Report to the Provost

of

The Graduate Student Housing Working Group

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Table of Contents

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Finally, we appreciate that our work is part of a long tradition of engaging faculty, students, and staff in exploring the nature of MIT community life, framing issues, and recommending ways forward. We note the work of previous committees who worked on student-life issues. Their reports remind us of our values and our legacy. We are honored to extend this tradition.

The Graduate Housing Working Group
January 2014

Executive Summary

In March 2013, the Provost appointed the Graduate Student Housing Working Group to evaluate how graduate student housing needs are currently met, identify strengths and weaknesses in the current system, and make recommendations for meeting graduate housing needs in the future.

The group reviewed past committee reports, analyzed existing and new data, consulted broadly with graduate students, faculty, and the Cambridge community, and reviewed the experience of peer institutions.

We settled on addressing five subtopics: graduate students' attitudes toward their current housing situation; the Boston-area housing market; the utilization, adequacy, quality, and sustainability of the graduate housing inventory; future graduate enrollment; and graduate housing at peer institutions.

Graduate students express high levels of satisfaction with the housing choices they have made. Housing is not a critical factor in their decision to attend MIT, but cost is a major concern. Graduate families and international students face special challenges in finding housing, and these groups express more desire to live on campus than single students do.

We estimated unmet on-campus housing demand using two measures: the number of students who live off campus but would rather live on campus, and the durable size of the waitlist. These two measures revealed significant unmet demand for on-campus graduate housing.

In the Cambridge housing market, rents have been increasing steeply, condo conversions have been reducing the supply of affordable housing, and new housing construction consists mostly of luxury units. The 62% of MIT graduate students living off campus will likely be squeezed further by these trends. MIT cannot rely on the market to provide affordable housing as it has in the past.

Graduate students living on campus express high levels of satisfaction with their housing, although there is some dissatisfaction with deferred-maintenance and operational issues in three of the graduate residences. The Institute has already committed to a capital renewal plan that will ensure the continuance of existing housing resources. Including additional units in the renewal would be a way to meet graduate housing needs.

The number of graduate students is not likely to increase or decrease significantly in the next decade. Reliance on postdoctoral staff has grown in recent years, a trend that may continue.

Our survey of housing opportunities for graduate students at peer institutions revealed that MIT is a leader in supporting on-campus graduate housing.

We recommend that MIT build housing for 500–600 students, and that these housing units be configured not in traditional dormitory-style facilities but in buildings that can accommodate a variety of housing types, ranging from studios and multi-bedroom suites to apartments. We recommend further that these housing units be capable of accommodating both married and unmarried students and families.

We recommend that to facilitate capital renewal, MIT create 400 additional beds to meet swing-space needs over the course of the next decade and, at the end of that period, make that housing available to graduate students. A range of development options exist for this new housing in addition to traditional dormitory development channels. These include partnerships with developers, long-term leases on new housing, inclusion in already-planned capital renewal in graduate housing, and incorporation into nonresidential building on campus. We make no recommendations regarding potential locations for these projects.

We make other recommendations with the aim of supporting the service, renewal, and operational aspects of graduate housing. We also make the argument that as MIT undertakes capital planning both on the east end of the campus and in Kendall Square, graduate students should be considered as a vital population that could contribute significantly to an outstanding and enhanced environment. MIT faces an opportunity in the next few years to greatly enhance the value of the campus and to create a place worthy of our legacy, achievement, and ambition.

1.0 Introduction

In March 2013, the Provost created the Graduate Student Housing Working Group (hereafter "the working group") to explore graduate housing at MIT. The introductory text and charge to the group read as follows:

Graduate Student Housing Working Group Charge

In order to strengthen the MIT 2030 campus planning framework, as recommended by the Task Force on Community Engagement in 2030 Planning, the Institute needs to develop and articulate a vision for serving its community's housing needs. As a first step in this process, a Graduate Student Housing Working Group has been formed with the following charge:

MIT's strength comes from the high quality of its people and in taking a leadership role in developing the future of the residential research university. In this regard, MIT needs to do the utmost to maintain competitiveness in recruiting the best graduate students and providing a rich and engaging residential experience for them. This working group is asked to:

1) Evaluate the ways in which the graduate student housing needs are currently met, and identify strengths and weaknesses in our current approach in the context of graduate student recruiting and satisfaction.

2) Recommend ways by which the graduate student housing needs might be best served into the future in order to maintain competitiveness. Any recommendations which require new resources should be weighed against the need for other resources to support the graduate student population.

The working group met many times over the ensuing months. Early tasks the group undertook were to more sharply frame the questions embedded in the charge and to organize to gather data, solicit input from the community, and analyze the information gathered. There were some iterations in this framing process, including requesting additional data on some topics and asking for new analysis of existing data.

A short history of graduate housing at MIT

We are not the first group to address housing for MIT graduate students. There are two ways to tell the story of graduate housing at MIT: to describe the vision and intentions of past MIT faculty and leaders, and to detail the features of MIT's graduate housing as it has evolved over the years.

MIT was one of the first U.S. universities to provide campus residences for graduate students. This long tradition of a residential campus began in the early 1930s, when MIT President Karl Compton described the need for graduate residences:

> *Graduate students now lack almost completely the social contacts, which the undergraduates enjoy throughout their manifold organized activities. Their cultural development, and hence their social effectiveness, depend on such contacts. The most natural cultural training comes from free social intercourse between men of differing interests but of equivalent intellectual outlook.*

The first housing at MIT specifically for graduate students was the buildings now known as Senior House (E2 and E3). These buildings, built as part of the original Cambridge campus in 1916, were designated as the Graduate House in 1933, with Professor Avery Ashdown as housemaster. In 1937, MIT bought the Riverbank Court Hotel, at the corner of Massachusetts Avenue and Memorial Drive, for use as a graduate house. Later renamed Ashdown House, the building (W1) was initially occupied in 1939.[1] Ashdown's first-floor cafeteria provided graduate students, faculty, and visitors with a much-needed gathering place, and the building provided lodging for more than 500 students. Professor Ashdown's strong presence nurtured an active community life in the building.

At the end of World War II, when large numbers of veterans came to campus, MIT constructed 100 units of temporary housing for veterans and their families. The first Westgate units were occupied in spring 1946, and naval huts were brought from Rhode Island, rebuilt, and occupied as "Westgate West." Westgate and Westgate West were demolished from 1957 to 1959, and the current Westgate (W85) was completed and first occupied in August 1963. This housing is still occupied today by married students and their families. These apartment-style developments had limited common space, but they did have onsite daycare centers that enabled spouses to work.

In 1956, graduate housing was addressed in the "Ryer Report," which recommended to President Killian that MIT develop a graduate center east of the main educational buildings by utilizing and expanding existing East Campus housing.

[1] This original Ashdown (W1), extensively renovated and renamed Maseeh Hall, reopened in 2011 as an undergraduate dorm. A new graduate residence named Ashdown (NW35) opened in 2008 to house the community displaced from the original Ashdown.

In 1961, the Bush-Brown Committee recommended that MIT build a "graduate college" that combined residential, dining, seminar, and recreational components. While MIT did not ever build this graduate college, the rationale for graduate housing was accepted by the administration, as reflected in subsequent correspondence among senior administrators and subsequent investments in graduate housing. The committee articulated a vision that remains relevant today. We include excerpts from the report and its appendix below.

> *. . . MIT must address four educational objectives: to develop attitudes of skeptical scrutiny and competence in legitimate methods of inquiry and decision; to inspire excellence in professional knowledge and judgment; beyond these; MIT must quicken the dedication to citizenship; and it must open students to the world of art, of music, of literature. . . .*

The isolation of students in narrowly focused departmental and laboratory settings seemed to be a major barrier to achieving this broad goal. The committee thought that social interaction in a residential organization could address this.

> *(MIT) is dedicated to the idea that its architects and city planners, its industrial managers and engineers, its political philosophers and economists should draw continuously upon science and art. To effect such interchange, surely graduate students, books, instruments and faculty must be brought together as effectively as possible.*
>
> *Put succinctly, MIT believes the professional person to be responsible for improving his society by employing today's art, today's science, and today's technology in humane ways. In accepting that as her goal -- to educate men wholly -- so that students are bent upon moral and liberal education aimed at social purpose, MIT must drive beyond intellectual competence within a specialty, must embrace the cultural, moral, and social development of citizens who seek more than a material end. Such concern is generated by MIT's idealistic students and by men of character in her faculty; they do not summon the picture of isolated professors and isolated students working ever more particularly upon our problems in dispersed laboratories and libraries.*
>
> *. . . To gain the kind of allegiance MIT expects of its students, they must belong to a residential organization. Now is the time to think imaginatively about such a community. … The virtues that MIT students genuinely possess, and their deficiencies, demand a residential form uniquely suited to our resources; we need now to think seriously about the social organization that will get the best from the best.*

Parts of the report argued against putting graduate students in deadening buildings with double-loaded corridors. They did envision large buildings, but with a socially conducive layout that included house entries, suites, common spaces, variety in accommodations, and spatial identity.

Nowadays, of course, we take cross-disciplinary engagement for granted. Students and faculty today want to go beyond simply appreciating different views and methods; they want to network with, learn from, and incorporate value from other disciplines and partners. They value the learning that happens informally but by design. Our graduate students see the residence as a design space that they control, and themselves as their residence's enterprising citizens.

So how does this historical vision relate to our present inventory and needs? The current inventory of graduate housing is discussed in more detail in Section 2.3, but the remainder of this section recounts the evolution of graduate housing over recent decades to view the changing interpretations of the early vision and different generations' responses to graduate student housing needs.

The Institute has clearly made good on the recommendation to dramatically increase the supply of campus housing for graduate students. In 1933, MIT housed fewer than 400 graduate students; today, 2,300 graduate students live in on-campus housing. Each addition to the graduate housing stock has reflected some interpretation of graduate student housing needs and the perceived best response.

Housing configurations have diverged considerably from the typical layout of the double-loaded corridor of single-bed rooms common in the original Ashdown. Configurations in the newer residence halls include suites of rooms sharing kitchens and common space; apartment-like units; and studio apartments with full cooking facilities. With the exception of Tang Hall and the married-student developments, these residence halls have various, and often generous, common space.

None of the graduate residences added since 1960 have full dining services. Some have catering kitchens, but the assumption in recent years has been that students prepare their own meals or eat on campus. Dining was a core feature of the original Ashdown (until the 1980s, food was served in Ashdown, and it was a favorite gathering place for residents as well as nonresident graduate students and faculty). Perhaps reflecting current student preferences, new Ashdown was not able to sustain dining, even though the commercial cooking facilities and space and program for dining were included in the building. Small eateries have similarly failed in new Ashdown after several attempts.

Common spaces have ranged from modest to extensive in these graduate residences, and amenities have included exercise rooms, multiple lounges, and, more recently, multiple group-kitchen and tech rooms. The common spaces are very popular among students. In our review of the archives, we found no discussion of standards or rationales for the configurations of these community spaces.

Although space allocation varies, about 85% of graduate residence hall square footage on average has been allotted to bedrooms or private student space. Housemaster space and mechanical space consume about half of the remainder, and the other half is devoted to common space and amenities. One exception is Tang Hall, which, unlike all of the other graduate residences, has very little in the way of common spaces or amenities: it is simply a tall tower with scant welcoming space on the first floor and only

one common room, on the top floor, with a housemaster suite below it. Students note this exception, and it explains Tang's lower satisfaction ratings.

Rents for on-campus housing vary. In 1982, MIT committed to equalizing on-campus rents, but over time, as new facilities were added, with a variety of configurations, quality, and amenities, the equalization goal was abandoned. Rents now range from $760 a month for a single student in a four-occupant apartment in Sidney-Pacific to $1,696 for a one-bedroom efficiency in Edgerton. Current prices for family housing range from $1,234 for a one-bedroom efficiency in Westgate to $1,826 for a two-bedroom apartment in Eastgate.

Competitiveness with market rents has also varied over the years. While some campus rents are now comparable to portions of the local market, rents in other facilities such as Tang Hall and Green Hall are below market. It must be acknowledged, however, that given the complex bundle of expenses that go into an actual rent payment, it is hard to compare housing costs precisely. For example, students who live on campus receive free Internet and cable. These services could cost upwards of $200 per month in off-campus housing. Off-campus students may also have to pay for transportation to school.

For the most part, MIT's graduate residences for unmarried students have had housemasters. The one exception has been Edgerton, which had no housemaster from its opening in 1990 until 2007. This hasn't been true for family housing: Eastgate has had a housemaster only for the past six years, and Westgate has not yet had a housemaster.

The role of the housemaster has been to support intellectual engagement. Housemasters hold faculty seminars, receptions, and student discussions, and work with house officers (students) on other programming and outside activities. Over the years, the manner in which graduate residential life is programmed has varied from the light touch, with occasional gatherings and open houses, to a more formal approach that has included career services workshops, seminars, and social activities programmed for and by graduate students.

The only clear explanation for the variation in housing planning decisions over the years is that each generation is different and has faced different challenges, and MIT has made each of its decisions based on each situation's unique characteristics rather than adhering to a simple rule or plan. For example, MIT saw that given the diversity of housing quality and demand present on campus, a range of rents made sense. Students accepted this, only strongly insisting that lower-cost options be preserved as much as possible. There was early opposition to closing the original Ashdown because it represented the lowest-cost housing option at the time. The compromise struck regarding cost was that some lower-cost options would be built into the new Ashdown, and Tang would become the new low-cost option. And while students in 1990 did not insist on a housemaster for Edgerton Hall, by 2007 they believed that a housemaster would significantly enhance the Edgerton Hall experience.

Architectural and urban design considerations took on a more prominent role in graduate residences with the development of the Warehouse, Sidney-Pacific, and the

new Ashdown. MIT devoted significant attention to programming and design and to the connections among these residence halls in the Northwest area. This attention to architecture reflected a combination of an increasing desire for architectural statements, a development process that included student groups, and the desire to use design to address a variety of issues, from site development to value engineering.

These newer buildings cemented a shift to more apartment-, suite-, and studio-style living, in buildings that look more like urban residential buildings than dormitories. The clustering of buildings in the northwest sector of campus encouraged some attention to site and place, though not in the true mixed-use sense of places that incorporate commercial elements and an active street life.

With few exceptions, students who have moved into graduate housing have been allowed to reapply each year. Students move into a chosen graduate residence and become part of an active community. The Warehouse is an exception to this rule — students can live in the Warehouse for one year only. This decision was made both to increase first-year housing for new students and to provide housing for summer programs and executive education.

Since the 1960s, MIT has acquired a portfolio of nine apartment buildings in Cambridge that provide 355 total beds, of which graduate students occupy 35 percent. These units are in MIT's real estate investment portfolio and are not part of the graduate housing inventory. They are apartments rented at market rates and have none of the amenities common in on-campus housing.

Organization of our work

To organize our work, we divided the charge into five subtopics. A subgroup of the working group worked on each subtopic with the assistance of MIT staff and a liaison from the city of Cambridge, and we created several venues for listening to students and other members of the MIT and Cambridge communities.[2]

[2] The working group did extensive outreach. It started with an article and invitation to comment in the June 2013 *Faculty Newsletter* and an online outreach to graduate students in May 2013. Two open student forums were held on May 30 and August 15 and attended by 30–50 students each, as well as members of the working group (including Dean Ortiz and Chairperson Clay) and representatives from MIT Housing. A Grad Housing Forum was convened for faculty on September 20 by the faculty chair, Professor Steven Hall, and the working group chair, Professor Phillip Clay. The audience was an eclectic group of a dozen faculty members and approximately 10 (vocal) graduate students, as well as a number of staff. A Cambridge community meeting held on campus on October 1 was attended by approximately 20 non-MIT people.

The online outreach, conducted via a Google Docs form to all graduate students, received more than 200 responses. The form asked: (1) Where do you live? (2) Describe your current and past housing at MIT. (3) Are your housing needs at MIT being met? Why or why not? (4) How did you pick housing at MIT? (5) Any other comments, ideas, suggestions or issues we should think about?

1. Graduate student attitudes – Using past and current surveys, open meetings, and focus groups, the working group sought answers to a number of questions. How do students approach the decision to live on campus or off campus? What do students think of their housing experience? How satisfied are they? Given choices, would they make different decisions in the future? Where do they live, and how has that changed over time? What do students pay for housing? We also undertook additional analysis to understand the experience of graduate families and international students.

2. Boston-area housing market – The charge to the working group requires an understanding of the local housing market, in terms of both our students' impact on the market and our students' experience of the market. What are the dynamics driving the Cambridge housing market relative to students and others seeking affordable housing? How have these dynamics changed over the years? What changes can we expect in the future, and how will these changes affect our students' ability to live in Cambridge? What are the trends in net additions to stock of housing, both in new construction and in existing stock? What are the trends in rents and vacancy rates? To what extent will the off-campus option in Cambridge remain viable for our students in the future? What is the market like in Boston and other adjacent communities? Although housing in Cambridge has always been relatively expensive, is there something different about current concerns and projections about rent levels?

3. Current graduate housing inventory – MIT houses more than one-third of its graduate students. In the last two decades, there have been major increases in the number of graduate beds (337 beds in 1990 to 2,330 beds now). The number of married-student units has remained constant during this period. Three issues are relevant when considering the existing stock of graduate housing: student satisfaction; how off-campus markets compare in both amenities and pricing; and the quality and sustainability of the stock over a 20-year time horizon. Finally, we assess what is required to maximize the contribution of the existing stock given the Institute's capital renewal planning process.

4. Future graduate enrollment – We explored with deans and department heads the factors that determine the size of the graduate student body in their unit. We looked at enrollment patterns from 1948 to the present day and used the next decade as a planning horizon. We sought to understand the factors associated with past change and what factors might shape future shifts. While we did not expect firm numeric projections, we did seek a general sense of potential changes in significant or recurring enrollment drivers (e.g., research volume or new degrees). We investigated whether the composition of the graduate student body was likely to shift (e.g., more master's students, or more students in

programs with limited residential presence). While we know that research volume is the major driver of change, we probed for other possible drivers, such as educational technology, preference in some cases for postdoctoral staff over graduate students, or international collaborations.

5. Graduate housing at peer institutions – To understand where MIT stands competitively, and what factors shape our competitive position, we examined what our peers offer in graduate housing and what factors prospective students consider in deciding which offer to accept. We also explored how local peer institutions house their graduate students in our common housing market.

Housing is undeniably important for graduate students — a critical component of the student experience outside of the classroom and laboratory. Housing affects community life, personal life, and stress management. Housing can integrate or segregate. It can be a venue for networking and collaboration, or a refuge. It can be convenient and accessible, or inconvenient and isolated. It can be a financial burden or a manageable expense. Neighborhoods can be safe and communal or remote and hostile. Students can be welcomed to a community or rejected as an obstacle to local families seeking affordable housing. We want our students to dwell on the positive sides of these dualities.

Our graduate students value MIT's tradition of choice. They can live on campus or off campus. They will spend different amounts based on location, household size, convenience, and amenities. No choice is permanent, and there have usually been good or good-enough options for most students. Whether this tradition will continue is the meta-question this report addresses.

