

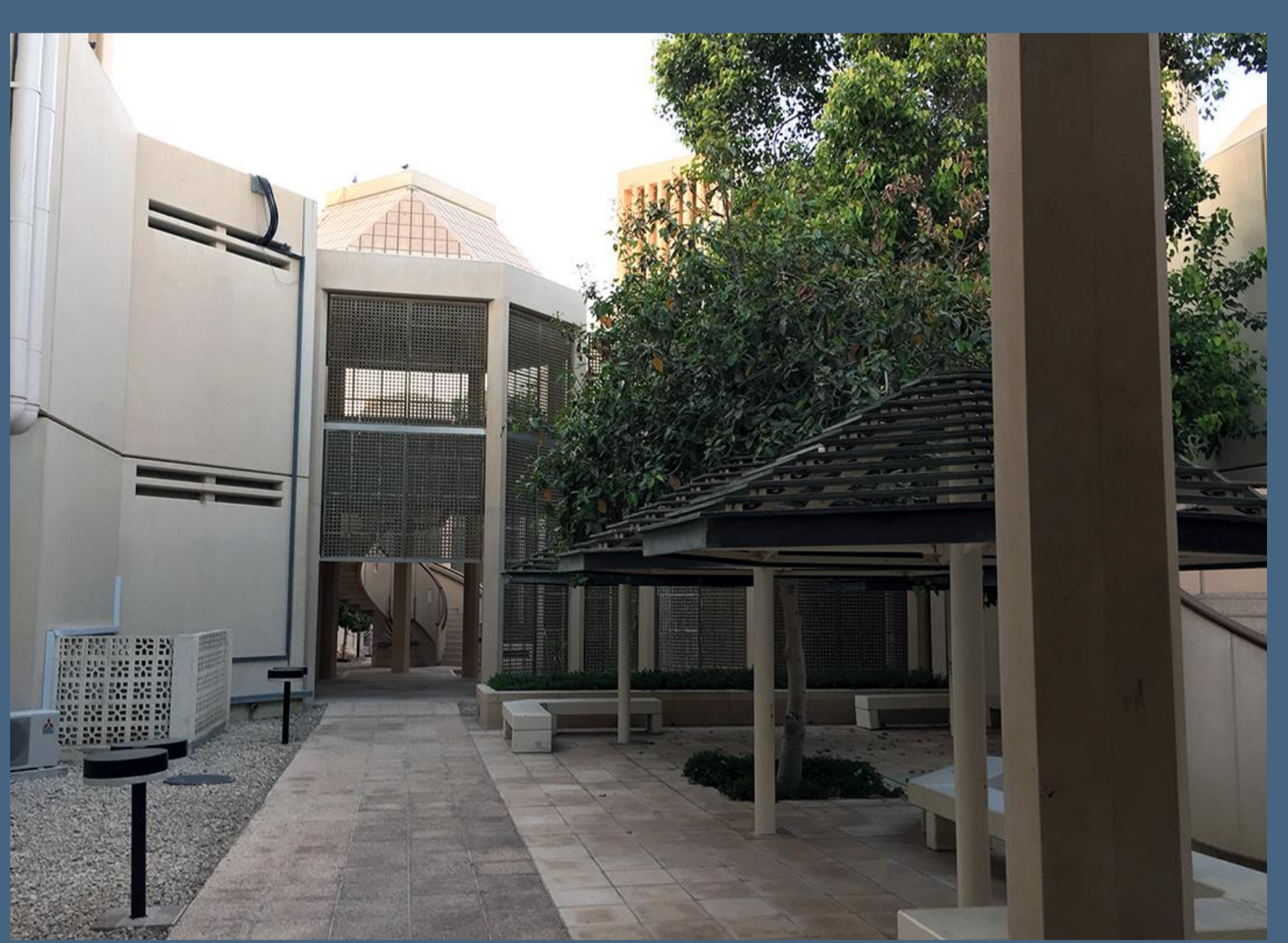
# Internal Grants

## QUST-2-CENG-2019-12

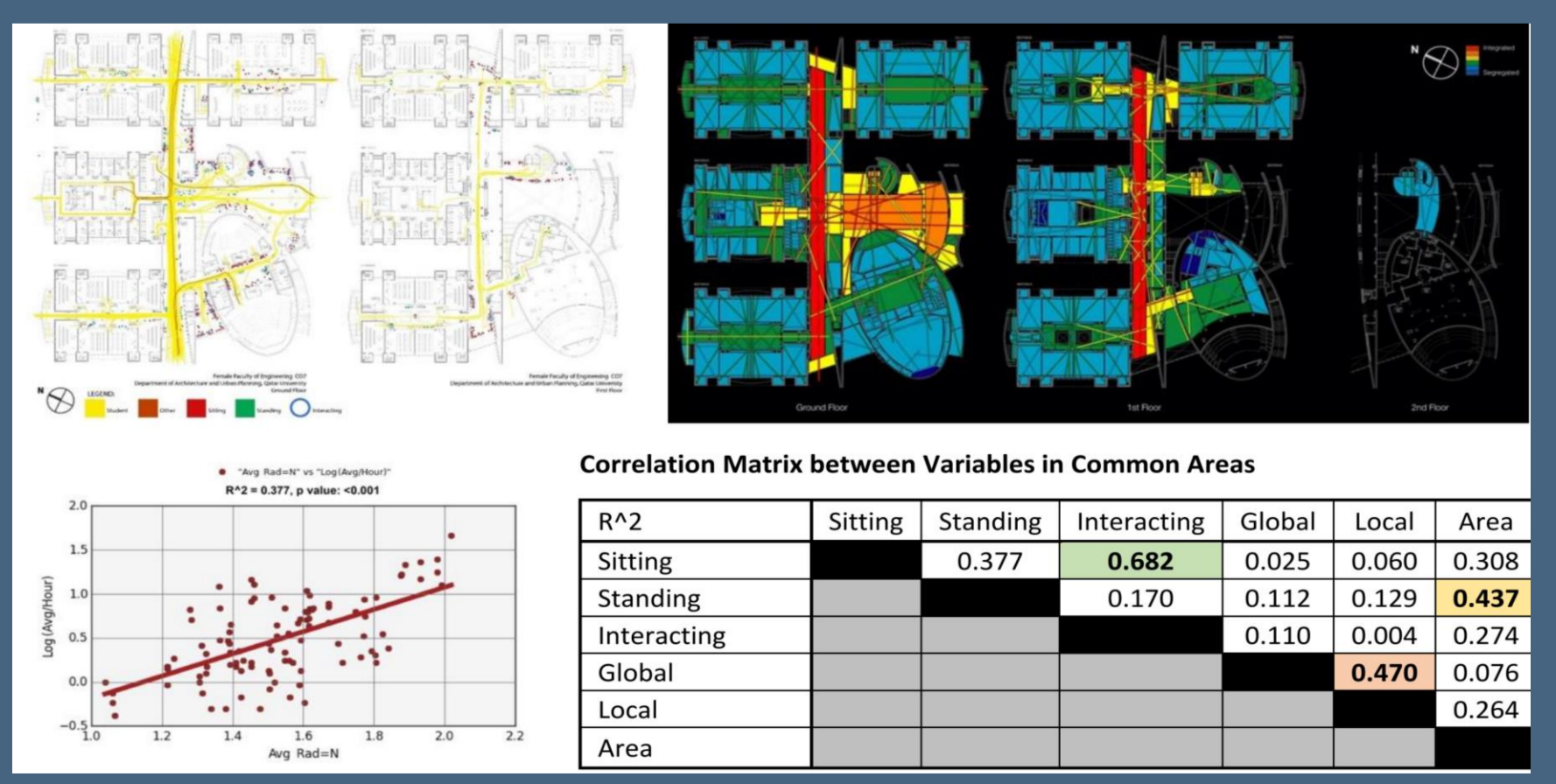
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### ABSTRACT

The BCR Corridors at QU are notorious for the wayfinding difficulties of end-users in the building complex. These navigation problems appear to arise due to the repetitive similarity of individual parts in its modular design, highly localized impediments to readability and visibility such as shading device screens and temporary installations, and the relationship of those different parts composing the collective whole of the BCR Corridors to the immediate surrounding context of the QU campus (Figure 1). The purpose of the "Complexity and Use in Building Evaluation" research project (CUBE2 : QUST-2-CENG-2019-12) is to build on the research success of the post-occupancy cluster in the first demonstration project (CUBE1 : QUST-2-CENG-2018-9). It includes continuing to develop a detailed postoccupancy dataset of movement and space use in buildings at QU. The goal is to contribute positively to future design refinements, alterations, and design of new university buildings at QU. We want to help create a world-class center of education and research where space use, interaction, and innovation are tactically 'woven' into the design and planning of the campus at various scales of the built environment. In the CUBE1 study, Major et al. (2019) were able to graphically illustrate building program/use and movement/space use patterns. It included quantifying the relationship between movement and spatial layout, and the significance of other