2025 AIA Fellowship

Candidate Regal Leftwich
Organization CannonDesign
Location Arlington, Virginia
Chapter AIA Washington DC;

Category of Nomination

Object 2 (Practice Management, Technical Advancement) > Practice (Technical Advancement)

Summary Statement

Regal Leftwich drives laboratory design into the future through transformative projects, development of national guidelines, innovative research and thought leadership. His advocacy and leadership creates opportunity for Native American architects, advancing the profession.

Education

Virginia Polytechnic and State University, 1994-2000, Bachelors of Architecture
McGill University, 2000-2001, Masters of Architecture

Licensed in:

Virginia

Employment

CannonDesign, 2021-Current
SmithGroup, 2018-2021
Page Southerland Page, 2016-2018
Perkins+Will, 2014-2016
Strategic Science and Technology (SST) Planners, 2008-2014
CEM Design, 2005-2007
InterCom, 2004-2005
InterSpec, 2002-2003
McGill University, 2000-2001
Bell Architects, 1999

Regal Leftwich, AIA

Laboratory Planner and Architect

2025 AIA Fellowship Submission

OBJECT 2: Practice Technical Advancement

To advance the science and art of planning and building by advancing the standards of practice.

SMITHGROUP

Attn: Carl D'Silva, FAIA
Jury Chair
2025 Jury of Fellows
American Institute of Architects
1735 New York Ave., NW
Washington, DC 20006

Re: Nomination of Regal Leftwich, AIA to the College of Fellows, Object 2: Practice Technical Advancement

Dear Carl D'Silva and Members of the Committee:

It is with immense pride that I sponsor Regal Leftwich, AIA, for nomination into the College of Fellows.

I first met Regal in 2018 when he joined the SmithGroup Washington, DC office, where I serve as Vice President and Corporate Director of Sustainability. From the start, Regal's expertise and passion for laboratory planning were immediately evident. Working alongside him, I am consistently impressed by his ability to push the boundaries of design, particularly in higher education and scientific research spaces. Regal's commitment to sustainability and innovation made our collaboration seamless and inspiring.

Regal is not just a technical expert in laboratory planning—he's a visionary. His contributions to national design guidelines, such as the *NIH Design Requirements Manual* and the *CDC Space Planning Guidelines for Laboratories*, have shaped the landscape of biomedical research environments across the country. His work on these documents is not just about compliance; it's about ensuring that spaces foster scientific breakthroughs. Regal has also authored numerous books and peer-reviewed papers, making him a thought leader in the field, with a real-world impact on laboratory design.

With over 100 laboratory projects under his belt, including federal labs like NASA, EPA and NIH, and academic institutions such as Georgetown University and UC Berkeley, Regal consistently demonstrates how thoughtful design can elevate scientific inquiry. His work on the University of Connecticut's Cell and Genome Sciences Building, which won the prestigious Laboratory of the Year award in 2011, exemplifies his ability to marry function with innovation in transformative ways.

As a member of the Chickasaw Nation, Regal is deeply committed to advocating for Indigenous communities. He has worked tirelessly to improve STEM education opportunities for Native Americans through laboratory design, serving on the board of the American Indian Council of Architects and Engineers and the NCARB Licensure Advisory Committee. His leadership in these organizations has opened doors for many young Native architects, and his dedication to increasing representation within the field is nothing short of inspiring.

Regal's leadership extends beyond his professional work. He has served in multiple roles, including as Chair of the AIA DC Resilience and Disaster Relief Committee and a member of the Scientific Equipment Furniture Association, where he's been instrumental in developing best practices for lab casework.

Regal's influence on national laboratory standards, his innovative project leadership, and his unwavering advocacy for Native American architects are remarkable. I wholeheartedly support his elevation to the College of Fellows, confident that his contributions to the profession will leave a lasting legacy.

Sincerely,

Greg Mella, FAIA, LEED AP BD+C
Vice President, Corporate Director of Sustainability Smith Group
202.974.5187
greg.mella@smithgroup.com

Regal Leftwich drives laboratory design into the future through transformative projects, development of national guidelines, innovative research and thought leadership. His advocacy and leadership creates opportunity for Native American architects, advancing the profession.

TRANSFORMING SCIENTIFIC RESEARCH SPACE

Regal's work has profoundly shaped advancements in the US scientific landscape. His extensive national research portfolio underscores his influence on the scientific community in the US. Working for prominent national laboratories, his designs — characterized by their emphasis on functionality, flexibility, advanced technology, and collaboration — have set the stage for groundbreaking research projects, including the lab that designed and fabricated the James Webb Space Telescope, the lab that first imaged the SARS-CoV2 virus that contributed to an accelerated vaccine, the lab that can detect Martian biosignatures, and the lab for Jennifer Dounda, Nobel Laurate who co-discovered CRISPR gene editing.

Globally, Regal's work — which totals over 20 million square feet — has deeply impacted researchers and students on the front lines of discovery. He has led the planning and design of **over 100 laboratories in North America, Africa, Asia and the Middle East** with a focus on federal and academic laboratories in the United States.

INNOVATING AND STANDARDIZING LAB DESIGN

Regal has developed some of the most influential national laboratory standards and has significantly advanced the design and planning of lab spaces, focusing on modular planning, space utilization, collaboration, and sustainable use of materials.

His work developing national laboratory standards includes the National Institutes of Health (NIH) *Design Requirements Manual*, the Center for Disease Control and Prevention (CDC) *Laboratory Planning Guidelines*, and the Scientific Equipment and Furniture Association (SEFA) *Desk Reference* for lab casework performance requirements. **These standards are pivotal to advancing scientific research. The NIH directs over $45 billion annually in biomedical research and facility construction**, the CDC sets biosafety regulations for all biomedical laboratories in the US, and SEFA's guidelines are utilized by 83% of architecture firms nationally.

Recognized globally, his work on lab planning methodologies and Artificial Intelligence (AI) and Machine Learning (ML) integration in lab design sets him apart as a leader in the field. His pioneering research for robotics in construction, 3D-printed structures, and data architecture continues to shape current practices.

SHAPING FUTURE GENERATIONS

Regal fostered a partnership between the AIA and American Indian Council of Architects and Engineers (AICAE), leading to a 75% increase in Native American and Alaska Native membership in the AIA from 2015 to 2019. As a member of the Chickasaw Nation, Regal supports underrepresented Native architects in STEM through his inclusive design principles that impact science education. His dedication to enhancing STEM teaching labs for Indigenous schools earned him induction as a Sequoyah Fellow by the American Indian Science and Engineering Society (AISES) in 2016.

Each year, over 30,000 STEM (Science, Technology, Engineering and Mathematics) students learn in spaces designed by Regal, benefiting from his focus on efficiency and active learning. Regal designs solutions that enhance early research exposure, active learning, and community building in STEM institutions — all statistically proven to increase access for underrepresented groups in STEM. His innovative designs improve educational experiences and ensure accessibility, promoting a more inclusive and diverse scientific community.

Curriculum Vitae

EDUCATION

Bachelors of Architecture (2000)
Virginia Polytechnic and State University
Blacksburg, VA

Masters of Architecture (2001)
McGill University
Montreal, QC, Canada

PROFESSIONAL MEMBERSHIPS

American Institute of Architects

American Indian Council of Architects and Engineers
(Board of Directors)

American Indian Science and Engineering Society
(Sequoyah Fellow)

REGISTRATIONS / CERTIFICATIONS

Virginia Registered Architect ID# 015471 (2012)

NCARB ID#101161 (2002)

LEED AP BD+C GBCI#10499229 (2011)

State of California Safety Assessment Program Trainer ID# 87412 (2016)

Regal (left) leads interactive planning session in 2019 with the Science Department Chairs at Montgomery Community College

PROFESSIONAL LEADERSHIP / FIRM HISTORY

CannonDesign (2021-Current)
Arlington, VA
Principal / Senior Laboratory Planner / Architect

SmithGroup (2018-2021)
Washington, DC
Senior Laboratory Planner / Architect

Page Southerland Page (2016-2018)
Washington, DC
Senior Laboratory Planner / Architect

Perkins+Will (2014-2016)
Atlanta, GA
Senior Laboratory Planner / Architect

Strategic Science and Technology (SST) Planners (2008-2014)
Arlington, VA
Senior Laboratory Planner / Architect

CEM Design (2005-2007)
Rockville, MD
Architectural Designer

InterCom (2004-2005)
Fairfax, VA
Project Manager

InterSpec (2002-2003)
Springfield, VA
Space Planner

McGill University (2000-2001)
Montreal, QC, Canada
Graduate Teaching Assistant

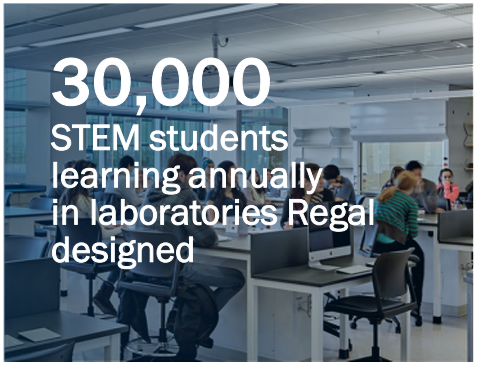
Bell Architects (1999)
Washington, DC
Architectural Intern

Regal's Impact by the Numbers

100+
Laboratory projects completed

5
Peer-reviewed academic research papers published

1st
Architect to publish research on machine learning for lab design



30,000
STEM students learning annually in laboratories Regal designed

8
Number of countries with laboratory projects located across North America, Africa, Asia and the Middle East

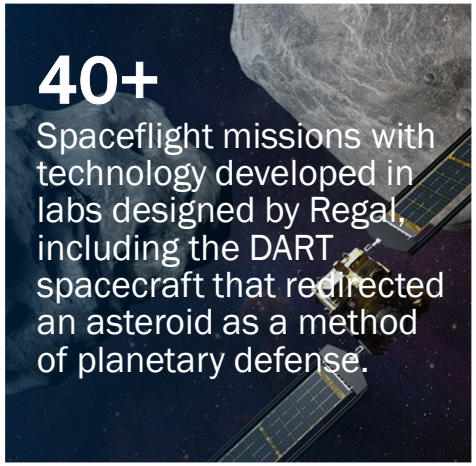
2,000+
Attendees to AIA Accredited CEU's on lab design led by Regal

75%
Increase in Native and Indigenous American enrollment in AIA over a 5-year period

33
AIA and project awards

3
National lab guidelines authored – including standards and planning for the NIH labs that house the microscopes that first imaged the SARS-CoV2 Virus contributing to an accelerated vaccine

6
Authored books on the impacts of machine learning and AI on laboratory design



40+
Spaceflight missions with technology developed in labs designed by Regal, including the DART spacecraft that redirected an asteroid as a method of planetary defense.

20 million
Square feet of built and planned labs globally, including the labs that built the James Webb Space Telescope — the world's most powerful telescope.