Many discussions of graduate student housing focus on options for single graduate students, but some graduate students have spouses and children. The fraction of graduate students with spouses or domestic partners increased from 34% in 2001 to 41% in 2013. Graduate families have fewer options than single students because they live as a family unit and cannot easily shrink to consume less space or share rent with other parties. They have additional concerns in selecting housing, such as childcare, child safety, and job opportunities for spouses. Newly arrived international students, overwhelmed by the local housing market, are more likely to opt for on-campus housing. International families face all of the challenges of families and international students, with the added complication that spouses are often not eligible to work.

Cambridge residents told us of a deepening crisis of family housing in Cambridge, citing concerns that local families now pay dearly for what used to be modest, affordable housing in many parts of Cambridge, including in areas within walking distance of campus. While this report shows an increase over the past decade in the number of MIT graduate students living in Cambridge, it also shows a significant reduction in the number of affordable units. Although this report only addresses graduate student

housing, MIT staff at all levels have also long been a part of the Cambridge community, and increasing numbers of MIT staff, especially postdocs, do cast an MIT shadow on the tightening market — one that affects all, including MIT staff with modest incomes.

Our working group did not convene in isolation. Although our charge emerges from the campus planning associated with MIT 2030, we are not formally engaged in the campus planning process of this group or its successor groups. We did interview several members of the 2030 planning group, review their reports and documents, and use what we learned from that process to inform our inquiry.

Our findings and recommendations regarding the intersection of graduate housing and campus planning are embedded throughout the report. One main conclusion is that the planning for the eastern end of the campus and Kendall Square represents the biggest place-making activity MIT will have ever embraced. We are not sure this is fully appreciated. As it also represents a major part of the future of the city of Cambridge, it is therefore of more than casual interest to city residents and leaders. Decisions made about this area, whether they relate to academic or nonacademic development or renewal, will shape the look and feel of the campus for generations to come.

There is both a great opportunity to create a wonderful new place that is iconic MIT, and a risk that we may extend uses that, however attractive they are as buildings or enterprises, and however significant a financial gain they deliver, create a non-place that is nevertheless the gateway to the campus. Each development decision forecloses certain options, and if decisions do not advance a collective vision, it may be harder to capture something better in the future. Effective planning requires the expression of intention and framing of options for advancing the collective vision. This is explored more fully in our recommendations.

Defining that vision was not our charge — another group is working on that issue — but in this report we do explore ways that graduate housing could play a role in campus planning. If the intention is to embrace the community in that planning, MIT's graduate students are an ideal population to consider: they are adults, they fit in, and they contribute to and benefit from the highest and best use of the target area for planning. We do not make recommendations for particular development projects or outcomes, but we do believe graduate student life should be a consideration in campus planning.

2.0 Data and Analysis

The next five sections present our analysis and findings in the five studied areas. In short, graduate housing opportunities are changing, both on and off campus. MIT has high expectations for residential life, and a legacy of supporting a rich residential life as a complement to the classroom and laboratory. Like MIT, the city of Cambridge is also looking to ensure the long-term viability of housing opportunities for its residents, even as it supports expanded development in critical areas.

MIT is rich in resources, but its resources are not unlimited. It will be important to prioritize options for graduate student life, research, and education. This work will need to be creative on all dimensions, and it will need to engage the city as a partner in housing. Every potential housing solution that requires a capital outlay has to be evaluated in terms of return on investment and multiple bottom lines.

In the sections that follow, we review requirements both for stewardship of resources and for legacy commitments to graduate life.

2.1 Graduate Student Attitudes

Introduction

This section details the unmet demand for on-campus graduate housing at MIT, the housing preferences of MIT graduate students, their satisfaction with their current housing situation, and the impacts of on-campus housing availability upon their decision to attend MIT and upon their academic and research experiences. We conclude with our best estimate of the unmet need for graduate campus housing. This assessment is based on the following sources:

- The 2011 Incoming Graduate Student Survey (62% response rate)
- The 2011 Enrolled Graduate Student Survey (62% response rate)
- The 2012 Commuting Survey (57% response rate)
- The 2013 Student Quality of Life Survey (52% response rate among graduate students)
- The 2013 Incoming Graduate Student Survey (64% response rate)
- Direct student feedback from forums and an online form[3]
- Data provided by Residential Life & Dining, Division of Student Life

Each key data breakout (school, department, degree program, age, citizenship, gender, ethnicity, term of entry, location) was well represented in these datasets.

Unmet demand for on-campus graduate housing

In 2013, 4,437 MIT graduate students lived off campus (Residential Life & Dining). Of the 1,417 respondents to the 2013 Student Quality of Life Survey who lived off campus, 163 (11.5%) said they would have preferred to be housed on campus for the full duration of their MIT program. Assuming similar housing preferences for non-respondents, it can be extrapolated that approximately 510, or 11.5%, of the 4,437 graduate students living off campus in 2013 would have preferred to live on campus for their entire program.

In addition, 50 of the 934 respondents who had never lived on campus (5.4%) reported that they would have preferred to live on campus for their first year and then move off campus for the remainder of their program. With 36% of graduate students who had never lived on campus responding to the survey question, and assuming similar housing preferences for non-respondents, it can be extrapolated that approximately 139 graduate students in 2013 who had never lived on campus would rather have lived on campus for the first year of their program.

[3] Two open student forums held on May 30 and August 15 of 2013 were attended by 30 to 50 students each, and more than 200 responses were submitted to a query to all graduate students via Google Docs. The query asked: (1) Where do you live? (2) Describe your current and past housing at MIT. (3) Are your housing needs at MIT being met? Why or why not? (4) How did you pick housing at MIT? (5) Any other comments, ideas, suggestions or issues we should think about?

Table 1 breaks down demand by group. Demand for on-campus housing for entire duration of education is highest among graduate student families with children, followed by families without children, followed by singles. Comparing "entire program" and "first year only" responses, graduate families and international students show the highest preference to remain in residence for their entire program. This may be due to the fact that parents are likely to want continuity in schools and childcare. Students with families receive two-year housing assignments in the May allocation, so families with children do not live on campus the first year only (see http://housing.mit.edu/graduatefamily/how_we_assign_housing). Sloan students likely wish to avoid moving due to the short two-year duration of most programs. Demand for on-campus housing is higher among international students, probably due to the difficulty of exploring the local real estate market and making residence arrangements from abroad.

Type of graduate student	Percentage of this type of survey respondent living off campus who would prefer to live on campus for entire MIT program	Percentage of this type of survey respondent who never lived on campus and would prefer to live on campus first year only
With children	22%	5%
With spouse/partner (no children)	10%	5%
Single	7%	6%
U.S. citizen/PR	9%	4%
International	18%	11%
Sloan School of Management	16%	6%
All	12%	5%

Table 1. Unmet demand for graduate student housing. *Source: 2013 Student Quality of Life Survey*

The most urgent unmet demand for graduate housing can be approximated by the difference between the on-campus housing cumulative waitlist and those assigned to housing during the allocation period (Δ), provided by Residential Life & Dining (**Table 2,** cumulative over the entire semester).[4] Waitlist data represents a lower limit for unmet demand for on-campus housing, since, according to student feedback, some students cannot tolerate the uncertainty (especially those with families and children) and refrain from joining the waitlist. From 2011 to 2013, the cumulative unmet demand (Δ) per semester fluctuated between 133 and 356 students, consistent with the 2013

[4] MIT assigns graduate housing electronically, via a series of algorithms, in two separate allocations. The May allocation assigns students to housing in the fall, and the November allocation makes assignments for the spring. See http://housing.mit.edu/graduatefamily/how_we_assign_housing.

Quality of Life Survey data. All graduate residences were determined to have a waitlist at some point during the calendar year.

	Waitlist Single	Assigned Single	Waitlist Family	Assigned Family	D Single (Unmet Demand)	D Family (Unmet Demand)	D Total (Unmet Demand)
Fall 2011	390	142	132	24	248	108	356
Spring 2012	170	82	61	16	88	45	133
Fall 2012	376	143	132	25	233	107	340
Spring 2013	164	77	67	16	87	51	138

Table 2. Cumulative on-campus waitlist and assignment data per semester, 2011–2013. Family graduate students include those with children and without (i.e., spouse only). Unmet demand is the difference between the waitlist and assigned. *Source: Residential Life & Dining*

The maximum unmet cumulative waitlist demand per semester for singles is 248 students, or 13% of the current 1,925 on-campus beds available for singles. The maximum unmet cumulative waitlist demand for families per semester is 108 students, or 27% of the current 408 on-campus beds available for families.[5] Urgent unmet housing demand is greater among families.

Housing preferences

According to Residential Life & Dining, the percentage of regular enrolled graduate students living in off-campus Cambridge housing has stayed relatively consistent since 2002, reaching a high of 33% in 2001 and 2010 and a low of 28% in 2007 and 2012, averaging out to 31%. However, we note that the percentage of "other/unknown" addresses increased during this time, from 3% in 2002 to 14% in 2012. The unknowns are students who choose not to report a local address or did not have a local address at the time they registered and had not updated their information for the registrar. Sloan students accounted for 38% of the other/unknowns in 2012, so these data do not show a large shift in the population of non-Sloan graduate students moving farther away from campus (< 5.3%).

Table 3 shows statistics for new applications to the graduate housing lottery system, requests for continuing graduate housing for the May 2012 allocation, and students who remained in the same graduate residence in the May 2012 allocation. (Detailed definitions of "new" and "continuing" are provided in **Appendix 2.1.1.**) The Warehouse (WH) saw the most applications from new students relative to its capacity

[5] A "bed" in the context of family housing is an apartment occupied by one graduate student and their family members.

(259%). Ashdown and Sid-Pac saw the largest numbers of applications, both new and continuing. Eastgate received more applications than Westgate, and the percentage of students staying is highest at Eastgate and Westgate (54% and 56%, respectively).

Building	# New to MIT*	% New of Bldg. Capacity	Building	# Continuing at MIT**	% Continuing of Bldg. Capacity	Building	# Stayed in Building	% Stayed of Bldg. Capacity	Bldg. Cap.
NW30 (WH)	311	259%	Edgerton	137	74%	Westgate	117	56%	210
Ashdown	763	141%	Ashdown	377	70%	Eastgate	109	54%	201
Edgerton	153	83%	Eastgate	91	45%	Sid-Pac	298	44%	676
Sid-Pac	557	82%	Sid-Pac	292	43%	Edgerton	80	43%	184
Eastgate	141	70%	Tang	142	35%	Ashdown	218	40%	542
Tang	224	55%	Westgate	58	28%	Tang	137	34%	404
Westgate	85	40%	NW30 (WH)	n/a	n/a	NW30 (WH)	13	11%	120

Table 3. New applications to the MIT housing lottery system, requests for continuing graduate housing for the May 2012 allocation, and students who stayed within the same dorm. Detailed definitions of "new" and "continuing" are provided in **Appendix 2.1.1.** *Source: Residential Life & Dining*

In May 2012, 247 students applied for family housing. In that allocation, Eastgate had 83 spaces available out of 201, and Westgate had 64 spaces available out of 210, so at most 60% of applicants could receive housing. Also in May 2012, 1,389 students applied for single-student housing. In that allocation, 1,183 single housing spaces were available out of 1,925, so at most 85% could receive housing.[6] Graduate families applying for on-campus housing were considerably less likely to get it than single applicants were.

Respondents to the 2011 Enrolled Graduate Student Survey indicated that the top factors influencing their decision to live off campus were price (29.5%), wanting to live away from MIT (25.5%), wanting to live with a friend (17.4%), and not being offered a space on campus (6.1%). In the open student forums, students expressed desire for housing that is affordable, safe (concerns were raised regarding CASPAR near Ashdown/Warehouse and transportation after dark), and close to campus (in this order).

[6] Fewer than 85% received housing in the allocation, as some students were unwilling to accept assignments in buildings like Edgerton (unfurnished) and Tang.

Satisfaction with graduate student housing

Responses to the 2013 Student Quality of Life Survey indicated that 82% of all graduate students were either "very satisfied" or "somewhat satisfied" with their housing situation. The only statistically significant difference among subgroups was that 36% of international students were very satisfied with their housing, while 43% of U.S. citizens and permanent residents were very satisfied. Of all students living in on-campus housing, 78% were very satisfied or somewhat satisfied.

In the open forums and the Google Docs survey, students overwhelmingly indicated that their housing needs were being met. However, they did raise concerns regarding rising costs and decreasing availability of convenient and affordable housing options, particularly in the context of east campus development. Additionally, graduate students with families, especially international students, cited concerns with both on-campus housing (e.g., building age, recurring maintenance issues, childcare, affordability, availability, communication issues) and off-campus housing (e.g., transportation, lead laws, childcare, affordability, availability).

Figure 4 details graduate students' satisfaction by location, encompassing off-campus locations as well as specific MIT residence halls. Satisfaction is highest at the Warehouse (NW30), followed by off-campus housing within a 15-minute walk of MIT, followed by Sidney-Pacific and Ashdown. Satisfaction is lowest at Tang, Edgerton, and the family residence halls of Eastgate and Westgate. Satisfaction is higher at Eastgate than at Westgate.

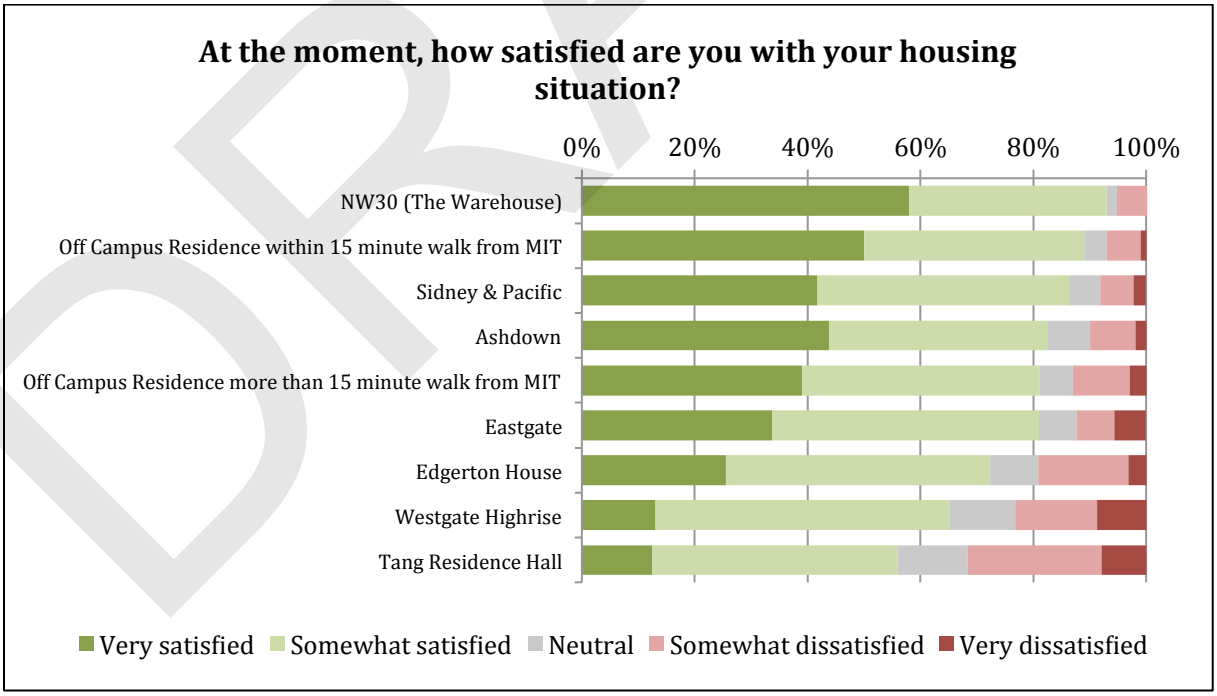


Figure 4. Satisfaction with graduate student housing, by location and residence hall.
Source: 2013 Student Quality of Life Survey

The Warehouse, primarily for new students, "provides one of the quieter environments on campus for graduate students. With a relatively small number of residents and a moderate activities calendar, the Warehouse is ideal for people who need their own space" (http://housing.mit.edu/housing/graduate/warehouse). The Warehouse offers only one room type, and it is one of the more expensive ones: an efficiency apartment for $1,237/month for the 2012–2013 academic year. The Warehouse is also a furnished residence (as are Ashdown, Sidney-Pacific, and Tang: http://housing.mit.edu/graduatefamily/residences).

Eastgate, Westgate, and Edgerton – three of the four halls with the lowest overall satisfaction ratings – offer only unfurnished apartments. Residential Life & Dining offered to upgrade Edgerton with furniture and furnishings, but following discussions of the pros and cons of this upgrade, the house government and Graduate Student Council opted to keep it unfurnished. The graduate student families, in particular international students, who attended the open forums cited building age, recurring maintenance concerns, access to childcare, and affordability as concerns with Eastgate and Westgate. Age and maintenance concerns were also raised with Tang.

Responses to the 2012 Commuting Survey indicated that distance and transportation are not significant factors in student housing satisfaction.

A comparison of the 2004 Graduate Student Survey and the 2011 Enrolled Graduate Student Survey (**Table 5**) reveals that students' satisfaction with the availability of graduate housing has increased. Satisfaction with the cost of housing was much the same in 2004 and 2011.

		Very dissatisfied	Somewhat dissatisfied	Somewhat satisfied	Very satisfied
2004	How satisfied are you with the **availability** of housing?	17%	25%	40%	18%
2011	In general, how satisfied are you with the **availability** of housing?	4%	17%	52%	27%
2004	How satisfied are you with the **cost** of housing?	32%	31%	28%	9%
2011	In general, how satisfied are you with the **cost** of housing?	22%	40%	31%	8%

Table 5. Satisfaction with availability and cost of graduate student housing in 2004 and 2011. *Source: 2004 Graduate Student Survey and 2011 Enrolled Graduate Student Survey*

Another advantage of on-campus housing mentioned by students is the fact that they can break their lease for graduation with 30 days' notice, which generally cannot be done with off-campus housing.

Impact of graduate housing on recruitment competitiveness

The 2013 Incoming Graduate Student Survey asked both enrolling and non-enrolling graduate students how important various factors were in their decision of whether to attend MIT. The availability of on- and off-campus housing was among the lowest-rated factors (**figures 6 and 7**). These data are consistent with meetings with department heads and school deans that indicated that housing does not play a significant role in recruitment competitiveness.

