# NC STATE
## PHYSICAL MASTER PLAN

PHYSICAL MASTER PLAN UPDATE

7.29.2022

# TODAY'S AGENDA

- Master Plan Process
- Enrollment Projections
- College of Engineering – Preliminary Needs Analysis
- Space Benchmarking

MASTER PLAN PROCESS

# MASTER PLAN SCHEDULE
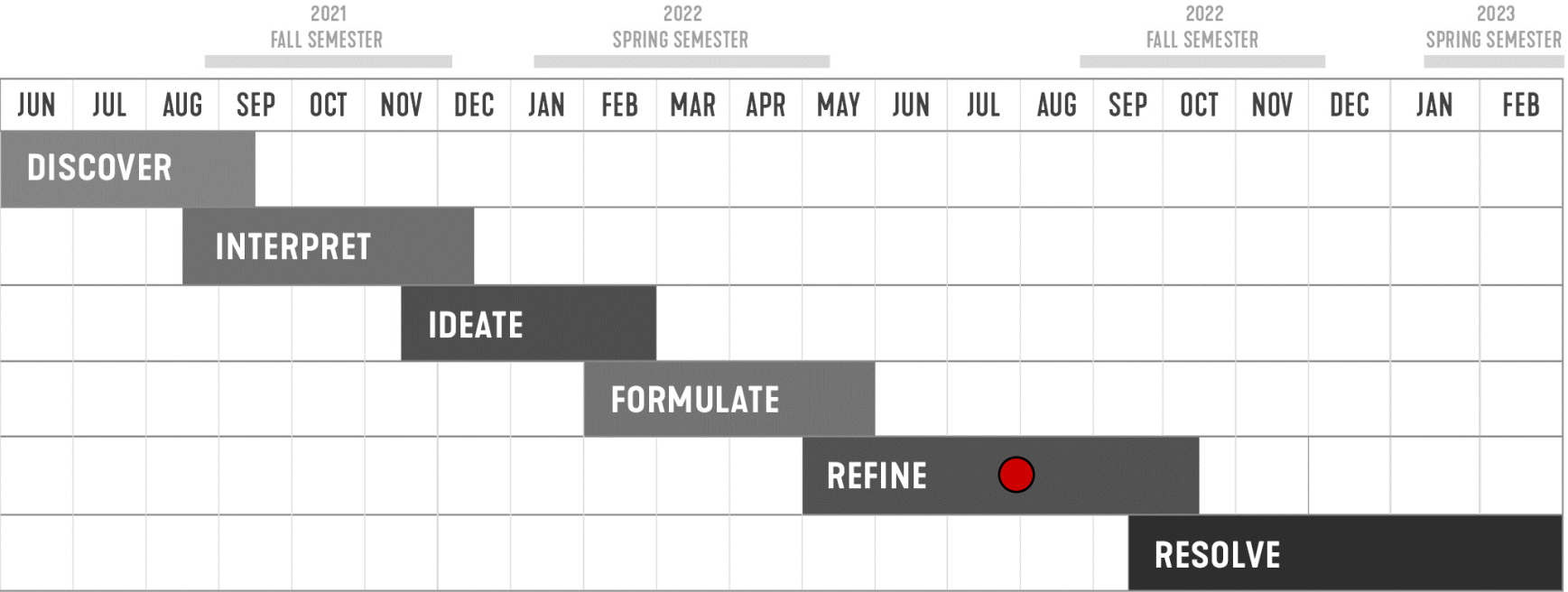
# REFINE

PHASE 5



**Preliminary Master Plan**

**Design Guidelines & Standards**

**Final Draft Master Plan Recommendations**

**Illustrative Renderings**

**Phasing & Implementation Plan**

**Campus Visit: Preliminary Master Plan**

**Workshops (Early Fall)**

# RESOLVE

PHASE 6



**Final Master Plan**

**Campus Visit: Final Master Plan Review**

**Draft Physical Master Plan Report**

    Executive Summary

    Technical Report

    Appendix

**Report Review**

**Final Documentation**

**Campus Visit: Board of Trustees Final Review**

# CAMPUS ENGAGEMENT

# MASTER PLAN WEBSITE

https://masterplan.ncsu.edu
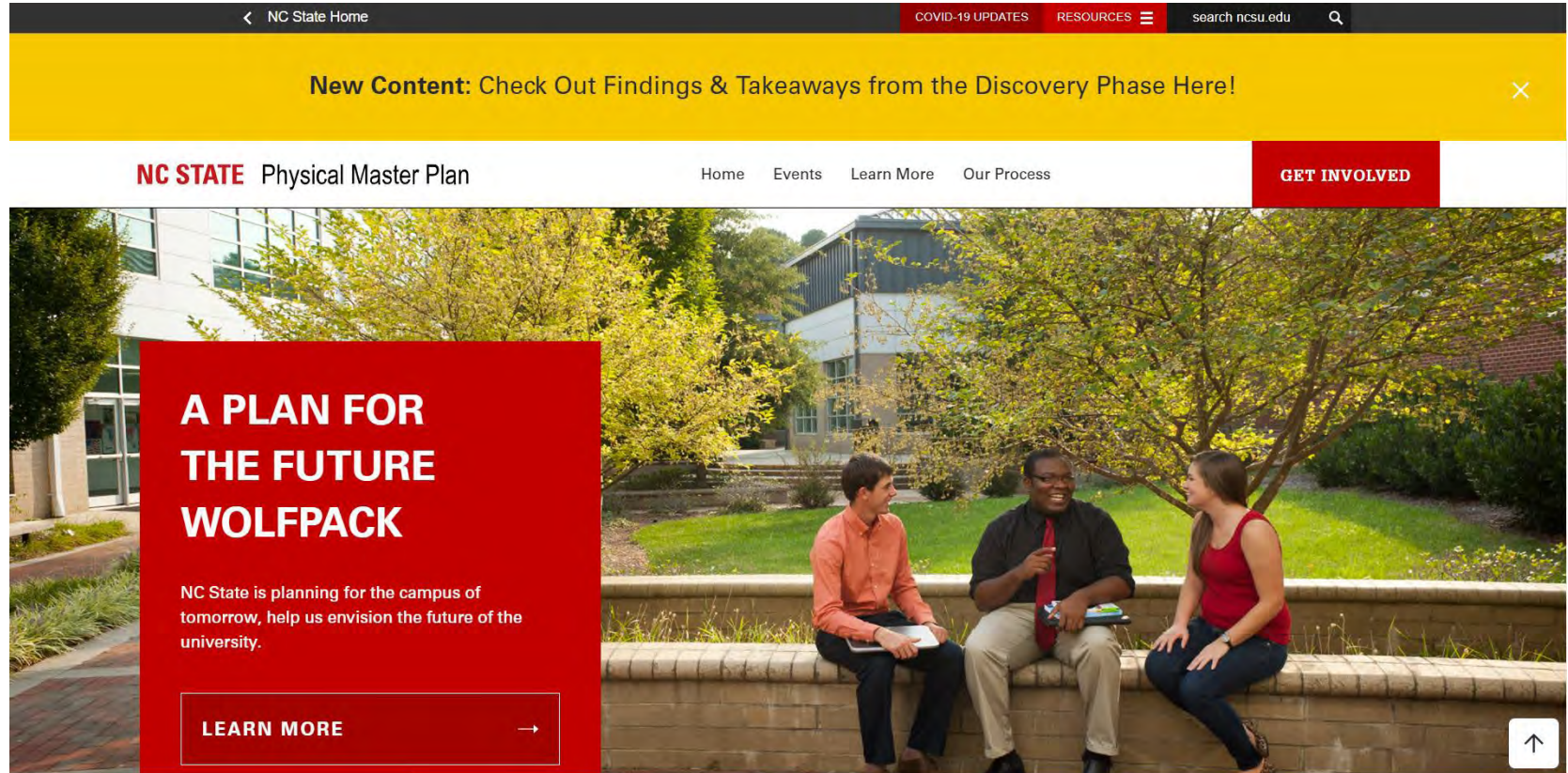
# GUIDING PRINCIPLES

Reinforce Culture and Place

Align Facilities with Mission

Steward Campus Resources

Strengthen Campus Connections

Elevate the Campus Experience

Ensure Infrastructure Reliability

# PLANNING ASSUMPTIONS

|  | **FALL 2021** | **YEAR 2030** |
|---|---|---|
| **Enrollment (FTE)** *(Headcount)* | **33,043** *(36,831)* | **39,829** *(44,342)* |
| **Faculty (FTE)** *(Headcount)* | **2,147** *(2,358)* | **2,513** *(2,740)* |
| **Staff (FTE)** *(Headcount)* | **10,835** *(16,923)* | **11,665** *(18,035)* |

*\*Faculty are assumed to grow at the same rate as students; staff at half the rate. (The growth rates are by college.)*
*Engineering & Veterinary Medicine are the exceptions, for which, targeted projections were provided by CoE & CVM.*