National Laboratory Standards

"Regal Leftwich sets the global standard in laboratory design, leading projects across continents and pushing the boundaries of innovation. His expertise and thought leadership shape the future of lab environments, driving the industry toward more collaborative and cutting-edge research spaces."

Daniel Watch, FAIA
Principal Science and Technology, Perkins&Will

National Institutes of Health (NIH), Design Requirements Manual

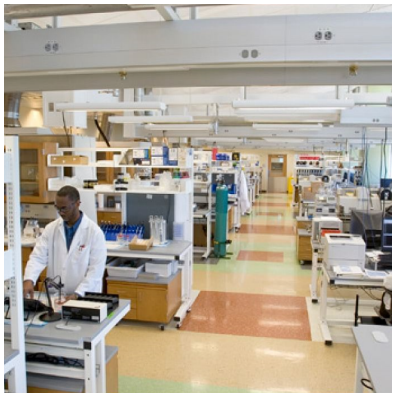
National publication

Exhibit 3.1

Completion 2023-24

Role: Laboratory Architect
Laboratory Planner: CannonDesign

Wrote key updates in chapters 2 and 4 on laboratory planning and design. His topics impact how master planning, programming, data, space, lab module, safety, and architectural requirements are implemented for the NIH and other federal, state, university, and international laboratory projects.



Centers for Disease Control and Prevention (CDC), Space Planning Guidelines for Laboratories

National publication

Exhibit 3.1

Completion 2017

Role: Laboratory Architect
Design Architect: Jacobs
Laboratory Planner: Page

Enhanced the quality and accuracy of space planning guidelines (the only of its kind) for the CDC's biocontainment laboratories by providing technical expertise and editing for bio-safety and laboratory design standards.

Scientific Equipment and Furniture Association (SEFA), SEFA Desk Reference 5th Edition

National publication

Exhibit 3.1

Completion 2016

Role: Laboratory Architect
Laboratory Planner: Page

Edited and oversaw the development of scientific casework performance requirements. Established rigorous standards for sustainable materials, load and finish, construction materials, 3rd party testing methods, exhaust enclosure requirements, and casework selection guidelines.

Laboratory Projects for National Research Institutions

National Renewable Energy Laboratory (EMAPS), Energy Materials & Process at Scale Research Capability

Golden, CO

145,000 SF
Est. Completion 2025

Role: Owners Rep, Laboratory Planner
Design Architect: SmithGroup
Laboratory Planner: SmithGroup

Led the programming and planning of the 145,000 sf EMAPS facility, a state-of-the-art laboratory for renewable energy technologies. The EMAPS facility will enable interdisciplinary research and innovation for energy-relevant materials and products.

NASA Langley Research Center, Measurement Systems Building

Hampton, VA

Exhibit 3.2

125,000 SF
Completion 2023
LEED Platinum

Role: Laboratory Planner
Architect: AECOM
Laboratory Planner: Page

Created a variety of massing options that catered to NASA's specific workflow. His studies resulted in a vertical research building that overcame the site's constraints and enhanced NASA's goals for workflow and collaboration.

National Institutes of Health, Building 10 E Wing Renovation

Bethesda, MD

Exhibit 3.3

249,500 SF
Completion 2023
LEED Platinum

Role: Laboratory Planner
Design Architect: Perkins+Will
Laboratory Planner: Perkins+Will

Transformed a bed tower into laboratories that brought scientists closer to patients, enabling life-saving translational medicine.

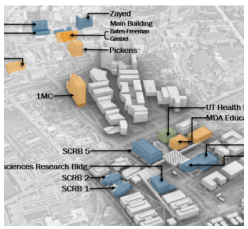
Argonne National Laboratory, Autonomous Discovery Lab

Lemont, IL

30,000 SF
Completion 2022

Role: Laboratory Planner
Architect: CannonDesign
Laboratory Planner: CannonDesign

Planned and designed research modules that enabled the AI-based modification of bacterial genomes and genes to alter the underlying behavior of the bacteria. This project is a benchmark for AI autonomous workflow for Department of Energy research labs.



MD Anderson, Research Space Strategy and Displacement Programming

Houston, TX

1,017,070 SF
Completion 2022

Role: Laboratory Planner
Design Architect: CannonDesign
Laboratory Planner: CannonDesign

Evaluated, re-organized and consolidated laboratory functions in five active research buildings. This will allow the research functions in two buildings to relocate before their demolition for a new bed tower.

Johns Hopkins University, Applied Physics Laboratory B201

Laurel, MD

Exhibit 3.4

263,000 SF
Completion 2021
Targeting LEED Gold

Role: Laboratory Architect
Architect: CannonDesign
Laboratory Planner: CannonDesign

United a team of 650 once-disparate interdisciplinary scientists to foster innovation and accelerate discoveries. Concentrating multiple disciplines in an active atrium visually connected to the labs has transformed the organization of science for JHU.

Laboratory Projects for National Research Institutions

National Institutes of Health, Building J Feasibility Study

Hamilton, MT

55,000 SF
Completion 2021

Role: Laboratory Architect
Architect: SmithGroup
Laboratory Planner: SmithGroup

Led the laboratory design to integrate the building design and massing with the highly complex cryo-electron microscopes and laboratory workflows. Created mixed collaboration and scientific spaces to encourage interaction among scientists, technicians, and visiting researchers.

Department of General Services, Emergency COVID Testing Facility

Valencia, CA

134,287 SF
Completion 2021

Role: Laboratory Planner
Architect: SmithGroup
Laboratory Planner: SmithGroup

Provided leadership and technical expertise for laboratory design allowed the team to rapidly plan and build this emergency COVID testing center from concept to operation in two months.

National Institutes of Health, Center for Disease Research Feasibility Study

Bethesda, MD

800,000 SF
Completion 2020

Role: Laboratory Planner
Architect: SmithGroup
Laboratory Planner: SmithGroup

Transformed the floorplate into a functional and efficient layout, separating the lab block from the vivarium block to create a natural gateway for this building facing the world's largest research hospital.

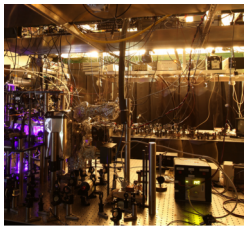
Environmental Protection Agency, Nationwide Laboratory Assessment

Nationwide, USA

3,400,000 SF
Completion 2019

Role: Laboratory Planner
Architect: SmithGroup
Laboratory Planner: SmithGroup

Spearheaded a nationwide assessment of the EPA's laboratory portfolio, covering 10 regions and 3.4 million square feet of facilities. He led the modernization of the labs to foster collaboration and resource sharing, enhancing the quality and efficiency of environmental scientific research.



National Institute for Science and Technology (NIST), Space Utilization Study

Gaithersburg, MD

800,000 SF
Completion 2013

Role: Laboratory Planner
Architect: Metropolitan Architect and Planners
Laboratory Planner: SST Planners

Improved NIST's Gaithersburg campus by conducting a comprehensive utilization study of all laboratories across 48 buildings and structures. His study led to a campus reorganization that enhanced the efficiency and influence of NIST, the national authority for scientific weights and measurements.

NASA Goddard Space Flight Center, Exploration Sciences Building

Greenbelt, MD

267,000 SF
Completion 2009
LEED Gold

Role: Laboratory Planner
Architect: Ewing Cole
Laboratory Planner: SST Planners

Led the design and equipment fit-out for the research laboratories focused on spaceflight hardware development. The customized solution enabled the development of the James Webb Space Telescope optical and infrared detectors to be designed, fabricated and tested at this facility.

Laboratory Projects for Academic Research Institutions

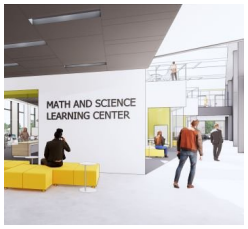
Norfolk University, New Science Building

Norfolk, VA

125,000 SF
EST. Completion 2025
Targeting LEED Gold

Role: Laboratory Planner
Architect: SmithGroup
Laboratory Planner: SmithGroup

Designed the building to foster cross-disciplinary collaboration and innovation in science. The flexible, sustainable, and technology-rich spaces will support Commonwealth and University goals and enhance this historically Black college and university's research capacity.



Montgomery Community College, Leggett Math and Science Building

Takoma Park, MD

134,600 SF
EST. Completion 2025
Targeting LEED Gold

Role: Laboratory Architect
Architect: SmithGroup
Laboratory Planner: SmithGroup

Created a design that allowed the college to adapt to changing course demands in biology and chemistry without costly and time-consuming renovations. His design created seamless transitions from formal to informal learning spaces adjacent to the instructional laboratories.

Johns Hopkins University, Stieff Silver Autonomous Lab

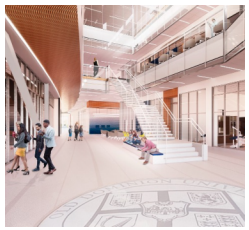
Baltimore, MD

Exhibit 3.5

2,340 SF
Completion 2024
Targeting LEED Gold

Role: Laboratory Architect
Architect: CannonDesign
Laboratory Planner: CannonDesign

Led the technical requirements, coordination and documentation for this lab combining automation, robotics, and advanced instrumentation. The lab is controlled by and AI system that generates novel materials and then characterizes and tests them, growing its data set over time for new materials.



Old Dominion University, New Health Sciences Building

Norfolk, VA

126,000 SF
Completion 2024
Targeting LEED Gold

Role: Laboratory Architect
Architect: CannonDesign
Laboratory Planner: CannonDesign

Integrated cutting-edge technology with the classroom spaces to enhance the programmatic needs for medical diagnostics and translational sciences, environmental health research laboratories support space, clinical teaching labs, and other teaching labs.

University of Delaware, Ammon Pinizzotto Biopharmaceutical Innovation Center

Newark, DE

126,000 SF
Completion 2024
Targeting LEED Gold

Role: Laboratory Architect
Architect: SmithGroup
Laboratory Planner: SmithGroup

Regal's agile laboratory expertise enabled a rapid and flexible response to the COVID-19 pandemic, accelerating vaccine research and development.

University of Virginia, Gilmer Hall Addition & Renovation

Charlottesville, VA

380,000 SF
Completion 2022
LEED Certification in progress

Role: Laboratory Planner
Architect: CannonDesign
Laboratory Planner: CannonDesign

Created an environment that fosters a collaborative culture and enhances STEM students' experience with laboratories and classrooms that support active learning models.

Laboratory Projects for Academic Research Institutions

Virginia Tech, Holden Hall

Blacksburg, VA

122,000 SF
Completion 2022
LEED Gold

Role: Laboratory Architect
Design Architect: SmithGroup
Architect of Record: Mosely Architects
Laboratory Planner: SmithGroup

Led the technical design of the research and instructional laboratories that integrates technology seamlessly and supported evolving pedagogies for engineering education.