end-user activities such as sitting and interacting in the common areas of the QU Women's Engineering Building. It also included identifying adaptive re-use of classrooms and storage spaces for laboratory and office uses, leading to a shortage of storage spaces in the building. There was a consistent relationship ( $R^2=0.68$ ,  $p < 0.001$ ) between sitting and interacting unrelated to accessibility or metric area, i.e., the availability of seating was the dominant factor for casual encounter, mostly of students. Finally, there was a weak but consistent relationship ( $R^2=0.38$ ,  $p < 0.001$ ) between spatial layout and movement flows using space syntax modeling when allowing for the strongly programmatic differences (classrooms versus faculty offices) in different wings of the building (Major et al., 2019) (Figure 2). The post-occupancy evaluation findings in the CUBE1 project were largely consistent with previous results of space syntax research over the last 30 years for generative layouts such as office buildings, colleges, and research laboratories. Those results include the generative role of spatial layout for movement and casual encounter in buildings, the prescriptive effects of strong programmatic aspects (in this case, classroom location and course schedules) in causing some spaces to overperform/underperform for some types of use, most usually movement, and the singular importance for the provision of seating to facilitate consistent and robust use of spaces whether at the building or urban level (Hillier and Penn, 1991; Hillier, 1996; Hillier et al., 1996; Major et al., 2019; Sailer et al., 2016).