*Athletics employees and space are not included in the analysis or data presented in the analysis.*

# PLANNING ASSUMPTIONS

ENROLLMENT GROWTH – HEADCOUNT

| College | 2021 | | | Projected 2030 | | | Delta | |
|---|---|---|---|---|---|---|---|---|
| | Undergraduate | Graduate | TOTAL | Undergraduate | Graduate | TOTAL | # | % |
| College of Agriculture and Life Science | 2,890 | 1,139 | **4,029** | 3,418 | 1,152 | **4,570** | 541 | 13% |
| College of Design | 614 | 310 | **924** | 620 | 354 | **974** | 50 | 5% |
| College of Education | 618 | 1,339 | **1,957** | 628 | 1,533 | **2,161** | 204 | 10% |
| College of Engineering | 6,938 | 3,199 | **10,137** | 9,473 | 4,499 | **13,972** | 3,835 | 38% |
| College of Humanities & Social Sciences | 3,786 | 914 | **4,700** | 3,822 | 969 | **4,792** | 92 | 2% |
| College of Management | 3,610 | 947 | **4,557** | 4,794 | 1,354 | **6,149** | 1,592 | 35% |
| College of Natural Resources | 1,567 | 537 | **2,104** | 1,875 | 581 | **2,456** | 352 | 17% |
| College of Sciences | 3,100 | 1,020 | **4,120** | 3,441 | 1,350 | **4,791** | 671 | 16% |
| College of Textiles | 764 | 237 | **1,001** | 765 | 318 | **1,083** | 82 | 8% |
| College of Vet Medicine | 1 | 487 | **488** | 1 | 580 | **581** | 93 | 19% |
| University College | 1,218 | - | **1,218** | 1,218 | - | **1,218** | 0 | 0% |
| Other | 1,476 | 120 | **1,596** | 1,476 | 120 | **1,596** | 0 | 0% |
| **TOTAL** | **26,582** | **10,249** | **36,831** | **31,532** | **12,811** | **44,342** | **7,511** | **20%** |

*Note: 2030 figures are based on enrollment trends analysis provided by NC State except for Engineering & Veterinary Medicine, which was provided by CoE & CVM.*

