

# MAKING INTERDISCIPLINARITY CONCRETE: VIEWS FROM LEADERS OF INTERDISCIPLINARY RESEARCH BUILDINGS IN HIGHER EDUCATION

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## ABSTRACT

Among strategies that campus leaders and research administrators employ to spur interdisciplinary research in U.S. higher education, one of the costliest—and increasingly popular—is designated interdisciplinary research spaces and buildings. Yet while interdisciplinary research buildings, often focused on the sciences, stand as significant investments and concrete manifestations of institutional interdisciplinary commitment, empirical research thus far has shed little light on who leads them, the challenges these leaders face, and buildings' broader aims and effectiveness. Using interviews with 26 leaders of and documents related to interdisciplinary research buildings at ten U.S. higher education R1 institutions, this qualitative multi-site case study begins to fill this gap. In probing key issues attending interdisciplinary buildings as a growing tool for research administration and development, this study describes various types of interdisciplinary building leaders; details novel challenges, lessons learned and suggested leadership practices; and explores how leaders already do (and future scholarship might) conceptualize and gauge building effectiveness. In doing so, this work provides novel and timely contributions to the current practice of leading interdisciplinary research efforts and grounds future directions for research

### Keywords:

Interdisciplinary, higher education, research administration, infrastructure, leadership, organizational priorities

## MAKING INTERDISCIPLINARITY CONCRETE: UNDERSTANDING HIGHER EDUCATION INTERDISCIPLINARY RESEARCH BUILDINGS AND THEIR LEADERSHIP

In U.S. higher education today, institutions of higher education (IHEs) and research administrators make many attempts to spur interdisciplinary research (IDR). They modify strategic plans to enable academic flexibility and transcend disciplinary and structural barriers (Harris, 2010; Harris & Holley, 2008). They create and institutionalize interdisciplinary academic fields and programs (e.g., Brint, Turk-Bicakci, et al., 2009; Camic, 1995; Olzak & Kangas, 2008; Rojas, 2006; Small, 1999). They hire faculty strategically via cluster initiatives, joint appointments, and affiliations across academic units (e.g., Bloom et al., 2020; Hart & Mars, 2009; Sá, 2008b; Samuels, 2020). They create novel academic structures including research clusters, centers, and institutes (e.g., Boardman & Corley, 2008; Geiger, 1990; Geiger & Sá, 2008; Sá & Oleksiyenko, 2011). And they organize physical spaces—within, across and in addition to existing campus infrastructure—in which IDR and other types of interdisciplinary work can take place (e.g., Harris & Holley, 2008; Kabo et al., 2014; Sá, 2008a).

Within the growing landscape of IHEs' IDR strategies, scholars have more recently begun to consider the influence of strategies including hiring and research centers on outcomes like faculty IDR productivity, collaboration and scholarly impact (e.g., Biancani et al., 2018; Bloom et al., 2020; Curran et al., 2020; Leahey et al., 2017; Samuels, 2020). Though some work has explored the intentions and outcomes of spaces for IDR, specifically (e.g., Harris & Holley, 2008; Kabo et al., 2014), empirical inquiry is scant relative to the recent proliferation of these spaces across IHEs. A basic internet search reveals entire buildings devoted to IDR ("IDR buildings")—a particularly costly subtype of interdisciplinary space—cropping up at IHEs across the U.S.; many have been erected in the past decade (e.g., Michigan State University Office of Research and Innovation, 2019; Shaw, 2021). Often costing hundreds of millions of dollars, such buildings in sum represent billions of dollars of investment.

As IDR buildings claim greater proportions of campus real estate and university funds, lacking empirical knowledge of their stewardship—including their design, use, management, and effects—presents a challenge for research administrators seeking to realize the promise of such buildings, as well as scholarship seeking to understand how they function. Yet the cost, proliferation, and high hopes associated with these IDR spaces necessitates a better understanding of the phenomenon of IDR buildings, where IHEs seek to make interdisciplinarity "concrete."

## PURPOSE

This qualitative multi-site case study seeks to meet this need by illuminating the leadership of IDR in the U.S. Using interviews with leaders of and documents from IDR-focused buildings on ten R1 IHE campuses, this work poses three research questions. First, what are the roles and responsibilities of IDR building leaders? Addressing this question synthesizes information on role level and domain as well as primary responsibilities to typologize a diverse set of IDR leaders, including research administrators as well as space planners, building managers and others. Second, what challenges do these leaders encounter, and what lessons do they learn from this experience? Addressing this question delineates key leadership needs in the management of IDR buildings. Last, how do IDR building leaders perceive building goals and effectiveness? Addressing this question considers the purported impact(s) of these buildings on fostering IDR and other aims and suggests how current practitioners are, and future research might, more systematically gauge success.

In sum, answers to these questions are expected to provide a baseline of knowledge about the rapidly expanding interdisciplinary research building landscape; detail emerging and potential best practices in their design, construction and ongoing management; and probe how scholars, research administrators and other campus leaders may evaluate these buildings' success at achieving myriad purposes. This work thus provides foundational insight into a costly and highly visible interdisciplinary strategy in U.S. higher education that is increasingly common yet understudied.

## LITERATURE

Two strands of literature ground this study. The first explores interdisciplinarity in U.S. higher education, mapping and evaluating the various strategies institutions and research administrators implement to spur IDR and other interdisciplinary activities (e.g., Harris, 2010; Holley, 2009a; Sá, 2008a) and the changing academic and organizational landscapes that result (e.g., Brint, Turk-Bicakci, et al., 2009; Jacobs, 2014; Leahey et al., 2019; Pryor, 2020; Pryor & Barringer, 2021). The second strand of literature investigates the role in higher education and research of physical space, generally (e.g., Fugazzotto, 2009; Kabo et al., 2014; Owen-Smith, 2018; Strange & Banning, 2001; Temple, 2014), and IDR space, specifically (e.g., Barringer et al., 2020; Harris & Holley, 2008). Together, these literatures illuminate the historical and currently evolving landscape, as well as the myriad goals

and impacts, of interdisciplinarity. This work also considers the potential role of space as a means by which campus leaders and research administrators can foster interdisciplinarity effectively.

## INTERDISCIPLINARITY IN U.S. HIGHER EDUCATION

Higher education's current and expanding interdisciplinary landscape has mid-20th-century roots, as academic disciplines have proliferated and diversified to meet demands of scientific advancement and research (Geiger, 1990); vocational curricula (Brint, 2002); and student preference (e.g., Brint et al., 2011; Brint, Turk-Bicakci, et al., 2009; Pryor, 2020; Rojas, 2010; Turk-Bicakci, 2007; Zupanelli, 2017). This process has resulted in curricular churn (e.g., Allardyce, 1982; Brint et al., 2011; Brint et al., 2012; Brint, Proctor, et al., 2009; Slaughter, 2002) and other types of dynamism, including novel disciplinary fragmentations and/or alliances (e.g., Camic, 1995; Gumport & Snyderman, 2002; Pryor & Barringer, 2021). New areas of study and scholarly interest have arisen at the intersections of disciplinary splintering, alignment, and reconstitution (e.g., Brint, Turk-Bicakci, et al., 2009; Holley, 2009b).