University of California, Berkeley, Innovative Genomics Institute Research Space Expansion

Berkeley, CA

112,000 SF
Completion 2021

Role: Laboratory Planner
Architect: SmithGroup
Laboratory Planner: SmithGroup

Planned and led the laboratory and infrastructure study to investigate how to optimize and expand the IGI's research capabilities in the existing building. The study identified various opportunities to repurpose research space.

Virginia Commonwealth University, Engineering Research Building

Richmond, VA

133,000 SF
Completion 2021
LEED Silver

Role: Laboratory Planner
Design Architect: GoodyClancy
Architect of Record: Baskervill
Laboratory Planner: Page

Crafted the vision and executed the plan to create a space where researchers and students can participate in creative collisions and enhance team-driven leadership for entrepreneurial and translational research.

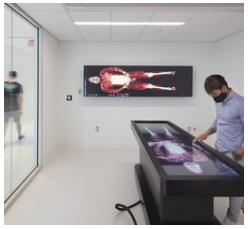
Gallaudet University, Hall Memorial Building Renovation

Washington, DC

263,000 SF
Completion 2021
Targeting LEED Gold

Role: Laboratory Architect
Design Architect: Studio 27
Laboratory Planner: Page / SST Planners

Designed the laboratories with technical features that suited Gallaudet's deaf student population. He innovated a safe environment that prioritized line-of-sight communication and linked instructional laboratories.



UNC Greensboro, Nursing and Instructional Building

Greensboro, NC

350,000 SF
Completion 2020
LEED Gold

Role: Laboratory Architect
Design Architect: SmithGroup
Architect of Record: LSP3
Laboratory Planner: SmithGroup

Designed the laboratory casework and equipment and integrated them with the architectural design to create student-centered technology-enabled active learning spaces.

Anne Arundel Community College, Health and Life Science Building

Arnold, MD

158,000 SF
Completion 2020
LEED Gold

Role: Laboratory Architect
Architect: SmithGroup
Laboratory Planner: SmithGroup

Created state-of-the-art spaces that integrated technology seamlessly and supported evolving pedagogies for science and nursing education.

Laboratory Projects for Academic Research Institutions

University of Kansas, Integrated Science Building

Lawrence, KS

284,000 SF
Completion 2018
LEED Gold

Role: Laboratory Planner
Architect: Perkins+Will
Laboratory Planner: Perkins+Will

Regal integrated the lab design with the overall architectural design, leading a team of designers, architects, engineers, and contractors. This facility unites engineering and science and creates opportunities to inspire new students with research.

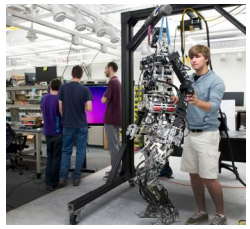
University of Massachusetts, Integrated Sciences Complex

Boston, MA

125,000 SF
Completion 2015

Role: Laboratory Architect
Architect: GoodyClancy
Laboratory Planner: Page / SST Planners

Transformed the science disciplines by planning and designing conjoined spaces that fostered commonwealth and university initiatives. He created flexible, interdisciplinary, collaborative, and sustainable spaces with integrated technology.



Virginia Tech, Goodwin Hall

Blacksburg, VA

Exhibit 3.6

155,000 SF
Completion 2014
LEED Gold

Role: Laboratory Architect
Architect: ZGF
Laboratory Planner: SST Planners

Led the architectural laboratory design to revolutionize engineering education and create the infrastructure for cutting-edge research. This facility sets the standard for team-based active learning paradigms on campus.

SUNY Upstate Medical University, Neuroscience Research Building

Syracuse, NY

156,000 SF
Completion 2013
LEED Silver

Role: Laboratory Architect
Design Architect: GoodyClancy
Laboratory Planner: SST Planners

Devised innovative design solutions that responded to the site's challenges and potential. He introduced the campus's first modular casework system, enabling the institution to accommodate diverse and changing needs without costly and disruptive renovations.

Colorado State University, Scott Bioengineering Building

Fort Collins, CO

105,000 SF
Completion 2013
LEED Platinum

Role: Laboratory Architect
Design Architect: Ratio Architects
Architect of Record: SlaterPaul
Laboratory Planner: SST Planners

Transformed the programming and laboratory design for research and instructional labs for the College of Engineering. He created a STEM concourse that showcases and integrates multiple disciplines of science for students.

University of Connecticut Health Science Center, Cell Sciences Institute

Farmington, CT

112,000 SF
Completion 2010
LEED Gold

Role: Laboratory Planner
Architect: GoodyClancy
Laboratory Planner: SST Planners

Led the programming and laboratory design, including innovations to sustainable casework re-use. Design innovations in this project were recognized in 2011 with the Lab of the Year Award.

Professional & Community Leadership

University of New Mexico
2021 | Visiting Lecturer

Arch 402: Indigenous Schools for the Future. Semester-long project where students design modern science facilities using indigenous design principles.

Catholic University
2018 & 2019 | Visiting Lecturer

4th Year Design Studio

American Indian Science and Engineering Society (AISES)
2016 | Sequoyah Fellow

Inducted as a Sequoyah Fellow, a recognized Indigenous leader advancing STEM, for his work specific to enhancing STEM teaching labs for Indigenous communities.

National Council for the Architecture Registration Boards (NCARB)
2021 | Licensure Advisory Forum

In 2019, NCARB created an effort to understand how to increase licensure in underrepresented groups. **In 2021, the AICAE voted Regal as the first Native American representative to the NCARB Licensure Advisory Forum.** Members from each organization shared their efforts to support licensure candidates and promotion of licensure, creating an idea exchange to support opportunities and challenges between organizations.

His committee work has led to an understanding and action plan about how to increase licensure amongst Native American and Indigenous architects. This includes outreach plans for early student engagement in the profession, strengthening Native communities at universities, and building a national network of Native architects to participate in licensure requirements with state officials.

American Indian Council of Architects and Engineers (AICAE)
2016 - Current | Board of Directors

Regal has served on the Board of Directors of the American Indian Council for Architects and Engineers (AICAE) since 2016. Leading discussions with the AIA and AICAE, Regal oversaw the development of a Memorandum of Understanding (MoU) between the organizations to properly reflect the number of Native architects by sharing Native American and Alaskan Native demographic information and lowering the cost for Native Americans to join the AIA and attend conferences. The MoU has impacted how the AIA represents and tracks Native American architects in its demographic reports. **The partnership Regal fostered between the AIA and the AICAE led to a 75% increase of Native American and Alaska Native inclusion in the AIA from 2015 to 2019.**

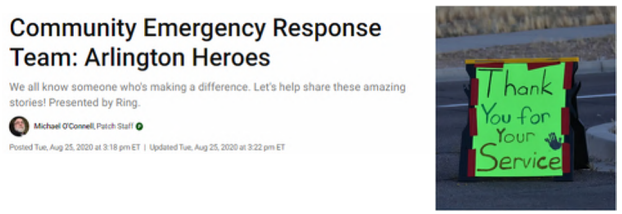
Professional & Community Leadership

Arlington County, VA Community Emergency Response Team (CERT)
2011-2019 | Neighborhood Disaster Coordinator
2019-Current | Volunteer First Responder

Led the community preparedness and response for the neighborhoods adjacent to the Pentagon. Led the efforts for multiple disaster relief efforts (Derecho 2012, Hurricane Sandy 2012, and the Covid Pandemic 2019-2021).

In 2020 prior to the vaccine roll out, he volunteered for the most shifts of any volunteer in the community delivering food to unhoused COVID patients.

Regal was recognized as an "Arlington Hero" August 2020 for "outstanding volunteer work delivering food to Arlingtonians in need during COVID-19."



Patch.com article about Regal's COVID response efforts

AIA State Disaster Coordinator Network
2021 - Current | Washington, DC Lead Coordinator

The network focuses on resilience and disasters focused on the supporting architects and communities create a more resilient built environment and emergency response. Representing nationally, Regal is the lead coordinator for the District of Columbia for the AIA State Disaster Coordinator Network.

Regal (Center) responding to the Pandemic

AIA Resiliency and Disaster Relief Committee
2021-Current | Founder and Committee Chair

Led the effort and advocacy to engage with DC Government to craft a Good Samaritan Law that allows architects to volunteer in times of crisis.

As introduced, Bill 25-423 Architect and Engineer Good Samaritan Act of 2023 will provide immunity from civil damages, absent gross negligence or willful misconduct, to licensed architects or professional engineers who, in good faith and without compensation utilize their professional skills in providing rescue or relief assistance at the scene of, or in connection with, a natural or human-made disaster or other life-threatening emergencies.

"Regal's dedication to the community as a volunteer first responder and leader cannot be overstated. His efforts in training the community for disaster preparedness and response to multiple activations over the years have been critical in the resiliency of the local community."

Les Garrison
Arlington CERT Coordinator Emeritus

Project Awards & Recognition

AIA PROJECT AWARDS

2024

Johns Hopkins University,
Applied Physics Laboratory Building 201
- SEFA Laboratory of the Year Finalist

2023

Johns Hopkins University,
Applied Physics Laboratory Building 201
- Excellence in Design Award, AIA Baltimore
- Award of Merit, AIA Northern Virginia

University of Virginia,
Gilmer Hall Addition and Renovation
- Juror's Citation, Institutional Architecture, AIA Northern Virginia

2022

Anne Arundel Community College,
Health and Life Science Building
- Award of Merit, Institutional Architecture, AIA Northern Virginia
- Award of Merit, AIA Potomac Valley Chapter
- PV Award, Best in Show, AIA Potomac Valley
- Honor Award, AIA Chesapeake Bay
- Design Excellence Award for Sustainability, AIA Chesapeake Bay

2016

Montgomery Community College,
- Bioscience Education Center
  AIA Maryland Design Award

2016, continued

Gallaudet University,
Hall Memorial Building Renovation
Merit Award, Excellence in Architecture for Building Additions or Adaptive Reuse, SCUP/AIA - CAE
- Merit Award, Interior Design, AIA Virginia

2015

Colorado State University
Scott Bioengineering Building
Award of Merit, AIA Colorado

2012

Germanna Community College,
Science and Engineering Building
- Presidential Citation for Sustainable Design, AIA DC Chapter

Montgomery Community College,
New Science Center
- Merit Award, AIA Maryland

"I have no doubt that this facility will help transform the way APL operates as we continue to position Johns Hopkins and APL as an epicenter for problem solving and mission-critical breakthroughs…"

Larry Hogan
Governor of Maryland,
Johns Hopkins University Applied Physics Laboratory Building 201 – Opening Ceremony Remarks, 2022

Gilmer Hall Addition and Renovation, University of Virginia

Building 201, Johns Hopkins University Applied Physics Laboratory

Project Awards & Recognition

OTHER PROJECT AWARDS

2023

Johns Hopkins University, Applied Physics Laboratory Building 201

- Architectural Innovation of the Year, Rethinking the Future Design Awards

Old Dominion University, Chemistry Building

- Award of Excellence, Best Educational Project, The Hampton Roads Association for Commercial Real Estate