# PLANNING ASSUMPTIONS

ENROLLMENT GROWTH – FTE

| College | 2021 | | | Projected 2030 | | | Delta | |
|---|---|---|---|---|---|---|---|---|
| | Undergraduate | Graduate | TOTAL | Undergraduate | Graduate | TOTAL | # | % |
| College of Agriculture and Life Science | 2,798 | 878 | **3,675** | 3,309 | 887 | **4,196** | 521 | 14% |
| College of Design | 598 | 285 | **883** | 604 | 325 | **930** | 47 | 5% |
| College of Education | 608 | 982 | **1,590** | 618 | 1,124 | **1,742** | 152 | 10% |
| College of Engineering | 6,639 | 2,588 | **9,227** | 9,065 | 3,640 | **12,705** | 3,478 | 38% |
| College of Humanities & Social Sciences | 3,664 | 792 | **4,456** | 3,700 | 840 | **4,539** | 83 | 2% |
| College of Management | 3,491 | 633 | **4,123** | 4,635 | 905 | **5,540** | 1,417 | 34% |
| College of Natural Resources | 1,520 | 408 | **1,928** | 1,819 | 441 | **2,260** | 332 | 17% |
| College of Sciences | 3,025 | 814 | **3,839** | 3,358 | 1,077 | **4,434** | 596 | 16% |
| College of Textiles | 745 | 202 | **947** | 746 | 271 | **1,017** | 70 | 7% |
| College of Vet Medicine | 1 | 473 | **474** | 1 | 563 | **564** | 90 | 19% |
| University College | 1,207 | - | **1,207** | 1,207 | - | **1,207** | 0 | 0% |
| Other | 575 | 120 | **695** | 575 | 120 | **695** | 0 | 0% |
| **TOTAL** | **24,871** | **8,172** | **33,043** | **29,637** | **10,192** | **39,829** | **6,786** | **21%** |

*Note: 2030 figures are based on enrollment trends analysis provided by NC State except for Engineering and Veterinary Medicine, which were provided by CoE & CVM.*

# ENROLLMENT PROJECTIONS

Assumption Details

- **Student Enrollment**
  - Engineering increases enrollment by 3,835 students
  - Veterinary Medicine increases enrollment by 93 students
  - Other colleges increase as identified in the Enrollment Management trends analysis
  - Overall, student headcount increases by 20%
- **Employee Growth**
  - Engineering provided targeted growth to support enrollment increase
  - Other colleges' faculty will grow by the expected enrollment increase for their individual college; staff for these colleges will grow by half the expected enrollment increase
  - Faculty for non-college/school units will grow by 20% (same as the total University enrollment increase)
  - Staff for non-college/school units will increase by 10% (half the total University enrollment increase)