In the 21st century, a primary vector of interdisciplinarity has turned more tightly toward scientific advancement and generative, impactful research (e.g., Abbott, 2001; Abbott, 2002; Jacobs, 2014; Jacobs & Frickel, 2009). Seeking scientific generativity to solve complex social problems such as climate change, public health, etc., IHEs have turned to novel scientific fields of study, boundary-spanning organizational structures and processes and, increasingly, physical infrastructure to support collaborative and innovative science and research (e.g., Bloom et al., 2020; Geiger & Sá, 2008; Harris & Holley, 2008). These highly visible efforts have positioned IDR as a "cornerstone of science and research policy in the United States" (Barringer et al., 2020, p. 680) and the nexus of many of academia's "hot topics" (National Academy of Sciences & Medicine, 2005, p. 17). Scholars have recently begun to assess whether IHE efforts to spur IDR and interdisciplinary collaboration are paying off.

These assessments show mixed results. Recent work on interdisciplinary cluster hiring, for example, suggests that it does not always lead to intra-cluster collaboration and generativity (Bloom et al., 2020); when positive effects are seen, they are limited by faculty, IHE and academic field characteristics (Curran et al., 2020). Work on faculty affiliations with research centers finds similarly mixed outcomes: More citations but less work volume (Leahey et al., 2017). Still other scholarship focused on IHEs' "structural commitments" to IDR suggests that interdisciplinary departments and centers result in increased scholarly and grant activity (Leahey & Barringer, 2020). Implicit in this work is a central question: Are IDR strategies worth it? Are they worth research administrators' time and effort, worth "the size of expenditures that accompany these ambitious programs," and worth the "potential to shift some share of control over the direction of university research from faculty members to university administrators" (Bloom et al., 2020, p. 757, in their discussion of cluster hiring)? A second strand of literature explores space and IDR space in higher education.

## PLACE, SPACE AND IDR SPACE IN HIGHER EDUCATION

Despite the increasing prevalence of online learning, place and space remain highly salient across U.S. higher education. From the symbolic, bucolic geography of the Colonial-era "hilltop colleges" (Thelin, 2011); to the collective nostalgia of the "American college town" (Gumprecht, 2003); to the enduring centrality of college location in shaping enrollment (Hillman & Weichman, 2016), physical place foundationally shapes IHEs' identity, culture and function. Intra-campus geography and architecture are important, too, such that "some universities are almost defined, at least in the public mind, by their physical presence" (Temple, 2014, p. 5). Institutional space planning and use shapes all facets of campus life including student, faculty and staff recruitment and experience (e.g., Kaiser, 1975). As such, campus space bears significant practical and symbolic weight, shaping day-to-day experience and telegraphing

institutional culture, values, and logics. Within campus place and space, the designation of spaces for innovative and collaborative IDR represents a highly visible though “difficult and costly” endeavor (Harris & Holley, 2008, p. 40).

Demand for collaborative IDR spaces has expanded as interdisciplinarity has gained traction and attracted funding (e.g., Brint, 2005; Council, 2014; Harris & Holley, 2008; National Academy of Sciences & Medicine, 2005). This infrastructure boom has particularly aimed at broadening access to STEM fields for more student learners (e.g., Wu & BEST, 2004; Narum, 2013; Narum, 1992) as well as higher research productivity. Rapid construction of interdisciplinary R&D spaces, often comprising “science and clinical facilities, which are among the most expensive per square foot to build,” has “changed the face of American higher education” (Trani, 2014, p. 159). Laboratories, core facilities, vivaria, and other high-tech spaces can present novel and complex safety, security and management issues for campus research administrators and myriad other leaders including facilities personnel (Carter et al., 2019; Dorhout, 2016; Haley, 2009, 2011; Hockberger et al., 2018; Trani, 2014; Zwick, 2021). Within IHEs, these technological issues as well as use by stakeholders across campus thus often necessitate space oversight that begins at the university level. In this way, IDR spaces can mark a distinct “culture shift” from traditional departmental- and faculty-governed space (Dorhout, 2016, p. 111). And these high-risk and culturally divergent management processes are often combined with lofty goals, as such spaces aim to break down disciplinary siloes (e.g., Harris & Holley, 2008) and serve as “force multipliers” in support of myriad IHE aims (Zwick, 2021). Though an emerging literature on higher education’s IDR spaces has begun to detail their parameters, there is much we do not know about the management, functioning and outcomes of these high-cost, high-complexity and high-hope-laden spaces.

## DATA AND METHODS

To provide a foundational understanding of the leadership and management of IDR research spaces, this multisite case study draws on qualitative interviews with leaders of and institutional documents from IDR buildings at ten U.S. R1 IHEs.

## INSTITUTIONAL SITE AND LEADER PARTICIPANT SELECTION

Site and participant selection followed a three-step process. First, the research team and others convened a virtual workshop on IDR building leadership, identifying prospective invitees via an Internet search of buildings at U.S.-based IHEs that had an explicitly interdisciplinary focus (e.g., interdisciplinarity mentioned in building name, website, press release) and incorporated research in the natural science disciplines. Second, a member of the research team reached out to publicly listed leaders at prospective buildings (e.g., Building Manager, VP of Research) and secured workshop participation from leaders at 10 institutions (plus the 11th coordinating institution). Third, after the workshop the research team invited workshop attendees, all of whom were university leaders, research administrators, and other staff and faculty involved in leadership of one or more IDR buildings, to participate in this study. The study was approved by the home institution’s IRB (protocol #22.081.01E). Leaders from ten of eleven workshop participant-institutions agreed to participate. Snowball sampling via these initial contacts resulted in 26 total leader participants.

Institutions represented in this study comprise a diverse set of high-status, R1 IHEs housing between one only (4 institutions) and 2 or more (6 institutions) IDR buildings related to the sciences. Select institutional site attributes are summarized in Table 1.

**Table 1: Participating Institutions, Select Attributes**

| Institution                        | Size          | Region       | Control | Land-Grant? | AAU Member? | # Participants |
|------------------------------------|---------------|--------------|---------|-------------|-------------|----------------|
| City University East (CityU)       | 20,000+       | East Coast   | Private | No          | Yes         | 1              |
| College University (CollegeU)      | 10,000-19,999 | East Coast   | Private | No          | No          | 4              |
| Eastern City University (Eastern)  | 20,000+       | East Coast   | Private | No          | No          | 2              |
| Elite University (EliteU)          | 10,000-19,999 | Mid-Atlantic | Private | No          | Yes         | 4              |
| Middle Coast University (MiddleU)  | 20,000+       | Mid-Atlantic | Public  | Yes         | No          | 2              |
| Midwest University (Midwest)       | 20,000+       | Midwest      | Public  | Yes         | Yes         | 4              |
| Northeast University (NortheastU)  | 10,000-19,999 | East Coast   | Private | No          | Yes         | 1              |
| Southern City Tech (SouthernTech)  | 20,000+       | Southeast    | Public  | No          | Yes         | 3              |
| West State University (WestU)      | 20,000+       | West Coast   | Public  | Yes         | No          | 3              |
| Western City University (WestCity) | 20,000 +      | West Coast   | Public  | Yes         | Yes         | 2              |

## DATA COLLECTION AND ANALYSIS

Data in this study results primarily from in-depth qualitative interviews with 26 leader participants during Fall 2021. After answering a brief demographic and professional survey, participants engaged in roughly hour-long, one-on-one, semi-structured virtual interviews covering four broad topic areas: (1) leaders' IDR buildings and roles, (2) challenges and practices in IDR building leadership, (3) assessing building effectiveness, and (4) general interdisciplinarity. Interviews were held virtually to mitigate travel constraints; the use of Zoom-based video interviewing also aligns with the increasing adoption of virtual qualitative methods in the wake of the COVID-19 pandemic (e.g., Roberts et al., 2021).

