



CAMPUS STRATEGY & ANALYTICS

RESEARCH ANALYSES AND SPACE PLANNING

SMITHGROUP

April 2020



FIRM INTRODUCTION

NATIONAL RENEWABLE ENERGY LABORATORY
ENERGY SYSTEMS INTEGRATION FACILITY

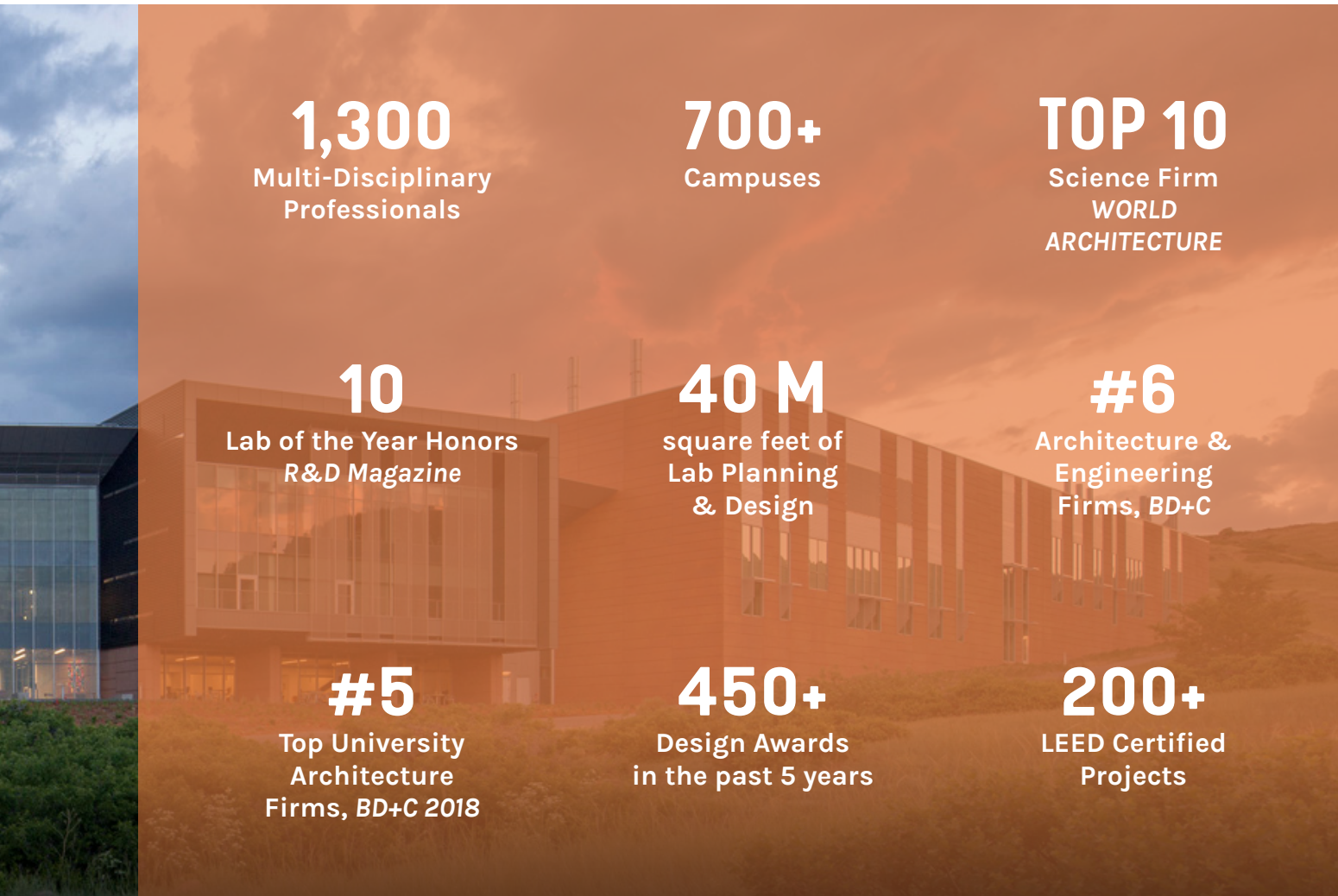
SmithGroup is an award-winning, multi-national organization that employs research, data, advanced technologies and design thinking to help clients solve their greatest challenges.