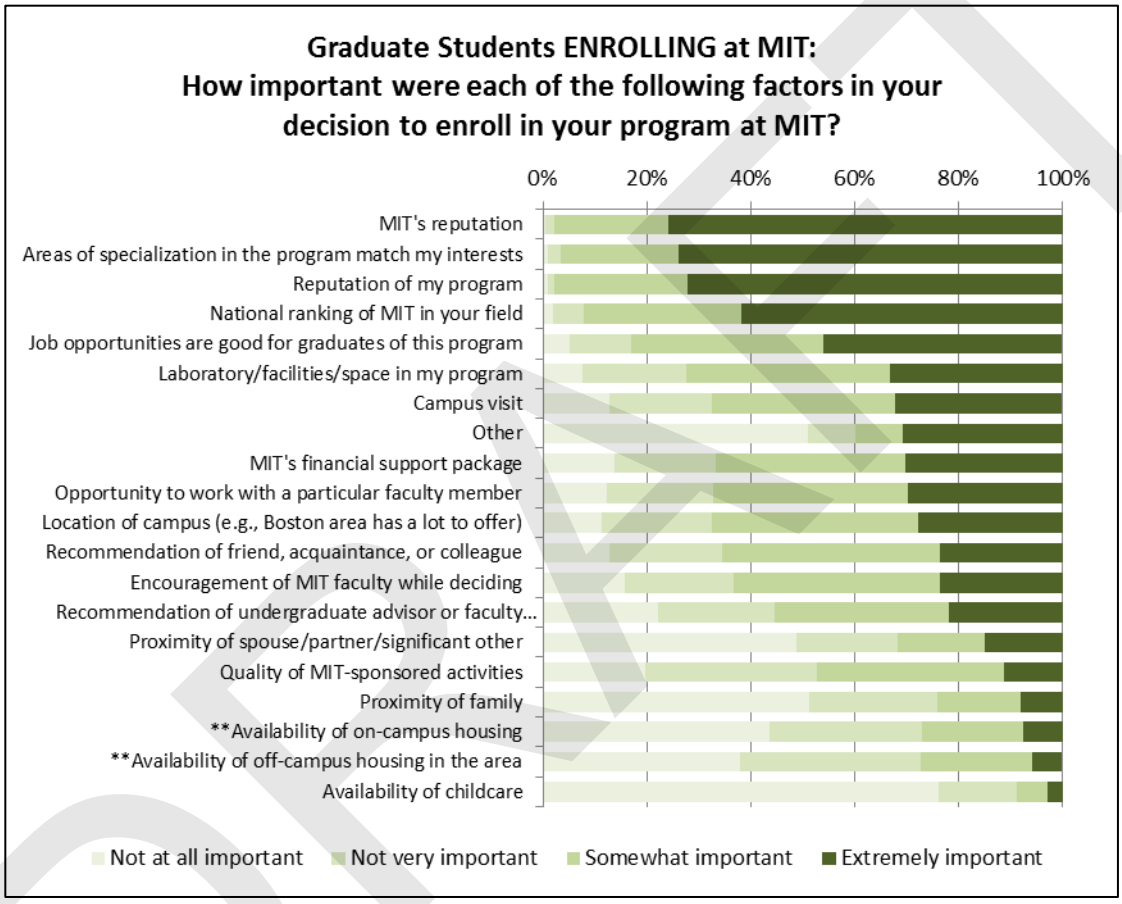


Figure 6. Factors affecting incoming graduate students' decision to enroll at MIT.
Source: 2013 MIT Admitted Graduate Student Survey

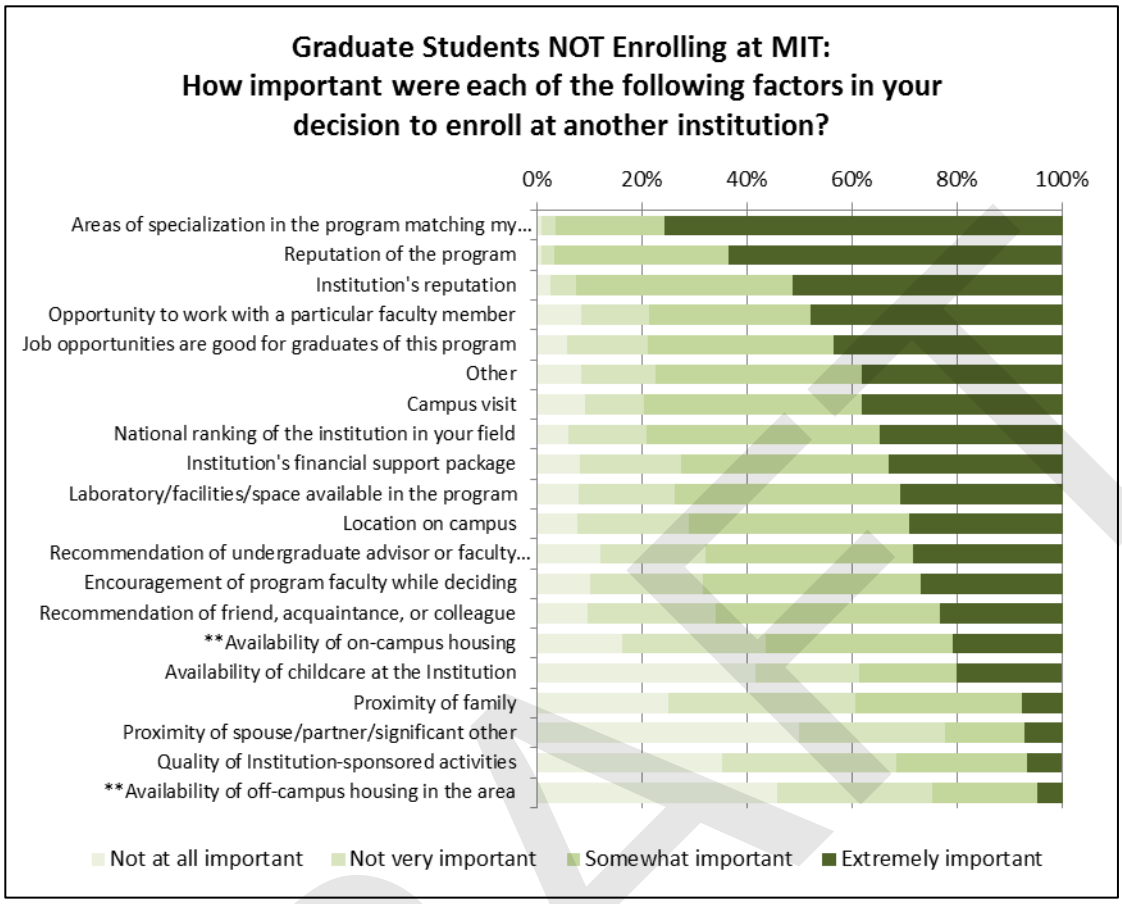


Figure 7. Factors affecting accepted graduate applicants' decision not to enroll at MIT. *Source: 2013 Admitted Graduate Student Survey*

The 2011 Enrolled Graduate Student Survey indicated no significant difference in time spent on research by on-campus and off-campus residents. Also, when asked to rate the extent to which housing is an obstacle to academic progress, there was little difference between on-campus and off-campus residency (**Figure 8**).

		Location (based on TermAddrCategory)		
		On-campus	Off-campus or unknown	Overall
Housing situation	Not an obstacle	60.5%	62.3%	61.6%
	A minor obstacle	31.5%	30.5%	30.9%
	A major obstacle	8.0%	7.2%	7.5%
	N	1165	1758	2923

Figure 8. Graduate students' perceptions of whether their housing situation is an obstacle to their academic progress. *Source: 2011 Enrolled Graduate Student Survey*

Of the approximately 300 graduate students who said they would not choose to come to MIT or would have second thoughts, fewer than 10 cited housing as a top reason to not attend or to have second thoughts about attending MIT.

Additional graduate housing topics raised in outreach

During the student outreach phase of this working group, many other issues were raised that are collected here for completeness, to give future readers a sense of other issues facing MIT graduate students in 2013.

- If not pursuing housing through MIT, students utilize craigslist, their peers, MIT Off-Campus Housing, Rent Monkey, and PadMapper to locate housing.
- Students raised several issues regarding the housing allocation process, including:
    - Move-in/move-out dates and lease termination, especially at the end of the summer. August 15 termination is the standard, but the majority of local real estate operates on a September 1 schedule, resulting in a very inconvenient two-week gap.
    - The lottery, including uncertainty around housing during April-June, when a housing search competes for attention with coursework and research; and officers "gaming" the lottery to remain in residence.
    - A desire among families with children to take priority over families without children in the family dorms.
    - A desire for greater control and flexibility in choosing roommates.
- Some students expressed a desire for cheaper, no-frills subsidized apartments without amenities such as common spaces and student-life events.
- Students expressed frustration at several operational issues, highlighting improvements that could streamline existing housing operations or be incorporated in future housing developments, including:
    - Coordination among offices to address issues (DSL, IS&T, Facilities).
    - Noise from early-morning deliveries at Novartis.
    - Issues with MIT-owned housing units (rent increases, etc.)
- Students reported that, in addition to rent and utilities, there are numerous hidden costs in finding off-campus housing (realtor fees, up to one month's rent, time spent to find a suitable apartment, time and money spent moving, broker fee, security deposit).

Summary

○ **Unmet demand for graduate housing on campus:** We used two methods to estimate the number of students who would occupy on-campus graduate housing if it were available. First, we utilized the data from the 2013 Student Quality of Life Survey to calculate the percentage of graduate student survey respondents living off campus who would prefer to live on campus for one year or longer, and extrapolated across the entire off-campus graduate student population. Second, we looked at the number of graduate students who went on the waitlist for housing and didn't receive it. This method was expected to be an underestimate of the total actual demand, since some students are deterred by the uncertainty of the waitlist.

- Extrapolating from the 2013 Student Quality of Life Survey, there are approximately 510 graduate students living off campus who wanted to live on campus for their entire program, and 140 who wanted to live on campus for their first year and couldn't, or approximately 50 students annually, taking into account master's and doctoral time-to-degree — yielding a total unmet demand of 560 students.
- Maximum cumulative annual waitlist data for 2011–2013 yielded a fall semester number of 356 students and a spring semester number of 138, for a total annual unmet demand of 494 students.
- From these estimates, we conclude that demand presently exists for 500–600 on-campus graduate student beds. We believe that if these beds were made available on campus, they would be occupied.

○ **Location:** According to Residential Life & Dining, the number of regular enrolled graduate students living in off-campus Cambridge housing has averaged 31% since 2002, reaching a high of 33% in 2001 and 2010 and a low of 28% in 2007 and 2012. The percentage of other/unknown addresses increased from 3% in 2002 to 14% in 2012, but 38% of the other/unknowns in 2012 were students in the Sloan School of Management, so these data do not indicate a large shift in the population of non-Sloan graduate students moving farther away from campus (<5.3%).

○ **Preferences and satisfaction:** Responses to the 2013 Student Quality of Life Survey indicated that 82% of graduate students were either "very satisfied" or "somewhat satisfied" with their housing situation. Satisfaction is highest in the Warehouse, off-campus housing within a 15-minute walk of MIT, Sidney-Pacific, and Ashdown (in this order), consistent with on-campus housing lottery preference data. Tang, Eastgate, Westgate, and Edgerton report the lowest levels of satisfaction. Direct student input overwhelmingly indicated that graduate students' housing needs are being met, although students did raise concerns regarding rising costs and decreasing availability of convenient affordable housing options, particularly in the context of east campus development. Graduate students with families, especially international students, cited concerns with both on-campus housing (e.g., building age, recurring maintenance issues, childcare, affordability, availability, communication issues) and off-campus housing (e.g., transportation, lead laws, childcare, affordability, availability).

○ **Recruitment:** According to the 2013 Incoming Graduate Student Survey, housing is among the least important factors in respondents' decision whether to attend MIT.

○ **Time spent on research:** The 2011 Enrolled Graduate Student Survey indicates no significant difference between on-campus and off-campus housing relative to time spent on research.

Appendix 2.1.1

The policies governing the renewability of housing assignments are based on two variables:

1) Whether a student is defined as "new" to Housing, and
    a. The lottery period the student entered for their initial assignment or
2) Whether a student is considered as a "continuing" student to Housing.

<u>"New" students to Housing:</u>

May allocation lottery (for August license commence date)

- Single graduate student: one-year assignment, non-renewable, may reapply.
- Family graduate student: one-year assignment, renewable for a second year, may reapply after second year.

November allocation lottery (for January license commence date)

- Single graduate student: six-month assignment, renewable for an additional year, may reapply.
    - Except students assigned to the Warehouse: six months, nonrenewable, may reapply.
- Family graduate student: six-month assignment, renewable for an additional year, may reapply.

<u>Students with "continuing" status to Housing: defined as students that have reapplied and been awarded an assignment after their initial assignment:</u>

May allocation (for August license commence date):

- Single graduate student: after initial term, and reapplication and award process, assignment is renewable annually.
- Family graduate student: after initial term, and reapplication and award process, assignment is renewable annually.

2.2 Boston-Area Housing Market

Introduction

The local housing market is a key factor in the graduate student experience, as a majority of MIT graduate students live off campus. The previous section explored graduate students' housing satisfaction and choices, and particularly the demand for on-campus housing. Whether by choice or by necessity, many graduate students interact with the off-campus housing market as well, and local market trends can influence demand for on-campus options. The off-campus market also has the potential to affect graduate student recruitment and the Institute's reputation.

This section summarizes trends and expectations related to off-campus housing, primarily in Cambridge but also in the Greater Boston area. We identify the communities inhabited by MIT graduate students and characterize rents, vacancy rates, and living costs in these areas. We assess how graduate students affect the local market, as well as how they experience the market. Finally, we analyze projected supply and demand to evaluate graduate students' housing prospects in the off-campus market of the near future.

Where do MIT graduate students live?

In 2013, MIT graduate students were distributed 38% on campus (2,419 students) and 62% off campus (4,012) (**Fig. 2.1**). About 14% (924 students) did not report their addresses. We classified these unknown addresses as off-campus because virtually all on-campus beds were accounted for, and we estimated the locations of the unknown addresses based on the distribution of known ones (**Appendix 2.2.1**). These estimates assume that the students with unknown addresses are representative of the general population.

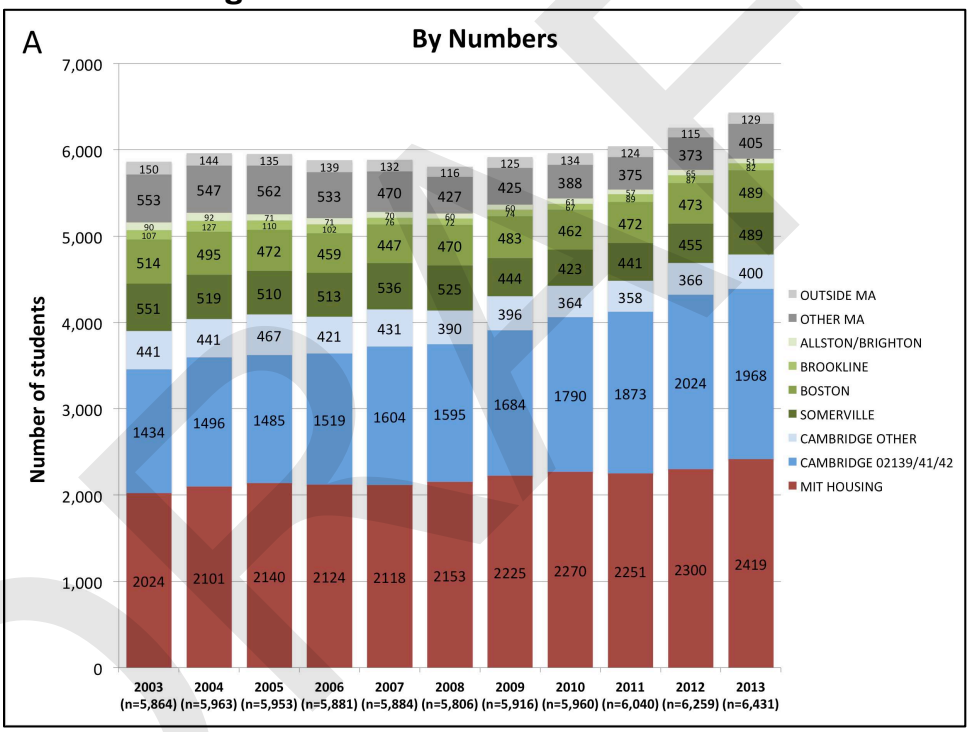
About 60% of the off-campus population (37% of the total; 2,368 students) lived in Cambridge in 2013. The vast majority of off-campus Cambridge students (31% of the total; 1,968 students) lived in the zip codes immediately adjacent to MIT: 02139, 02141, and 02142. Boston and Somerville each housed 7.6% of the total (489 students), and the more distant neighborhoods of Brookline and Allston/Brighton each accounted for less than 2% of the total (combined, 133 students). About 6% of students (405) lived in other regions of Massachusetts, and 2% of students (129) lived out of state.

MIT graduate students are concentrated in the areas near campus, which include the neighborhoods of East Cambridge, Wellington/Harrington, Area Four, Cambridgeport, Mid-Cambridge, and Riverside. In the 2013 MIT Quality of Life Survey, 64% of respondents reported living either on campus or off campus within a 15-minute walk of MIT. Since the graduate dormitories are also within a 15-minute walk of MIT, a majority of the graduate student population (about 4,100 students) lives close to campus.

How has this distribution changed over time?

The geographical distribution of MIT graduate students has been largely consistent over the past 10 years (2003–2013): approximately one-third on campus, one-third off campus in Cambridge, and one-third off campus elsewhere, largely in Boston and Somerville (**Fig. 2.1**). Although we interpreted the 924 unknown student addresses neutrally, it is possible that this uncertainty could be masking a shift in the distribution of graduate students. The Cambridge area near campus (02139/41/42) was the only region that showed an increase in the number of students in 2003–2013 (+37%). The total number of MIT graduate students has increased only modestly (10%) during that decade (see **Section 2.3**). The sizeable and relatively time-stable population of students living in Cambridge indicates that a large segment of the graduate student body is vulnerable to changes in affordability and availability of local housing.

Housing Locations for MIT Graduate Students



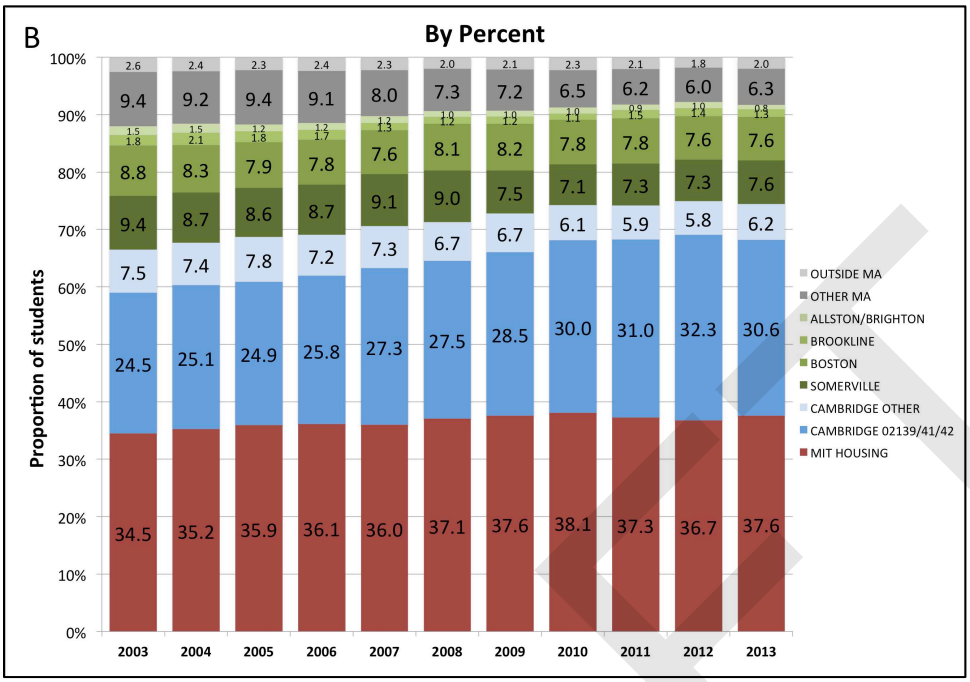


Figure 2.1. Housing locations for MIT graduate students, 2003–2013, **A)** by numbers and **B)** by percentages. Data for each academic year reflect self-reported student addresses for the fall term. For example, 2013 represents academic year 2012–2013 and includes student addresses from the fall 2012 term. See **Appendix 2.2.1** for methodology. "MIT Housing" includes single graduate housing, family graduate housing, graduate students living in undergraduate housing (typically as graduate resident tutors), and FSILGs (fraternities, sororities, and independent living groups). *Source: MIT Institutional Research*

Local housing market trends

The Greater Boston region, particularly Cambridge, is a highly desirable living area, as reflected by high rents and low vacancy rates over the past decade. In this increasingly competitive housing market, one of the most expensive in the country, rising rents are outpacing both the incomes of many local renters and the stipends of MIT graduate students. A major consequence for both residents and graduate students has been a high cost of living and a decline in affordability. In particular, Cambridge rents are rising at a rate that appears unsustainable for graduate students.