In addition to interviews, institutional documents including IDR building plans and strategic visions, web copy and institutional research statements were solicited and obtained from participants directly or archived from IHE websites. Descriptive and qualitative analysis of survey and interview data address RQ1, on the roles and responsibilities of IDR building leaders. Qualitative analysis of interview data and institutional documents address RQ2, on challenges and lessons, and RQ3, on IDR building goals and effectiveness.

For interview and document data, the lead researcher undertook qualitative analysis by first completing two rounds of open coding. The first round constituted descriptive or topic coding to create “bread and butter” categories for further analytic work (Saldaña, 2015, p. 88). These categories, based loosely on research questions, included broad topics such as leadership roles (RQ1), challenges in IDR building leadership (RQ2) and assessing success (RQ3). A second round of open coding worked within and across these categories to address new ideas emerging from the data (Holley & Harris, 2019). Within leadership roles (RQ1), second-round coding generated subcodes such as *allocating, managing and re-allocating space; getting faculty buy-in and assessing success*. Within challenges in building leadership (RQ2), second-round coding generated sub-codes such as *determining building access, unclear building purpose and determining administrative and financial support*. Of particular note, COVID-19 challenges received a unique sub-code, as the pandemic was cited by multiple leaders as a factor shaping all sorts of challenges—building-related and other. And within assessing success (RQ3), sub-codes included building goals such as *beacon of campus innovation and use ID to address societal issues* as well as methods of assessment including *foot traffic, word of mouth and institutional prestige*.

As coding proceeded, the lead researcher iteratively revised and expanded open codes to ensure sensitivity to data,

exhaustiveness, mutual exclusivity and conceptual congruence (Merriam, 2009). Last, she undertook axial coding, grouping codes together within larger themes and using the constant comparative method in allocating them to themes, collapsing multiple codes or modifying code categories (Glaser & Strauss, 1967; Lincoln & Guba, 1985) until reaching analytic saturation (Creswell, 2007).

## LIMITATIONS

This work evinces three primary limitations. First, we determined our sites and participant sample purposively and in an ad hoc rather than systematic fashion; while each building and IHE represented in the study met our eligibility criteria, we did not systematically review the population of IDR buildings at U.S. R1 IHEs. Our sample is thus limited and not explicitly representative of the broader population. Relatedly, and connected to our efforts to uncover the broad array of actors involved in IDR building leadership, we included one participant whose campus did not yet have any IDR buildings up and running. We also interviewed a handful of participants who had been in their building-related roles for less than a year, as well as those who had not been employed at their institutions during various stages of the building's life (e.g., the planning and construction phase). This hindered our ability, in multiple cases, to ask in-depth questions about the initial stage of building design, resourcing and planning. We instead posed broad, atemporal questions including, "Describe your role," "Describe some challenges you've faced," and "What are some things you've found to be most effective in your building leadership?" Despite anecdotal knowledge that decision-making during this earliest phase of building planning—including foundational allocations of funds—represents a central inflection point and challenge in the lives of these buildings, our sample renders us unable to fully explore such issues in the current study.

Despite these limitations, we contend that our sample's diversity and breadth—by individual background and role, AAU status, region, number of IDR buildings, timing of their planning, etc.—strengthens the foundational nature of our findings. The broad base of knowledge we provide here also points toward future opportunities to further explore individual and institutional differences in IDR building leadership, as well as home in on key phases (e.g., the project initiation phase) of building development and leadership practice.

Second, the broader context of the COVID-19 pandemic, in its 2nd year during our data collection, foundationally shaped the challenges faced by leaders across higher education (e.g., Marinoni et al., 2020) particularly those related to space and its use (e.g., Jens & Gregg, 2021). It is therefore impossible to extricate the space-based leadership challenges we outline in this paper from the pandemic context. However, the fact that our findings align with much common wisdom about academic building challenges in general (Temple, 2014) suggests that this analysis still provides useful information to the field. Third, this study is exploratory in nature, and our findings are not generalizable to other institutions or buildings beyond those included. Yet foundational work to map the landscape of IDR buildings is needed to conduct more systemwide future research, potentially via expanded case selection or population-wide survey work. Despite these limitations, we believe this work provides novel, timely and critical insight into an important higher education trend.

## FINDINGS

Our findings suggest that IDR buildings are led by individuals who hold a diverse array of roles and responsibilities at varying levels of institutional hierarchy; that building leadership gives rise to many challenges and related opportunities for lessons learned; and that building leaders rely on a variety of objective and subjective indicators to gauge building effectiveness in achieving myriad and sometimes conflicting goals. Our initial analysis paints a rich and diverse portrait of IDR building leaders at R1 IHEs. All IHE and participant names are pseudonyms.

## ROLES AND RESPONSIBILITIES

Addressing the question, “Who is involved in IDR building leadership?” resulted in a highly variable list of roles and responsibilities held by individuals arrayed hierarchically—at the institution-, building-, and unit-level—within university organizations. At each level, we uncovered distinct role domains and professional profiles, leading us to allocate IDR building leaders to one of four unique types.

### UNIVERSITY-LEVEL LEADERS

At the university level, IDR building leaders led research administration, guided strategic and large-scale architectural planning and oversaw building governance and space customization and use. Two distinct types of university-level leaders emerged in the domains of research and innovation and space planning.

#### Leader Type #1. University-Level Research and Innovation

University-level research leaders and administrators, many of whom were Vice Presidents, Provosts or Chancellors within Offices of Innovation or Research, were among the best represented leader type in our sample (N=8) and reflected the unique university-level needs of IDR buildings. All senior research administrators and tenured faculty leaders’ primary building-related responsibilities included strategically overseeing building plans and occupants, creating multi-level and complex building governance structures (and overseeing other types of building leaders), and in some cases contributing to ongoing strategic efforts aimed at fostering intra-building community. Preoccupied with what Elite University (EliteU) research leader Marcus called “the whole gamut” of broad strategic planning and day-to-building life and processes, research and innovation leaders described their roles with positive phrases like *exciting*, *challenging* and *brainstorming*; innovation-oriented phrases like *cutting edge* and *brand enhancement*; and phrases focused on consensus-building and mediating like *advocacy*, *influence*, *liminal*, *intermediary* and *collaboration*.