2022

NASA Langley Research Center, Measurement Sciences Building

- Best Government/Public Building, MidAtlantic Best Projects, Engineering News Record (ENR) MidAtlantic

Virginia Commonwealth University, College of Engineering Research Building

- Best Institutional Project, Greater Richmond Association for Commercial Real Estate
- First Place, Educational/Institutional, IIDA Virginia/West Virginia and ASID Virginia Interior Design Excellence Awards
- North American Copper in Architecture Award, Copper Development Association

2020

State University of New York, Stony Brook University and Stony Brook Medicine, Medical and Research Translation (MART) Building

- Award of Merit, ENR New York's Best Projects

2016

Integrated Sciences Complex, University of Massachusetts Boston

- Award of Merit, Higher Education/ Research, Engineering News Record New England
- Green Building Market Leadership Award, U.S. Green Building Council, Massachusetts

2014

Naval Research Laboratory, Laboratory for Autonomous Systems Research

- Best Sustainable Project, New Construction, AGC Washington Contractor Awards
- Pinnacle Award, ACEC of Virginia Engineering Excellence
- Grand Award, ACEC of Virginia Engineering Excellence

2011

Richard Bland College, McNeer Hall

- Louis I. Kahn Citation, AIA American School & University's Architectural Portfolio

Johns Hopkins University Hospital, Wilmer Eye Institute

- Bronze Award, Brick in Architecture Awards

University of Connecticut Health Science Center, Cell Sciences Institute

- Lab of the Year Award, Best Lab Renovation, R&D Magazine

Hall Memorial Building Renovation, Gallaudet University

Scott Bioengineering Building, Colorado State University

Significant Publications: Regal's Technical Impact on a Typical Laboratory

Regal has authored technical guidelines for the planning and design of laboratories for the three most-referenced and used publications in the country: the NIH, the CDC and SEFA. These include requirements on space, equipment and infrastructure planning, architectural finishes, laboratory casework design and construction. **Every architect in the country who is planning a laboratory for biological safety will have read Regal's technical guidance in these publications.**

Below is an example of how Regal's technical expertise impacts a typical laboratory.

A **NIH Design Requirements Manual Chapter 2 – Planning and Programming**
NIH requirements on laboratory space planning including scientific infrastructure, clearances and equipment required for NIH funded.

B **CDC Space Planning Guidelines for Laboratories**
Guidelines for all biological safety laboratories in the US meeting CDC compliance, including best practices for biocontainment in a laboratory.

C **NIH Design Requirements Manual Chapter 4 – Architectural Design**
NIH requirements on the architectural design of laboratories. Includes requirements for laboratory finishes, door and wall construction for biological containment.

D **"SEFA DESK Reference Sixth Edition"**
Industry recommended laboratory casework performance requirements. Performance specifications for laboratory casework ind equipment used by 83% of all architecture design firms.

Center for Advanced Cellular Therapies, University of Pennsylvania

Significant Publications: Peer-reviewed Research

Regal has authored and co-authored multiple peer-reviewed research papers in collaboration with leading research institutions advancing the practice of architecture.

Methodology for Evaluating Space Requirements for Biological Safety

International Symposium on Academic Makerspaces

Carnegie Mellon University, Pittsburg, PA

October 2023
Co-Author

Establishes the method for laboratory designers to adequately size spaces for compliance with NIH and CDC guidelines for biological safety.

Image Classification and Prompt Engineering to Optimize Text-to-Image in Laboratory and Makerspace Design

International Symposium on Academic Makerspaces

Georgia Institute of Technology, Atalanta, GA

November 2022
Author

Documents the process of using command prompt engineering terms to guide diffusion modeling to generate images of laboratories and makerspaces. ⟶ Link

Area Calculation for Academic Makerspaces

International Symposium on Academic Makerspaces

Yale University, New Haven, CT

October 2019
Author

Defines a methodology to identify and define key space drivers for properly sizing areas for the design of academic makerspaces. ⟶ Link

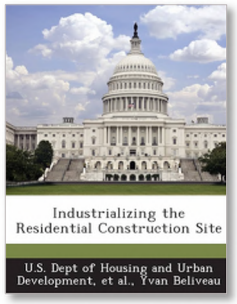
Biomaker and Biosafety: Fundamentals of Training, Operation and Design for a Safe Working Environment

International Symposium on Academic Makerspaces

Case Western Reserve University, Cleveland, OH

September 2017
Co-Author

Outlines the requirements for facility administrators and design professionals to safely design and operate spaces involving biological agents with potential health consequences.



Industrializing the Residential Construction Site

US Department of Housing and Urban Development

Virginia Tech University, Blacksburg, VA

July 2000
Contributor

Examines the means and methods available for integrating and industrializing the housing construction site and the housing industry. ⟶ Link

"Regal's research on the intersection of technology, makerspace, laboratory design and collaboration has significantly influenced the current community of laboratory design professionals and architects."

Joe Bocchiaro, PhD
Intelligent Building Technology, Harvard University

Various Publications

Regal has authored and contributed to numerous books and articles on lab planning.

"Co-lab(oration): Leveraging Technology and Architecture to Support Collaboration for Scientific Research," Lab Design News Whitepaper, January 2, 2024, Co-Author ⟶ Link

"The Expanding Lab: Considerations When Repurposing Space to Bolster Research Capabilities," Consulting Specifying Engineering Magazine, January 3, 2022, Author ⟶ Link

"Experiments in Autonomous Laboratory Design," Laboratory Architect Books, May 2022, Author ⟶ Link

"Data Driven Laboratory Design: Command Prompt Text-to-Image Synthesis," Laboratory Architect Books, May 2022, Author ⟶ Link

"Convergence: Augmented Design in a Complex World of Meaning and Machines," Laboratory Architect Books, May 2022, Author ⟶ Link

"Innovative Makerspaces: Diffusion Modeling for Makerspace Design," Laboratory Architect Books, May 2022, Author ⟶ Link

"Scientific Fictions: The Role of Machine Learning Prompt Architecture for Laboratory Design," Laboratory Architect Books, May 2022, Author ⟶ Link

"New Frontiers in Laboratory Design: Machine Learning for Visioning Laboratories," Laboratory Architect Books, May 2022, Author ⟶ Link

"How to Become a Lab Planner," Lab Manager, May 2021, Quoted Contributor ⟶ Link

"How Design Can Shape the Future of Engineering Education," Consulting Specifying Engineering Magazine, August 27, 2021, Co-Author ⟶ Link

"Biosafety Best Practices to Help Inform Everyday Environments," SmithGroup website, April 29, 2020, Co-Author ⟶ *Link*

"Here's why bio spaces can be quite bewildering specimens in the real estate sphere," Washington Biz Journal, May 2019, Quoted Contributor ⟶ Link

"Designing the Sustainable Lab," Lab Manager, November 6, 2019, Quoted Contributor ⟶ Link

"E-VITAL: Equipment – Virtual Information to Architectural Language Best Practice Approach to Laboratory Equipment Planning," P+W Innovation Incubator, October 2015, Co-Author

"Successful Planning Strategies for Adding Cleanroom Capabilities to a Lab Project," Laboratory Design News, September 2014, Author ⟶ Link


Co-lab(oration): Leveraging technology and architecture to support collaboration for scientific research

The future of science and engineering buildings is already here in many forms. This article envisions a tour through an imaginary state-of-the-art interdisciplinary science and engineering building, showcasing the current and future trends emerging in many academic and private institutions around the globe. It is grounded in real-world ideas based on feedback, visioning sessions and lessons learned from top research group faculties preparing the next generation of scientific minds. Please join us for a conversational walkthrough with expert technologists and planners, envisioning how institutions can leverage technology and architecture to support collaboration for scientific research. Relax, and enjoy the tour!


engineer

The Expanding Lab: Considerations when repurposing space to bolster research capabilities

With an urgent need to increase lab space all over the country, the logical question is: can we convert non-lab space into lab space?

Regal's contributions to laboratory design are featured in many national trade publications.

Speaking Engagements

Adtech Design and Development Leaders Podcast

"Lab Planner to Lab Leader," host Jakey Brentwood. April 2023 ⟶ Link

American Indian Council of Architects and Engineers National Conference

Indigenous Knowledge, Science and Laboratory Design," Virtual Conference, November 17, 2021

"Lab Design Fundamentals," Tulsa, OK, May 2018

American Indian Science and Engineering Society National Conference

"Designing the STEM Classroom of the Future," NASA Langley, VA, April 2024

"Fostering a Culture of Collaboration in STEM Facilities," Oklahoma City, OK, October 2018

"STEM facility design for Active Learning and Upside-Down Pedagogies," Denver, CO, October 2017

Architectural Research Centers Consortium

"Fundamental Science Building Research," ARCC 2015 Conference: the FUTURE of Architectural Research, Chicago, IL, April 2015

Association of University Research Parks Conference

"Contemporary Approaches to Adding Research Facilities," HBCU Engage University-Industry Demonstration Partnership Conference, Nashville, TN, April 2023

Elevate National Conference

"Creating and Recognizing Big Ideas," Scottsdale, AZ, March 2024

Forbes Expert Panel

"Future of Labs, Accommodating for Rapid Change and Equipment Innovation," Moderated by Alex Knapp, Virtual Conference, November 17, 2021 ⟶ Link

International Symposium on Academic Makerspaces

Optimize Text-to-Image in Laboratory and Makerspace Design," Georgia Tech University, October 2022

"Architectural Perspectives on Academic Makerspaces," Yale University, New Haven, RI, October 2019

Lab Manager Design Summit

"Agile Lab Planning for Agile Labs," Virtual Conference, May 2020 ⟶ Link

"Regal's universal lab design was a great idea and even though we do not open for a semester, it has already allowed us to change functions between biology and chemistry to accommodate changes in enrollment demands, something we cannot easily do in our older buildings."

Dwayne Henry
Lab Manager, Montgomery Community College, 2024 Lab Design Conference

Regal speaks to a 400-person audience as an invited panelist for "Architectural Perspectives on Academic Makerspaces." International Symposium on Academic Makerspaces Conference, Yale University, October 2019

Speaking Engagements, cont'd

Laboratory Design National Conference

"Attracting Diverse Talent in the Lab Design and Building Industry," Phoenix, AZ, May 2024

"Scientific Fictions: From Imagination and Scientific Realization," San Diego, CA, May 2023

"Solitude, Interaction, Serendipity and Inspiration in the New Scientific Workplace," New Orleans, LA, May 2022

"The Zero Lab: Design for Carbon Neutrality," Orlando, FL, April 2019

"The 15 Week Lab Building," Philadelphia, PA, April 2018

VAPPA Conference

"Future of Science Education," University of Virginia, Charlottsville, VA, March 2019

"Academic Makerspaces and Maker Communities: Planning for Effectiveness and Safety," George Mason University, Fairfax, VA, March 2017

AIA Continuing Education Units

Regal has authored training courses for AIA CEUs.