Working across a network of 15 offices internationally, our team of 1,300 experts is committed to excellence in strategy, design and delivery—giving rise to new and innovative processes and methodologies that are redefining the way we work as teams. Our specialists—from architects and engineers, to nurses, workplace strategists and beyond—develop beautiful, sustainable, future-focused solutions for healthcare providers, science and technology organizations, higher education and cultural institutions, urban environments, diverse workplaces, mixed-use and waterfront developments, and parks and open spaces. Our integrated practice offers depth in all disciplines serving the built and natural environment, including architecture, engineering (coastal, civil, structural, mechanical, electrical, and plumbing), landscape architecture, urban design, and planning.

TIME HONORED. BUT NOT TRADITIONAL.

Blending artistry, technology, planning, research and strategy, SmithGroup specialists partner with clients to anticipate disruptors that are redefining their businesses and solve challenges impacting their worlds. Whether tasked to develop a business model, workflow processes, a campus master plan, a building, an energy model, or a strategic plan, our integrated team of experts relentlessly explore and refine until they arrive at a solution that realizes success at every scale of a project.

Our ability to skillfully blend aesthetics with performance, sustainability, and resiliency criteria necessary to create a better tomorrow—for clients, employees, the community, the environment, and our collective future—has earned SmithGroup recognition from top-ranking institutions, publications and design authorities the world over.



1,300
Multi-Disciplinary
Professionals

700+
Campuses

TOP 10
Science Firm
WORLD
ARCHITECTURE

10
Lab of the Year Honors
R&D Magazine

40 M
square feet of
Lab Planning
& Design

#6
Architecture &
Engineering
Firms, BD+C

#5
Top University
Architecture
Firms, BD+C 2018

450+
Design Awards
in the past 5 years

200+
LEED Certified
Projects

CAMPUS STRATEGY & ANALYTICS (CS&A) STUDIO

SmithGroup's Campus Strategy & Analytics (CS&A) studio is a nationally recognized, professional services studio focused on providing higher education planning, space analyses and tailored solutions. We have focused on academic and facilities-related studies for higher education for almost 40 years.

Our planning and programming projects have included more than 700 campuses across the United States and around the world. The outcomes of our work inform institutional leadership as they guide the fulfillment of strategic, academic, and physical planning goals.

Our team of accomplished college and university planners includes multi-skilled staff whose experience ranges from individual program plans to campuswide studies and from single campuses to statewide systems, with each person bringing exceptional dedication and insight to every project.

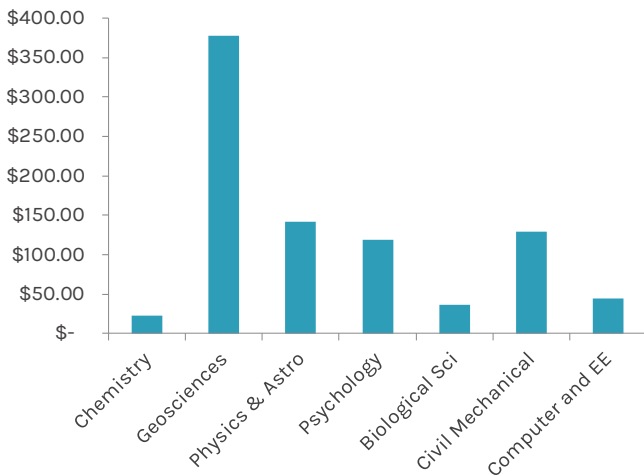
We listen and observe and customize our wide array of services to best meet the needs of each campus, institution or system. Our specialized software, combined with our depth of experience and deep understanding of higher education, allows us to provide objective, data-driven results to our clients. Peer comparisons and benchmarking studies are used to confirm these findings.