Vacancy rates

The rental vacancy rate in Cambridge and Somerville is close to 2%, which is extremely low compared to the surrounding counties, the state of Massachusetts, and the nation overall (**Fig. 2.2**). In Boston and Brookline, rental vacancy rates are more representative of the counties at ~5%, although vacancy rates likely vary among neighborhoods within these cities. For the past decade, the Greater Boston metropolitan area has also shown low vacancy rates relative to the nation and relative to the benchmark of 5.5% at which rents tend to stabilize (Greater Boston Housing

Report Card 2013) (**Fig. 2.3**). The vacancy rate of 3.7% in mid-2013 suggests that rents in the Boston area will continue to rise, as renters compete for existing stock in a market that favors landlords.

Rental Vacancy Rates: City, County, State, and Nation

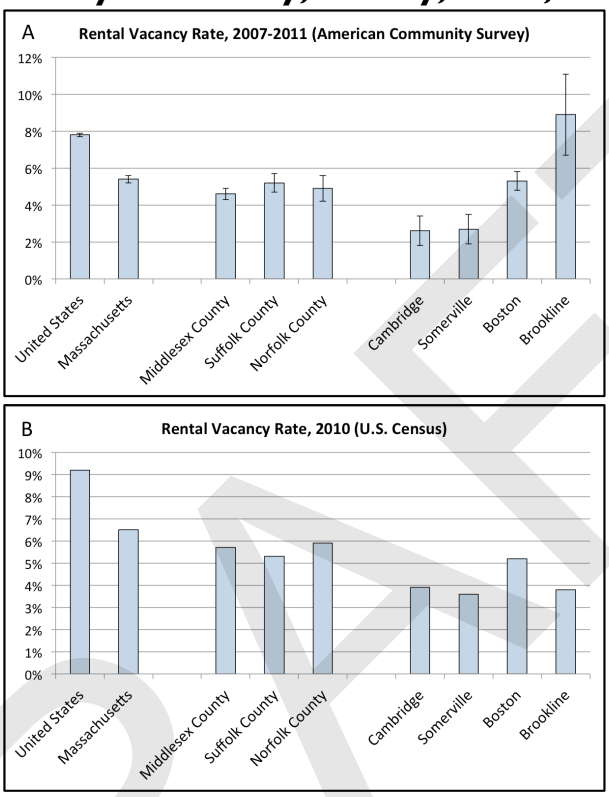
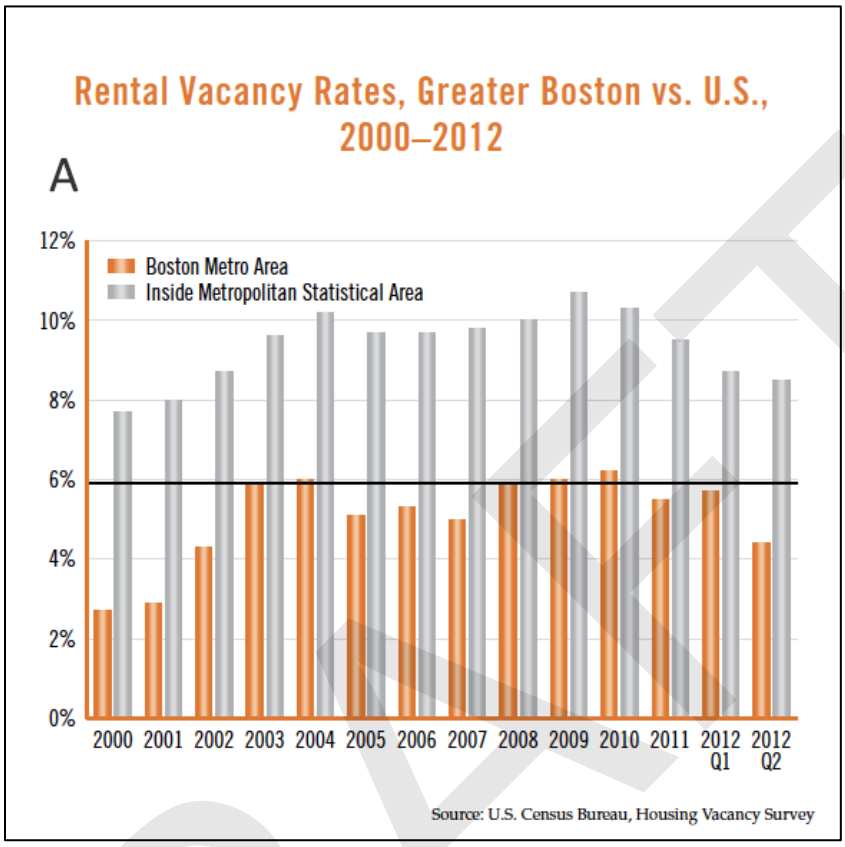


Figure 2.2. Rental vacancy rates in the cities and regions inhabited by MIT graduate students. Cambridge and Somerville belong to Middlesex County, Boston belongs to Suffolk County, and Brookline belongs to Norfolk County. Vacancy rates were surveyed by **A)** the American Community Survey, 2007–2011, and **B)** the 2010 U.S. Census. Error bars represent the survey margin of error (90% confidence intervals). Slightly different methodologies were employed in each survey, as described on the U.S. Census Bureau website. *Source: U.S. Census Bureau, American Community Survey 2007–2011*

Rental Vacancy Rates: Greater Boston Area



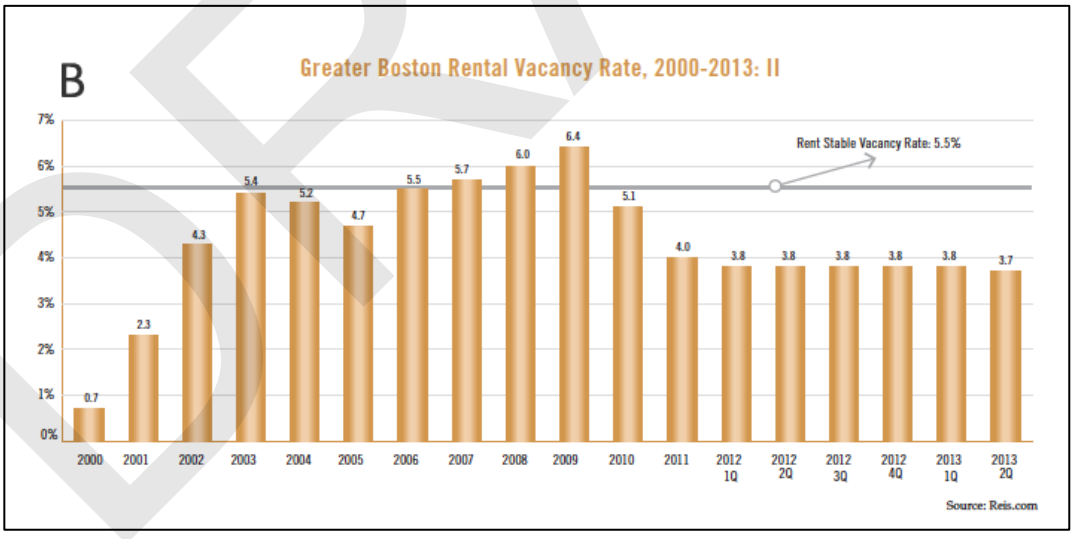


Figure 2.3. Rental vacancy rates in Greater Boston, **A)** 2000–2012, including a comparison to the U.S., and **B)** 2000–2013. The Greater Boston area is defined as the Boston-Cambridge-Quincy Metropolitan Area. *Source: Greater Boston Housing Report Card 2012, 2013*

Rents

The cities inhabited by MIT graduate students (Cambridge, Somerville, Boston, and Brookline) lead their respective counties, the state of Massachusetts, and the nation in terms of high median rents (**Fig. 2.4A**) and proportion of high-rent housing units (**Fig. 2.4B**). These statistics ("effective rents") include rents paid for occupied, off-market, and assisted-housing units. In Cambridge, advertised rents ("asking rents") for the pool of available units are even more extreme (**Fig. 2.5**).

Effective Rents: City, County, State, and Nation

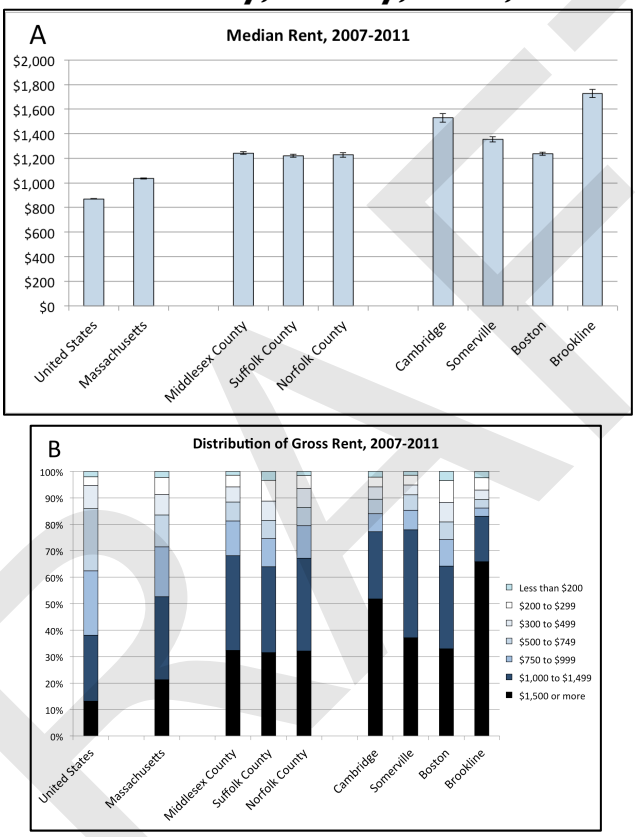


Figure 2.4. A) Median rents and **B)** distribution of gross rents in the cities and regions inhabited by MIT graduate students. Error bars represent the survey margin of error (90% confidence intervals). The American Community Survey includes rents from assisted housing, for which only the out-of-pocket expenses, excluding subsidies, are reported. Subsidized rents in publicly assisted affordable housing may account for reported rents in the lowest price ranges of panel B and will therefore reduce the median effective rent when compared to a sample that does not include subsidized rents in assisted housing. Other rent surveys may exclude assisted housing or interpret subsidies differently. Units represented in this dataset are not necessarily available for rent. *Source: U.S. Census Bureau, American Community Survey 2007–2011*

Asking rents in Cambridge have steadily increased over the last decade, with an especially sharp upturn in the past few years (**Fig. 2.5**). Median asking rents for one-bedroom, two-bedroom, and three-bedroom units have increased on average 4% to 6% per year since 2000. Compared to the average annual housing CPI increase of 2.4%, rents are rising at approximately twice the rate of inflation. Between 2000 and 2013, the median asking rent in Cambridge increased by 80% for a one-bedroom unit, 65% for a two-bedroom, and 60% for a three-bedroom. As conveyed by the second-order trendlines fitted to the rent data, Cambridge rents appear to be increasing not incrementally but at an accelerated rate.

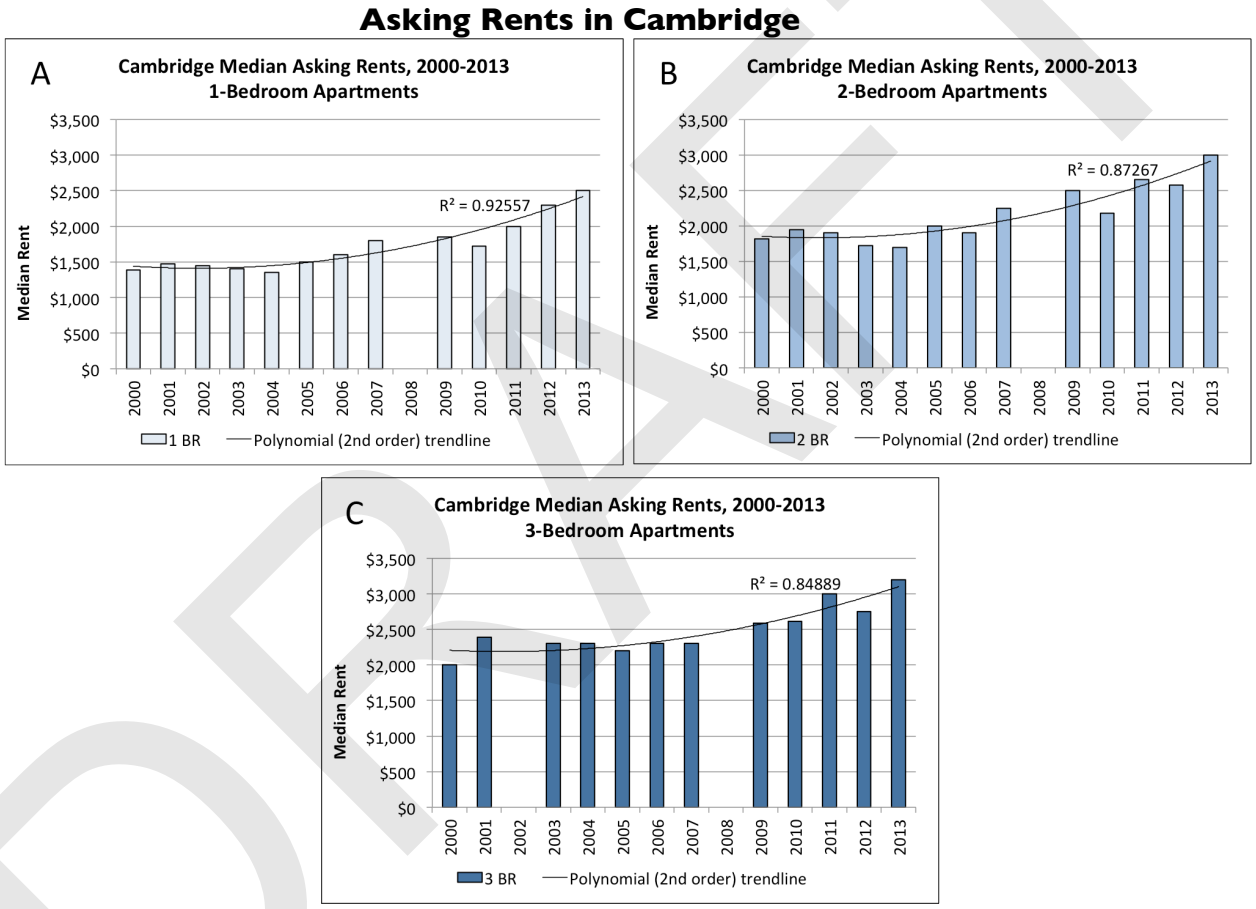


Figure 2.5. Median asking rents in Cambridge, 2000–2013, by apartment size: **A)** one-bedroom, **B)** two-bedroom, and **C)** three-bedroom. Asking rents reflect advertised, available rental units. These numbers may differ from regional rent estimates such as the American Community Survey, which also surveyed units that were occupied, subsidized, or not on the market. *Source: City of Cambridge Community Development Department*

This trend of rising rents extends to the Greater Boston region, which is one of the most expensive rental markets in the nation (Greater Boston Housing Report Card 2013). In Greater Boston, average asking rents increased on average 1.8% per year since

2000. During the same time period, average effective rents, which include adjustments to asking rents, increased on average 1.5% per year and reflected discounts of only 0% to 6% from asking rents (**Fig 2.6**). Between 2000 and 2013, the average asking rent increased by 26%, and the average effective rent increased by 21%. In a comparison of average effective rents in 20 metro regions nationwide, Boston has consistently ranked since 2000 among the top three most expensive rental regions, exceeded only by New York and San Francisco (Greater Boston Housing Report Card 2012). The region-wide extent of these trends indicates that the vast majority of off-campus graduate students are experiencing similar housing market pressures, although those pressures are particularly intense in Cambridge.

Not only are Cambridge rents high and climbing, but in the past three years Cambridge has substantially exceeded the already expensive rents in the Greater Boston region. Between 2010 and 2013, the average asking rent in Greater Boston increased by 6%, while the median asking rent in Cambridge increased more drastically: 45% for a one-bedroom unit, 38% for a two-bedroom unit, and 22% for a three-bedroom unit. From 2000 to 2010, the median rent for a one-bedroom apartment in Cambridge has been closely representative of the average rents for the Greater Boston region, but in the past three years, Cambridge rents have sharply surpassed those of Greater Boston (**Fig 2.6**). A typical one-bedroom Cambridge apartment now costs 36% more than the average apartment in the Greater Boston region.

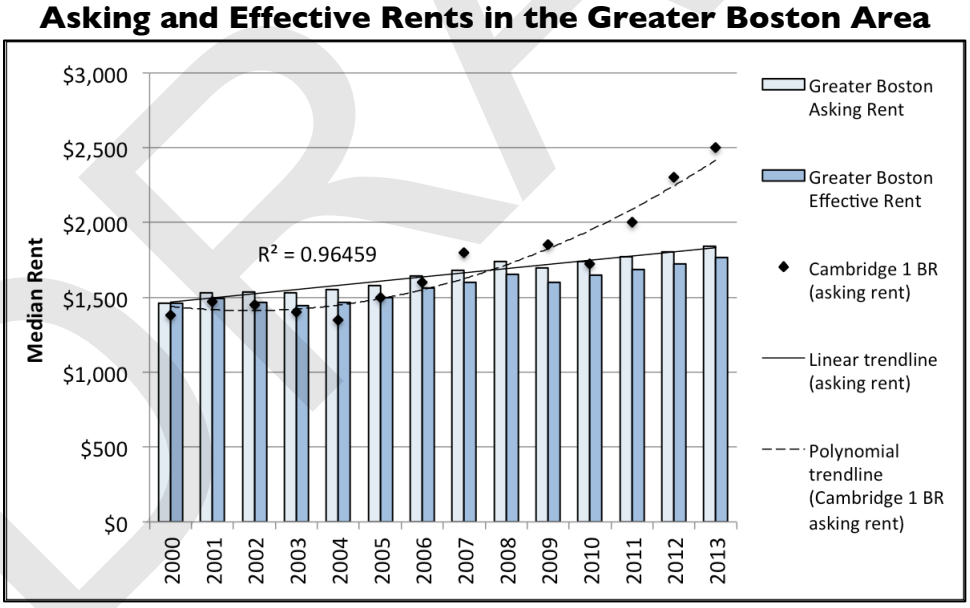


Figure 2.6. Average asking rents and average effective rents in the Greater Boston area, 2000–2013. Effective rents have represented 94% to 100% of asking rents, which have been increasing linearly over time (R-squared value indicated). The asking rent of a one-bedroom Cambridge apartment is shown for comparison. *Source: Greater Boston Housing Report Card 2013, City of Cambridge Community Development Department*

Cost of living

High regional rents have made living in Greater Boston less affordable for renters in general, including graduate students (see below). Spending 30% of pretax income on rent is considered a benchmark for affordability (City of Cambridge Community Development Department). The fraction of renter households spending greater than 30% of their pre-tax income on rent increased from 39% in 2000 to 51% in 2011 (a +31% change). The fraction of households who are "severely cost burdened," paying greater than 50% of their income on rent, increased from 18% in 2000 to 26% in 2011 (a +44% change). The Greater Boston Housing Report Card 2013 warns that with an increasing cost burden on renters, "the cost of living could again trump livability" in this otherwise desirable area.