Academic Makerspaces and Maker Communities: Planning for Effectiveness and Safety
Course Number: CD-ACAMAK

Agile Lab Planning for Agile Labs
Course Number: LM202007

Design for Interdisciplinary Collaboration in Science Facilities
Course Number: GS092319

Key Considerations When Renovating Older Buildings
Course Number: CD11162023NIH

Lab Design Fundamentals: Basic Principles of Laboratory Planning
Course Number: CD-LABDES

Solitude, Interaction, Serendipity and Inspiration in the New Scientific Workplace
Course Number: LDC2022B15

Supporting and Elevating Diverse Voices in the Lab Design / Build Industry
Course Number: LDC2024LDC9A

Zero Lab: Laboratory Design for Carbon Neutrality and Zero Energy
Course Number: GS072021D

A frequently invited speaker, Regal (right) leads a lab design workshop at the Laboratory Design National Conference in New Orleans, 2022. He has trained over 2,000 professionals in AIA accredited CEUs focused on laboratory design.

Exhibits

3.1 AI/ML IN LAB DESIGN

Thought leadership in AI and Machine Learning in laboratory design

3.2 PROJECT

NASA Langley, Measurement Systems Laboratory

3.3 PROJECT

National Institutes of Health, Building 10 E Wing

3.4 PROJECT

Johns Hopkins University, Applied Physics Laboratory Building 201

3.5 PROJECT

Johns Hopkins University, Stieff Silver Autonomous Lab

3.6 PROJECT

Virginia Tech, Goodwin Hall

3.7 NATIONAL STANDARDS

(1) National Institutes of Health
(2) Center for Disease Control
(3) Scientific Equipment and Furniture Association

3.8 ADVOCACY

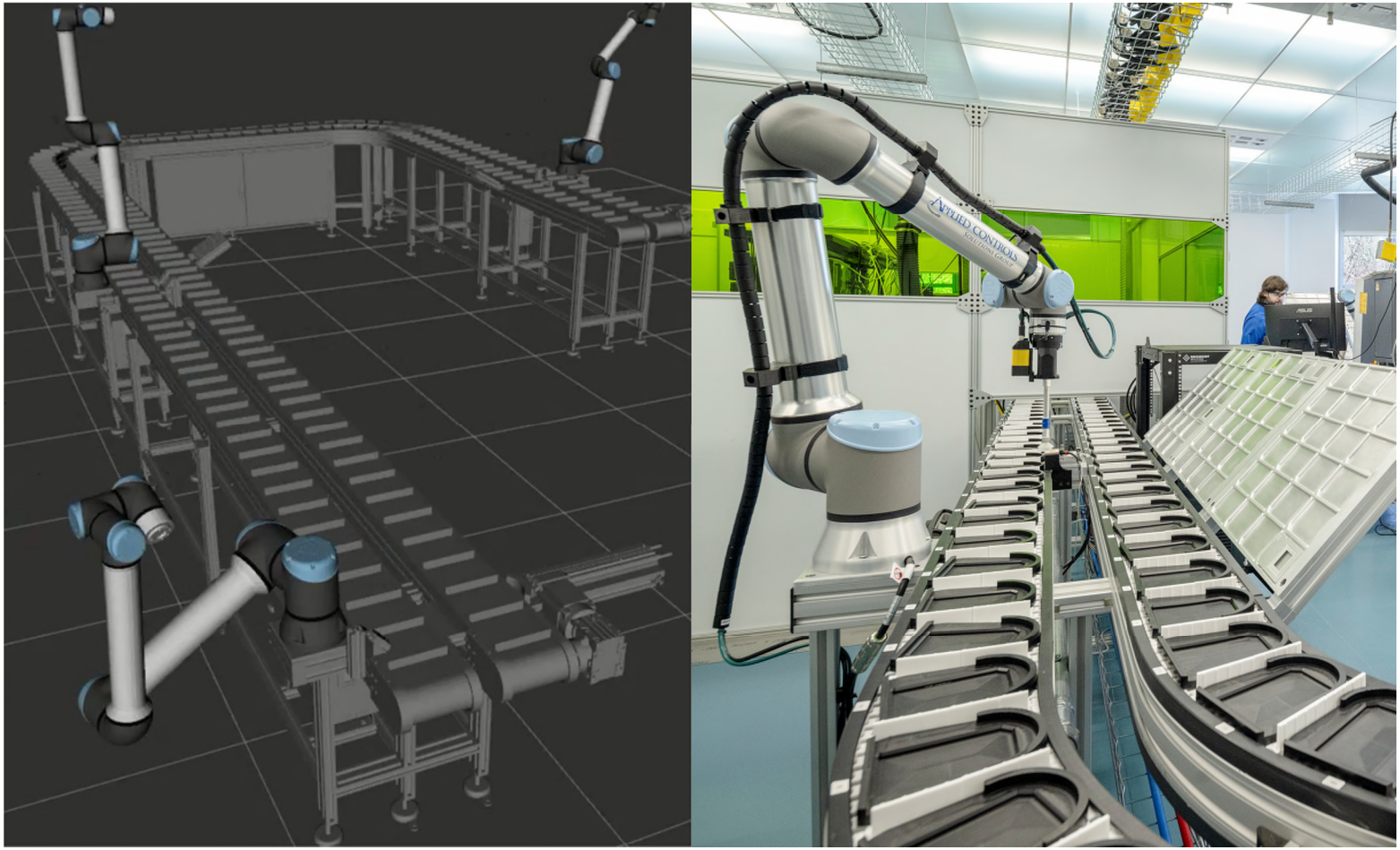
Advocating for Native American Architects

AI and Machine Learning in Laboratory Design

Role of Candidate:
Thought Leader, Author and Laboratory Architect

Design Firm: CannonDesign

Regal is the first architect to publish research on using AI and machine learning for laboratory design. The research informed Regal's six books on the future of laboratory design in an age of artificial intelligence.



AI/ML In Practice of Architectural Design: Leveraging a digital twin (left) of the automation, the design and scientific team at John Hopkins University had the ability to test functional scenarios prior to construction (right).

"Regal Leftwich is a pioneer at the intersection of Architecture and AI/ML. His work continues to impact research and practice in profound new ways."

David Mendlen
Partner, PwC
Executive Producer of the Decoded Show
Former General Manager, Microsoft

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and thought leadership of the project listed above.

Stephen Blair, PE
Director of Science and Technology, CannonDesign

AI AND MACHINE LEARNING IN LABORATORY DESIGN

Synopsis
Regal is a pioneer in integrating Artificial Intelligence (AI) and Machine Learning (ML) into laboratory design. **He wrote the first peer-reviewed paper on command prompt engineering for AI/ML applications for laboratories, setting new standards for efficiency and discovery.** His projects at Johns Hopkins, Naval Research Labs, NASA, and Argonne National Labs demonstrate the impact of AI, automation, and robotics on scientific breakthroughs.

Approach
Regal's approach is based on his research on command prompt engineering, using AI/ML to create labs that adapt to researchers' needs. He generates solutions that respond quickly to changing demands. He streamlined processes and enhanced data accuracy with AI-driven systems. He reduced human error and increased productivity and leveraged algorithms to manage large datasets and facilitate faster analyses. This method ensures lab environments are tailored for cutting-edge research.

Impact
Regal's integration of AI/ML in laboratory design has transformed the field, pushing the boundaries of research environments. His command prompt engineering research has led the practice of modern laboratory design, influencing how AI/ML is implemented across the industry. Regal has improved the functionality of these spaces and set new standards for future laboratory designs.

Overall, Regal's contributions to AI/ML in laboratory design represent a significant advancement in the profession, illustrating the potential of technology to accelerate scientific progress. **His work inspires and guides the integration of AI/ML in laboratories worldwide, ensuring that research environments remain at the cutting edge of innovation.**

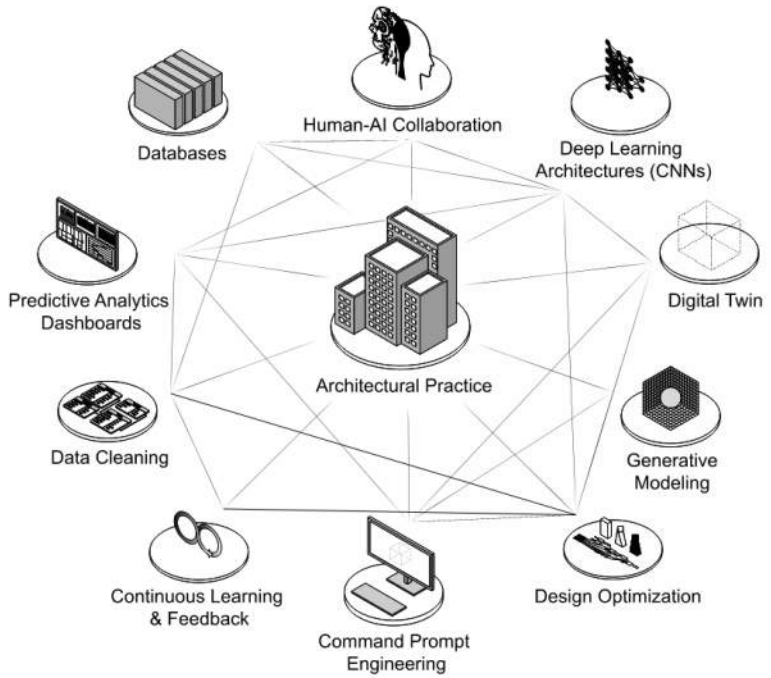


Diagram shows the ecosystem of AI/ML in Architectural Practice.

From design to operation, AI/ML influences the design of spaces as well as the operation of modern laboratories.

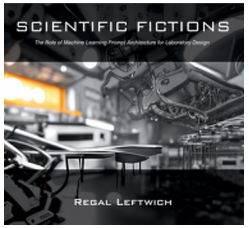
AI AND MACHINE LEARNING IN LABORATORY DESIGN

Regal is the first architect to publish research on using AI and machine learning for laboratory design. The research led Regal to publish six books on the future of laboratory design in an age of artificial intelligence prior to the release of platforms such as ChatGPT.

New Frontiers in Laboratory Design: Machine Learning for Visioning Laboratories

Laboratory Architect
Books, 2022
479 pages
Author

The contents of this book leverage machine learning prompt architecture for laboratory design by exploring the potential of natural language processing and machine learning to support the creative design process.



Scientific Fictions: The Role of Machine Learning Prompt Architecture for Laboratory Design

Laboratory Architect
Books, 2022
131 pages
Author

Prompt Engineering is at the forefront of design in the world of generative modeling. How architects address these “Scientific Fictions” of machine interpterion is at the heart of discussion in this book about architectural representation and laboratory design.

Innovative Makerspaces: Diffusion Modeling for Makerspace Design

Laboratory Architect
Books, 2022
459 pages
Author

This book explores the techniques of diffusion modeling for makerspace design. It relies on peer reviewed research for techniques of command prompt engineering and large language model generative design.