View of an outdoor space internal to the BCR Corridors complex at Qatar University in 2017 (Source: QUST-2-CENG-2019-12).

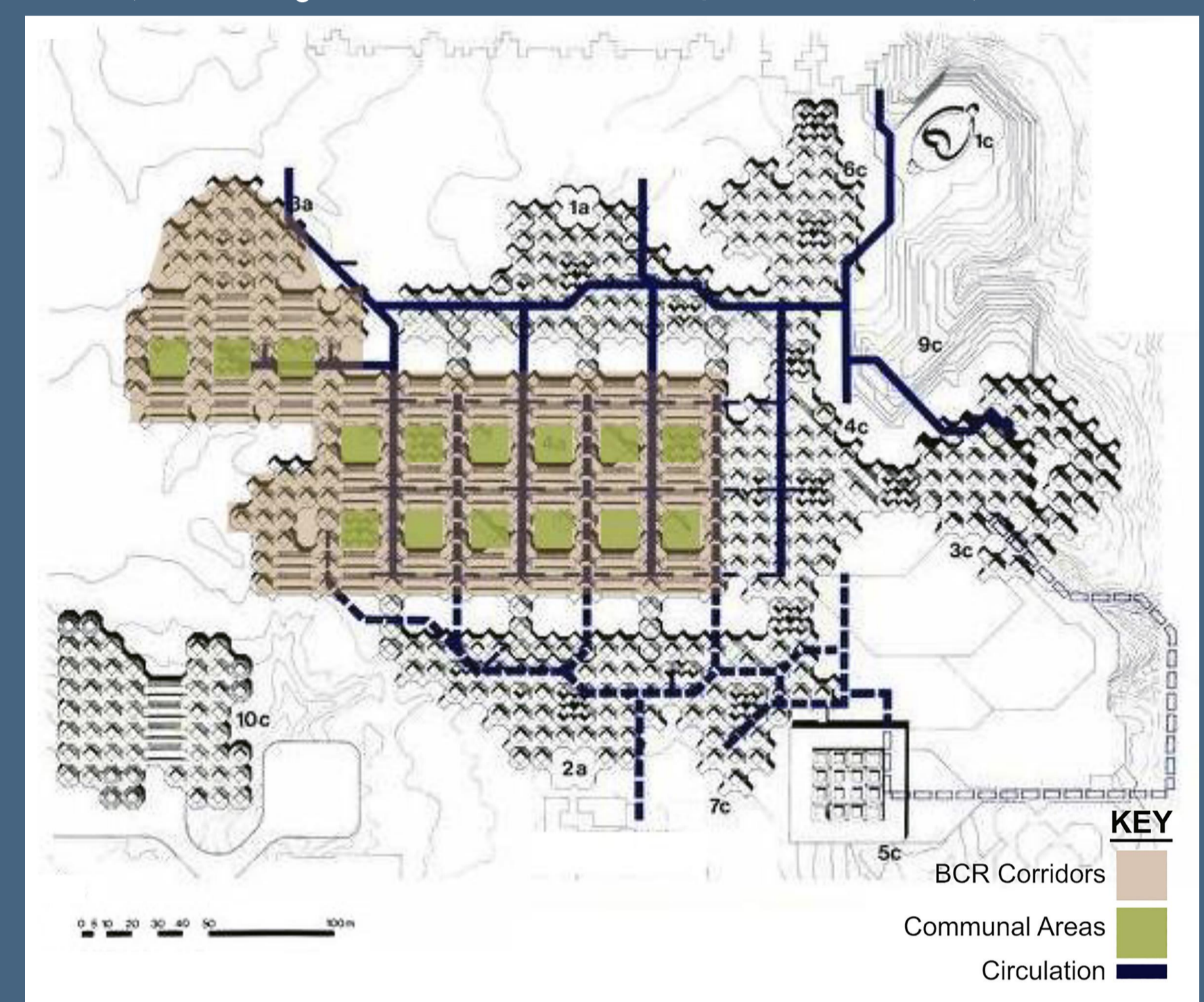


(top, left) Movement traces and non-programmed stationary space use; (top, right) space syntax model of global integration for all floors combining convex spaces and lines of sight and movement; (bottom, left) correlation between integration (average of axial line and underlying convex space) and log of average movement per hour; and (bottom, right) correlation matrix between several variables in the QU Women's Engineering Building (Source: QUST-2-CENG-2018).

### INTRODUCTION



Aerial exterior view of the iconic image of the BCR Corridors and the Faculty Office Building (Old Women's Library) at Qatar University circa 2002 (Source: Aga Khan Trust for Culture/Qatar Museums).