Supply of private housing

In Cambridge, the projected supply of new housing is unlikely to fully meet the growing demand. In the past three years, about 2,800 housing units have been permitted or are under construction (**Fig. 2.7A**), but a large proportion of these are one- or two-bedroom luxury units that are unlikely to be affordable for graduate students, their families, and the low-, moderate-, and middle-income Cambridge residents and families who compete for existing housing stock. The luxury market is particularly strong in Kendall Square.

Condominium conversion also intensifies the demand for affordable rental housing by reducing supply and removing units from the rental market, as units are repositioned as higher-cost housing that is more likely to be owner-occupied. Many small multifamily buildings that traditionally provided rental housing at reasonable rates have been converted to condominiums, a trend that will further reduce the supply of reasonably priced rental housing. The number of condo conversions has varied widely since 1970, with an average of 46 converted parcels per year (**Fig. 2.7B**). Demand for condos is also increasing in the Greater Boston region overall, and in 2013, municipalities close to MIT led the region in condo sales: Downtown Boston, Cambridge, South Boston, Brookline, Jamaica Plain, Brighton, and Somerville, in decreasing rank (Greater Boston Housing Report Card 2013).

In addition to pressures of condo conversion on the stock of multifamily rental housing, dramatic rent increases in recent years have increased competition among buyers of available multifamily buildings. Although prices for existing rental stock are rising along with rents, rents may be high enough to warrant such purchases by investors who do not necessarily have to convert to condos to obtain a return on their investment. Nevertheless, the stock of reasonably priced rental housing suffers as rents are increased and mid-range rental housing is repositioned as higher-end rental housing.

Net Housing Stock Increases and Condominium Conversions in Cambridge

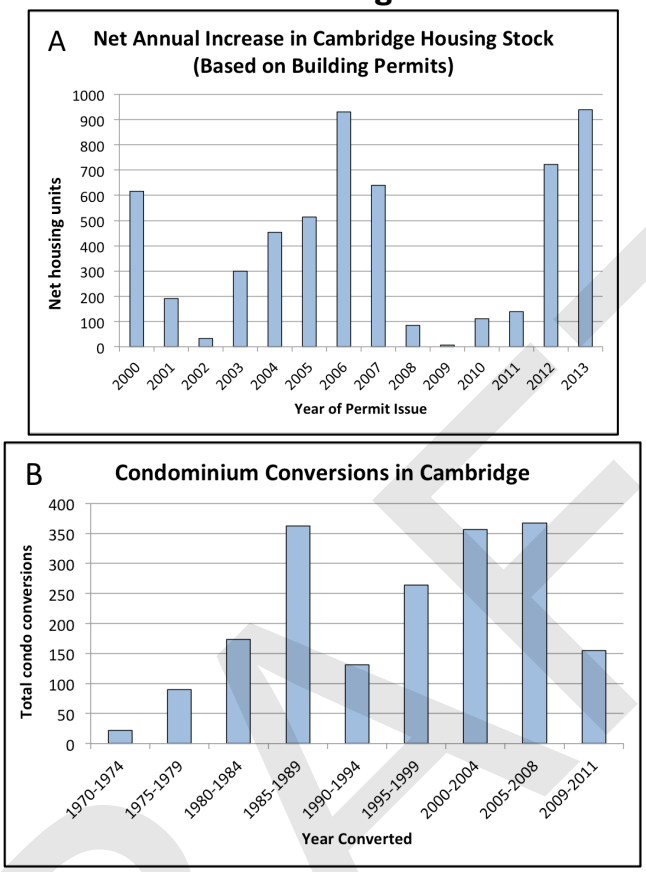


Figure 2.7. A) Net annual increase in Cambridge housing stock, 2000–2013. Years reflect the dates on which permits were first issued, not necessarily project completion. **B)** Cambridge condominium conversions, 1970–2011. The number of converted parcels does not account for the number of residential units per parcel, but roughly two-thirds of condo conversions have been two- or three-unit properties. *Source: City of Cambridge Community Development Department*

How MIT graduate students affect the local housing market

MIT graduate students and the local community

Off-campus graduate students impact the local housing market in two ways: in general, as additional renters in a tight housing market, and specifically, as roommate groups who can outprice local families for multiple-bedroom units. Given that graduate stipends are modest, an individual graduate student is unlikely to outbid many other Cambridge residents in the rental market, but a group of roommates who pool their incomes can out-compete local families. A roommate group may have one (or more) income-earning individuals per bedroom, as opposed to only one or two breadwinners in a family with children. (This situation could be true for roommates of any profession, although graduate students and postdoctoral appointees are particularly conspicuous in

Cambridge.) Competition is especially intense for units with three or more bedrooms, which are desirable for families but relatively rare, likely because financial incentives for developers favor small units with the highest revenue per square foot.

Household and family trends in Cambridge are consistent with the roommate pricing-out problem. The percentage of family households decreased by more than a factor of two during the last six decades, from 87% of total households in 1950 to 45% in 1980 and only 40% in 2010. Between 1980 and 2010, the proportion of households occupied by unrelated roommates increased from 13% to 20% (City of Cambridge Community Development Department). As Cambridge is expected to continue attracting young professionals, particularly highly paid knowledge workers (see below), the competition with families for housing is likely to intensify.

At the listening session with community members, the working group heard from residents concerned about this pricing-out problem and the changing age demographics in Cambridge. At the population level, young adults have been steadily replacing children as a proportion of total Cambridge residents. The 20–39 age group accounted for 35% of the total population in 1950 (~43,000) but now makes up 51% of Cambridge residents (~54,000) (**Fig. 2.8**). There has been an accompanying decline in the number and proportion of children in Cambridge. In 1950, 28% of the population belonged to the 0–9 or 10–19 age groups, but that proportion is now nearly halved, at 16%. MIT graduate students, in the 20–39 age demographic, may contribute to the observed changes, but as less than 10% of that population segment (~4,800 students on campus or in Cambridge), they are not the primary drivers of the demographic shift.

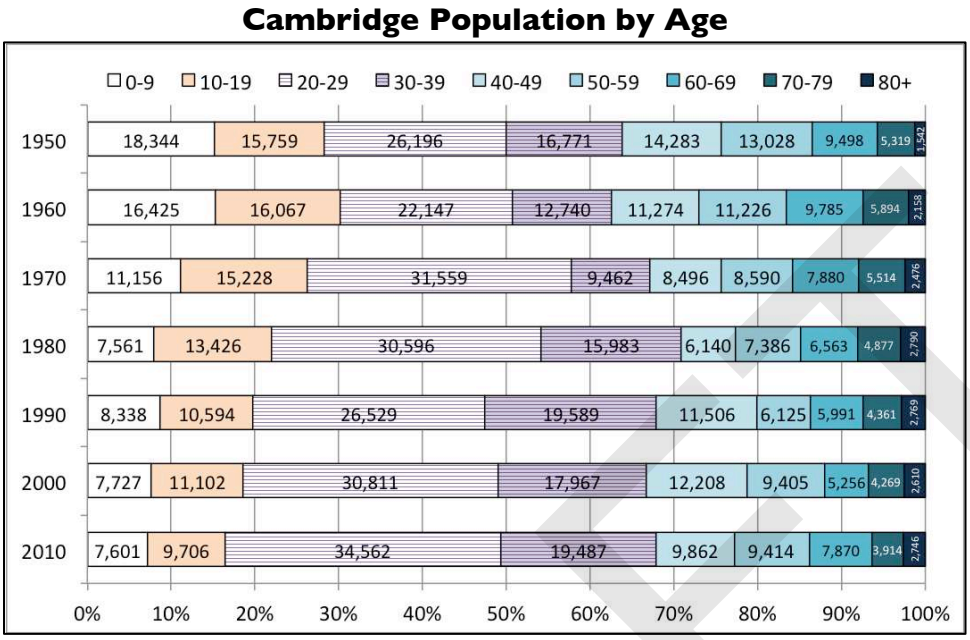


Figure 2.8. Cambridge population by age, 1950–2010. The number of individuals in each age group is indicated on each bar. *Source: City of Cambridge Community Development Department*

MIT graduate students and the growth of Kendall Square

Kendall Square is now a highly desirable place of work, residence, and investment, and the research performed at MIT, largely by graduate students, has fueled this demand. As summarized in a previous housing study: "Cambridge's distinctive business environment begins with its major academic institutions, MIT and Harvard. These institutions produce a top-notch labor pool and stimulate a great deal of office development through spin-off research projects" (Bluestone *et al.*, 2002, "The Impact of Cambridge Office Development on Cambridge Housing Prices"). In the past decade, Kendall Square has become an "innovation cluster" of technology and pharmaceutical companies, including "the densest concentration of startups anywhere in the world" (*MIT Technology Review,* Business Report, "The Next Silicon Valley," July 2013). To cultivate innovation clusters, "what's essential is proximity to human talent," and the high concentration of advanced-degree holders in Cambridge provides this talent in abundance.

Similarly, the City of Boston's Housing Boston 2020 Report asserts: "Without question, Boston's 31 private and 4 public institutions of higher education are key to the city's current economic success, and will only become more important in the future as America's knowledge-based economy expands." The intellectual talents and research output of MIT graduate students have contributed to the economic prosperity of Kendall Square and Greater Boston, although one consequence of this prosperity has been a highly competitive rental market that is increasingly challenging for graduate students seeking affordable housing.

How MIT graduate students experience the local housing market

Affordability

Housing affordability is a challenge for many MIT graduate students, even compared to other Cambridge residents. We considered research and teaching assistantship stipends to be graduate students' only source of income, although some students may have accessory sources such as business ventures or working spouses. In the 2014 fiscal year, MIT graduate student stipends ranged from $26,302 to $37,664, or $2,192 to $3,139 per month (Office for the Dean of Graduate Education). At 40% to 60% of the regional median income for a one-person household, and 35% to 50% of the regional median income for a two-person household (e.g., a single parent or a student supporting a nonworking spouse), stipends could be categorized as "low" or "very low" income (2013 HUD Income Limits, Boston-Cambridge-Quincy, MA-NH).

Consequently, MIT graduate students (both off-campus and on-campus) have experienced a high cost of living that is growing increasingly severe. Monthly housing expenditures were essentially identical between on-campus and off-campus graduate students in 2013: about $1,100 for rent and utilities (**Fig. 2.9**). That amount represents approximately 35% to 50% of stipends, more than the recommended 30%-of-income standard employed by most housing programs (City of Cambridge Community Development Department). During our outreach, we heard concerns that the cost of living can be virtually untenable for graduate students whose stipends must also support dependent children or nonworking spouses. This situation is especially relevant to international graduate student families, whose visa restrictions may prohibit additional work by the student or spouse.

The Graduate Student Council (GSC) prepares a cost-of-living survey every four years, in collaboration with the Office of the Dean for Graduate Education and the Office of the Vice President for Research, and recommends stipend increases to the dean's group annually. On-campus rental increases and hyperlocal off-campus rental data provided by the MIT Housing Office in the Division of Student Life are employed in the analysis. In the past five years, stipends have increased approximately 2% to 5% annually to track the cost of living, which is largely driven by off-campus rents (on-campus rents have increased by 3.5% annually during this time). Stipend levels are not expected to significantly exceed the total cost of education (i.e., tuition, stipend, fees) relative to peer institutions, and they therefore cannot be expected to increase indefinitely if local rents begin to outpace graduate student incomes.

One possible response to high living costs is to move to more affordable areas, typically farther from campus, but we have seen little evidence of such a pattern in the distribution of student addresses over the past 10 years (**Fig. 2.1**). Although living farther from campus might be considered a cost-saving measure for graduate students, housing expenditures were similar for off-campus students living beyond a 15-minute walk from MIT and off-campus students living within a 15-minute walk from MIT (**Fig. 2.9**). In particular, Somerville has been perceived as a more affordable area than Cambridge, but the median rents paid by students were similar in the two cities. If out-

migration has not been a major response to cost-of-living increases, it may be (among many reasons) because rent increases have not yet become intolerable, because outlying areas are no longer as affordable, because transportation is a concern, or because students prioritize campus proximity.

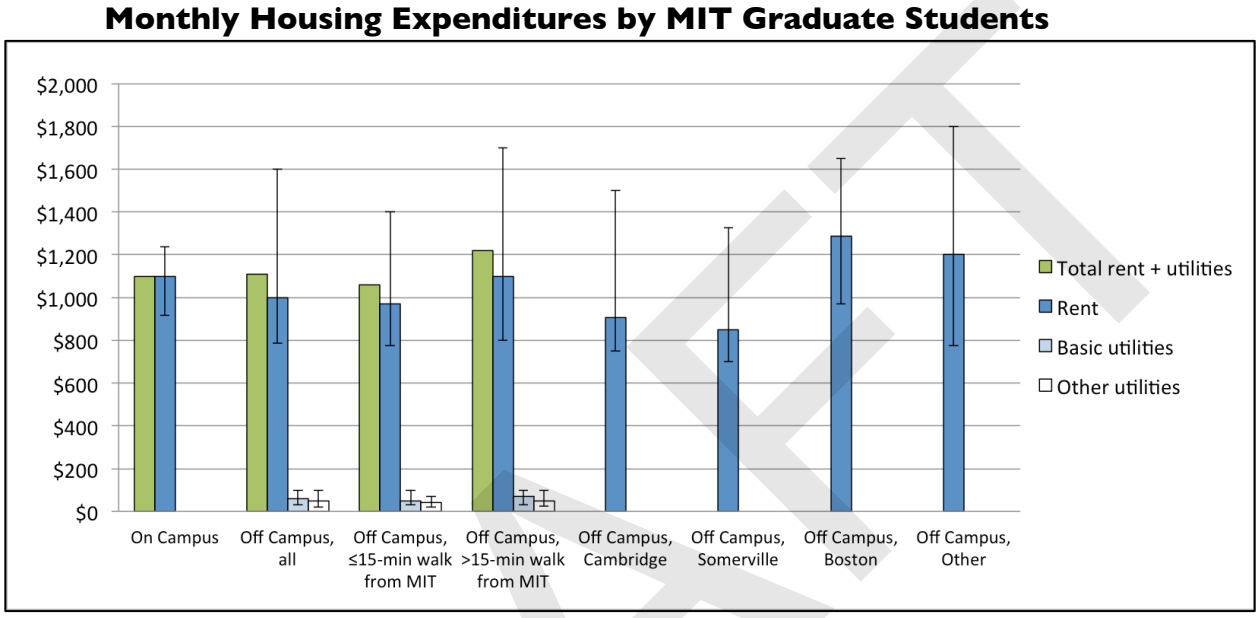


Figure 2.9. Median monthly housing expenditures by MIT graduate students in 2013. Median values are plotted, with upper and lower error bars representing the 75th and 25th percentiles, respectively. Rent also encompasses mortgage, residence fees, or condo fees. Basic utilities are defined as heat, water, and electricity. Other utilities may include land-line phone, cable, and Internet. Rent for on-campus graduate housing includes basic utilities as well as Internet and basic cable. Off-campus values are self-reported and therefore represent the housing chosen by MIT graduate students, not necessarily the overall rental market in each area. On-campus values represent a weighted average of known rents for each room type and assume 100% occupancy of the graduate residences. *Source: MIT Quality of Life Survey 2013*

Availability

Vacancy rates are extremely low at the city, county, and regional level (described above), and affordable housing is likely to become even scarcer due to increasing demand and the predominance of luxury units in the projected new housing stock (also described above).

Families with children may encounter an additional barrier in their housing search, in the form of housing discrimination. Graduate students raised awareness of this issue during our outreach sessions. Massachusetts lead laws require landlords to disclose to tenants the presence of lead paint, and any known lead paint must be removed or sealed from homes built before 1978, if the occupants include children under six years old. Although housing discrimination is illegal, landlords may be inclined to avoid the cost of de-leading

by rejecting potential tenants with young children; given the intense competition for available housing, it can be easy to find alternative, childless tenants and offer other reasons for preferring them. Even families with older children may encounter rejection due to concerns about noise and property damage. Not only is the cost of living especially steep for families supported by graduate student stipends, but covert discrimination can drastically reduce the already low availability of housing.

Expectations for the future

Housing demand driven by innovation workers
The robust job market for innovation workers, combined with the increasing preference of employees to live near their workplaces, has intensified demand for housing in Cambridge and Greater Boston. The high concentration of knowledge workers in Kendall Square has fueled a market for high-end apartments near MIT. The considerable new construction of offices and research facilities in the Kendall Square area is expected to increase the number of Cambridge-based employees and consequently increase pressure on the local housing market.

Nearly 4 million square feet of office/R&D development is under construction in Cambridge, and 87% of this space is being developed in the Cambridge neighborhoods adjacent to MIT, particularly East Cambridge and Area Four (City of Cambridge Community Development Department; see **Appendix 2.2.2**). Based on development statistics and a previous impact study from the City of Cambridge, we estimate that these new facilities could attract at least 8,000 employees. We project that 1,600 to 3,200 of these employees may live in Cambridge and produce demand for 400 to 1,700 units of rental housing (**Appendix 2.2.2**). We offer these rough and tentative approximations only to suggest the potential magnitude of innovation-driven housing demand in Cambridge. New researchers, knowledge workers, and their support staff will almost certainly be financially well positioned to outbid MIT graduate students and working families for housing, especially in the neighborhoods proximal to campus.

The same phenomenon is taking effect at the regional level. The City of Boston's Housing Boston 2020 Report cites a growing preference of workers to live in the city and minimize the time and environmental impact of their commutes; over one-third of Boston workers also reside in Boston. The report notes that "Boston's specialization in the fast-growing professional, scientific, and technical economic sectors" created over 14,000 new jobs and demand for 4,000 new housing units in 2011. With 100,000 net new jobs expected in Boston by the end of this decade, demand is projected for 30,000 new housing units in Boston alone by 2020.

The future housing market for MIT graduate students
The trends discussed above — rapidly rising rents, limited vacancies, an expected influx of well-salaried competition, and new housing stock that is largely unaffordable — predict an increasingly precarious off-campus rental market for MIT graduate students. Although current living conditions may not be untenable for the majority of graduate students, those with families are already being acutely affected by the aforementioned trends. Since the existing on-campus graduate housing is essentially full to capacity,

graduate students could respond to pressure from the off-campus housing market by:

1. Moving to a more affordable residence, perhaps with fewer amenities or in a different area;
2. Increasing the number of rent-sharing roommates (generally not an option for students with families); or
3. Paying an increasingly larger stipend proportion toward rent.

Finding a more affordable residence may require longer commutes or other tradeoffs. The low vacancy rate for Cambridge indicates that even the least-desirable housing stock near campus gets rented, and the reported student rents do not show that Somerville, Boston, or Brookline confers substantial savings compared to Cambridge. If larger numbers of MIT graduate students are driven to live farther from campus, improving transportation will become critical.

