STUDIES

Observations / Trends

Simon Hall
Indiana University

Technical Institute
Northwestern University

Jenkins Laboratory Addition
State of Connecticut

VACATE / DEMOLITION
RENOVATION
ADDITION
NEW CONSTRUCTION

EXISTING FACILITIES
NEW FACILITIES
Preserve the campus’ values of place

Simon Hall
Indiana University

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Northwestern University

Jenkins Laboratory Addition
State of Connecticut

CASE STUDIES

VACATE / DEMOLITION
RENOVATION
ADDITION
NEW CONSTRUCTION

EXISTING FACILITIES
NEW FACILITIES
CASE STUDIES

Project Review: Simon Hall, Indiana University

**Project:** 140,400 gsf

- Research laboratories and offices
  - Chemistry
  - Biology
  - Physics
  - Biochemistry

- Core facilities
  - ISO 6 clean room
  - Biosafety level 3 facility
  - High field NMR facility
  - X-ray crystallography

**Budget:** $46,647,816
Objectives
- Designed to fit seamlessly into the historic context of the campus
- A literal and philosophical intersection of the chemistry, biology, and physics departments
- Promote interdisciplinary research and teamwork within existing scientific departments
- To accommodate continuously changing research needs
- To maximize resources with highly specialized core facilities
- Construct for longevity and efficiency with superior craftsmanship
“It would be impossible to overstate the importance of this new space. More space means more fruitful collaboration among brilliant minds within the College and our School of Medicine.

It fortifies our position as a life sciences leader.”

Michael A. McRobbie, Indiana University President
CASE STUDIES

Project Review: Simon Hall, Indiana University
**CASE STUDIES**

Project Review: Simon Hall, Indiana University

- Approximately 1/3 of the program space located below the ground plane while maintaining access to daylight

- Serviced by connections to existing Chemistry Building, Jordan and Myers Hall

- Future facility connections planned
CASE STUDIES

Project Review: Simon Hall, Indiana University

- Reflects the traditional architectural heritage of Indiana University’s campus

- Visual cues from Myers Hall, a 1930s *art moderne* building which housed the medical school

- Echoing Myers Hall’s isolated symmetry and works in unison to complete it
Maximize new space consistent within the campus context

- Simon Hall
  Indiana University

- Technical Institute
  Northwestern University

- Jenkins Laboratory Addition
  State of Connecticut
CASE STUDIES

Project Review: Technological Institute Infill, Northwestern University

**Project:** 100,000 gsf

- Integrated Molecular Structure Education and Research Center (IMSERC)
- ISO 5-6 clean room
- Research laboratories and offices
  - Generic
  - Engineering life science program

**Budget:** $72,000,000

Existing Facility 800,000 gsf
Wings B-C Infill 50,000 gsf
Wings F-G Infill 50,000 gsf
Objectives
- To integrate and showcase advanced teaching and research facilities for rapidly changing technologies (IMSERC and clean room)
- Provide adaptable environments to retain and attract the best faculty
- Provide maximum utilization of available site
- Create a model for future expansion and development
- Provide daylight to all faculty offices
- Maximize existing proximities and resources
- Meet the USGBC’s LEED requirements for Silver certification
- Maintain use of existing functions – before, during and after
CASE STUDIES

Project Review: Technological Institute Infill, Northwestern University

- Code implications
- Daylighting for all faculty offices
- Building and campus infrastructure
- Structural design
  - How close?
  - How deep?
- Construction logistics
- Construction disruptions
CASE STUDIES

Project Review: Technological Institute Infill, Northwestern University
Project Review: Technological Institute Infill, Northwestern University
Project Review: Technological Institute Infill, Northwestern University

- Maximization of space for growth and new programs
- Construction manager
  - Logistics
  - Sequencing
  - Phased implementation plan
- Atrium for internal daylighting and public space
- Views into IMSERC and clean room
Project Review: Technological Institute Infill, Northwestern University
Provide the best possible value for the institution

**CASE STUDIES**

- **Simon Hall**
  - Indiana University

- **Technical Institute**
  - Northwestern University

- **Jenkins Laboratory Addition**
  - State of Connecticut

- **VACATE / DEMOLITION**
- **RENOVATION**
- **ADDITION**
- **NEW CONSTRUCTION**

- **EXISTING FACILITIES**
- **NEW FACILITIES**
CASE STUDIES

Project Review: Jenkins-Waggoner Laboratory, Conn Agricultural Experiment Station

Project: 27,000 gsf

- Research and testing laboratories with associated offices
  - Plant pathology
  - Entomology
  - Environmental sciences
- Instructional facilities
  - Lecture / seminar
  - Public interface laboratories
  - Library and display
- Administrative offices

Budget: $10,000,000

- New Construction 12,500 gsf
- Historical Renovation 14,500 gsf
Project Review: Jenkins-Waggoner Laboratory, Conn Agricultural Experiment Station

- Jenkins Laboratory 1936
- Osborne Library 1886
Project Review: Jenkins-Waggoner Laboratory, Conn Agricultural Experiment Station

**Historic Context**

- To put science to work for society as the State investigates plants and their pests, insects, soil and water
- First research and testing facility in the country (1882) – currently repurposed into a library
- Jenkins Laboratory was built in 1936
- CAES campus was designated a Registered National Historic Landmark in 1964
Project Review: Jenkins-Waggoner Laboratory, Conn Agricultural Experiment Station

- **Objectives**
  - Maximize utilization of existing facilities
  - To optimize spaces and functions for two similar departments
  - Provide connectivity to all departmental facilities
  - Develop community spaces for public and group activities
  - Provide state of the art research spaces and a modern addition to create a new image to the public
  - Reinforce historic significance of the departments and State agency
Project Review: Jenkins-Waggoner Laboratory, Conn Agricultural Experiment Station

PLANNING FOR FLEXIBILITY

PROPOSED GROUND LEVEL

PROPOSED UPPER LEVEL
Obstacles

- Floor to floor height of existing facility
- Temporary use relocation / ‘swing space’:
  - Several research groups
  - Special research units
  - Maintain public access
- Identification of elements which best fit within renovated historic structures
- Maintain functionality throughout project
- Create a modern addition to a historic structure
Challenges Bring Opportunities

- **Clear delineation between public spaces and research spaces**
- **Embracing historical significance of the facility**
  - Faculty meeting room
  - Reading room
  - Reuse of materials
- **Activation of public plaza**
  - Water filtration
  - Delineated shade areas
SUMMARY

Preserve the campus’ values of place

Reflects the longevity of the campus heritage through detailing and reinforcement of campus pathways and outdoor spaces
SUMMARY

Maximize new space consistent within campus context
Created highest practical development within existing footprint
Provide the best possible value for the Institution

Minimized the scale of new construction through program optimization and full utilization of historic facilities
questions & discussion