We are versed in the unique issues facing campuses as they address funding issues, evolving pedagogies that require flexible learning environments, more effective stewardship of existing resources through increased efficiency, and ever-present student recruitment and retention goals.

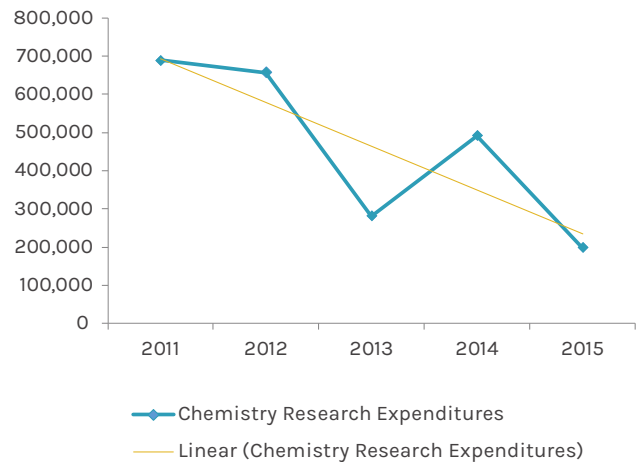
SPACE STUDY AND RESEARCH ANALYSIS

As Paulien & Associates, the SmithGroup Campus Strategy & Analytics group performed a campuswide space utilization study and space needs assessment. As part of this effort, a departmental level analysis of research space was also conducted. This identified some outliers in the sciences, which corresponded with the loss of key faculty.

RESEARCH EXPENDITURES PER ASF



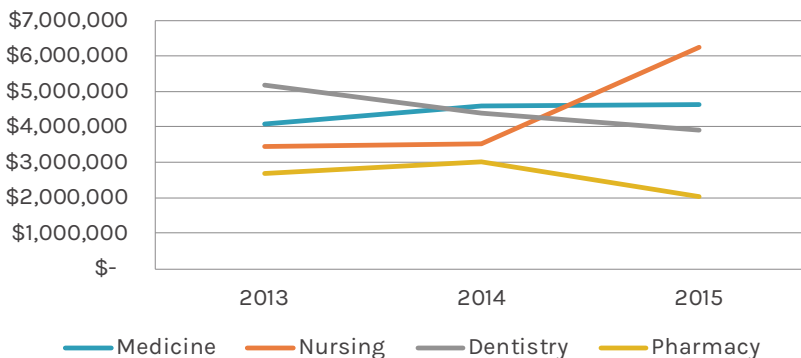
CHEMISTRY RESEARCH EXPENDITURES



This presented opportunities to either capitalize on excess space capacity with hiring new faculty lines or repurpose space for other programmatic priorities.