#### Leader Type #2. University-Level Space Planning

University-level space planners, many within Offices of University Planning, were also well-represented (N=5). As design and architecture professionals (one also held a faculty role), they primarily worked alongside external architecture and construction firms, as well as individual building occupants, to implement building design, project-manage construction and, as College University (CollegeU) space planner Lillian described it, “align spaces with people.” Highly attuned to ways in which the concrete process of construction clashed with manifold, murky and shifting stakeholder priorities, space planning leaders described their roles with words like *interactive*, *negotiator*, *balance*, *communicator*, *political*, and *diplomat*.

#### Leader Type #3: Building-Level Leaders

Typified by leadership within a building boundary, building-level leaders (N=8) contributed to “boots on the ground,” day-to-day management of buildings by facilitating intra-building communication; resolving disputes and fostering community; and tracking metrics like square-foot use and research expenditures. Day-to-day work included receiving, sorting, and delivering mail (or overseeing personnel who did); responding to requests to repair broken equipment, to address malfunctioning tech, to grant key-card access and to reserve rooms; and communicating with occupants about potentially disruptive building activities. West State University (WestU)’s Amy likened her role to “the building’s personal assistant;” others used parenting analogies. Midwest University (Midwest) leader Pamela described mediating disagreements between building occupants as “hav[ing] to bring the kids to the table and say, ‘Now, why are you hitting Johnny?’” At SouthernTech, Mary described faculty as “the kids in [my house], my rules.” Constantly in motion to respond to many and competing priorities, building-level leaders referred to their work as

*tactile* and *essential*, used conflict-laden words like *compromise*, *juggling*, *squeezed*, *problem-solving*, and emphasized their roles in *enabling*, *influencing*, and *facilitating* intra-building work. EliteU building-level leader Erin summarized: “I’m an advocate, and I’m a smoother-over of volatile issues. [...] We won’t say babysitter, but sometimes...”

Though building-level leaders shared many common responsibilities, they varied by professional profile: five were facilities professionals who did not hold a PhD or come from a high-level research background; three were active faculty researchers. Views varied as to which type of professional background was ideal. City University East (CityU)’s Lucas felt his lack of disciplinary affiliation enabled him to remain neutral and resist “affinity to a certain discipline in this building because I know it really well.” Conversely, Eastern City University (Eastern)’s Farrah was an experienced researcher who considered her faculty experience crucial: “In this position, the person needs to have done the research himself, needs to have written the grant himself, needs to have all this experience because [then he] understands it.”

#### **Leader Type #4: Unit-Level Leaders**

As leaders at various academic units that resided in (e.g., research centers) or affiliated with faculty (e.g., departments, colleges) in ID buildings, unit-level leaders (N=5) contributed to or voluntarily spearheaded building governance and community building efforts beyond their unit-level purview. These leaders coordinated formal networking events and speaker series as well as informal building-wide get-togethers, as in the case of the weekly “faculty soup lunch” facilitated by Middle Coast University (MiddleU)’s Jack, whose institute had governed a prior building but was “just another tenant” in his current building. Unit-level leaders’ work was often more self- than building-interested; College University (CollegeU)’s James stated, “I’m less concerned about the goals of the building being a success as I am the institute being a success.” Because of this, unit-level leaders sometimes encountered “some suspicion,” MiddleU’s Jack noted, in their leadership efforts. Southern City Tech (SouthernTech) research leader Richard had witnessed this firsthand, when a building had “gone off the rails—where all the occupants claim that the entity who manages it is always favoring their thing versus all the other things.” Continually balancing their own unit’s needs versus those of the broader building, unit-level leaders described their roles using phrases like *politics*, *diplomatic*, *turf wars*, *negotiation*, *fulfilling* and *educational*.

Table 2 summarizes select professional attributes and responsibilities of IDR building leaders.

**Table 2: IDR Building Leaders, Select Attributes**

| Leader Level | Role Domain             | N | Professional Profile             | Yrs. in Role | Est. % FTE on Buildings | Example Job Title                                       | Key Responsibilities   |
|--------------|-------------------------|---|----------------------------------|--------------|-------------------------|---|--|
| University   | Research and innovation | 8 | Tenured faculty                  | 7.4 (<1-23)  | 27.2% (1-80%)           | Vice President, Institutional Research & Planning       | Strategic/research planning and administration, governance structuring and oversight, community building |
|              | Space planning          | 5 | Design professional              | 4.1 (2-7.5)  | 8.4% (1-15%)            | Director, University Planning                           | Design, project management, “tenant improvements” oversight  |
| Building     | Building and facilities | 5 | Facilities professional          | 6.3 (1.5-12) | 89% (40-100%)           | Facilities Manager                                      | Day-to-day management, ongoing communication, community building, metrics tracking                       |
|              | Faculty researcher      | 3 | Research-active, tenured faculty | 3.3. (3-4)   | 45% (20-100%)           | Operations Director                                     |  |
| Unit         | Faculty/administrator   | 5 | Research-active, tenured faculty | 6 (3-10)     | 22.5% (20-25)           | Director, Institute; Associate Dean, College of Science | Governance participation, volunteer advocacy   |

Leaders brought their unique roles to bear on many challenges that arose uniquely within IDR buildings; navigating these challenges led to emergent lessons and suggested practices.

## CHALLENGES FACED AND LESSONS LEARNED IN IDR BUILDING MANAGEMENT

Across all types of building leaders, challenges arose in four primary domains—*planning, programming and construction; space allocation; occupant needs; and resources and administrative personnel*. In navigating these challenges, leaders generated insights and both enacted and suggested responsive leadership practices. Challenge domains, takeaways and practices are summarized in Table 3.

**Table 3: IDR Buildings: Leadership Challenges, Emergent Lessons and Suggested Practices**

| Domain                                  | Challenge Detail   | Emergent Lessons  | Suggested Practices   |
|---|--|---|---|
| Planning, programming, and construction | Determining cohesive and interdisciplinary building purpose                    | <i>Interdisciplinary buildings should have a clear and commonly understood vision and purpose.</i>  | Tie building purpose to university mission; give building a clear academic focus (e.g., data science); devise and telegraph clear vision, purpose, and brand for “general” interdisciplinary buildings  |
|   | Tailoring building to initial and future long-term occupants                   | <i>Significant and potentially unanticipated space modifications should be planned for; enhanced occupant management will be necessary.</i>   | Secure occupant commitments prior to space retrofits; hold timely, one-on-one meetings with future occupants; provide real-life senses of shared space; encourage wait-before-change mentality; leave shell space when necessary                                |
| Space allocation                        | Determining initial building occupants   | <i>Initial occupants should be selected via an intentional and transparent process that considers total-building cohesion.</i>  | Select targeted occupants via committee; select among faculty “cluster” applications; meet frequently with college/department leaders; select interdisciplinary-minded faculty (not just research “rockstars”); clearly communicate occupant decision processes |
|   | Maintaining or re-allocating long-term-use space                               | <i>An interdisciplinary building should not be “set and forget”; ongoing processes to align space use with building vision and purpose should be developed.</i>   | Deploy shared governance to make space decisions; use a visible, periodic tracking and review process to inform decision-making   |
|   | Allocating short-term-use space  | <i>Interdisciplinary buildings are architecturally innovative attractors; significant disruption from visitors should be anticipated and planned for.</i>   | Devise guidelines for external use of building spaces; communicate potential intra-building activities and disruptions (e.g., university PR efforts, construction, power disruptions) regularly   |
| Occupant needs                          | Determining safety and access across disciplines                               | <i>Complex safety (among multiple disciplines) and building access protocols should be devised.</i>   | Telegraph highest-need safety protocols in shared lab spaces; secure broad consensus on building security clearances  |
|   | Promoting collaborative, cooperative mindsets                                  | <i>Intentional promotion of intra-building community will be necessary.</i>   | Select interdisciplinary-minded faculty; build community through formal and informal events; track common research interests  |
| Resources and personnel                 | Securing building philanthropy   | <i>Intentionally planned and “branded” buildings will garner more philanthropic support.</i>  | Telegraph a clear building “brand” and vision   |
|   | Determining funding sources for equipment, maintenance, administrative support | <i>Questions of who pays for shared equipment, space and administrative support will arise; streamlined standards of cost-sharing should be devised.</i>  | Clarify which costs fall to buildings and facilities, to faculty and colleges/departments, and to other sources   |
|   | Operating with lacking or under-developed staff                                | <i>Personnel typically at the departmental- or college-level may be needed at the building level instead; forecast hiring needs beyond the disciplinary unit.</i>   | If possible, hire building-wide staff in areas including mail receiving, administrative support, engineering and repairs; create communities of practice for building personnel to share best practices   |
|   | Operating within unclear/biased reporting structures                           | <i>Traditional academic reporting structures may be inappropriate for interdisciplinary buildings; clarify building-related organizational hierarchies to level playing fields among units and researchers.</i> | Clarify/consolidate chains of command to university (not unit) level  |

