

Study: MIT's campus design and architecture influence interactions among researchers

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MIT's Infinite Corridor — which is one-sixth of a mile long — mixes thousands of people together daily. Credit: Massachusetts Institute of Technology

The MIT campus is built to connect people. Some structures, like the Stata Center, the Sloan building, or the Media Lab building, offer large

lobbies, flexible labs, and common spaces to enhance collaboration. MIT's Infinite Corridor—which is one-sixth of a mile long—mixes thousands of people together daily. Aerial walkways connect campus research buildings.

Do all these design elements truly help people to work together? A study led by MIT scholars reveals new details about collaboration on the Institute's campus. Overall the study, which looks at email traffic between faculty, researchers, and staff on campus, confirms that physical proximity does matter for workplace collaboration, but it adds new wrinkles about how this happens.

People are more likely to communicate via email after running into each other at a campus eatery, for instance, than in a crowded corridor. The study also found that email exchanges occur more often among researchers whose workspaces are connected through indoor halls rather than outdoor paths. And greater physical proximity may not replace email communication among people who don't know each other well—they are more likely to email each other even when working in close proximity.

"Studying how spatial relationships may influence [social ties](#) has been of interest to scholars of the built environment and sociologists alike for a long time," says Andres Sevtsuk, an associate professor in MIT's Department of Urban Studies and Planning (DUSP), and co-author of a new paper detailing the study's results. While past work often used [survey data](#) to account for interactions, here the campus email information added hard data to the research.

"We were interested in taking this idea of spatial relatedness further and examining its more nuanced aspects that have not been well-covered in prior research," Sevtsuk notes.

Those findings apply to not only MIT but other organizations as well.

"These ideas could be explored analogously in other work environments beyond MIT, such as companies, organizations, or even public sector institutions," says Bahij Chaucey, a researcher at the MIT City Form Lab and a co-author of the paper.

The paper, "Spatial structure of workplace and communication between colleagues: A study of E-mail exchange and spatial relatedness on the MIT campus," was published in advance online form in March, by the journal *Social Networks*.

The authors are Chancey; Rounaq Basu, a doctoral candidate in DUSP; Martina Mazzarello, a postdoc at the MIT Senseable City Lab; and Sevtsuk, the Charles and Ann Spaulding Career Development Associate Professor of Urban Science and Planning in DUSP and head of the MIT City Form Lab.

The Allen curve and onward

A large body of scholarship has examined workplace interactions—often influenced by the late Thomas Allen, a professor at the MIT Sloan School of Management whose interest in the subject was spurred in part by a stint working at Boeing. Allen's research in the 1970s and 1980s found that greater proximity has a strong relationship with greater collaboration among engineers, a phenomenon represented by the "Allen curve."

To conduct this study, the researchers used anonymized email data collected by MIT's Information Systems and Technology group in February 2020, a month before the COVID-19 pandemic altered campus routines. The data track how many bilateral email exchanges occurred between research units on campus, such as departments or labs; the

scholars examined the number of individuals in a unit to estimate the typical amount of person-to-person exchange.

The team then examined the spatial relationships between research units, to see how the built environment might interact with email patterns. Overall, the study spanned 33 different departments, labs, and research groups, and 1,455 office occupants.

The scholars also modeled the likely walking routes to the office or lab of MIT workers, based on MIT's 2018 Commute to Work survey, while also estimating the total foot traffic or crowdedness of each corridor and eating venue on campus. Sevtsuk's research has included extensive modeling of pedestrian routes in city settings using such methods.

More food for thought

Many specific, granular findings emerged from the study—especially the idea that proximity matters along with the specifics of the built environment. For starters, other things being equal, workers in research units located near the same dining facilities are more likely to email and interact.

"Cafeterias are spaces where verbal and visual communication is an important part of eating culture, especially in a research environment like MIT," says Basu.

Not having to venture outside also influences behavior—at least, it did during the wintery Massachusetts weather during the study period. For research units that are basically an equal distance apart, those linked by interior corridors tended to communicate more than those separated by outdoor space, even when that communication was in the form of email.

"We clearly saw that if people's offices are linked via the indoor Infinite

Corridor system, they are more likely to engage in email exchange than if the logical connections between their offices require outdoor paths," Basu says.

As an added wrinkle, however, really busy corridors seem to generate brief greetings more than exchanges that lead to follow-up communication. "We found that if the corridor where person A may be walking past person B's office on the way to work tends to be more crowded, then it reduces the likelihood of A and B engaging in [email](#) exchange," Sevtsuk says.

However, this does not seem to be the case with very crowded cafeterias, which if anything seem to encourage more subsequent contact. "A more crowded cafeteria could provide more opportunities to engage in group conversations, where new social ties can emerge between people who are introduced by mutual connections," Sevtsuk observes.

Not least, the effects of physical proximity are themselves related to preexisting relationships. For people already familiar with each other, the research suggests, proximity leads to more face-to-face interactions; for those previously unfamiliar with each other, meeting people due to proximity tends to lead to a greater proportion of emails being exchanged, at first.

Many pathways ahead

The researchers believe their methodology could suggest ways to place new faculty or staff in useful spots where they would be able to interact easily with others.

"It is possible to use our findings to identify where such locations are within each department and school," Sevtsuk says.

Campus planners could also continue to build on ideas evident in the Stata Center and Sloan building, which have large ground-floor cafeterias and "strategically position social lounges or dining facilities at locations where access from surrounding offices, and the likelihood of passing [by] is highest," Sevtsuk adds.

In universities and tech-firm campuses, Sevtsuk suggests, when new building projects are being considered, it makes sense to "strategically evaluate their locations and circulation systems vis-a-vis spatial connectivity to surrounding departments with which they have the most potential for joint research."

Certainly, MIT, other universities, and large companies cannot always quickly reconfigure themselves. But over time, good planning and design can enhance interdisciplinary work, collaboration, and generate serendipitous meetings between people. Or, as the authors state in the paper, "Planning environments to encourage greater interaction across different groups may offer a pathway to bridge siloed social networks and encourage information exchange between otherwise unlikely parties."

More information: Andres Sevtsuk et al, Spatial structure of workplace and communication between colleagues: A study of E-mail exchange and spatial relatedness on the MIT campus, *Social Networks* (2022). [DOI: 10.1016/j.socnet.2022.03.001](https://doi.org/10.1016/j.socnet.2022.03.001)

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