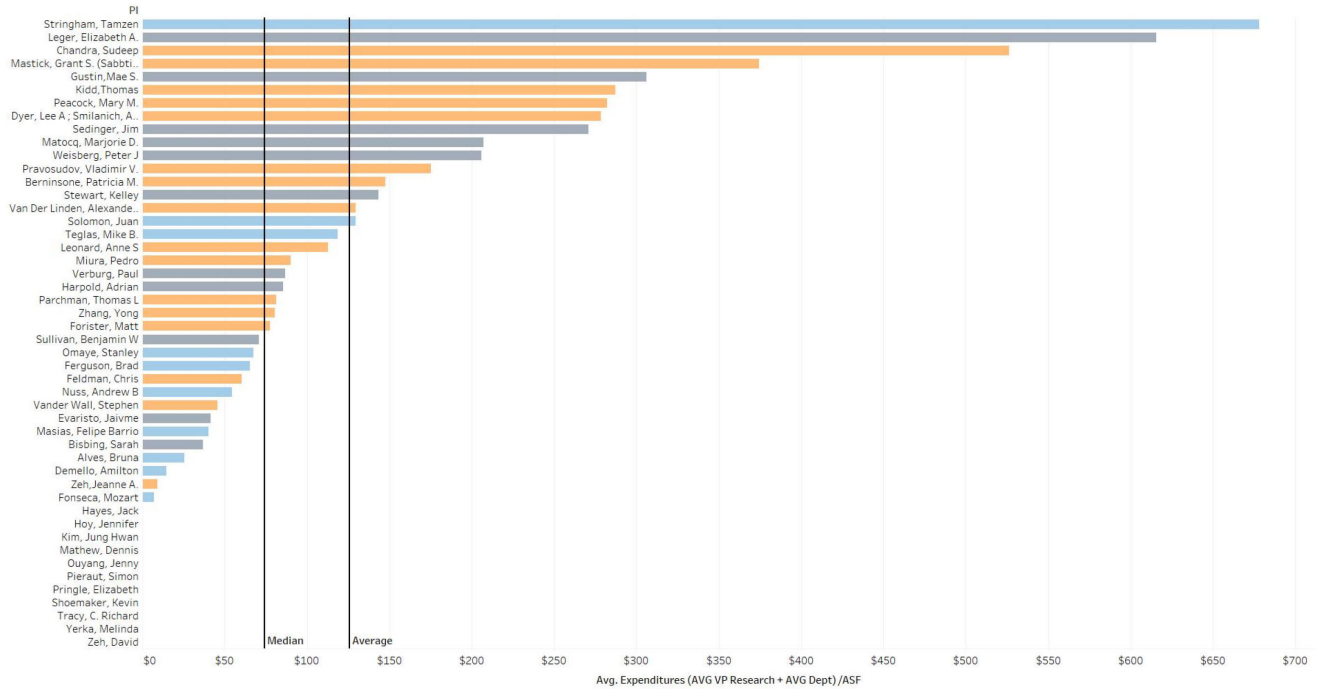
The study also included the Hospital Hill portion of campus which is home to the Schools of Medicine, Dentistry, Nursing, and Pharmacy. Here the research trends were mixed, with expenditures declining where retirements and loss of faculty were impacting productivity. Expenditures in Nursing in Medicine were increasing.

RESEARCH EXPENDITURE - 3 YEAR TRENDS



Issues regarding both the quality and quantity of Medicine space were identified as key issues for continued growth. The nature of Nursing research was community based, so space needs were not impacted.