Convergence: Augmented Design in a Complex World of Meaning and Machines

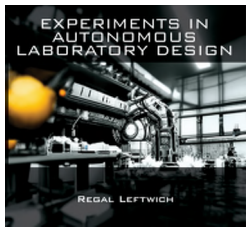
Laboratory Architect
Books, 2022
179 pages
Author

This book explores the meaning of generative design, and the ways architects can leverage artificial intelligence and machine learning and its impacts to practice.

Data Driven Laboratory Design: Command Prompt Text-to-Image Synthesis

Laboratory Architect
Books, 2022
219 pages
Author

The laboratory typology relies heavily on a data driven approach to decision making. This book is a lessons learned on using data to inform laboratory design.



Experiments in Autonomous Laboratory Design

Laboratory Architect
Books, 2022
165 pages
Author

This book is an exploration of multiple experiments in using artificial intelligence and machine learning for laboratory design and how the industry might position itself for design in an autonomous framework.

NASA Langley Research Center, Measurement Systems Laboratory

Location: Hampton, VA
Size: 175,000 GSF
Completion: 2023

Design Firm: AECOM
Architect of Record: AECOM
Laboratory Planner: Page
Role: Laboratory Planner

Awards & Publications:
LEED Platinum
2022 Best Government/Public Building, MidAtlantic Best Projects

"Regal's work at NASA Langley and Goddard has been transformative to the way we collaborate. His innovative designs and integration of AI systems into our labs have significantly enhanced our research capabilities. Regal's ability to create spaces that advance our mission is invaluable to NASA's ongoing exploration and discovery efforts."

Alan Binstock, RA
Campus Architect, Goddard Space Flight Center, NASA (Retired)

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the planning and programming of the project listed above.

Ed Weaver, AIA
Principal-in-Charge, AECOM

NASA LANGLEY RESEARCH CENTER, MEASUREMENT SYSTEMS LABORATORY

Synopsis

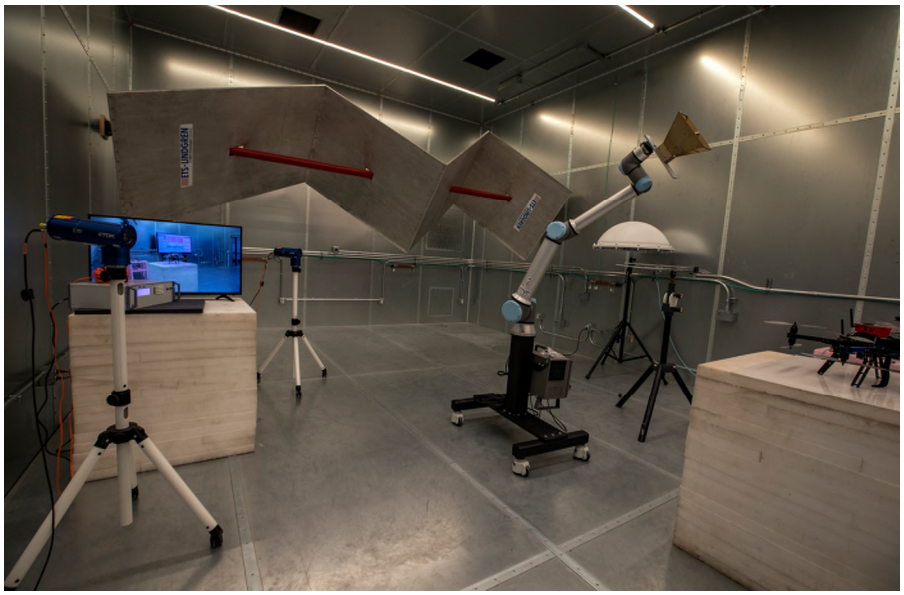
The Measurement Systems Laboratory (MSL) at NASA Langley Research Center is a cutting-edge facility that develops advanced measurement systems technology for atmospheric and space flight hardware sensors. The design brings to life the New Towne Campus masterplan, which aims to densify the campus and collocate scientists. The main challenge was to accommodate specialized labs such as cleanrooms, optics, metrology, and laser testing labs while fostering collaboration among scientists.

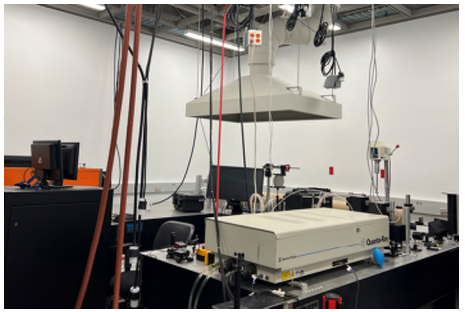
Approach

Regal designed the MSL as a versatile and collaborative environment. The building includes a variety of specialized laboratories with advanced technological infrastructure for high-precision measurements and sensor development. **The design emphasizes flexibility, allowing laboratories to reconfigure to meet changing research needs.** Shared spaces and open areas encourage interaction and knowledge exchange among scientists from different disciplines, enabling a multidisciplinary research approach.

Impact

The MSL has enhanced NASA Langley's research capabilities. The facility houses diverse, state-of-the-art laboratories that support innovative research in atmospheric and space flight sensors. **Regal's design has increased interaction among scientists, fostering multidisciplinary partnerships that have accelerated technological advancements. T**he project has advanced NASA's mission, contributing to groundbreaking developments in measurement systems technology for planetary, atmospheric and environmental research.





The MSL contains many technically challenging spaces for research including shielded autonomous high energy testing (top), rooftop laser testing (middle right) and optical labs (middle left) and high bay cleanrooms (bottom).

National Institutes of Health, Building 10 E Wing Renovation

Location: Bethesda, MD
Size: 248,500 GSF
Completion: 2023

Design Firm: Perkins+Will
Architect of Record: Perkins+Will
Laboratory Planner: Perkins+Will
Role of Candidate: Laboratory Planner

Awards & Publications:
LEED Platinum
"*E-VITAL: Equipment – Virtual Information to Architectural Language Best Practice Approach to Laboratory Equipment Planning*"

"With his dedication, vision, and ability to deliver impactful, forward-thinking design, Regal Leftwich is an outstanding candidate for the AIA Fellowship. His significant contributions to the NIH project exemplify his capacity to excel in the healthcare and research architecture sectors."

Susan Roberts, RA
Facilities Planning and Programming Branch Chief, National Institutes of Health

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the planning and programming of the project listed above.

Dan Watch, FAIA
Principal, Science and Technology, Perkins+Will

NATIONAL INSTITUTES OF HEALTH, BUILDING 10 E WING RENOVATION

Synopsis
The NIH Building 10 E Wing renovation transformed a hospital bed tower into a collaborative research facility. The project combined critical programs from the Clinical Center and eight NIH institutes into a cohesive, flexible space. The main challenges were to maintain hospital operations during renovations and to meet the specialized needs of diverse research groups.

Approach
Regal designed adaptable laboratory spaces that met the specialized requirements of interdisciplinary groups. He integrated specialized laboratory areas with shared equipment spaces, promoting resource optimization and collaborative research. He coordinated meticulously to ensure the hospital's operations were uninterrupted, demonstrating an innovative approach to adaptive reuse of existing structures.

Impact
Regal's strategic planning created nearly 250,000 square feet of renovated space, providing modernized facilities for over 1,500 research and administrative staffers. He enhanced the research environment by integrating specialized laboratory needs with flexible, collaborative spaces. The renovation marked a major milestone for the Clinical Center's department of transfusion medicine, which now includes a state-of-the-art Blood Bank and a new cGMP laboratory. The remodeled spaces support critical research programs across multiple institutes, embodying a spirit of collaboration and excellence in scientific research. **Regal's leadership and innovative planning have breathed new life into Building 10, positioning it as a hub for groundbreaking research and interdisciplinary collaboration at NIH.**

Reimaging the research environment with a focus on technology integration (top) and researcher and patient centric design approach (bottom).

Johns Hopkins University, Applied Physics Laboratory Building 201

Location: Laurel, MD
Size: 263,000 GSF
Completion: 2021

Design Firm: CannonDesign
Architect of Record: CannonDesign
Laboratory Planner: CannonDesign
Role of Candidate: Laboratory Architect

Awards & Publications:
Targeting LEED Gold
AIA Award of Merit
Laboratory of the Year Finalist
"Co-lab(oration): Leveraging Technology and Architecture to Support Collaboration for Scientific Research"

"Regal crafts environments that empower researchers to push boundaries, foster innovation and encourage strong collaboration among diverse users. His personal commitment to every detail makes him an invaluable partner, and the impact of his work was appreciated by our entire site research and high-tech manufacturing team.

Martin Sharpless, AIA
Former Senior Director, Intuitive Surgical
Current Facilities Design and Construction Executive, Johns Hopkins University

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the planning and programming of the project listed above.

Stephen Blair, PE
Principal-in-Charge, CannonDesign

OBJECT 2: Practice Technical Advancement

JOHNS HOPKINS UNIVERSITY, APPLIED PHYSICS LABORATORY BUILDING 201

Synopsis
The Applied Physics Lab was a visionary project to create a state-of-the-art research facility for diverse technical disciplines. The main challenge was to design versatile and collaborative labs for advanced research areas such as cosmology, energy storage, and human-machine intelligence integration, with unknown end-users.

Approach
Regal oversaw the design of a flexible and adaptable environment that could accommodate various lab types and research tools. He emphasized collaboration and interaction among scientists from different disciplines, creating shared spaces and open areas. He integrated advanced technological infrastructure to support cutting-edge research and development.

Impact
Regal's design enabled the lab to become a hub of innovation, where researchers could explore new frontiers and develop breakthrough technologies. His innovations have had far-reaching implications in fostering interdisciplinary collaboration. By creating an adaptable and versatile space, Regal allowed for the seamless integration of various technical disciplines within the same facility. The co-location of these research teams was a critical factor in sparking spontaneous collaboration, where experts in cosmology, AI, energy storage, and human-machine intelligence could engage with one another, leading to cross-pollination of ideas. This environment not only enables individual research efforts to thrive but also nurtures collective innovation, pushing boundaries across multiple fields.

Regal assists in the final installation of a quantum computer.

The research labs are designed with a “skunkworks” mind-set that allows for the space to be fully reconfigurable and customizable by the end-users as their science and equipment needs change.

Johns Hopkins University, Stieff Silver Autonomous Lab

Location: Baltimore, MD
Size: 2,340 GSF
Completion: 2024

Design Firm: CannonDesign
Architect of Record: CannonDesign
Laboratory Planner: CannonDesign
Role of Candidate: Laboratory Architect

Awards & Publications:
Targeting LEED Gold
AIA Award of Merit

"Regal has designed a first of its kind, leading-edge laboratory within the historic Stieff Silver Building for the Whiting School of Engineering. The Artificial Intelligence for Material Design laboratory includes automation, robotics, advanced laser tools and multiple imaging and characterization instruments. Regal's technical expertise leading the team directly impacted the overall success of this project."