COLLEGE OF ENGINEERING
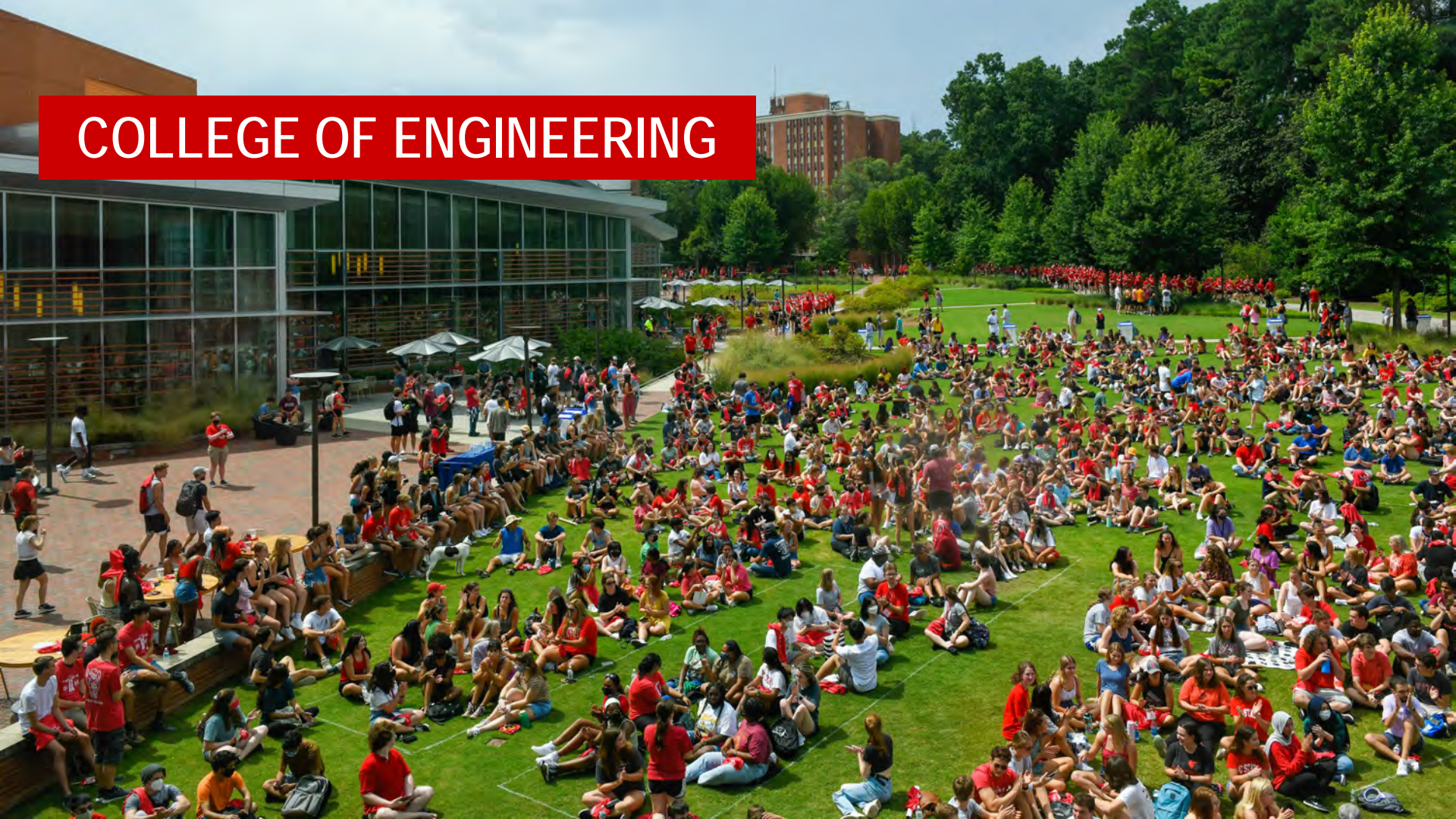
# COLLEGE-WIDE SPACE NEED SUMMARY

| Space Needs Summary | Classrooms | Teaching Labs | Open Labs | Offices | Research Labs | Collaboration | Total |
|---|---|---|---|---|---|---|---|
| Total Existing Space | 54,691 | 60,151 | 35,342 | 276,927 | 310,449 | 15,142 | **752,702** |
| Total Current Need | 53,748 | 86,858 | 49,212 | 210,060 | 357,300 | 16,873 | **774,051** |
| Total Future Need | 78,195 | 106,322 | 64,581 | 283,600 | 439,500 | 22,142 | **994,340** |
| Current Surplus (Deficit) | 943 | (26,707) | (13,870) | 66,867 | (46,851) | (1,731) | **(21,349)** |
| Future Surplus (Deficit) | (23,504) | (46,171) | (29,239) | (6,673) | (129,051) | (7,000) | **(241,638)** |

- Currently, College-wide space is balanced overall:
  - 15% deficit in Research space
  - 24 % surplus in Office space
  - 44% deficit in Teaching Lab space
- In the future, a slight space deficit increases to almost 250,000 ASF, 32%.

# PLANNING ASSUMPTIONS

ENROLLMENT

| Enrollment by Department | Bachelor's | | | Master's | | | Doctorate | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021 | Increase | Percentage Increase | 2021 | Increase | Percentage Increase | 2021 | Increase | Percentage Increase | |
| College | 2,064 | 700 | 34% | 69 | 70 | 101% | | | | **2,903** |
| Biomedical Engineering | 291 | 126 | 43% | 13 | 20 | 154% | 60 | 30 | 50% | **540** |
| Civil, Construction and Environmental Engineering | 587 | 144 | 25% | 149 | 30 | 20% | 155 | 50 | 32% | **1,115** |
| Chemical and Biomolecular Engineering | 413 | 198 | 48% | 93 | 30 | 32% | 134 | 70 | 52% | **938** |
| Computer Science | 992 | 468 | 47% | 497 | 180 | 36% | 207 | 120 | 58% | **2,464** |
| Electrical and Computer Engineering | 845 | 415 | 49% | 454 | 120 | 26% | 281 | 180 | 64% | **2,295** |
| Industrial and Systems Engineering | 327 | 58 | 18% | 173 | 40 | 23% | 79 | 50 | 63% | **727** |
| Mechanical and Aerospace Engineering | 1,205 | 288 | 24% | 254 | 80 | 31% | 151 | 100 | 66% | **2,078** |
| Materials Science Engineering | 111 | 54 | 49% | 42 | 10 | 24% | 84 | 40 | 48% | **341** |
| Nuclear Engineering | 90 | 54 | 60% | 42 | 10 | 24% | 94 | 40 | 43% | **330** |
| Total | **6,925** | **2,505** | | **1,786** | **590** | | **1,245** | **680** | | **13,731** |

*Note: Existing headcount data retrieved from the Institutional Strategy & Analysis factbook.*
*Totals do not include Biomanufacturing and Biological & Agricultural Engineering.*

NC STATE  Physical Master Plan

SMITHGROUP

# PLANNING ASSUMPTIONS

FACULTY & STAFF

| Department | Current Faculty & Staff | Current Faculty | Future Faculty & Staff | Future Faculty |
|---|---|---|---|---|
| College | 112 | - | 133 | - |
| Biomanufacturing | 47 | 2 | 51 | 2 |
| Biomedical Engineering | 103 | 23 | 139 | 27 |
| Civil, Construction and Environmental Engineering | 233 | 49 | 295 | 56 |
| Chemical and Biomolecular Engineering | 193 | 32 | 278 | 42 |
| Computer Science | 296 | 59 | 450 | 79 |
| Electrical and Computer Engineering | 391 | 84 | 609 | 112 |
| Industrial and Systems Engineering | 136 | 24 | 198 | 31 |
| Mechanical and Aerospace Engineering | 221 | 54 | 346 | 70 |
| Materials Science Engineering | 122 | 25 | 171 | 30 |
| Nuclear Engineering | 128 | 24 | 175 | 29 |
| Total | 1,982 | 376 | 2,845 | 478 |