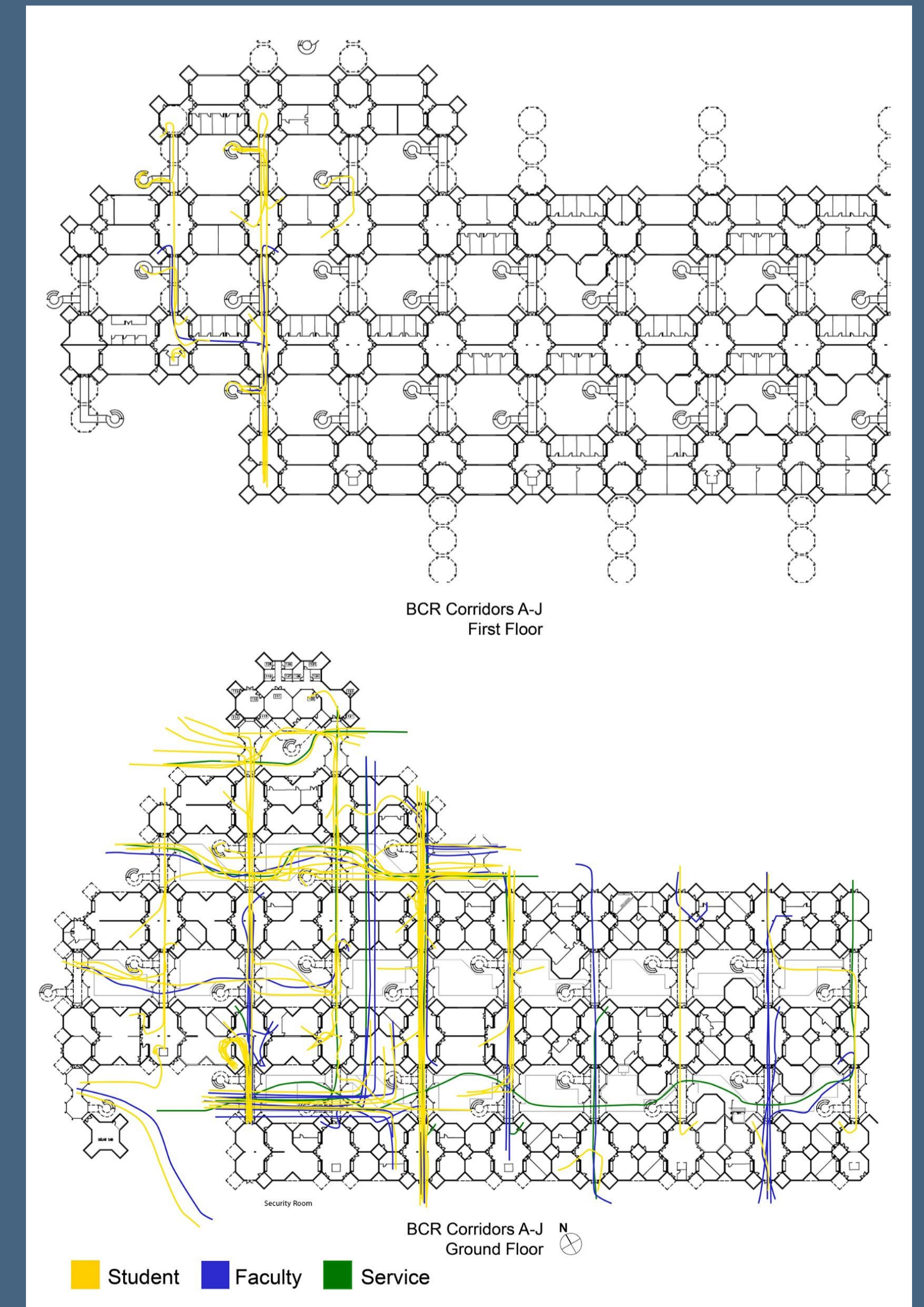


Original circulation diagram by Kamal El-Kafrawi color-coded to indicate the building complex (in beige), communal areas (in green) and the main corridors (in blue) (Source: Aga Khan Award for Architecture/Rowaida Elnahas/QUST-2-CENG-2019-12).