Sharing rent with roommates contributes to the pricing-out of other Cambridge residents, and there are logistical as well as legal occupancy limits. Graduate students with families do not have the same flexibility as single students in this respect.

Paying higher rents will likely compromise quality of life if stipend adjustments cannot keep pace, but students will make this sacrifice if they need proximity to the laboratory or access to schools or childcare badly enough. Research often requires hands-on, time-sensitive work, including at late or irregular hours, and class attendance and TA responsibilities generally require on-campus presence. The MIT Medical Center, pharmacy, and fitness centers are also important on-campus resources for graduate students and their families.

So far, the relatively consistent geographical distribution of students suggests that, if anything, graduate students may be prioritizing campus proximity and accepting a higher cost of living or more roommates, although it is difficult to interpret priorities from geographical trends. Under continued pressure in the long term, all three of the above off-campus response options are expected to reach a point of unsustainability. We believe that the convergence of these economic and demographic trends has defined a new and concerning expectation of "normal" in the Boston-area housing market.

Conclusion

Cambridge and the surrounding communities house the majority of MIT graduate students, but the increasingly competitive local rental market suggests that the areas around campus may become increasingly inaccessible to graduate students in the near future. Although the local market has historically been expensive for graduate students, the current trajectory — rising demand catalyzed by development in Kendall Square and a declining supply of housing that is affordable to graduate students — has the potential to make the cost of living in Cambridge unsustainable for graduate students.

- Geographical distribution of MIT graduate students. For the past decade, MIT

graduate students have been distributed approximately one-third on campus, one-third in Cambridge, and one-third in other off-campus communities such as Somerville and Boston. The majority of the graduate student body stands to be impacted by changes in the local housing market.

- Rising rents and low vacancy rates. Cambridge and Greater Boston are highly desirable areas with negligible vacancy rates and high rents. In the past three years, rents in Cambridge have climbed more steeply, likely fueled by the commercial development of Kendall Square as an innovation center. Graduate students contribute to the research output and human talent that drive the economic success of MIT and Kendall Square, but a consequence of this prosperity is an increasingly competitive rental market.

- Cost of living. Rent consumes nearly half of graduate student stipends, so individual graduate students have limited ability to compete in an inflating rental market without diminishing their quality of life. Although living farther from campus may be perceived as a more affordable option, these students pay rents similar to near-campus rents. In **Section 2.1**, 30% of off-campus graduate students cited price as their top reason for choosing to live off campus. If off-campus rents continue on their current trajectory, there may no longer be a perceived cost advantage to living off campus, and the ~60% of total graduate students currently living off campus may well increase their demand for on-campus housing.

- Families. Families, whether graduate students or Cambridge residents, face particular hardships in the rental market due to safety requirements, inflexibility in sharing rent with unrelated roommates, and competition with roommates who pool incomes to occupy multiple-bedroom units. For student families subsisting on a typical graduate stipend, the off-campus housing market presents acute challenges of affordability and availability.

- Projected housing supply and demand. The already competitive local housing market is expected to intensify as new offices and research facilities in Kendall Square attract well-salaried knowledge workers to Cambridge. MIT graduate students are not financially well-positioned to compete with these professionals for the limited supply of housing, and much of the new private housing stock is unaffordable for most students.

- Graduate student responses. Current trends offer every indication that the off-campus rental market will become even less accessible to graduate students. Off-campus students are likely to see their quality of life decline, whether they move to more distant or less desirable areas, share rent with additional roommates, or spend a larger proportion of their stipends on rent. We also expect that after a certain point, off-campus housing pressures will induce a surge in demand for on-campus housing.

Appendix 2.2.1. Methodology for determining housing locations for MIT graduate students

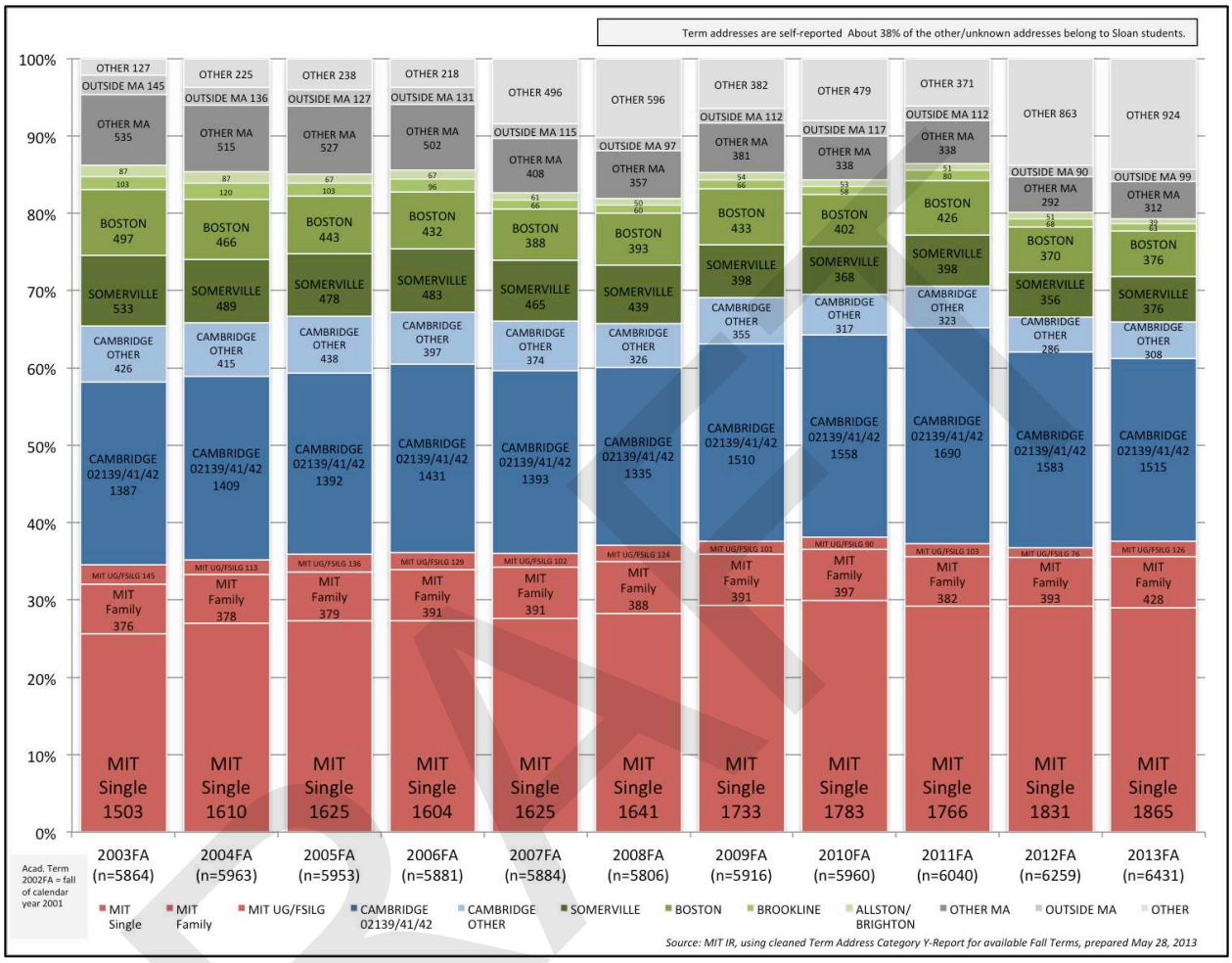
Housing locations were determined by the self-reported addresses of regular, degree-seeking MIT graduate students (e.g., excluding nonresident, special, or cross-registered students). It is reasonable to assume that nonresident students do not need local housing, and special students are typically staff members who are responsible for their own housing. Nonresident and special students combined account for fewer than 300 students each year (2003–2013). Cross-registered graduate students, at least half of whom are generally from Harvard, were excluded because other institutions may provide housing for them. Total numbers of students thus refer only to regular, degree-seeking graduate students, and the same totals are used in **Fig. 2.1** and in **Supp. Fig. 2.1** below.

The raw housing data (**Supp. Fig. 2.1**) included students who were counted in the yearly totals but who did not report their addresses. The fraction of students with unknown addresses has increased from 2% to 4% in 2002–2006 to 14% in 2013. (In 2013, this 14% uncertainty was greater than the combined percentages of students living in Somerville, Boston, Brookline, and Allston/Brighton.)

To facilitate year-to-year comparisons, given the substantial uncertainty in recent years, we estimated the locations of unknown addresses based on the distribution of known addresses. We interpreted the unknown addresses as neutrally as possible using two assumptions:

1) All of the unknown addresses are off campus, because the self-reported on-campus addresses account for essentially all of the on-campus beds. (In 2013, there were 2,336 total on-campus beds and 2,293 self-reported on-campus students. At most only 43 of the unknown students could be living on campus, a negligible 0.67% of the total population.) Therefore, we made no adjustments to the on-campus numbers and percentages. The 2013 MIT Quality of Life Survey also supports treating the unknown addresses as off campus; 42% of respondents lived on campus or with a FSILG (consistent with term addresses), 57% lived off campus, and only 2% responded "other."
2) In a given year, the unknown addresses follow the same geographical distribution as the known addresses for that year (e.g., in 2013, 5.8% of students with known addresses lived in Boston, so we expect that 5.8% of the students with unknown addresses also lived in Boston). If, however, the unknown addresses represent a population of students with different housing preferences than the general student population (e.g., in 2013, ~40% of the unknown addresses belonged to Sloan students), the actual distribution might be different than expected, and the large uncertainty in recent years might be masking a shift in graduate student housing distribution.

Housing Locations for MIT Graduate Students, Including Unknown Addresses



Supplementary Figure 2.1. Housing locations for MIT graduate students, 2003–2013, including unknown addresses. Numbers of students residing in each location are indicated on the appropriate bar, and percentages are shown along the y-axis. Data for each academic year reflect self-reported student addresses for the fall term. For example, 2013 represents academic year 2012–2013 and includes student addresses from the fall 2012 term. Three categories of MIT housing include single graduate housing, family graduate housing, and graduate students living in undergraduate housing (typically as graduate resident tutors) or FSILGs (fraternities, sororities, and independent living groups). For each year, the total number of students and the number of on-campus students are the same as in **Figure 2.1**. *Source: MIT Institutional Research*

Appendix 2.2.2. Estimated employment and housing demand from Cambridge development projects

The Development Log from the City of Cambridge Community Development Department lists all projects under construction as of March 2013. We calculated the total gross floor area (GFA) of all projects listed as "Office/R&D" use: nearly 4,000,000 sq ft (**Supp. Table 2.1**). The vast majority of this office/R&D development (13 of 18 projects; 87% by GFA) is occurring in the neighborhoods near MIT, particularly East Cambridge and Area Four.

Based on the methodology of Bluestone *et al.* in the 2002 study "The Impact of Cambridge Office Development on Cambridge Housing Prices," we used office/R&D GFA to estimate the expected number of new employees and their impact on the Cambridge rental market.

New resident employees from new office development

We estimated the total number of employees based on the expectation that each employee accounts for 250–500 sq ft of office/R&D space (Bluestone *et al.*, 2002, used 250 sq ft/employee; the expectation for the 181 Mass Ave Novartis campus is closer to 500 sq ft/employee, based on the Transportation Impact Study estimates of ~540,000 sq ft and 1,060 employees). This approximation gives 8,000–16,000 total employees for 4,000,000 sq ft of office/R&D space.

About 20% of people who work in Cambridge live in Cambridge (21% according to the City of Cambridge Community Development Department; 19% according to Bluestone *et al.*, 2002). These resident employees may have moved to Cambridge for their job, or they may have already lived in Cambridge, for example as recent college graduates. Only those who are not already Cambridge residents will be expected to contribute to housing demand. At most, 100% of resident employees (20% of total employees) can be "new resident employees," and an estimated lower limit is 50% (10% of total employees; Bluestone *et al.*, 2002). We therefore expect the new office development to generate 1,600–3,200 employees living in Cambridge, including 800–3,200 *new* resident employees.

Rental housing demand from new resident employees

A subset of new resident employees will rent rather than own housing. The proportion of Cambridge office workers who rent is approximately 75% (Bluestone *et al.*, 2002), so the 800–3,200 new resident employees translate to an expected 600–2,400 renters. Each new resident employee who rents will not necessarily require a new unit of housing, as some employees may live together or share units with existing residents. Cambridge is estimated to have 1.4 wage earners per household (Bluestone *et al.*, 2002). The 600–2,400 new resident employees who rent would then be expected to require one rental unit per 1.4 employees: an estimate of 430–1,700 rental units demanded.

The demand for these units would likely appear in stages as successive projects reach completion. Since all of these development projects are already under way, we expect that the arrival of new resident employees to the Cambridge rental market would

precede or coincide with any implementations of our recommendations for new MIT housing stock. As these changes unfold, it will be important to continue monitoring the off-campus rental market and graduate student housing demand.

Cambridge Office/R&D Projects Under Construction

Neighborh	Project Address	Gross Floor	% Total
4	181 Massachusetts Avenue / Novartis	572,663	14.5%
1	Binney St Dev - 50 Binney Street	496,000	12.5%
1	Binney St Dev -100 Binney Street	387,700	9.8%
1	Binney St Dev - 75-125 Binney Street	338,700	8.6%
1	Binney St Dev - 225 Binney Street - Biogen	302,680	7.7%
1	1 Education Street	295,000	7.5%
2	75 Ames Street / 7 Cambridge Center	250,000	6.3%
4	610 Main Street / Pfizer	230,000	5.8%
4	650 Main Street MIT	188,317	4.8%
1	17 Cambridge Center / Biogen	188,000	4.8%
11	Discovery Park Bldg 500	157,000	4.0%
11	Discovery Park Bldg 600	124,000	3.1%
1	150 Second Street / Skanska	108,600	2.7%
11	Discovery Park Bldg 400	106,000	2.7%
10	114 Mt. Auburn Street / Conductor's Building	83,200	2.1%
7	5 Western Avenue / Former Police Station	55,553	1.4%
1	450 Kendall Street / Cambridge Research	53,000	1.3%
1	Binney St Dev - 41 Linskey Way	16,200	0.4%
Total GFA in Cambridge		**3,952,613**	100.0%
Total GFA in Neighborhoods 1-5 (13 of 18		**3,426,860**	86.7%

Supplementary Table 2.1. Office and R&D projects under construction in Cambridge as of March 2013. Neighborhoods 1, 2, 3, 4, and 5 include or are adjacent to MIT. *Source: City of Cambridge Community Development Department*

2.3 Current Graduate Housing Inventory

Introduction

Over the past two decades, the graduate student population at MIT has grown significantly, and MIT has built additional housing to accommodate this growth. MIT presently houses more than one-third of its graduate students in graduate housing.

The focus of this section is the utilization of current graduate student housing inventory, with a discussion of the historical evolution of the housing stock. The section examines the composition of current MIT graduate student housing, graduate student demographics, and quality of life; identifies the graduate residential buildings most in need of renovation; and considers lessons from the waitlist as evidence of the size and composition of student demand for housing. Taken together, this provides a summary of the current housing inventory and an assessment of its usage.

Percentage of graduate students housed on campus

MIT currently houses about 38% of its graduate students in on-campus accommodations. The number of graduate beds has increased significantly over the past two decades, and the percentage of graduate students housed on campus is near the all-time high (**Figure 3.1**).

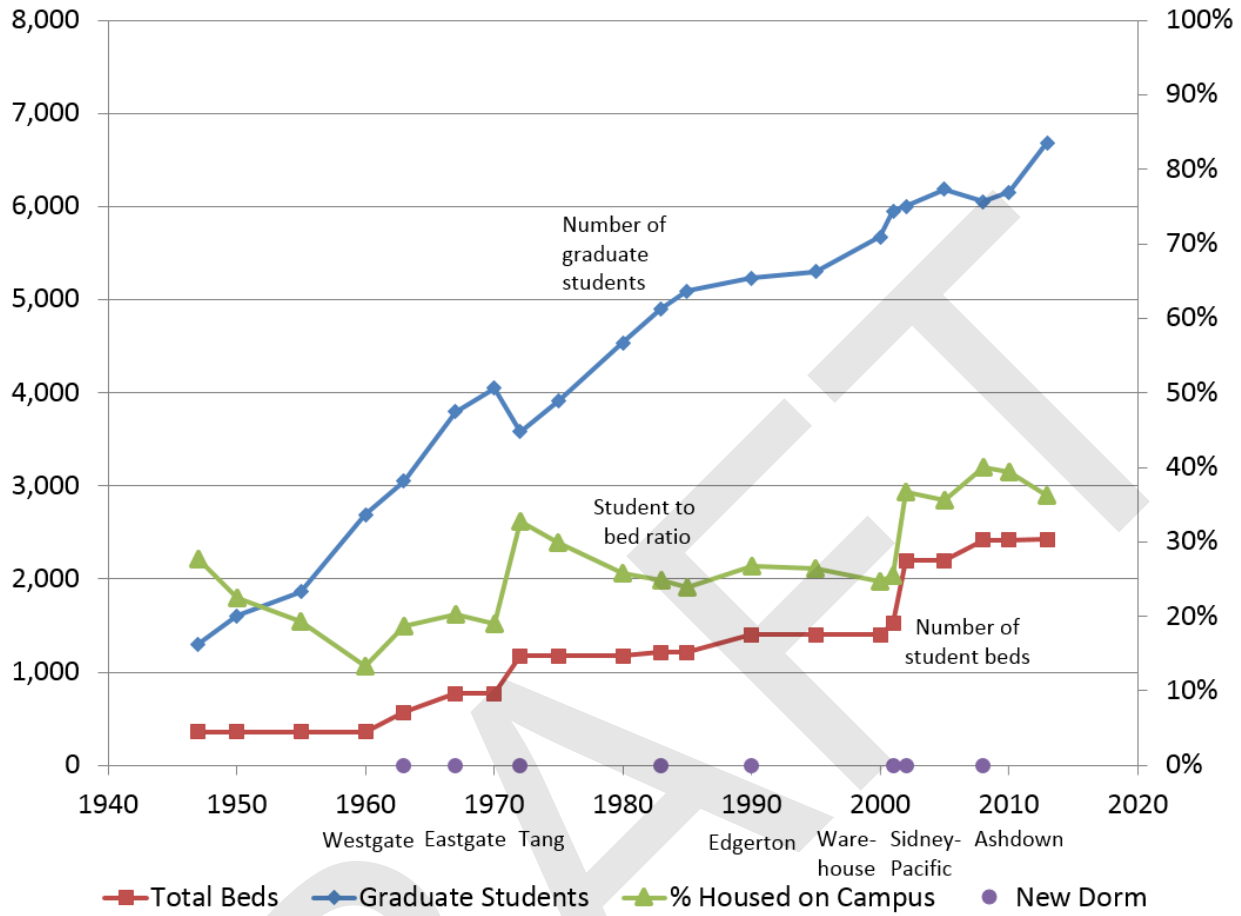


Figure 3.1. Graduate students and on-campus housing. *Source: Office of the Registrar and MIT Residential Life and Dining*

MIT has expanded graduate housing substantially in recent years. In 2001, the campus had roughly 1,500 beds for graduate students and housed approximately 25% of the graduate population. With the significant growth of the northwest residential community, including the Warehouse (NW30), opened in 2001, Sidney-Pacific (NW36), opened in 2002, and Ashdown (NW35), opened in 2008, MIT added over 50% more beds for graduate housing, leading to an all-time high in 2008 of just over 40% of the graduate student population housed.