*Note: Existing employee data provided as part of Physical Master Plan effort.*

SMITHGROUP

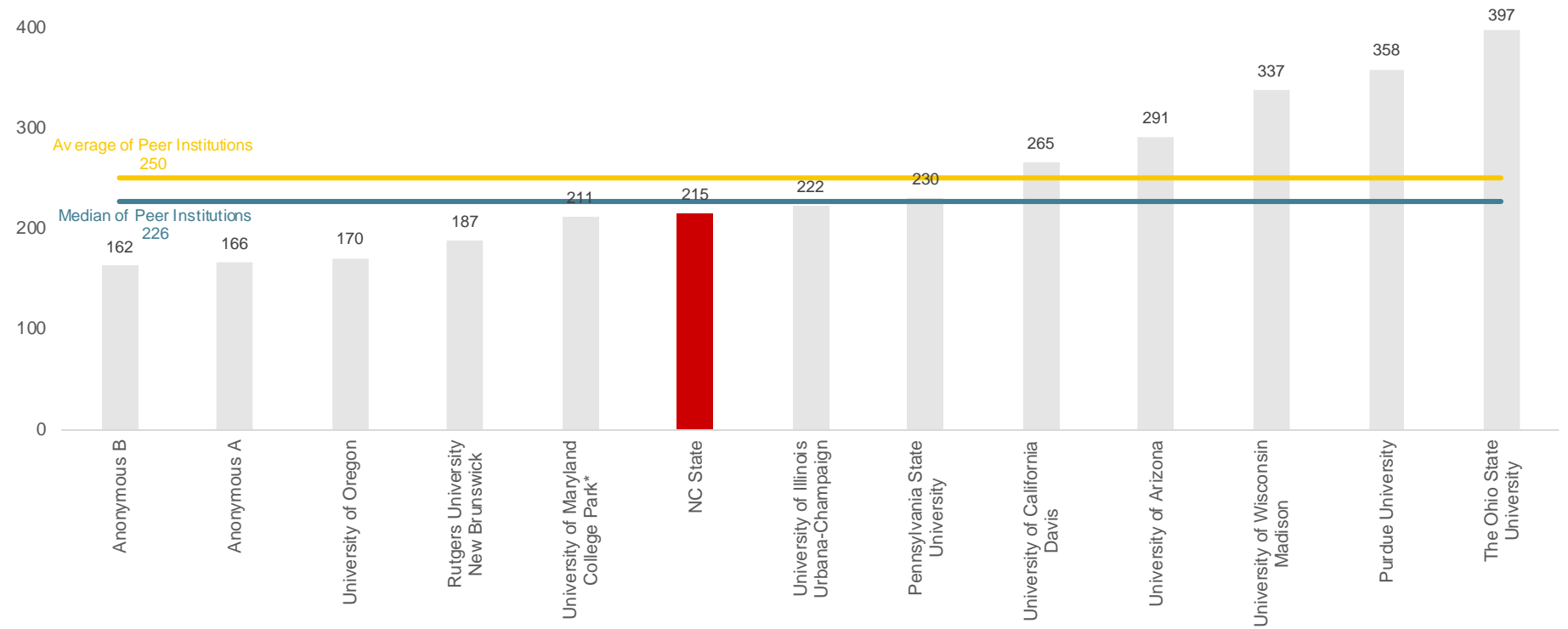SPACE BENCHMARKING

# BENCHMARKING ANALYSIS

UNIVERSITY-IDENTIFIED PEERS

| | Existing Assignable Space | Student FTE | Faculty FTE |
|---|---|---|---|
| **NC State** | **7,090,903** | **33,044** | **2,202** |
| The Ohio State University | 22,668,596 | 57,132 | 2,700 |
| Pennsylvania State University | 9,567,327 | 41,592 | 3,619 |
| Purdue University | 12,794,930 | 35,745 | 1,835 |
| Rhode Island School of Design | 834,947 | 2,578 | 287 |
| Rutgers University-New Brunswick | 8,330,934 | 44,524 | 3,716 |
| University of Arizona | 11,424,839 | 39,313 | 865 |
| University of California-Davis | 10,051,191 | 37,948 | 1,598 |
| University of Illinois at Urbana-Champaign | 10,818,997 | 48,675 | 3,191 |
| University of Maryland-College Park | 7,575,919 | 35,962 | 3,677 |
| University of Oregon | 3,774,016 | 22,143 | - |
| University of Wisconsin-Madison | 13,246,208 | 39,308 | 2,009 |
| Anonymous A | 5,335,937 | 32,206 | - |
| Anonymous B | 5,152,625 | 31,738 | 1,292 |

*Residential space is excluded.*

- Compared assignable space, grouped according to the National Center for Education Statistics' Postsecondary Education Facilities Inventory and Classification (FICM) taxonomy

- Variances in application of FICM such as computational research labs classified as offices
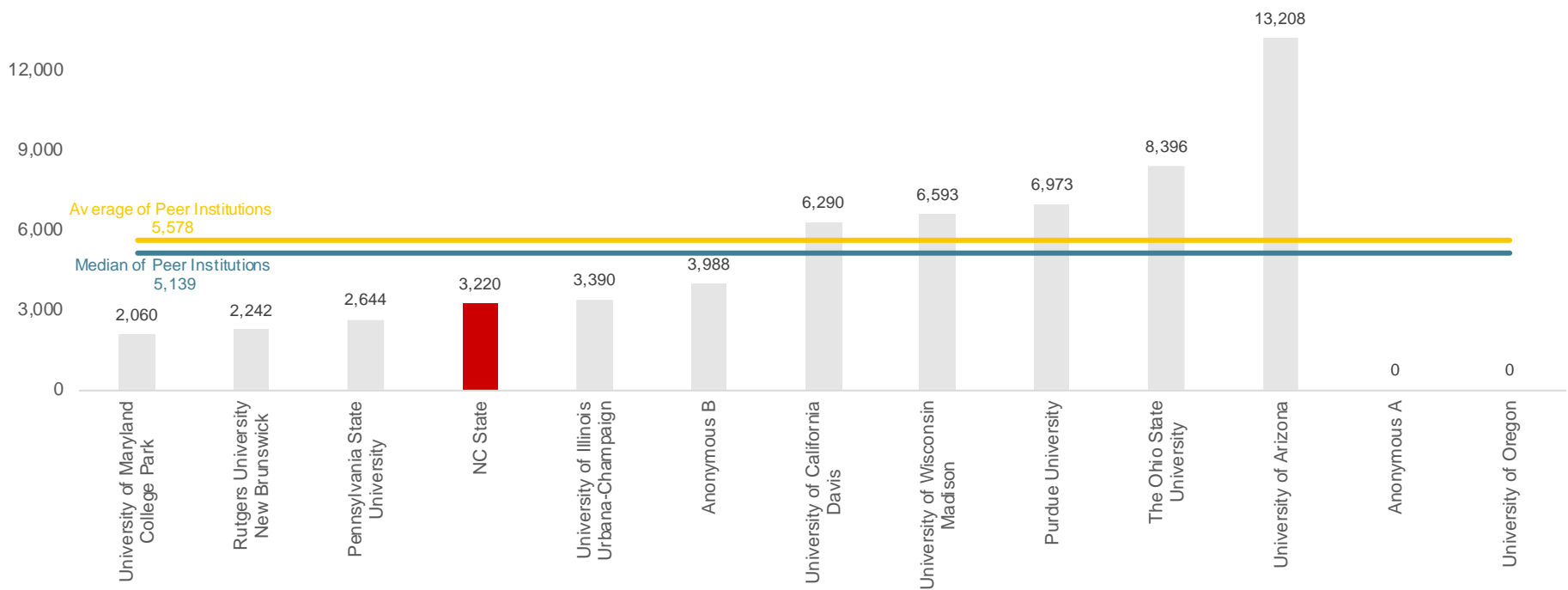
# SPACE PER STUDENT