### METHODOLOGY

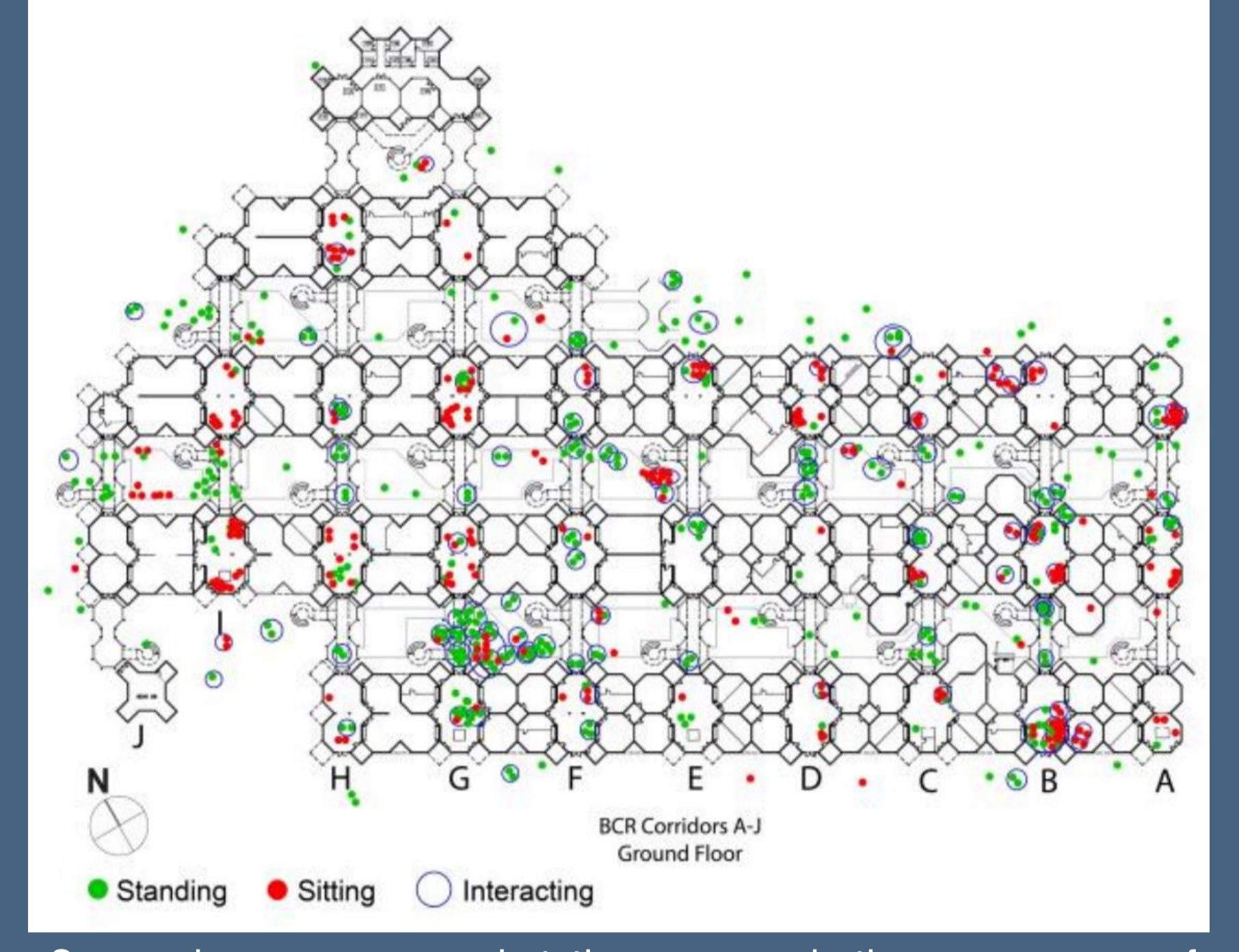
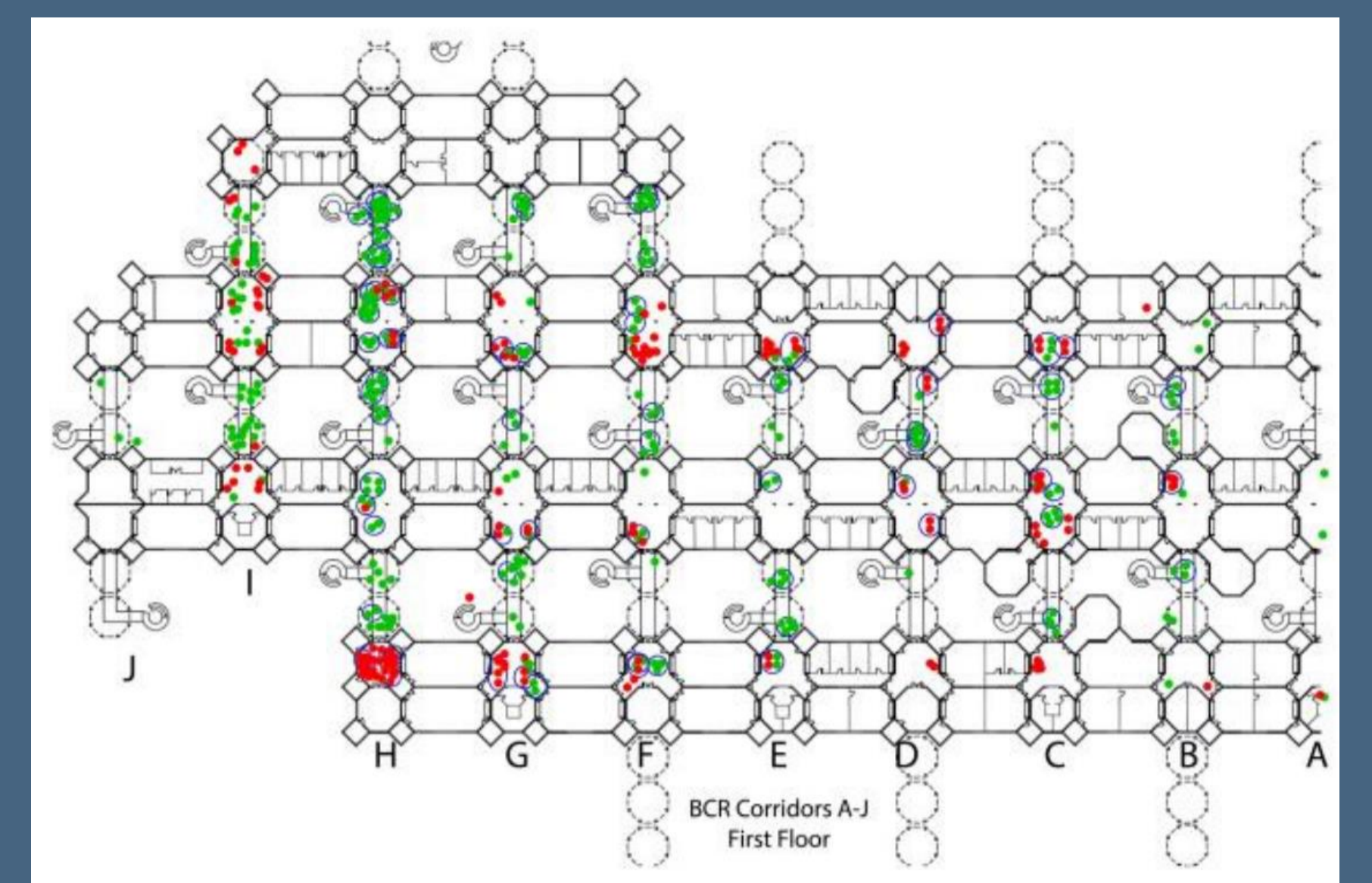
TYPE	MALE	FEMALE	TOTAL	PERCENTAGE
Students	373	95	468	47.9%
Faculty/Administrative	232	49	281	28.7%
Security	63	5	68	7.0%
Service	149	7	156	16.0%
Other	3	2	5	0.4%
<b>Subtotal</b>	<b>820</b>	<b>158</b>	<b>978</b>	