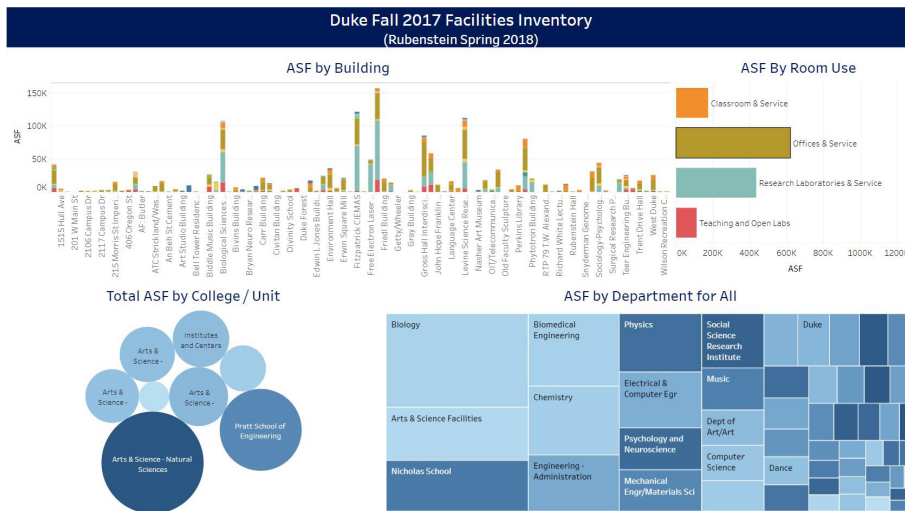
ACADEMIC AND RESEARCH SPACE NEEDS



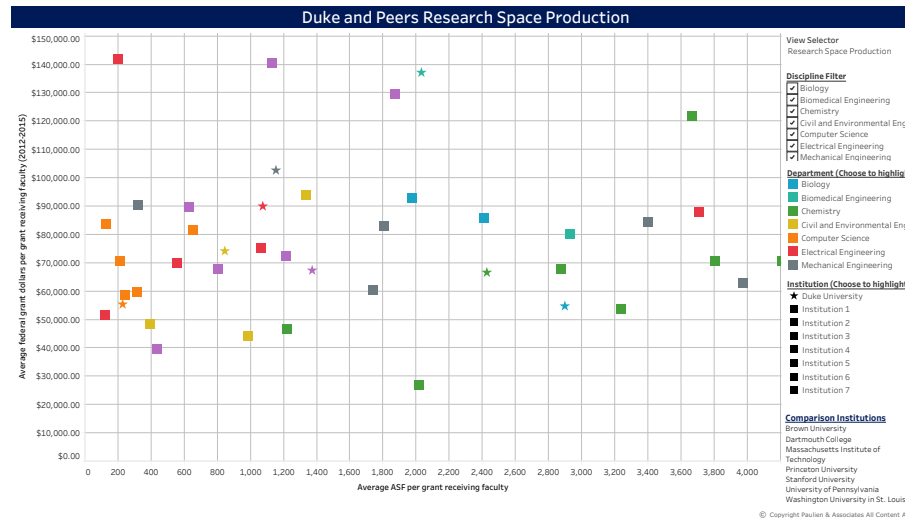
In order to support strategic institutional goals for research growth, the Provost wanted to focus on the research units in a mid-century building that housed research labs for three academic departments. A room-by-room facility inspection was conducted, followed by determination of team sizes and compilation of research related data. Data analysis showed a wide range of lab performance by both tenured and more junior tenure-track faculty. Additional metrics were documented including team size, status, and publications. Additional lab planning analysis identified short-term, medium term and long term strategies for improving performance and increasing capacity through strategic reconfigurations and capital investments.

SPACE UTILIZATION AND BENCHMARKING STUDY

SmithGroup (as Paulien & Associates) performed space needs and utilization analyses on classrooms, laboratories, offices, and informal learning spaces. One specific focus was to concentrate on science and engineering space in support of institutional strategic goals for a significant increase in research. Due to a time lag for constructing new facilities, campus leadership wanted to optimize the use of existing space. This required an in-depth analysis of all laboratory intensive space, used for both instruction and research. The analysis identified potential opportunities for increased research laboratory activity and recommended best practices for space management policies and procedures.