TOTAL ASF / STUDENT FTE



Average of Peer Institutions
250

Median of Peer Institutions
226

| Institution | Value |
|---|---|
| Anonymous B | 162 |
| Anonymous A | 166 |
| University of Oregon | 170 |
| Rutgers University New Brunswick | 187 |
| University of Maryland College Park* | 211 |
| NC State | 215 |
| University of Illinois Urbana-Champaign | 222 |
| Pennsylvania State University | 230 |
| University of California Davis | 265 |
| University of Arizona | 291 |
| University of Wisconsin Madison | 337 |
| Purdue University | 358 |
| The Ohio State University | 397 |

*Total includes spaces coded 100 through 800*

*University of Maryland-College Park only provided Student headcount (HC). Student FTE was calculated using the average change between HC and FTE for all other institutions in the study.*
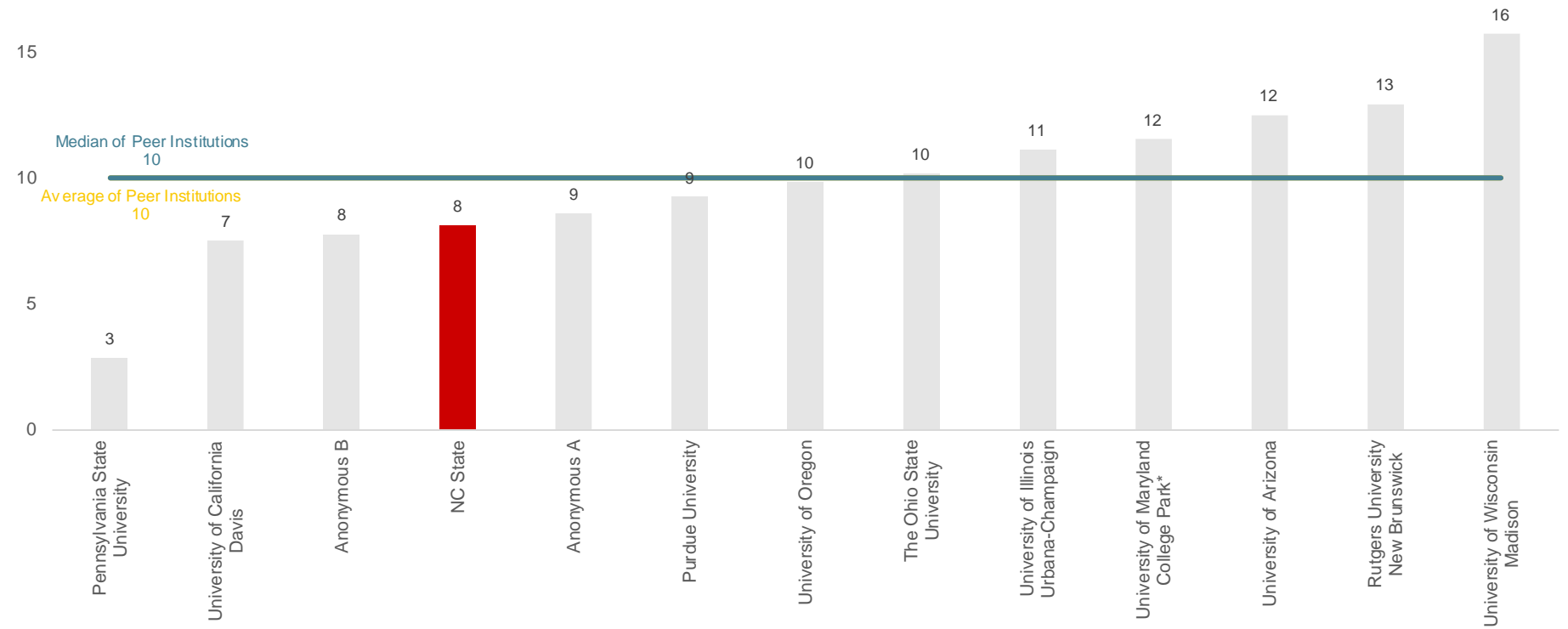
NC STATE Physical Master Plan