Many foundational challenges arose as interdisciplinary buildings were planned, programmed, and constructed.

### Planning, Programming and Construction Challenges

Nearly all participants had experienced leading IDR buildings in some phase of planning, programming or construction (including retrofits to previously constructed space). Challenges in this domain of IDR building management included determining whether buildings had clear and intentional aims and how these were devised; securing major building philanthropy; and tailoring under-construction or previously constructed buildings for individual occupant use. Unlike more streamlined monodisciplinary buildings, IDR buildings without a clear mission or purpose—described as having “no plan,” not being designed for “anyone in particular,” and being “programmed before there was a program”—were referenced at nearly half of institutions represented in the study. Such buildings posed serious challenges. Leaders across multiple levels derisively summed up how they functioned: “Apartment building,” “pre-K classroom where everybody is doing parallel play” and interdisciplinary in name only. Eastern space planner Gabe stated: “Some very prestigious institutions, who have a long list of interdisciplinary buildings for many years, do not have interdisciplinary buildings. [...] There’s interdisciplinary buildings, and there’s truly interdisciplinary buildings.” For buildings that were deemed interdisciplinary in name only, leaders opined the difficulty—or impossibility—of fostering interdisciplinarity when it was already “too late.”

In cases where building purposes were unclear, this challenge exacerbated others, including what Lillian at CollegeU called “tenant improvements.” Though lab space customization was also challenging in monodisciplinary buildings, lacking vision for interdisciplinary buildings resulted in greater strife, as initial lab-design assumptions were proven false and retrofit costs stacked up. Western City University (WestCity) space planner Joseph described this phenomenon as “a tiger by the tail:” “[The building] was planned as generic plug-and-play laboratories, but as they started to assign PIs, [...] generic wasn’t really going to fly. [...] So, we started effectively renovating the building before it was even done.” Recalling similarly renovating newly constructed space, Eastern space planner Gabe winced: “If you think that still hurts, it does.” Even in buildings with clearer goals, the challenge to discern, manage and meet occupant expectations was high. EliteU space planner Connor described complications caused by a “chicken and the egg” dynamic in which potential occupants and planners confusedly looked to each other to set expectations for innovative, out-of-the-box IDR building design.

In addressing these challenges, leaders stressed the need to devise and telegraph clear building goals as well as bake flexibility into design processes. To recognize clear building goals and aims, multiple leaders referred to university mission and strategic planning—sometimes in competition with unit-level decision-making. At SouthernTech, building-level leader Mary’s response to this challenge was ensuring that “you [are] very interconnected at university and unit levels.” At SouthernTech and one other institution, leaders found it most effective for buildings to have a clear and singular interdisciplinary academic focus (e.g., brain sciences). For buildings whose purposes were more generally interdisciplinary, which made up far more of those represented in this study, other leaders offered guidelines to facilitate a cohesive vision. Building-level leader Linda at West State University (WestU) stressed devising a clear, structured selection process and “setting the tone from the beginning” of building operation. To plan adaptable spaces, leaders suggested multiple practices. Most dealt with engaging directly with future occupants. Midwest research leader Edward recounted a worst-case experience: A prospective occupant declined to move after his future space received a costly retrofit. Edward therefore suggested securing advance commitments from prospective occupants. Though other leaders did not cite quite as dire experiences, they discussed how to mediate incoming occupants’ expectations. CollegeU space planners Lillian and Stefani focused on holding in-depth and timely meetings with occupants and giving them real-life indicators of space; Midwest building-level leader Pamela agreed: “I think they should use more of [...] giving people the opportunity to walk through a plan to really feel where the walls are.” WestU building-level leader, Eliza, concurred, describing “literally tap[ing] out on the floor of the space [...] where each piece of equipment would go, so that there would be no surprises.” And at

least six leaders hammered the necessity of “shell space,” in which unoccupied space was left unfinished. Related to yet distinct from issues of planning and design, challenges of how to allocate and use space also commonly arose.

### Space Allocation Challenges

Challenges of allocating intra-building space spanned considerations over the long term (e.g., designating initial occupants to fill spaces, re-allocating inefficiently used space, navigating ad hoc space decisions) and short term (e.g., lending conference rooms and event space). These challenges were contextualized by differing and competing priorities between university leadership and faculty researchers, between differing research faculty and groups, and/or between academic departmental homes and interdisciplinary building-based faculty. The COVID-19 pandemic added in additional wrinkles. For at least two institutions, interdisciplinary buildings were repurposed temporarily as testing centers. Both in and outside of the critical pandemic era, selecting the “right” initial building occupants, and organizing them appropriately, was considered a very high-stakes challenge—in WestU building-level leader Linda’s mind, “the number one important decision. Everything else that happened is secondary.”

Yet even good early-on decisions needed revisiting. Maintenance and future re-allocation of long-term-use space represented, for a majority of interviewed leaders, a source of possibility and dread. Leaders as disparate as EliteU research leader Marcus and SouthernTech building-level leader Mary discussed unanticipated space use by building occupants: “Space is getting utilized—and nobody told us!” WestCity research leader Ishan was optimistic, hoping space turnover would ensure a building “stays fresh and new and exciting [...] at the cutting edge.” WestU building manager Linda was more cautious, concerned with future reversion to disciplinary norms: “How do we get succession plans for these research themes to evolve over the years? [...] How do you keep that [synergistic research] done without it getting 5, 10 years, balkanized?” Shorter term considerations for space use were complicated by buildings’ common role as campus focal points; in some cases, research activities were disrupted by tours, meetings, and press events. For example, WestU building-level leader Amy evinced frustration that a “gorgeous seminar room” was only used “maybe twice a month,” and that the building as “event center” meant such spaces couldn’t be used for research. At Eastern, building manager Farrah opined that “everybody likes [the building] because it’s beautiful. [...] This is really very good for the university, for everybody, but it makes my job harder.”