Profile of users of the BCR Corridors based on direct observation entry counts during February 2019 (Source: QUST-2-CENG-2019-12).

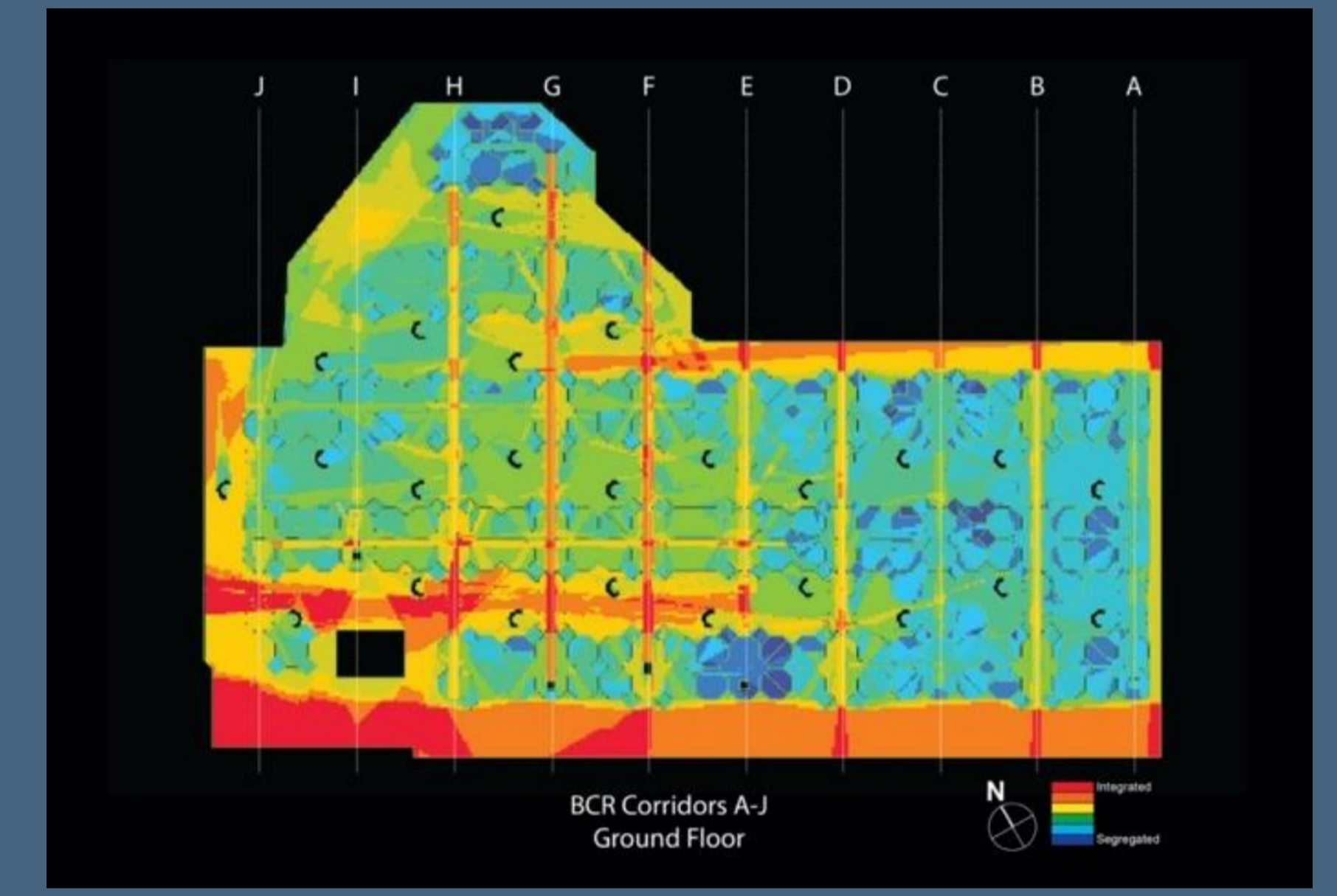


Movement traces of a typical one hundred (100) people over an entire day from 7:00 am to 