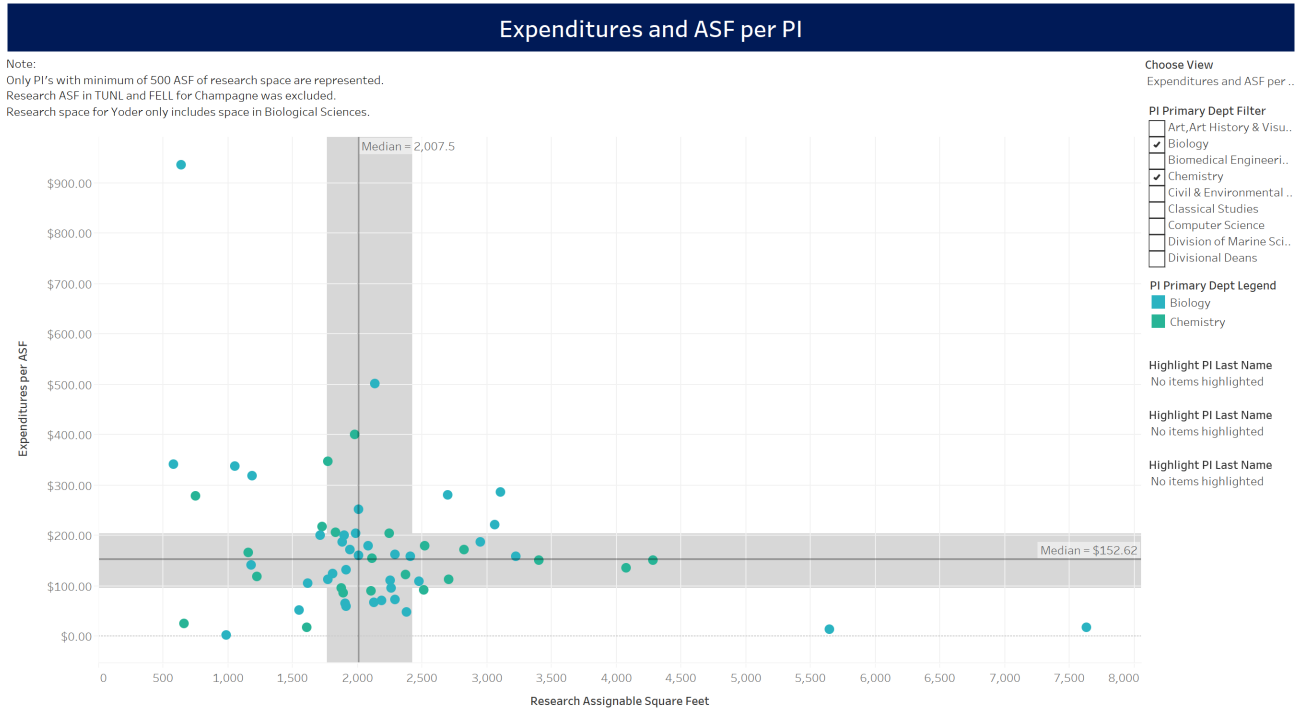
The initial effort consisted of cataloging existing space and creating interactive space inventory dashboards that showed the distribution of space types by building and by academic unit. This tool helped highlight the high concentrations of laboratory research space in a handful of key buildings and allows user to filter data by college and department.