SMITHGROUP

# CLASSROOM SPACE PER STUDENT

CLASSROOM ASF / STUDENT FTE

Median of Peer Institutions: 10

Average of Peer Institutions: 10

| Institution | Value |
|---|---|
| Pennsylvania State University | 3 |
| University of California Davis | 7 |
| Anonymous B | 8 |
| NC State | 8 |
| Anonymous A | 9 |
| Purdue University | 9 |
| University of Oregon | 10 |
| The Ohio State University | 10 |
| University of Illinois Urbana-Champaign | 11 |
| University of Maryland College Park* | 12 |
| University of Arizona | 12 |
| Rutgers University New Brunswick | 13 |
| University of Wisconsin Madison | 16 |

*Classroom spaces include spaces coded in the 100s.*

*University of Maryland-College Park only provided Student headcount (HC). Student FTE was calculated using the average change between HC and FTE for all other institutions in the study.*

NC STATE Physical Master Plan

SMITHGROUP

# INSTRUCTIONAL SPACE PER STUDENT

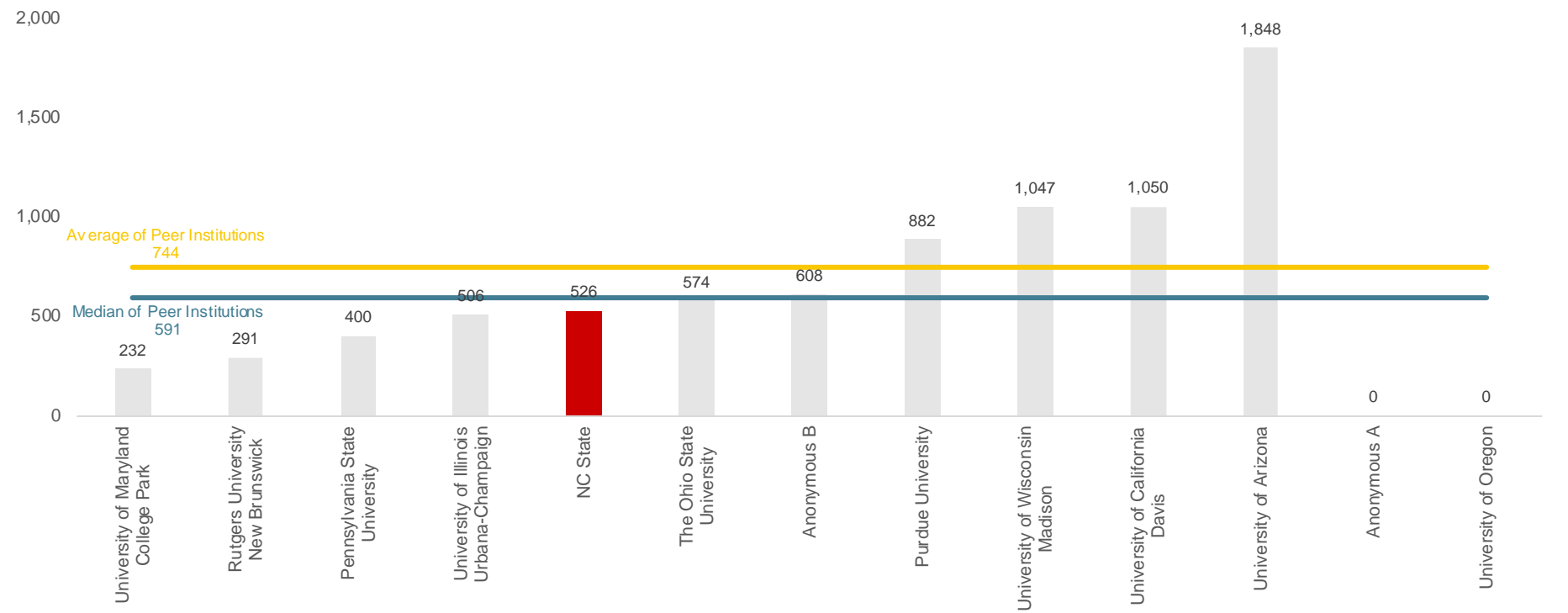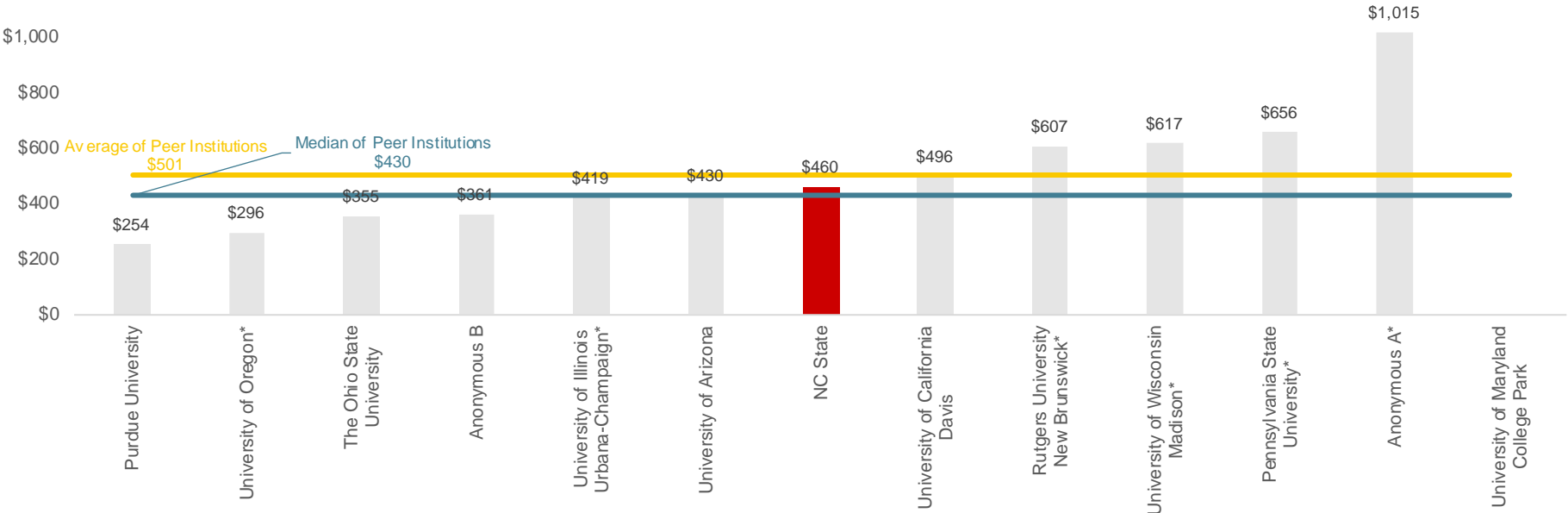INSTRUCTIONAL ASF / STUDENT FTE
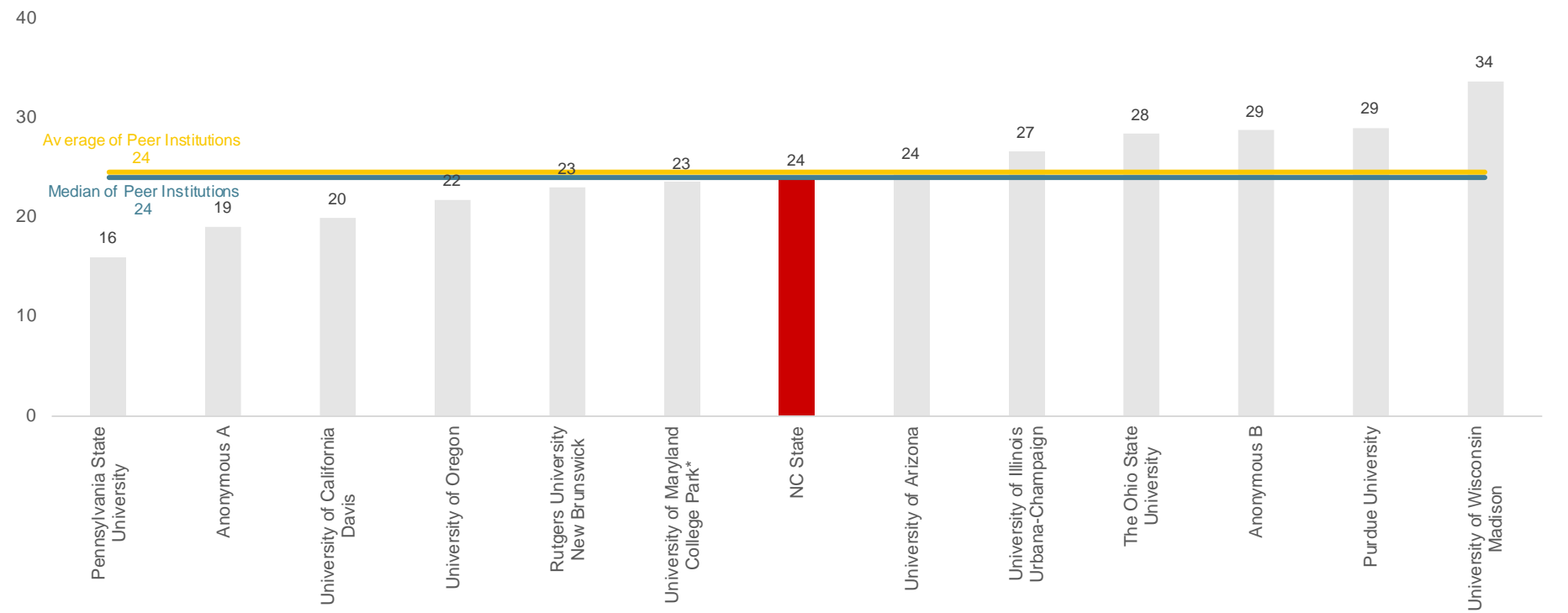