This creation of a large residential graduate community in the northwest area of campus is a significant stride toward achieving the recommendations of the 1960 Bush-Brown report, which recommended that MIT house 50% of graduate students to promote community and engagement among students outside the classroom and lab (http://libraries.mit.edu/archives/mithistory/housing.html). Though this was not a firm commitment, the report advocated creating an environment for graduate students that would combine dining and residence functions and offer intellectual activities to encourage graduate students to address questions that cross traditional departmental boundaries.

Current housing composition

MIT offers graduate students an array of accommodations, ranging from efficiency apartments to four-bedroom suites with shared kitchen. **Table 3.1** summarizes the seven MIT graduate residences, and **Figure 3.2** displays locations and capacities of current graduate residences and walking times to central campus.

Residence	Capacity	Type	Opened
Ashdown	541 beds	Single	2008
Edgerton	184 beds	Single	1990
Sidney-Pacific	676 beds	Single	2002
Tang Hall	404 beds	Single	1972
The Warehouse	120 beds	Single	2001
Eastgate	201 beds	Family	1967
Westgate	207 beds	Family	1963

Table 3.1. MIT graduate residences. *Source*: MIT Residential Life and Dining

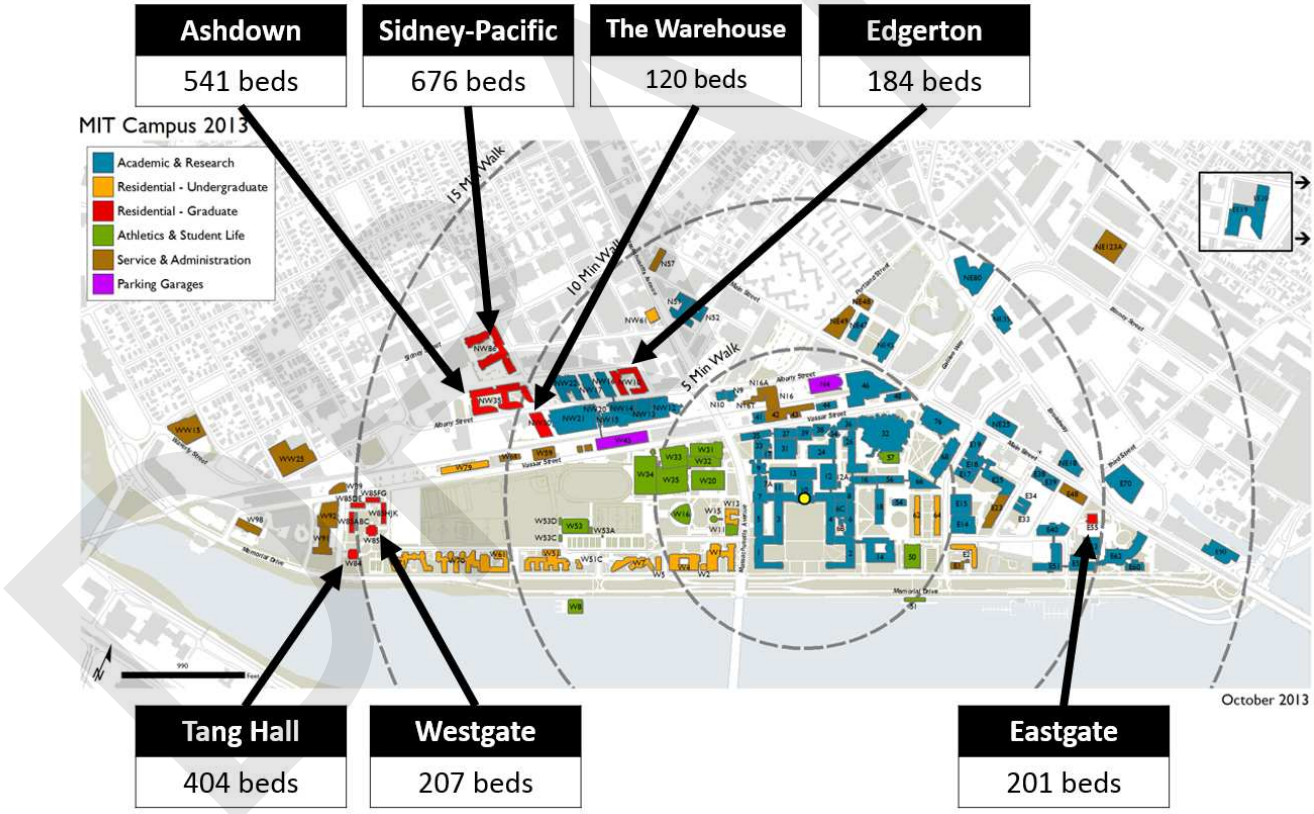


Figure 3.2. Graduate housing and walking distances to central campus. *Source: MIT Residential Life and Dining*

Of the 2,333 beds provided on campus for graduate students, approximately 83% (1,925 beds) are designed to accommodate single graduate students, and only 17% (408 beds) are for married students and families.[7] The designated family-housing buildings — Eastgate and Westgate — include childcare and playground facilities. **Table 3.2** summarizes bed counts and room types presently included in the MIT graduate housing inventory.

By Single or Married/Family	#	
Single	1925	83%
Married/Family	408	17%
Total beds	2,333	

By Room	#	
Efficiency	613	26%
1 Bedroom	253	11%
2 Bedroom	805	35%
3 Bedroom	300	13%
3 Bedroom Suite	150	6%
4 Bedroom	204	9%
Quad	8	0.3%

Table 3.2. Graduate housing room types and bed counts. *Source: MIT Residential Life and Dining*

In addition to the 2,333 beds in graduate housing, another 183 graduate students currently live in MIT-managed or approved housing. Eighty-eight graduate students provide academic and social mentorship in the undergraduate residences as live-in graduate resident tutors (GRTs), and another 95 live in MIT-approved housing as resident advisors or as tenants in fraternities, sororities, and independent living groups (FSILGs).

In recent decades, the demographic composition of the campus graduate population has changed somewhat. In particular, the percentage of international graduate students has increased, from 33% in 1998 to 40% in 2013, and the percentage of graduate students who are married or who live with a domestic partner has increased, from 34% in 2001 to 41% in 2013, reaching an all-time high of 49% in 2011.

Student demand and preferences for on-campus housing

Graduate housing on the MIT campus is close to full occupancy. Some rooms become available when students graduate or move off campus during the academic year, but they are typically filled relatively quickly. Thus, while the graduate housing on campus is never at 100% occupancy, few rooms remain empty for long. This is true for every dorm on campus.

[7] A "bed" in the context of family housing is an apartment occupied by one graduate student and their family members.

Earlier in this report (Section 2.1), the waitlist was used to estimate the unmet demand for graduate student housing. Because waitlisters rank the buildings and room types in which they are willing to accept an assignment, the waitlists also give some insight into the type of housing that current graduate students prefer. In both the general allocation and the waitlist, efficiency room types are ranked highest, and this appears to be the area of greatest demand. Though Ashdown and Sidney-Pacific are newer and have substantially higher rent than the much older Tang Hall, students prefer these facilities.

Quality of student life and community

The Institutional Research section of the Office of the Provost conducts annual surveys to determine student perceptions of quality of life (http://web.mit.edu/ir/index.html). Quality of life encompasses safety, community, housing, transportation, and personal development outside the lab or classroom. Results from recent surveys are summarized briefly below.

In the 2011 survey of enrolled graduate students, more than 90% of respondents felt safe ("reasonably safe" or "very safe") pursuing daytime activities on campus, and 80% felt safe walking alone on campus at night. Off campus, only 61% felt safe walking alone at night, suggesting that students perceive on-campus housing as a safer alternative. In 2013, MIT Police assigned a dedicated officer to the northwest community to further enhance campus safety.

More than 87% of graduate students living off campus consider transportation options somewhat important or very important. Close to 90% of the graduate students who live within a 15-minute walk of MIT are somewhat satisfied or very satisfied with their housing situation, and close to 80% of graduate students who live outside of a 15-minute walk to MIT are somewhat or very satisfied with their housing situation. Previous surveys revealed that this rating combines safety and accessibility concerns, based on the need to travel to and from MIT in all seasons, in all weather, on weekends, and after 8 pm. Such constraints limit commuting options such as bicycles or regular MBTA bus service.

Satisfaction rates are particularly low for the three oldest residence halls: Eastgate, Westgate, and Tang. Residents of Westgate report feeling isolated, particularly compared to residents of Eastgate, who have much closer MBTA access at the Kendall Square/MIT station.

Survey data and feedback from the listening sessions indicate that students who have spouses and/or families face more hardships and have fewer options to meet those hardships. Finding affordable family housing is particularly challenging for international students, whose spouses often lack work authorization. Families also need housing that is free of lead paint and near affordable childcare. Families are therefore more severely affected by the allocation process, and by uncertainty with allocation. The family residences are among the oldest in the MIT graduate housing stock, and have been identified as needing significant capital renewal.

Summary

With the construction of several new graduate residences in the northwest community, MIT has dramatically increased the quantity of graduate student accommodation on campus over the last 12 years. Currently 38% of graduate students live on campus, which is near an all-time high. Despite this growth in campus housing, the current housing stock is fully utilized, with little to no vacancy.

Three residences, Tang, Eastgate, and Westgate, are 40 to 50 years old and in need of significant capital renewal. To enable the renovation or loss of these residence halls, additional swing space will be required.

Graduate students' housing and amenity preferences are diverse, though efficiency apartments appear to be in highest demand. Finally, affordable family housing, particularly for international students, appears to be a crucial need for additional on-campus housing.

2.4 Future Graduate Enrollment

Introduction

Our study of MIT's graduate student housing needs must include an assessment of the size of the graduate student population and our expectations about its size in the future. In this section, we provide a broad overview of past and future trends. Our overview is based on analysis of historical data and recent data collected from department heads, and on discussions with the deans of MIT's five schools.

The graduate population at MIT has grown from just over 1,300 students in 1948 to over 6,500 students in 2013. Any small decreases in the graduate population during that 65-year period have been followed by quick recoveries lasting less than 10 years, so that, despite year-to-year fluctuations, the graduate population has steadily increased by about 800 students per decade.

In contrast, over the last 30 years, the numbers of undergraduate students and faculty members have not changed significantly. While the ratio of undergraduate students to faculty has remained at approximately 4.5, the ratio of graduate students to faculty has grown from 4 to approximately 6.5 since 1983. In addition, the postdoc population has more than tripled over this period, with a very pronounced growth over the last five years – from 1,025 in 2008 to 1,441 in 2013. As expected, this large increase in graduate-student and postdoc populations has been supported by a growth in faculty productivity as measured by research expenditures.

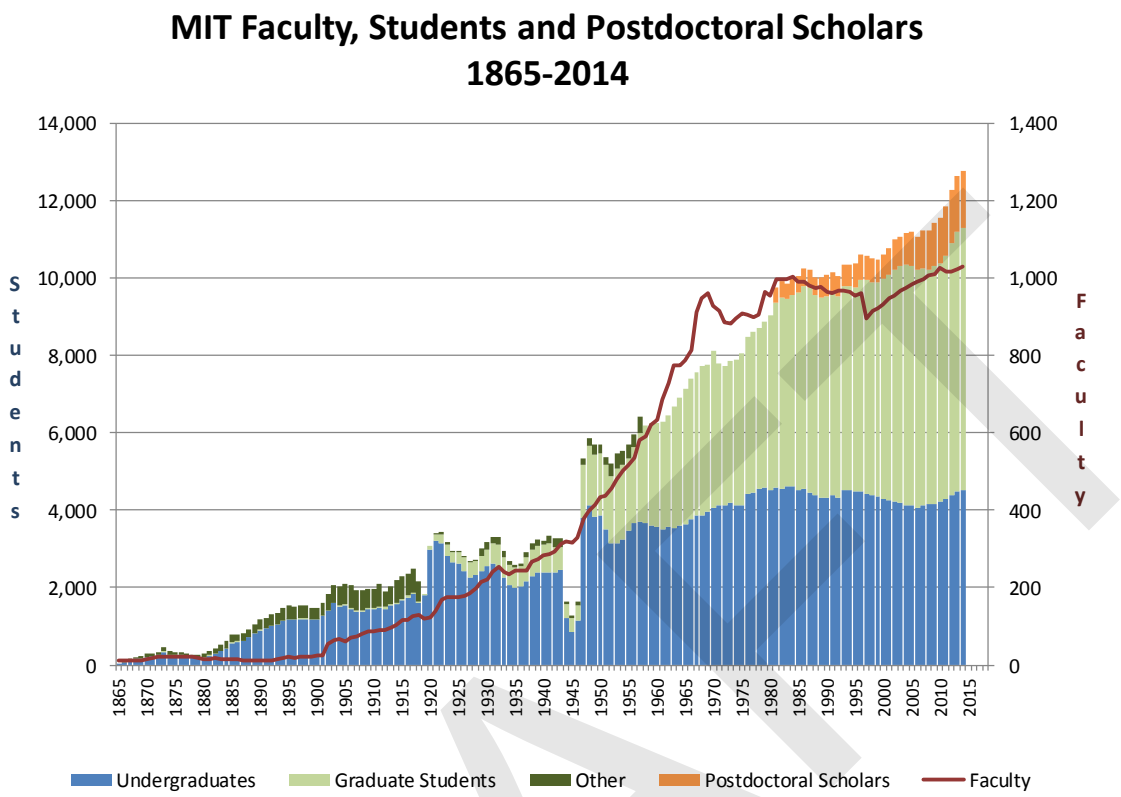


Figure 4.1. MIT Faculty, Students, and Postdoctoral Scholars, 1865–2014. *Source: Office of Institutional Research, Office of the Provost*

Based on this history, we might conclude that the growth in graduate student population and faculty productivity will continue as we move forward. It is clear, however, that this growth cannot continue unabated. In fact, there are indications that we might be on the threshold of saturation even now, with a future notable for reduced growth or decrease in graduate program size.

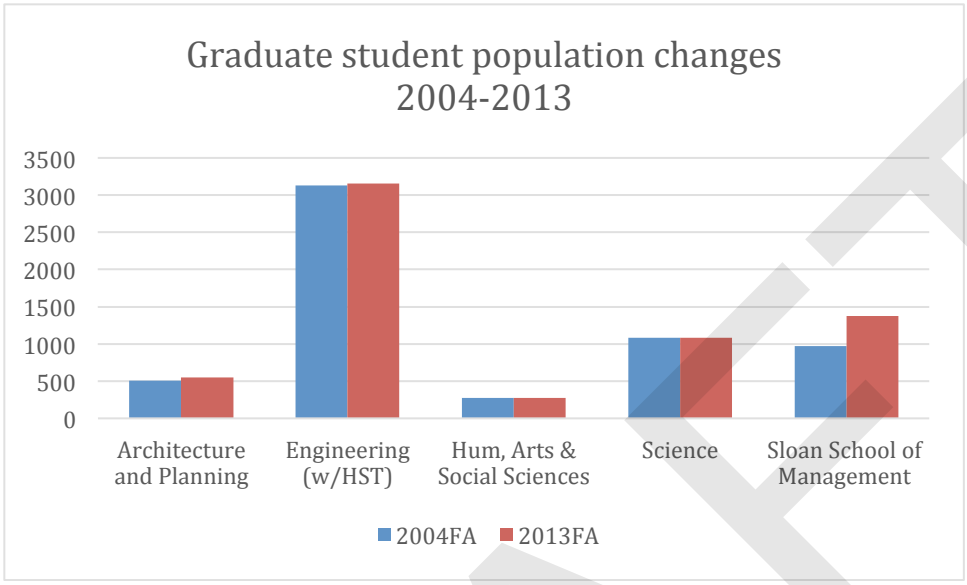
To better understand the factors that have shaped the shifts in enrollment, it is helpful to look at the different schools and focus on a recent period.

Recent trends and factors that have shaped graduate enrollment

Over the last decade, the graduate population at MIT has increased by 7.35%, from 6,228 students in 2004 to 6,686 students in 2013. During that same period, the size of the faculty has grown by 4.9%, from 974 in 2004 to 1,022 in 2013.

Year-to-year increases in graduate student population have not been steady, and, in fact, the number of graduate students dropped to 6,146 in 2009, likely due to the financial crisis. Since 2009, there has been a steady recovery. The net growth in graduate student population seen at the Institute over the last decade is the direct result of increased

enrollment at the Sloan School of Management and the creation of new master's degree programs.



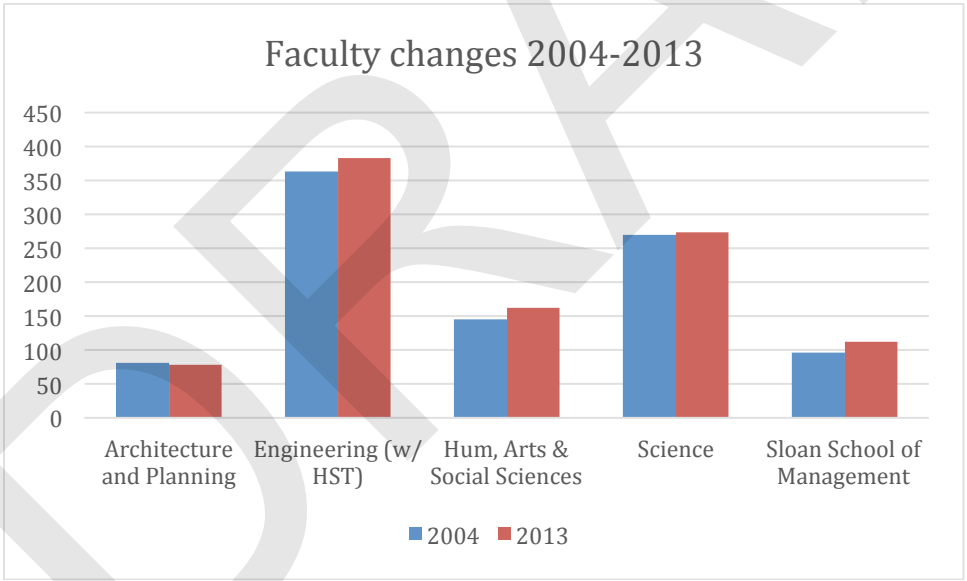


Figure 4.2A, Graduate student population changes, 2004–2013, and **4.2B,** Faculty changes, 2004–2013. *Source: Office of the Registrar and Office of Institutional Research, Office of the Provost*

School of Engineering

The number of graduate students in the School of Engineering has remained nearly constant, at a ratio of over eight graduate students per faculty member, with dawning awareness that the school is nearing saturation. Over the last five years, the school has seen an increase in research funding due to international engagement and government stimulus, but the numbers of faculty and graduate students have not grown. The additional resources have been used instead to support postdocs, whose number has grown dramatically, from 364 in 2009 to 618 in 2013. This 70% increase lends credence to the hypothesis that 70% of the increased funding is spent on people.

There are no plans to grow the size of the SoE faculty, and the graduate student population will increase only marginally at best. We may see modest growth in the number of postdoctoral researchers, who are often offered short-term employment when extra funding is available. Postdocs offer an advantage over graduate students because they require shorter time commitments, and, with MIT's current cost structure, they are very competitive in terms of financial outlay. Although federal funding is always a concern, only 64% of SoE's funding is from the federal government (versus 85% in the School of Science).