5:00 pm in the BCR Corridors during February 2019 (Source: QUST-2-CENG-2019-12).

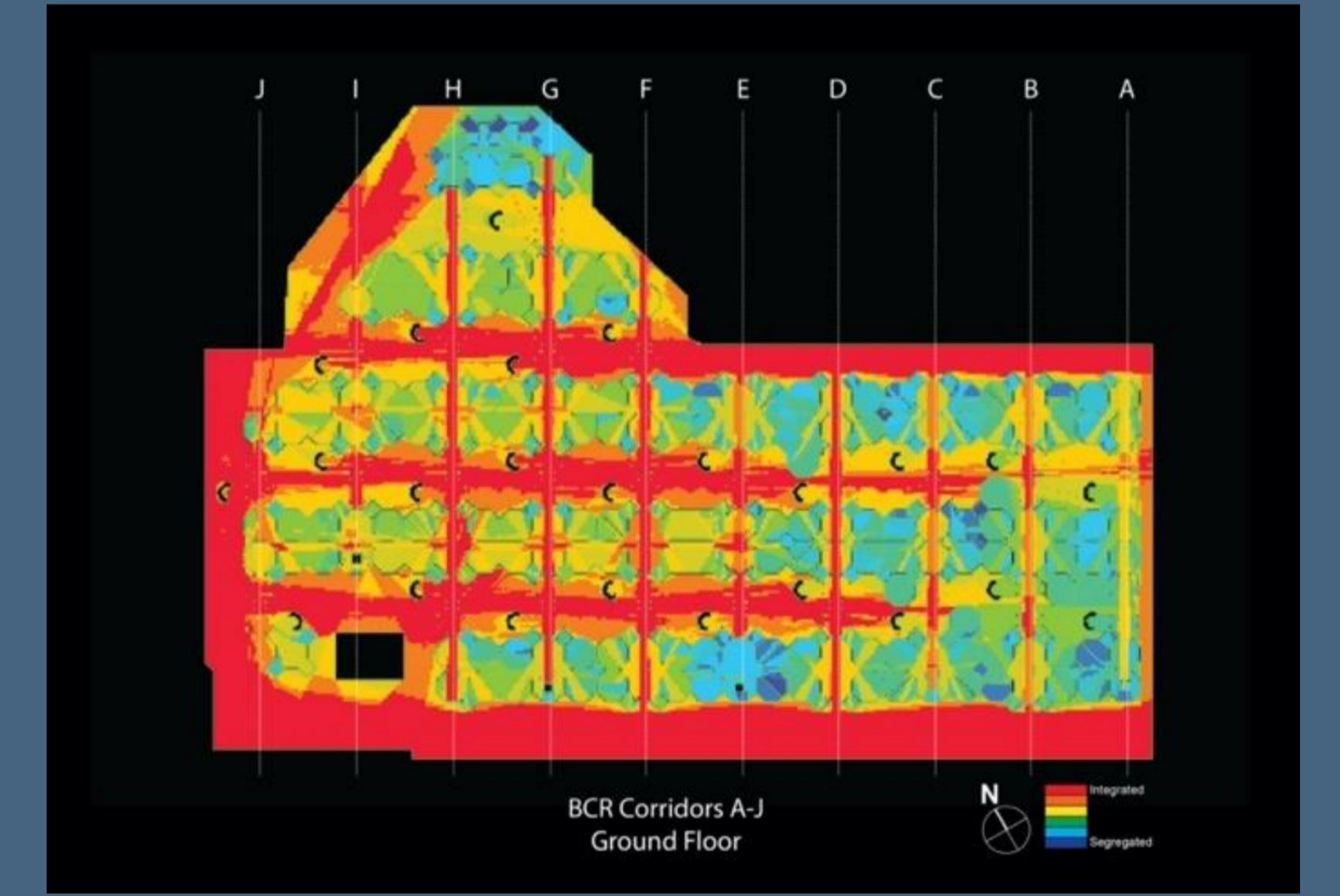
### RESULTS



Surveyed non-programmed static space use in the common area of the BCR Corridors in February 2019 (Source: QUST-2-CENG-2019-12).