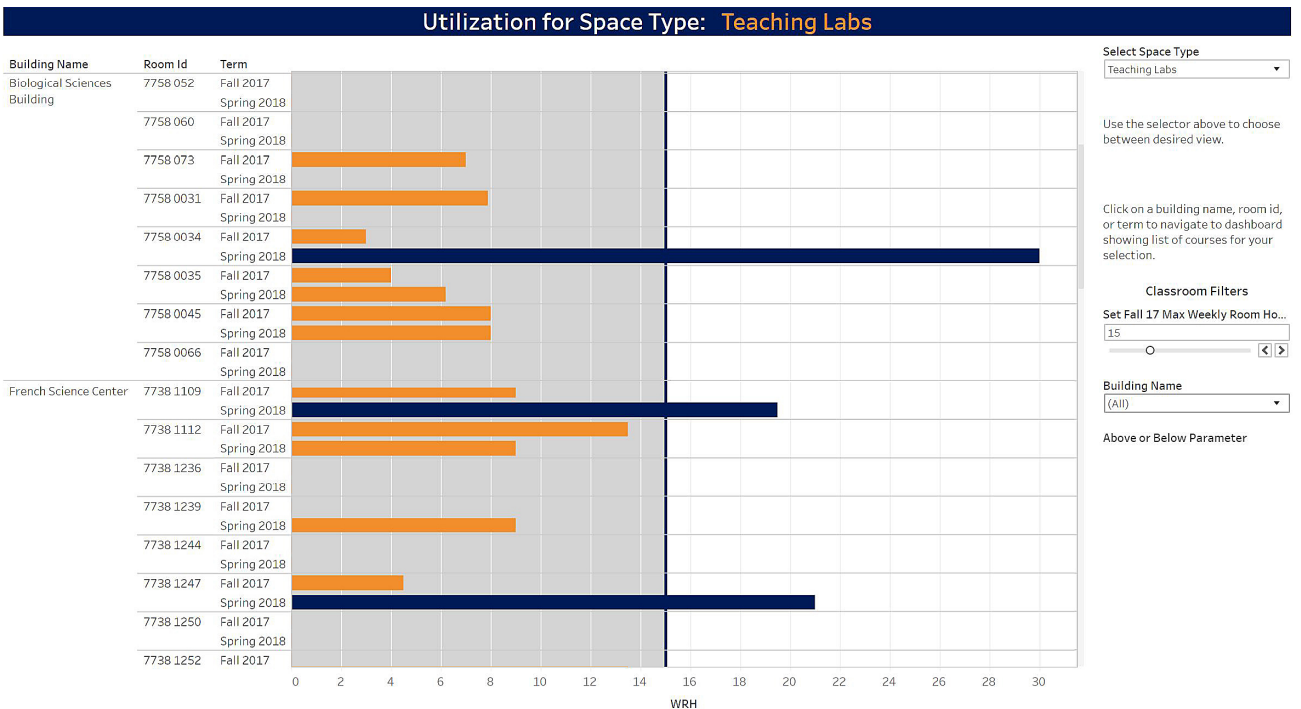
SmithGroup also conducted a benchmarking study to determine where Duke's space utilization ranked in comparison to Ivy and Ivy Plus peer institutions. SmithGroup also worked closely with stakeholders to identify issues and opportunities for increased efficiencies. SmithGroup was able to recommend best practices for space utilization and space standards based on SmithGroup's data from other peer institutions and the analysis of instructional space utilization, allocation of conference rooms and offices, and research productivity metrics.

RESEARCH LAB PRODUCTIVITY

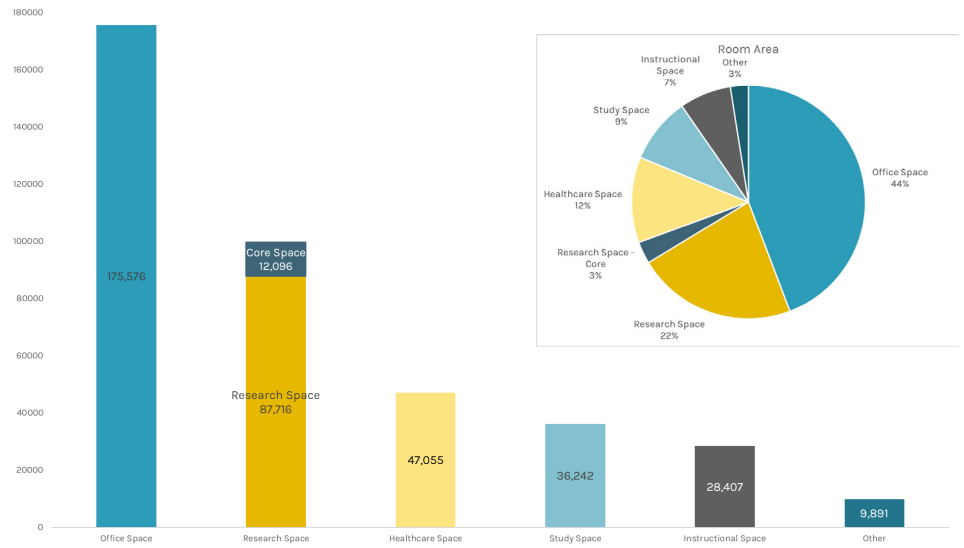
Understanding how existing research was being used, a number of productivity metrics were developed in collaboration with the campus. For example principal investigator (PI) expenditure data was graphed with assignable square footage of laboratory space, resulting in a productivity metric of expenditures/ASF. Similar metrics were also developed around space and expenditures per team member. The data was then graphed, with filters by department; hover boxes provide additional data regarding each Principal investigator in terms of expenditures, team size, and space allocation.