Stephen Blair
Director Science and Technology, CannonDesign

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the technical documentation of the project listed above.

Mike Glaros, AIA
Principal-in-Charge, CannonDesign

JOHNS HOPKINS UNIVERSITY, STIEFF SILVER AUTONOMOUS LAB

Synopsis

The Artificial Intelligence for Material Design (AIMD) Laboratory at Johns Hopkins University is a groundbreaking facility that harnesses AI and robotics to design and discover new materials for extreme dynamic environments. The lab combines high-throughput capabilities, central robotic automation, and advanced data/computing infrastructure to create a fully autonomous and efficient research system.

Approach

Regal led the documentation of the AIMD Laboratory, highlighting how it integrates AI and robotics to accelerate materials research and development. The lab autonomously manages specimen fabrication, processing, and movement through various subsystems, using a central robotic system guided by computational protocols. The lab also connects all research efforts to cloud computing for data management, design guidance, and robotic control, creating a seamless and highly efficient research environment.

Impact

Regal's planning and technical leadership of the AIMD Laboratory has propelled the field of materials design and discovery to new heights. By leveraging AI and robotics, the lab increases the accuracy and speed of research processes. This innovative approach enables rapid adaptation to changing research needs and supports cutting-edge discoveries in extreme dynamic environments. The AIMD Laboratory is a trailblazer for future research facilities, showing how AI and robotics can transform laboratory operations and outcomes.

Human and autonomous systems are designed to work collaboratively to process new material discoveries.

Virginia Tech, Goodwin Hall

Location: Blacksburg, VA
Size: 155,000 GSF
Completion: 2014

Design Firm: ZGF
Architect of Record: ZGF
Laboratory Planner: SST Planners
Role of Candidate: Laboratory Architect

Awards & Publications:
LEED Gold
"Academic Makerspaces: Planning for Effectiveness and Safety"
"Designing the Sustainable Lab"

"Regal Leftwich digs deep into the actual place, understanding the community and specific drivers for success in a very context-specific way, not imposing pre-configured patterns. The resulting labs are uniquely responsive and evolve an approach to hands-on learning that creates a remarkable bridge from instruction to independent research."

David McCullough, AIA, PE
Science and Technology Director
Principal, Page

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the planning and programming of the project listed above.

Todd Shelton
Project Manager, Virginia Tech

VIRGINIA TECH, GOODWIN HALL

Synopsis

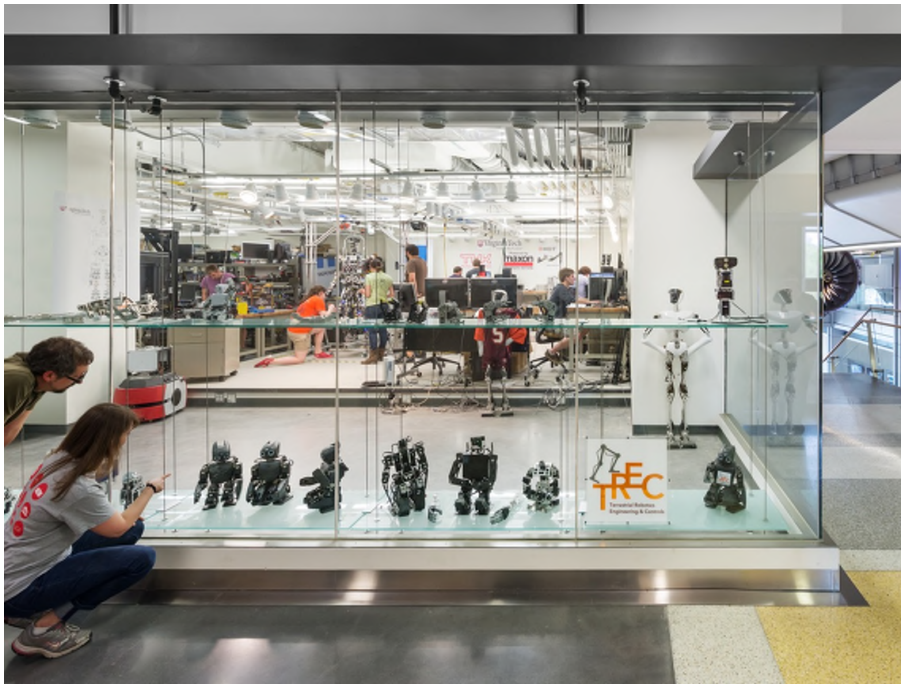
After the tragic shooting on campus, Virginia Tech faced a dilemma: how to create open, visible spaces that promote engineering education and community, while ensuring safety and security. Regal convinced the university administration that transparent, active learning environments were not only feasible, but desirable.

Approach

Regal's design solution integrated transparency and openness to create a vibrant, interactive learning environment. Goodwin Hall features glass-walled laboratories and classrooms that are visually accessible, fostering an engaging atmosphere for students and faculty. The design also incorporated discreet safety measures, such as secondary egress through secure corridors.

Impact

The transparent and flexible spaces have enhanced student engagement and collaboration, creating a dynamic learning environment. The design has demonstrated that open, visible spaces can coexist with safety concerns. Goodwin Hall is a symbol of resilience and innovation, showcasing the importance of engineering and science education while creating a secure and welcoming campus environment. **This project showcases Regal's ability to address complex challenges with innovative design solutions that advance educational goals and community well-being.** The project also set the standard for planning of teaching laboratories via infrastructure zoning, which has had an enormous impact on subsequent planning methodologies.



The building is designed to celebrate the science by showcasing the laboratories from the atrium.

Active atrium with departmental identity and science on display with the donated Rolls-Royce engine suspended from the ceiling.

National Standards, National Institutes of Health (NIH), Design Requirements Manual (DRM)

Role of Candidate: Laboratory Subject Matter Expert, Committee Member

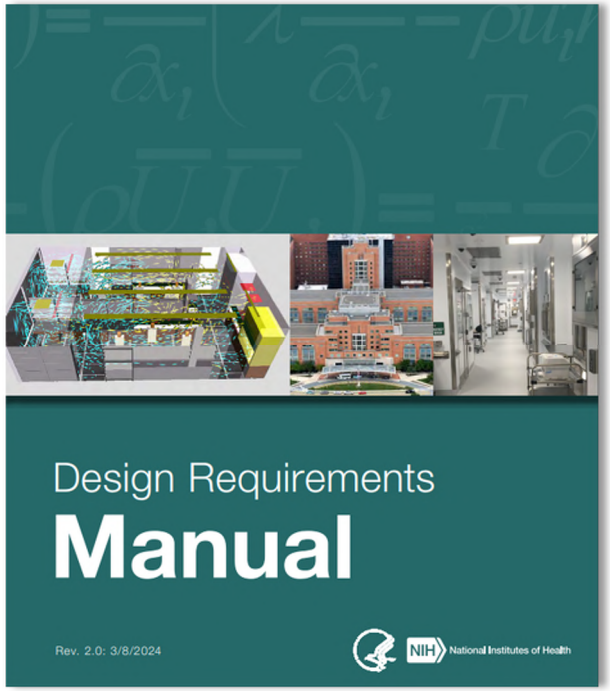
Design Firm: CannonDesign

Publication: DRM, Planning and Programming, 2023, Architectural Design, 2024 ⟶ Link

Synopsis
The NIH is the world's leading public sponsor of biomedical research, with a 2024 budget of $47.1 billion for over 300,000 researchers across more than 2,500 institutions. The NIH created the Design Requirements Manual (DRM) to standardize and ensure biosafety in funded capital projects,

Approach
Regal updated the DRM sections on laboratory planning and programming (chapter 2) and architectural design (chapter 4). His amendments cover topics such as lab master planning, project programming, data collection, space and module requirements, safety protocols, renovation considerations, lab wall construction, sink specifications, equipment planning, and Energy Star requirements.

Impact
The DRM is the US's comprehensive design manual for NIH facility policies, standards, and technical benchmarks. **Regal's updates to the laboratory planning and architecture standards are now key references for architects and planners following the DRM.** His guidelines on aspects such as lab master planning and energy efficiency for equipment are mandatory for NIH-funded capital projects, and influence how a substantial part of the NIH's $47 billion research budget is used at various institutions.



NIH Design Requirement Manual outlines the requirements for Research Laboratory Design for all NIH and NIH funded capital projects.

"Regal's deep knowledge of biomedical research facility design is crucial in balancing the complex functional requirements of the researchers with innovative architectural solutions. His contributions ensure facilities will not only meet current research needs but also remain adaptable and sustainable for future advancements."

Susan Roberts, RA
Facilities Planning and Programming Branch Chief, National Institutes of Health

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the editorial contributions of the project listed.

Steven Breslin, AIA, PE, LEED AP
Branch Chief, SPB DTR/ORF, National Institutes of Health

NATIONAL STANDARDS, NATIONAL INSTITUTES OF HEALTH (NIH), DESIGN REQUIREMENTS MANUAL (DRM)

The NIH Design Requirements Manual are the required guidelines for all NIH capital laboratory projects and adopted by many federal agencies, states, universities and even other countries that want to build to NIH standards.

Below is an example how Regal's contributions to the NIH Design Requirements Manual impact a typical laboratory design:

A Updated standards for emergency safety showers and eye washes to be required directly in the lab for increased safety.

B Revisions to the net-to-gross area calculations to better calculate laboratory efficiency and the standard module size used in planning all labs and sets the dimension between benches.

C Guideline updates for biocontainment facility planning, including zoning, barriers and safety equipment at the sinks.

D Typical laboratory casework and finish requirements for that enable the use of chemicals and sterilization for biomedical research.

National Institutes of Health, Building 10 E Wing Renovation

National Standards, Center for Disease Control (CDC), Space Planning Guidelines for Laboratories

Role of Candidate: Contributor / Editor, 2017 **Publication:** CDC Space Planning Guidelines

Design Firm: Page

Synopsis

The CDC publishes the Biosafety in Microbiological and Biomedical Laboratories (BMBL) which establishes the minimum requirements for biosafety in all biocontainment laboratories in the United States. However, the BMBL does not provide space planning and design guidelines. There was a need to create a supplemental publication that gave architects and designers the information needed to design for bio-containment safely. The intent was the creation of technical guidance for proper bio-containment that outlined planning strategies, floorplan examples, common elements and infrastructure requirements.