Instructional spaces include spaces coded in the 100s, 210s, and 220s.

*University of Maryland-College Park only provided Student headcount (HC). Student FTE was calculated using the average change between HC and FTE for all other institutions in the study.

NC STATE Physical Master Plan

SMITHGROUP

# RESEARCH SPACE PER FACULTY

RESEARCH ASF / FACULTY FTE

Average of Peer Institutions 744
Median of Peer Institutions 591

| Institution | Value |
|---|---|
| University of Maryland College Park | 232 |
| Rutgers University New Brunswick | 291 |
| Pennsylvania State University | 400 |
| University of Illinois Urbana-Champaign | 506 |
| NC State | 526 |
| The Ohio State University | 574 |
| Anonymous B | 608 |
| Purdue University | 882 |
| University of Wisconsin Madison | 1,047 |
| University of California Davis | 1,050 |
| University of Arizona | 1,848 |
| Anonymous A | 0 |
| University of Oregon | 0 |

*Research space include spaces coded in the 250s.*

**NC STATE** Physical Master Plan

SMITHGROUP

# BENCHMARKING ANALYSIS TAKEAWAYS

- Space per student is **below** the peer group (215 ASF)
- Space per faculty is **below** the peer group (3,220 ASF)
- Classroom space per student is **below** the peer group (8 ASF)
- Instructional space per student is in **balance** (24 ASF)
- Research space per faculty is near the **middle** of the peer group (526 ASF)
- Expenditures per square foot is **below** the average but above the median ($460/ASF)
- Office space per faculty is **below** the peer group averages and medians (911 ASF)

# NC STATE
## PHYSICAL MASTER PLAN

---

### PHYSICAL MASTER PLAN UPDATE

---

7.29.2022