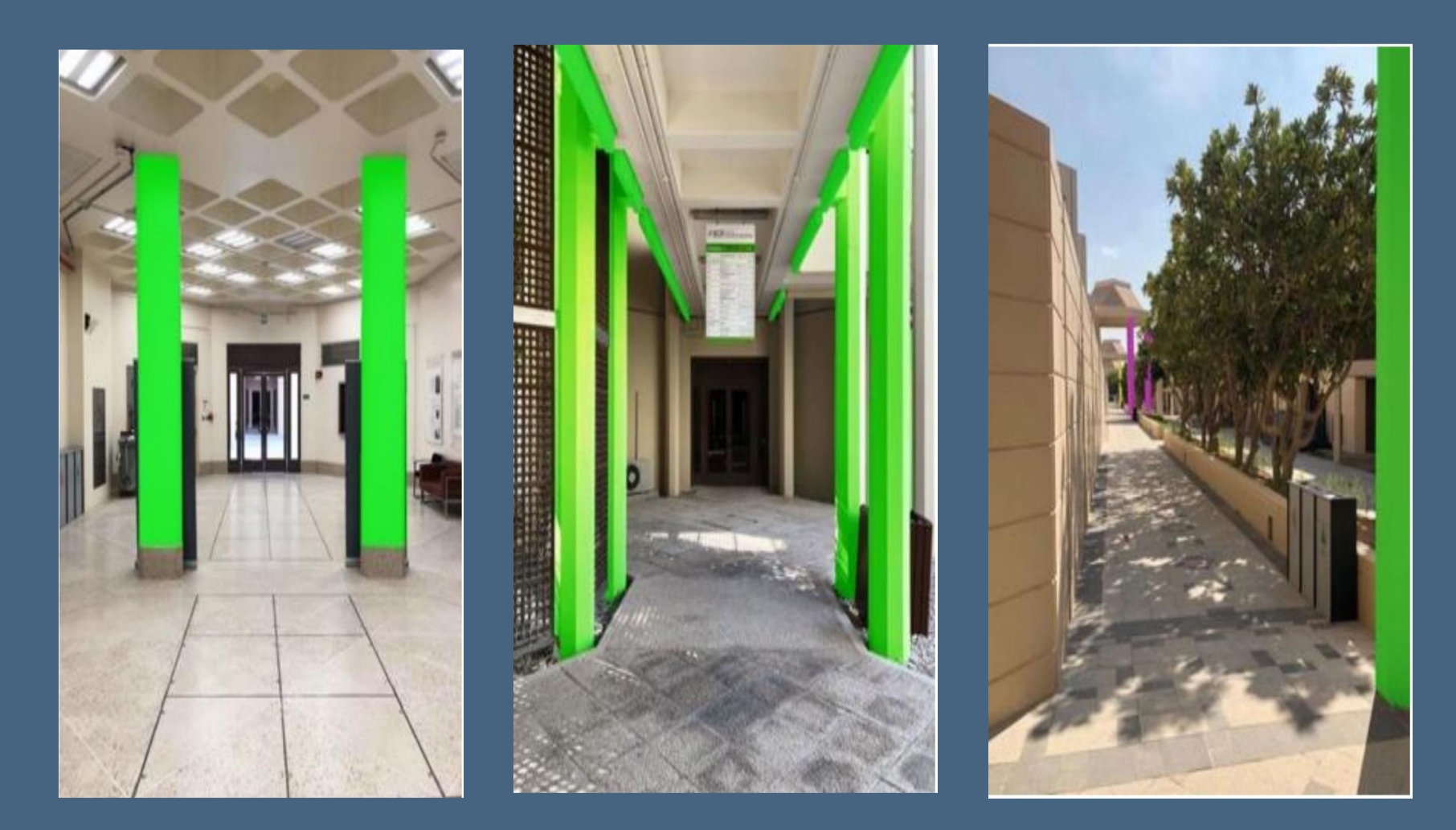


Visibility graph analysis (VGA) of integration (radius=n) on the ground floor of the BCR Corridors which is existing (Source: QUST-2-CENG-2019-12).



Proposal to remove of all shading screen devices and temporary installations impeding movement and visibility set to a common range (Source: QUST-2-CENG-2019-12).

### DESIGN RECOMMENDATIONS



Example color-coded rendering of (top right) BCR Corridors exterior on the female campus and interiors for Corridor A (e.g., Red Corridor) and (top left & middle) Corridor F (e.g., Green Corridor) inside the BCR Corridors to assist navigation and way-finding for end-users (Source: QUST-2-CENG-2019-12).