To address these challenges, leaders emphasized that initial occupants be selected intentionally and transparently; that ongoing and systematic review serve to maintain and re-allocate space; and that communication forestall day-to-day disruptions. To fill buildings intentionally and transparently, leaders extensively targeted and evaluated faculty in line with building and broader campus stakeholders and goals or, conversely, solicited applications from existing campus-based research clusters. Across both methods of initial space allocation, leaders emphasized selecting interdisciplinary-minded faculty occupants—not just “heavy hitters” whose large teams might stress limited space and cause “tension,” as was one case at Midwest.

To maintain and re-allocate space leaders designed, implemented or served on committees to govern space-use decision-making. At SouthernTech, research leader Richard developed a complex, three-tiered governance model to streamline space allocation decisions. Leaders also tracked key space use metrics (see more detail in “Building Goals” section) and devised review processes to determine ongoing space and potential reallocation needs. At Midwest, a “five-year rolling evaluation” helped to determine whether occupants had outlived their tenancy. And to communicate about day-to-day space use, leaders relied on “over-communication” to ensure research was not compromised by other building activities. At WestU, using a single-point-of-contact building email address and a “lab lead newsletter” facilitated timely intra-building communication. At EliteU, it was a messaging system as well as series of monthly meetings to discuss projects or meet with unit-level leaders. Many practices related to addressing

space allocation challenges also mitigated a third large category of challenges: occupant needs.

### Occupant Need Challenges

Challenges arising from unique and sometimes conflicting occupant needs included basics such as determining safety and security protocols in shared labs, as well as broader, but grand, challenges of promoting interdisciplinary cooperation and collaboration in the face of occupants' tradition-, culture- and discipline-bound perspectives on academic activity. A handful of leaders raised issues with keycard building access and safety hazards in labs facilitating fundamentally different types of research. WestU building-level leader Amy relayed how an abrupt administrative decision to make a previously secure interdisciplinary research building open-access had caused uproar among occupants, while MiddleU unit-level leader Jack described safety challenges in shared lab space: "You have one lab and one PI and a large open concept lab that's working with radioactive material; everyone in that space needs to go through basic radioactive safety training." Safety considerations regarding disease transmission were also central during the COVID-19 pandemic, with significant restrictions on the number of students, staff and faculty that could gather in or access common spaces synchronously.

Traditional and disciplinary perspectives on research and space also got in the way of bringing building occupants together. At their most benign, these perspectives manifested in faculty's attempts to cover glass office windows or hole up in closed-door offices. More significantly, though, these attitudes stymied collaboration and cooperation. Often, the notion of "shared" space raised the specter of "lost" space; at Midwest, Bob noted that many faculty saw only "what is their actual desk space—and they don't take into account that they've got a lot of shared space!" His colleague, building-level leader Pamela, relayed an incident in which a faculty member had insisted she "tape off areas on the floor. [...] That's how contentious it was." The pandemic was also a factor hindering intra-building gathering and community-building. Linda, a building-level leader at WestU, was one of multiple leaders who described COVID as a "hiatus" of sorts and spoke about instituting or re-instating more interactional programming post-pandemic.

To address issues of safety and access, leaders suggested accounting for disciplinary differences and devising and communicating processes in light of these. To promote collaboration and cooperation, leaders discussed the need to break down mental as well as physical siloes, encouraging faculty occupants to, as Lillian from CollegeU put it, "think in new ways" by intentionally fostering interdisciplinary engagement. Consistency, "cross-training and coverage," as CollegeU research leader Kyle put it, was essential to mitigating safety issues, broken down equipment and "redundancies" caused by proliferating school-based protocols. Intentional interdisciplinary engagement comprised of formal and informal events, including seminar series, artist events, lunch and learns, and more. EliteU research leader Marcus articulated why such undertakings were necessary: "I think we put a lot of stock in the idea that the building drives those kinds of things, but we have a lot of buildings that get used in a way that we never anticipated. And we have these great collaborative spaces where nobody sits." His colleague, research leader Kate, concurred that spaces weren't enough: "It's very hard for an institution to [ask faculty] to do interdisciplinary research [...] when everything else about their life at that institution still exists with a very siloed structure—like tenure, promotion, all of those different pieces." Yet leaders were also hindered in efforts to respond to myriad occupant needs by resource and personnel constraints and limitations.

### Resource and Administrative Personnel Challenges

Unique challenges pertaining to sourcing resources and administrative personnel significantly impacted day-to-day life within IDR buildings. These challenges included determining who, among the many PIs and academic units involved, paid for and provided what (e.g., occupant renovations, building and equipment repair and maintenance, administrative support services); inadequate staffing for proper building functioning; and held-over departmental

or college-level reporting structures for building personnel that were inappropriate for multi-unit, multi-disciplinary team use. Equipment repair needs loomed large in the mind of building-level leader Pamela at Midwest, who was “just waiting to see” who would pay for a recently broken \$30,000 piece of equipment.

Inadequate, under-developed or inappropriately reporting staff was also a common issue, arising within at least 12 participants’ perspectives, across levels of leadership. Of IDR building leadership in general, EliteU research leader Marcus chuckled, “There should be people that specialize in this!” while MiddleU research leader Dale leveled: “We’re great at building buildings, I’ll be honest with you. We’re not great at staffing buildings once we build them.” Other and more quotidian building needs were also unmet due to staffing crunches, as at Eastern when time- and temperature-sensitive mail languished, with no one to deliver it, on an outdoor loading dock. And even staff who did perform critical functions at the building level were sometimes holdovers from departments or colleges whose faculty had become occupants.

To address challenges of determining the source(s) of funding and administrative support, leaders recommended foreseeing issues and preparing streamlined processes for future scenarios. For lacking staff and personnel development, they looked to departmental and collegiate buildings to forecast building staffing needs. And to clarify reporting structures and mitigate bias, they suggested new building-level hierarchies. Midwest building-level leader Pamela looked to one criterion to determine building versus faculty costs: Whether a resource would outlast the faculty occupant’s stay in the building. Across interviews, leaders discussed key personnel in areas including shipping and receiving; general administrative support; and equipment facilitation, management, and repair. In other cases, enhanced professional development or reconfigured reporting structures rather than new personnel was viewed as a solution to foster best practices and mitigate potential disciplinary bias. At SouthernTech, Richard discussed the recent creation of a university-wide “community of practice” for interdisciplinary building managers; Mary, his building-level colleague who facilitated the group, described it as “about consistency. It’s about networks, standard career progression, finding community and sharing information.” And while they had not yet implemented it, EliteU space planner Connor called for a needed “central command location” for EliteU’s multiple IDR buildings.

## CHALLENGES SUMMARY

Across these four domains of challenges, building leaders worked within and across a strikingly broad group of stakeholders, competing priorities, personalities and resource limitations to serve as what Ishan, WestCity research leader, called “stewards” of IDR buildings. Whether addressing grand or day-to-day challenges in building management, leaders foregrounded building goals and effectiveness in determining their practice.