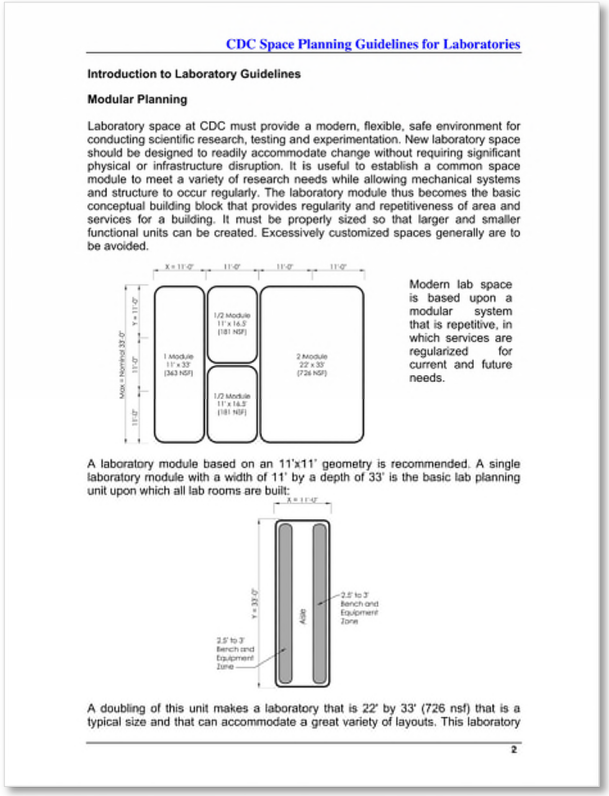
Approach

Regal provided technical expertise by editing and overseeing the quality assurance of requirements for bio-safety and laboratory design. Regal ensured the guide met the requirements of the BMBL while using best practices for bio-containment, equipment layouts, workflows and laboratory space utilization.

Impact

The CDC guidelines are required for any laboratory in the United States working with bio-hazardous materials. This includes federal, academic, healthcare (including hospitals and doctor's offices) and corporate laboratories handling biological hazards.

Regal's work has contributed to safer and more efficient laboratory designs nationwide. The guide has enabled architects with the tools they need for bio-containment design. This has allowed scientists to safely research existing and emerging bio-hazardous such as Tuberculous, Ebola, COVID-19 and the flu.



CDC Space Planning Guidelines for Laboratories

Introduction to Laboratory Guidelines

Modular Planning

Laboratory space at CDC must provide a modern, flexible, safe environment for conducting scientific research, testing and experimentation. New laboratory space should be designed to readily accommodate change without requiring significant physical or infrastructure disruption. It is useful to establish a common space module to meet a variety of research needs while allowing mechanical systems and structure to occur regularly. The laboratory module thus becomes the basic conceptual building block that provides regularity and repetitiveness of area and services for a building. It must be properly sized so that larger and smaller functional units can be created. Excessively customized spaces generally are to be avoided.

Modern lab space is based upon a modular system that is repetitive, in which services are regularized for current and future needs.

A laboratory module based on an 11'x11' geometry is recommended. A single laboratory module with a width of 11' by a depth of 33' is the basic lab planning unit upon which all lab rooms are built:

A doubling of this unit makes a laboratory that is 22' by 33' (726 nsf) that is a typical size and that can accommodate a great variety of layouts. This laboratory

2

CDC Space Planning Guidelines includes Laboratory Planning Guidelines and example layouts and best practices requirements.

"Regal Leftwich is a visionary leader in laboratory design, blending his technical mastery with a strategic influence on federal and academic projects. Throughout his career, Regal has been a leader in shaping industry through his work on national lab guidelines that set cutting-edge programmatic, planning and design goals and objectives."

Chris Cowansage, RA
Science and Technology Director
Principal, Page

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the editorial contributions of the project listed.

Chris Cowansage, RA
Principal-in-Charge, Page

NATIONAL STANDARDS, CENTER FOR DISEASE CONTROL (CDC), SPACE PLANNING GUIDELINES FOR LABORATORIES

A majority of federal, academic and private intuitions in the United States require CDC compliance on biosafety best practices. The CDC Space Planning Guidelines supplements the Biosafety in Microbiological and Biomedical Laboratories with space planning criteria for architects and designers.

Below is an example of how Regal's guidance on planning impact all biosafety level 2 and 3 biocontainment facilities regulated by CDC guidelines:

A Defined CDC requirements for finishes, lighting, and air filtration to enable stringent bio-containment specific to higher hazards and to create a barrier to prevent contamination in other parts of the building.

B Requirements for lab doors to enable accessible personnel and equipment movement. Vision panels maximize visibility, increasing safety in the lab environment.

C Edited the guidelines enable proper clearances for working in biological safety cabinets and adequate adjacent clearances for safely working with biological hazards.

D Created multiple laboratory types with recommended layouts and clearances for common and specialized laboratory equipment specific to biocontainment facilities.

NIH, National Cancer Institute, cGMP Lab

National Standards, Scientific Equipment and Furniture Association (SEFA), Laboratory Casework Design

Role of Candidate: Contributor / Editor / Committee Co-Chair, 2014 – current

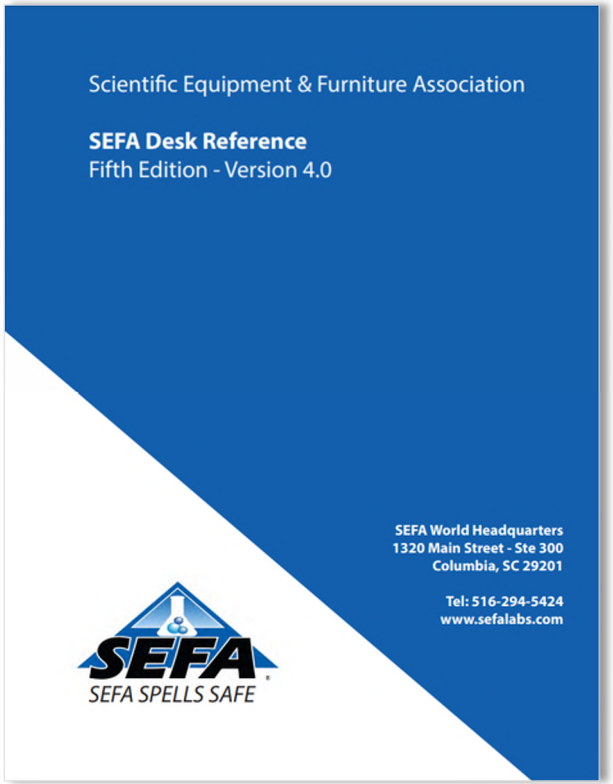
Publication: SEFA 2016 Desk Reference
→ Link

Design Firm: Perkins&Will, Page, SmithGroup, CannonDesign

Synopsis
Laboratory casework and equipment lacked a general requirement for design and performance. Designers and owners needed guidance to ensure the optimal functioning and durability of lab facilities.

Approach
Regal led and provided technical input and guidance for the SEFA Desk Reference, a performance-based guide for architects and manufacturers. Regal offered technical expertise on topics such as digital lab design, sustainable materials, casework and countertop finishes, installation, exhaust containment devices, and lab casework adaptability.

Impact
The performance requirements by SEFA have been integrated into Divisions 11 and 12 of the CSI MasterSpec template, which is used by 83% of all architecture firms. **Regal's contributions to the technical development of best practices for laboratory casework and equipment design have set the standard for all laboratory projects that use this template.**



SEFA Desk Reference sets the laboratory casework and equipment performance standards for manufacturers and architects. The guidelines include the industry definition of casework types used in scientific environments.

"For the past twenty years we have manufactured many of Regal's custom laboratory casework designs for clients such as Virginia Tech, George Washington University, and NASA. He has contributed to many innovative solutions in the laboratory environment and in the industry of laboratory casework specifications."

Matthew Teal
President, New England Lab

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for laboratory design and is a key advisor for the editorial contributions of the project listed.

David J. Sutton, CAE, JD
Executive Director and General Counsel
Scientific Equipment & Furniture Association

NATIONAL STANDARDS, SCIENTIFIC EQUIPMENT AND FURNITURE ASSOCIATION (SEFA), LABORATORY CASEWORK DESIGN

Regal's work with the Scientific Equipment and Furniture Association (SEFA) has been instrumental in developing industry standards for laboratory furniture and equipment, promoting best practices in lab design and functionality.

Below are examples of Regal's impact to the performance requirements of laboratory casework.

- **A** Developed laboratory casework performance requirements including load, finish, and operational criteria appropriate for intuitional research and academic labs.
- **B** Generated selection criteria and classification functionality of laboratory casework systems from least adaptable to most adaptable to assist architects in correct casework selection.
- **C** Identified classification information for selection of appropriate fixtures for low pressure, high pressure, and high purity service fixtures for lab specifiers.
- **D** Authored content to performance requirements for laboratory work surfaces, including sustainable options for chemical resistance, structural strength, and appropriate use cases for material selection.

Scott Bioengineering Building, Colorado State University

Addressing Underrepresentation in the Profession for Native American Architects

Role of Candidate: AICAE Board of Directors, 2017 – Current

Publications: MoU Between AIA and AICAE, 2019

Design Firm: Page, SmithGroup, CannonDesign

"Statistically speaking, Native Americans are more likely to become an astronaut than to become an architect."

Michael Laverdure, AIA, AICAE
AISES National Conference, 2018

Synopsis

Native Americans face significant barriers and underrepresentation in STEM fields, including architecture. Despite being the original inhabitants of the land, they are often ignored or erased from research and data collection. For example, the AIA report on diversity in 2015 failed to include Native American students in its demographic data, making it impossible to track their progress and challenges. This lack of visibility and recognition undermines the potential and contributions of Native American architects and engineers.

Regal (left) at AICAE board meeting Reviewing edited version of the MOU with the AIA

Approach

Regal led efforts through presentations, speaking, publications and sponsoring events focused on Native American advocacy and awareness.

Impact

As a board member of the American Indian Council for Architects and Engineers (AICAE), Regal initiated and led a dialogue with the AIA to address this issue. He oversaw the creation of a Memorandum of Understanding (MoU) between the AIA and AICAE, which established a partnership to share accurate and updated demographic information on Native American and Alaskan Native architects and engineers. The MoU also reduced the cost and increased the access for Native Americans to join the AIA and attend its conferences. **As a result of Regal's leadership and advocacy, the AIA's representation and tracking of Native American architects improved significantly, with a 75% increase of Native American and Alaska Native inclusion in the AIA from 2015 to 2019.**

DECLARATION OF RESPONSIBILITY

I have personal knowledge that the nominee is largely responsible for leadership in the project listed above.

Tamarah Begay, AIA, AICAE President

MaryBeth DiDonna

Laboratory Design Conference
Lab Manager Magazine, Managing Editor
New Jersey

Industry Colleague

Tammy Eagle Bull, FAIA

Encompass Architects
Lincon, Nebraska

Colleague, Serve together on the AICAE Board

Jeffery Murray, FAIA

CannonDesign
Pittsburgh, Pennsylvania

Colleague, collaborated on multiple lab projects

Lorena Permuy, AIA

Johns Hopkins University
Baltimore, Maryland

Client, worked together on multiple lab projects

Todd Ray, FAIA

Page
Washington, DC

Colleague, collaborated on multiple lab projects

David Sutton

SEFA
Columbia, South Carolina

Industry Colleague, SEFA Committee

Jay Woodburn, AIA

Baskervill
Richmond, Virginia

Colleague, collaborated on multiple lab projects