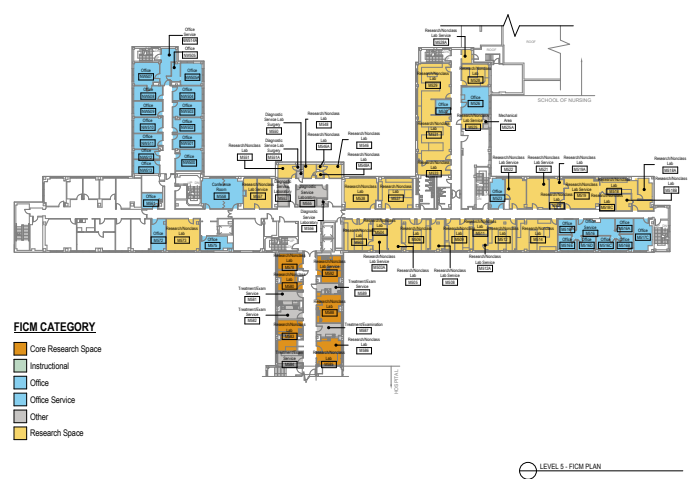
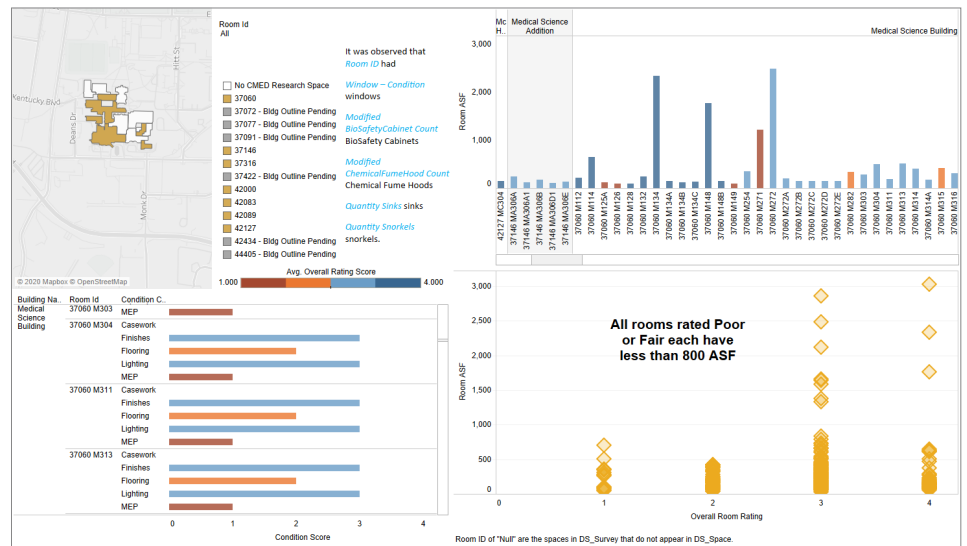
An analysis of teaching lab utilization also indicated strategies for optimizing lab use and the potential conversion of these utility intensive space for research.



Research metrics involving direct, indirect and total costs were compiled from multiple data sets and married with space and room data by department and by principal investigator. Dashboards were used to help visualize the connections between space and PI performance.



The School also recognized that the quality of space was a critical factor for research productivity, so SmithGroup also performed a room-by-room field survey of existing conditions and then developed interactive dashboards to display the data and enable users to evaluate individual rooms, by such criteria as lab utilities, MEP, casework, general condition, and number of chemical fume hoods or biosafety cabinets.



Design a Better Future

SMITHGROUP

smithgroup.com
303.832.3272

899 Logan Street
Suite 508
Denver, CO 80203