## ASSESSING BROAD GOALS AND EFFECTIVENESS OF IDR BUILDINGS

While they sought to successfully shepherd buildings through many challenges, leaders of all types considered the broader goals of IDR buildings and offered varying indicators of buildings’ effectiveness at meeting them.

### Goals for IDR Buildings

Leaders at multiple levels and institutional documents relayed multiple and sometimes competing goals for IDR buildings; these included proximate goals to *foster cooperation, collaboration and community* and *enhance broader institutional priorities* as well as broader goals to *represent and spur interdisciplinary innovation to solve complex societal problems*.

Whether tightly focused on an interdisciplinary academic area or more broadly aimed at interdisciplinary inquiry and knowledge generation at the intersection of many fields and topics, the utmost stated goal for IDR buildings was to *foster cooperation, collaboration and community* among faculty and student scholars and, in a few instances, industry partners. Traditional avowals of the power of interdisciplinarity to “break [disciplinary] silos down,” as CollegeU space planner Lillian described it, arose across interviews and institutional documents. Midwest research leader Bob described how placing faculty from different disciplines together aimed at integration and interaction: “They’re different departments. They’re different colleges. But together, they’re stronger than they are apart.” The key for Eastern space planner Gabe was that the building instigated “interactions that wouldn’t happen otherwise.” WestCity space planner Joseph described an ideal interaction, spurred by “collaboration space,” that led to innovation: “That’s sort of the dream come true, right?”

Many leaders connected buildings directly to grander aims to *enhance broader institutional priorities* that included IDR and other interdisciplinary activities in a fundamental way or, conversely, considered how buildings sometimes fulfilled unrelated or even competing aims. At Eastern, space planner Gabe easily connected his campus’ IDR buildings to a university mission for interdisciplinarity to be “complete, all pervasive, and everywhere.” WestCity research leader Ishan similarly described institutional goals to not “build our university in its old traditional discipline-based model” and stated proudly, “This building in many ways exemplifies and physically impersonates that vision.” Buildings contributed to other institutional goals including enhanced faculty and student recruitment, increased sustainable and innovative architecture, attainment of university-wide distinction in particular disciplinary areas and the enhancement of overall institutional reputation. At Northeast University (NortheastU), university-level leader Paul described a planned IDR building as “brand enhancement. [...] Keeping up with the Joneses, a little bit.”

IDR buildings also provided in-demand space. “The university’s out of space,” intoned space planner Stefani at CollegeU. “Every time you hire someone, I’m going to ask you: ‘Where are they sitting?’” WestCity space planner Joseph concurred, describing “just a desperate need” on his campus for wet lab and research space. Yet this general need for more research space on campus, cited by multiple leaders, sometimes clashed with IDR goals. As MiddleU research leader Dale stated, “Occasionally deans or department chairs will come to me and say, ‘I need lab space.’ Right? And these buildings are not designed to solve the problem of, ‘I need lab space.’ They are designed to build an intellectual community of scholars to allow them to do things.” This issue arose at Midwest, too, where unit-level leader Jennifer’s “apartment building” was just giving “space to people who don’t have space, or whose space is obsolete”—the opposite, she opined, of a “coherent building that has a theme and has floors integrated vertically.”

Multiple leaders and documents described IDR buildings’ goals to *represent and spur interdisciplinary innovation to solve complex societal problems*, suggesting the symbolic role of IDR buildings as a “beacon,” “focal point” and “showcase” of interdisciplinary innovation. At CollegeU, unit-level leader James stated that “many of society’s most critical issues need an interdisciplinary approach,” and that a building goal was to enable such. Midwest unit-level leader Ted acknowledged that many “problems are beyond the scope of” any one discipline; at NortheastU, building-targeted problems were “the world’s hardest: [...] health, food, and energy.” Joseph, the WestCity space planner, was starry-eyed about the potential for life-changing research to stem from his campus’ IDR building: “What if, by chance, when we bring [experts from different disciplines] together, a grand problem in the world is solved?” In the face of these many and varied goals for interdisciplinary buildings, leaders looked to many indicators to gauge their effectiveness.

### Gauging Effectiveness of IDR Buildings

The methods leaders used to gauge building effectiveness included objective measures as well as fuzzy and subjective measures of success. Additionally, a critical mass of leaders discussed the difficulty in gauging the success of IDR buildings. These various measures and factors in difficulty are summarized and quantified in Table 4.

**Table 4: Interdisciplinary Building Goals and Effectiveness: Leader-Derived Measures and Measurement Challenges**

| Type                           | Measure/Factor   | # Unique Mentions <sup>1</sup> |
|--------------------------------|--|--------------------------------|
| Objective measures             | Increased research productivity  | 10                             |
|                                | Dollars of funding per square foot                                     | 5                              |
|                                | Enhanced institutional status  | 3                              |
|                                | Increased donor activity   | 3                              |
|                                | Growth in building-related programs and units                          | 2                              |
|                                | Increased donor activity   | 3                              |
| Subjective measures            | Student and faculty recruitment, retention, and satisfaction           | 10                             |
|                                | Building reputation (“word of mouth”)                                  | 9                              |
|                                | Foot traffic (“buzz”)  | 3                              |
| Measurement difficulty factors | Lack of clear building goals   | 6                              |
|                                | Buildings’ limited lifespans   | 1                              |
|                                | Building effects versus effects of other interdisciplinary initiatives | 1                              |

1. How many unique participants mentioned the measure/detail at least once.

Concrete, quantifiable and *objective measures* for assessing building success included many not unique to interdisciplinarity: dollars of funding generated per square foot of space used, increased donor activity, enhanced institutional status, growth in building-related programs and units, and increasing research output, both specifically IDR and more generally. Multiple leaders mentioned dollars per square foot as a useful measure—both in assessing overall building success and in determining which occupants were allowed to maintain residency. Others focused on academic productivity and grant attainment, whether interdisciplinary or not. At WestU, building-level leader Eliza looked to “bigger types of grants than perhaps we’ve landed” in the past to gauge building success; at MiddleU, research leader Dale cited already-attained “pretty significant large-scale research awards [...] from NIH, NSF, Department of Energy.” CollegeU space planner Stefani noted how building success should “roll up [...] to better rankings for CollegeU, more fundraising, more philanthropy.” At Midwest, unit-level leader Ted noted, “Research stature means a lot to our position in the AAU.” MiddleU’s Dale acknowledged that objective measures were requested by the likes of governing boards, who considered buildings “more of an ROI, return on investment.” Yet many leaders also, or even more greatly, valued less-concrete measures of building success.

Qualitative *fuzzy* and *subjective measures* of success included observations of building foot traffic; informal interdisciplinary engagement and “buzz”; broader building reputation and word of mouth; and student and faculty recruitment, retention and happiness. At SouthernTech, research leader Richard gauged success “by the traffic in the lobby or atrium,” tying on-the-ground “buzz” to the notion that “collaboration is very physical.” At Eastern, building-leader Farrah described her sense, walking around every day, that she could see “the student[s] working day and night, [...] different subject, different college, different people.” She concluded that the building was successful: “It’s moving, moving, moving all the time.” The broader campus buzz about buildings, too, was a means of gauging effectiveness. CollegeU space planner Lillian discussed wanting to “hear that chatter and that discourse between people. If there’s a lot of complaining, then I know it’s not working.” At NortheastU, research leader Paul hoped for “a jealousy of those that get to be in the space.” And WestCity research leader Ishan concurred: “If the building turns out to be a success like I expect it will be, more people will want to be in it.”

A focus on recruitment, retention and occupant happiness was also evident, though often unrelated to specific interdisciplinary aims. At Midwest, unit-level leader Bob straightforwardly referred to this as “faculty acceptance” of life in the building: “Were faculty happy? Recruiting of new faculty, retention of faculty.” EliteU research leader Marcus also focused on faculty recruitment and happiness: “We watch if we have retention challenges or competing recruitments and the sense that the facility is not up to speed.” Above all, he wanted faculty to not “view [the building] as a hurdle, an obstacle to recruiting graduate students to their group or to advancing their science.”

### Difficulty in Gauging Success

Factors that rendered gauging the success of IDR buildings difficult included lacking clarity of building goals; the complexity of disentangling building effects from related IDR programming, faculty initiatives, etc. and, in multiple cases, buildings’ limited lifespan to see clear and sustained progress toward goals. CollegeU space planner Stefani wondered, “Is the goal research? Is the goal academic programs and departments? [...] I don’t know.” NortheastU research leader Paul mused, “It’s not like we have a controlled study, where we have one building that’s boring and old, versus one new one, and how does it work out?” And Midwest research leader Bob guessed that many buildings “haven’t been around long enough for us to see if they’re successful yet.”

## DISCUSSION

This work sought to illuminate increasingly prevalent and resource-intensive IDR buildings in higher education. In richly mapping these buildings and describing related leadership issues, our findings suggest that a broad and variable range of higher education leaders, research administrators, faculty and support professionals contribute to building leadership via dynamic roles, responsibilities and lessons learned in the face of myriad challenges. And while leaders at multiple levels cited different lived experiences, significant alignment on many topics, including how they framed building goals and effectiveness, suggests an emerging consensus on what IDR building leadership is and is for. Our analysis also suggests that IDR buildings serve multiple and sometimes conflicting purposes, and that gauging their effectiveness is a highly complex process frequently tied to indicators that are not overtly interdisciplinary, such as revenue generation and overall increases in research output. Overall, our findings suggest that IDR buildings utilize and demand multifaceted, multi-level leadership teams; result in robust and unique challenges that provide opportunities for enhanced knowledge and practice; and represent a high-need, high-reward context for further scholarship and best practices development.

In documenting IDR spaces’ many strategic goals, Harris and Holley (2008) 15 years ago avowed that, while “difficult and costly [...] a well-designed physical space holds powerful potential for fostering active engagement among community members and encouraging the collaborations necessary for interdisciplinary work” (pp. 40-41). Our findings suggest that both the problems and potential of IDR buildings are being realized today. As with core facilities, IDR buildings are framed as potential “force multipliers” (Zwick, 2021), serving a range of university priorities including fostering cross-campus collaboration; spurring innovative research; and supporting recruitment, retention and faculty and student success. In supporting this conclusion, our work joins a growing body of research exploring the multifaceted and resource-intensive IDR strategies that typify the modern research university.

Our findings also join a critical, yet limited, literature evaluating IDR strategy effectiveness. Though we make no causal claims about IDR building effects, our findings suggest reasons for optimism—and caution—regarding buildings’ ability to spur productive and impactful interdisciplinary collaboration. Optimistically, multiple participants echoed prior findings that physical proximity can spur collaboration (Kabo et al., 2014) and institutional commitments to interdisciplinarity can work (e.g., Leahey & Barringer, 2020; Leahey et al., 2017). Still, other leaders acknowledged buildings’ limitations. In addition to addressing many challenges unique to these buildings (see

again Table 3), many leaders stressed that IDR buildings alone cannot promote collaboration. Like recent research suggesting that ill-maintained cluster hiring can result in limited collaboration (Bloom et al., 2020), the many and varied strategies leaders undertook to foster intra-building collaboration—social events, seminars, speaker series, grant-tracking, shared core facilities—suggests that effective IDR strategies require operational attention and care. And careful assessment, too: This work suggests that efforts to gauge buildings’ unique “value-add” are complicated by the potential overlapping effects of other IDR factors and strategies (e.g., hiring, funding, faculty characteristics).

To the practice of careful IDR building leadership, our work brings novel insight into the types of challenges building leaders across the field may face, and what lessons they may learn from facing them. Summarized in Table 3, emergent lessons and practices arising from leaders’ experiences paint a foundational portrait of what scholars of interdisciplinary buildings, as well as building leaders themselves, might take away from our findings. An overall lesson is that interdisciplinary buildings should have clear vision and purpose. In a very basic way, this central lesson distinguishes interdisciplinary buildings from their mono-disciplinary counterparts; after all, the vision and purpose of a “biology building” is rarely questioned. This central lesson thus shapes suggested practices within the building planning, programming, and construction phase (e.g., give building a clear academic focus); it also orients lessons and practices for selecting building occupants (i.e., to align with the building vision), making ongoing space-use decisions, seeking philanthropic support and other domains of challenge. Many building leadership practices, suggested by leaders themselves and arising through the research process, comprise intentional planning (around building vision, occupant selection, building processes) and also purposeful communication of planning processes and decisions. Certainly, a “best practice” of purposeful communication, for example, is common across many academic initiatives. Yet the more nuanced suggestions we provide here, for how to select building occupants and arrange interdisciplinary spaces, are largely unique to IDR buildings. Through the contribution of these lessons and suggested practices, then, our work aims to provide a tangible and targeted benefit for research administrators and other leaders of current and future IDR buildings.

In identifying the significant expense, break-neck proliferation and transformative field-wide undertaking represented by IDR buildings, this work thus suggests an urgent need for further research and best practices development in IDR building leadership. Future scholarship should continue mapping these buildings field-wide, creating a robust, longitudinal dataset to assess building outcomes (see again Table 4). Surveys of and continued interviews with building leaders as well as occupants can further illuminate life inside IDR buildings and explore the extent to which the lessons learned and suggested practices (see again Table 3) generated by this work hold across a broader sample. Work that disentangles buildings from or maps intersections with other IDR strategies can clarify whether buildings represent merely one of many or, conversely, a uniquely impactful interdisciplinary strategy. For practice, this work provides university, research, and faculty leaders, at any stage of building planning or leadership, with foundational knowledge to guide decision-making in building planning, programming, and construction; creating and/or enhancing multi-level building leadership teams; foreseeing potential challenges and emergent best practices in building management; and tracking and assessing building goals and effectiveness.

Overall, this work brings the concrete realities of higher education interdisciplinary research spaces to light and establishes a foundational set of guideposts for future inquiry. In doing so, it signals multiple directions for future research and efforts to ground administrators’ practices in the management of IDR buildings. As such, we aim to answer the imperative to better understand these costly, time-intensive, and potentially transformative higher education spaces.

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