Sloan School of Management

The growth in Sloan's graduate population is due to the creation of new master's programs. All master's students are required to pay full tuition, and the size of the program is determined by admissions. In contrast, the number of PhD students is small. Of note, housing needs for the more senior Sloan students (e.g., executive MBA program) are different: they do not need to live in graduate housing, as they are on campus for short windows of time, often two weekends a month.

There is a sense that existing programs are at maximum capacity. For instance, expanding the MBA program beyond the current enrollment would mean changing the character of the educational experience (e.g., you can know 400 classmates at graduation, but not 600). There are also no plans for new programs.

School of Science

Enrollment in the School of Science has remained constant over the past decade — not by design, but by necessity, in that no additional funds have been available to increase the size of the graduate student body. The number of postdocs at the school has also remained constant. Graduate student funding varies among departments. For instance, all students in Biology are guaranteed three years of support from NIH training grants, followed by faculty-funded research assistantships. Brain and Cognitive Sciences does not offer training grants, but does raise money for fellowships. In Physics, enrollment has decreased due to a decline in federal funding. In Math, many grad students are supported through teaching assistantships.

It is predicted that graduate student enrollment will drop in the near future, due in large part to the school's dependence on federal funding. Prospects are bleak that the situation will improve in the near term.

School of Architecture and Planning

The number of graduate students has grown slightly at the School of Architecture and Planning, where admission is controlled by seats available. The number of postdocs at the school is small.

There are no plans to grow the student population of SA+P, and any increase would require a major change, such as the introduction of the new Media Lab. At the time the Media Lab opened, there was a modest increase in student numbers. Today, the Media Lab has space available to accommodate a few additional students, as well as unfilled slots, but the numbers are small.

School of Humanities, Arts, and Social Sciences

The number of SHASS graduate students has decreased slightly over the past decade, with available funding dictating student enrollment.

At present, there are no plans to grow the school. Economics could grow slightly because of a large financial endowment, but other departments' student populations will likely remain constant.

Conclusion

The main factor controlling the size of the graduate student population at MIT appears to be research funding. Faculty availability appears to be an important secondary factor influencing graduate student population size in the School of Engineering and the Sloan School. Availability of space does not appear to be a limitation.

The overall forecast is that the number of graduate students will not grow in the near future, and, in fact, it may decrease slightly. Most schools predict that their funding will remain the same or decrease. The School of Science, which relies heavily on federal funding, anticipates that those funds will decrease. The School of Engineering, which depends less on government funding and more on industrial collaboration and international programs, is well positioned to compensate for reduced federal funding. MIT as a whole has no plans to increase faculty size. The population group that is most likely to increase is postdocs, who, importantly, are likely competitors with MIT graduate students for housing.

MIT is about to mount a capital campaign. A successful effort could yield resources to moderate the stress on financial aid, either directly, from funds raised to support fellowships, or indirectly, from gifts to support research.

2.5 Graduate Housing at Peer Institutions

It is critical that MIT continue to recruit top students to its graduate programs. Many attributes contribute to MIT's ability to recruit these students, including the quality of faculty and research, the vibrant intellectual environment, and the facilities in which graduate students eat, sleep, socialize, and conduct research.

This section identifies peer institutions and MIT's current competitiveness with them, examines the graduate housing situation at these peer institutions, and explores the importance of housing to students during graduate school selection. Of particular focus are peer institutions that are located in a relatively expensive housing market.

1. Which institutions are MIT's local and national peers in graduate recruiting?

MIT's peer group at the graduate level is discipline-dependent and therefore includes a broad array of institutions. Department heads and faculty were asked to identify their department's primary competitors for graduate student recruitment. **Table 5.1** summarizes institutions that are considered to be peers by at least 10 departments at MIT. Institutions are ranked according to the number of MIT departments that consider them peers. In contrast to the small group of institutions against which MIT measures itself in undergraduate admissions (Harvard, Stanford, Princeton, and Yale), the graduate peer group includes both private universities and public ones, particularly for engineering disciplines. Peers not appearing in the table below include medical schools with large research endeavors (e.g., UC San Francisco) and private research institutions (e.g., Cold Spring Harbor Laboratory).

Institution	Number of departments at MIT that consider this institution a peer
UC Berkeley	29
Stanford	28
Harvard	24
Princeton	23
Columbia	19
Univ. of Michigan	19
Univ. of Pennsylvania	17
Yale	16
Cornell	15
Caltech	14
Georgia Tech	12
UC Los Angeles	12
New York Univ.	10
Univ. of Illinois	10
Univ. of Chicago	10

Table 5.1. Institutions with at least 10 MIT departments as peers. ***Source:*** *Office of Institutional Research, Office of the Provost*

2. Has MIT's competitive situation changed?

The number of graduate applicants to MIT has increased steadily. In the past decade, applications have increased over 40%, with more than 24,000 received for the 2013 entering class (**Figure 5.1**).

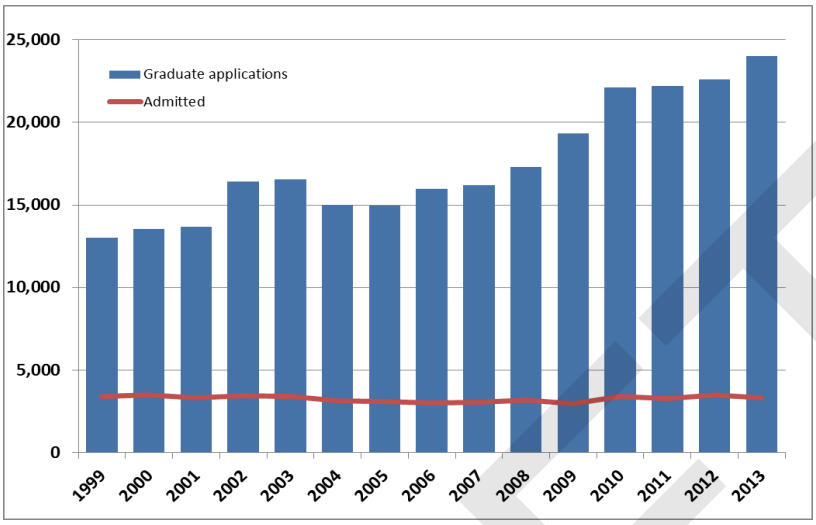


Figure 5.1. MIT graduate student applications received, 1999–2013. *Source: Office of Institutional Research, Office of the Provost*

Because the number of graduate students admitted to MIT has remained steady over the same time period, admission to MIT has become increasingly selective (**Figure 5.2**). Only 3,320 students (less than 14% of applicants) were accepted for admission to the entering class of 2013. Importantly, the percentage of admitted students deciding to enroll has shown a slow but steady increase. In 2013, 2,163 of 3,320 admitted students enrolled, a rate exceeding 65%. Thus, both selectivity and yield have improved over the past 15 years.

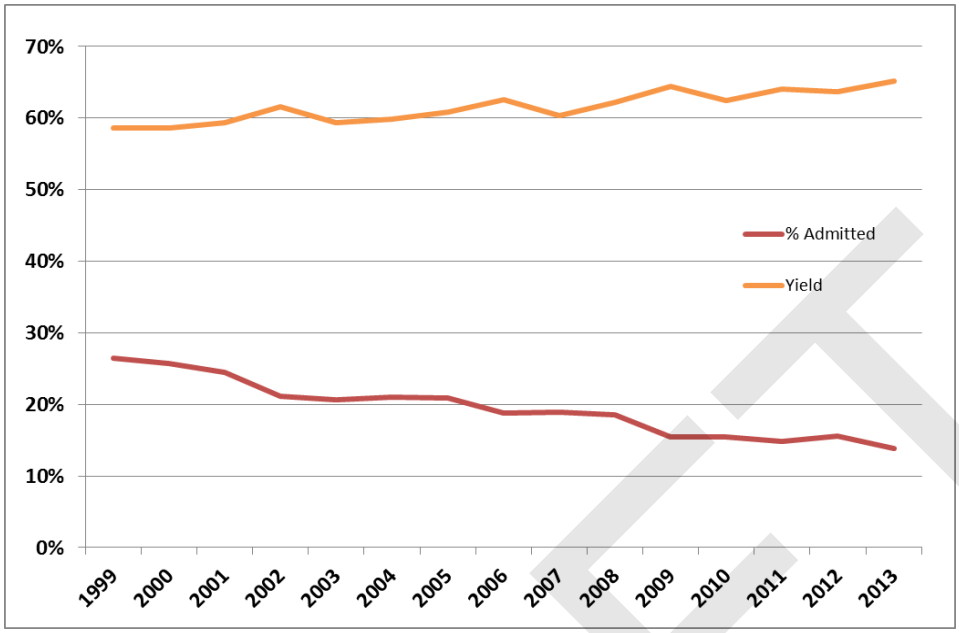


Figure 5.2. Graduate student admission and acceptance yields, 1999–2013. *Source: Office of Institutional Research, Office of the Provost*

3. Is housing for graduate students among the factors responsible for any change in graduate recruiting?

In 2013, MIT asked all admitted graduate students (including those who chose to attend other universities) what factors were important in their decision to enroll at MIT or another institution. Students enrolling at MIT cited MIT's reputation, their program's areas of specialization, and the reputation of their program as the most important reasons (**Table 5.2**). Those choosing other institutions listed a similar set of top reasons, although the opportunity to work with a particular faculty member ranked higher on this list, suggesting that these students were often choosing other institutions for very specific research opportunities (**Table 5.3**).

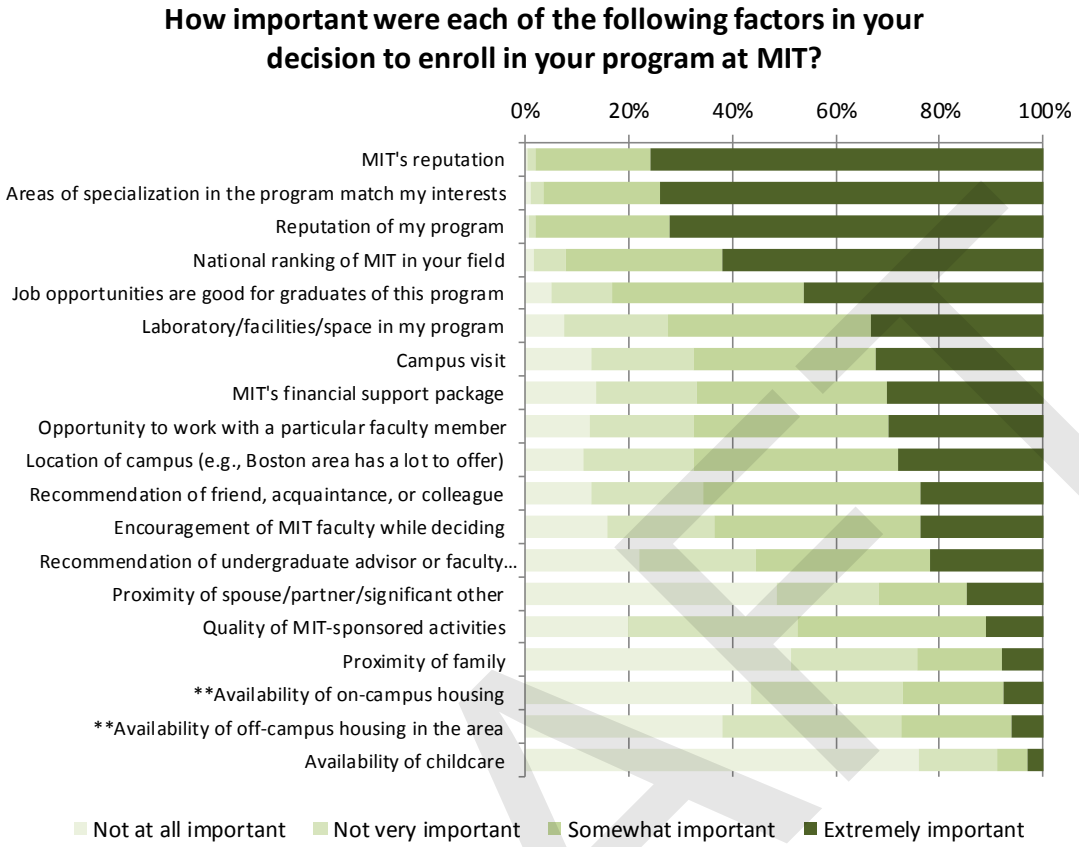


Table 5.2. Factors contributing to graduate applicants deciding to enroll at MIT. *Source: 2013 MIT Admitted Graduate Student Survey, Office of Institutional Research, Office of the Provost*

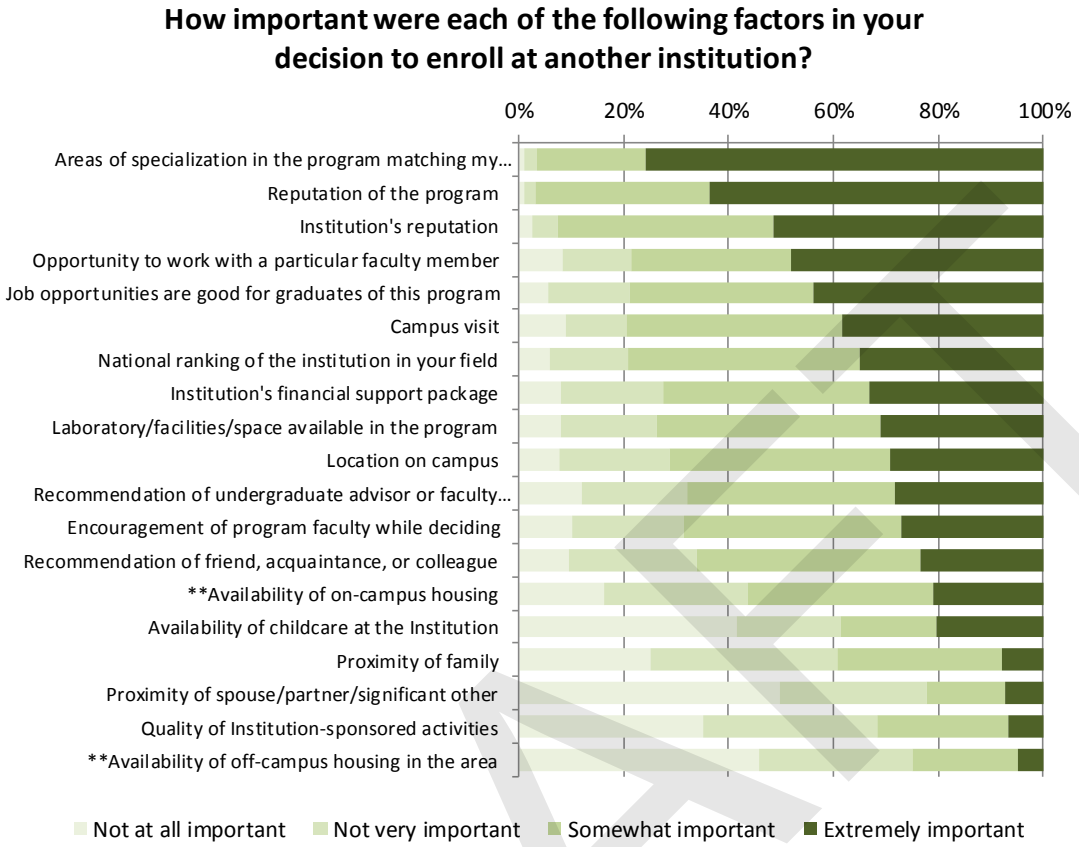
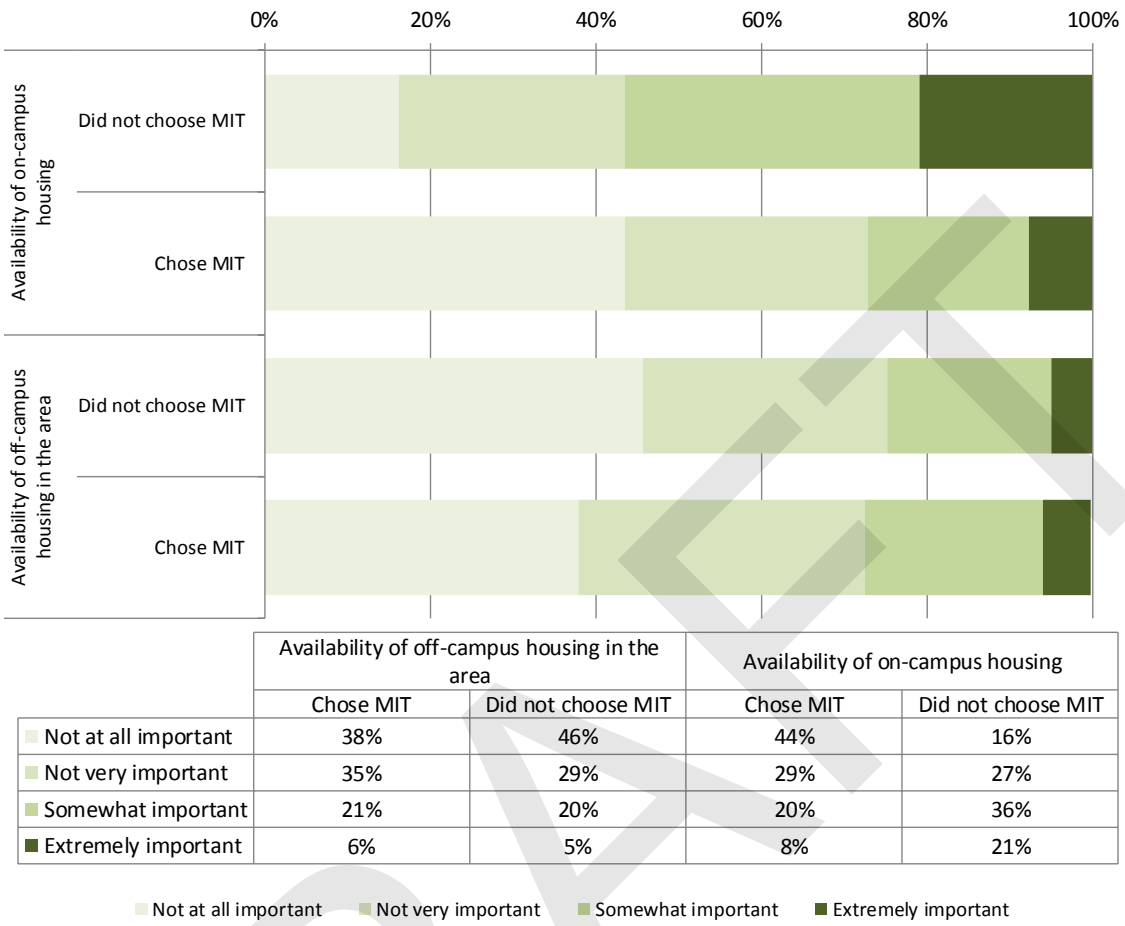


Table 5.3. Factors contributing to graduate applicants deciding to enroll at another institution. *Source: 2013 MIT Admitted Graduate Student Survey, Office of Institutional Research, Office of the Provost*

Housing ranked significantly lower on both lists, but there were clear differences in the importance of this issue between those who did and did not enroll (**Table 5.4**). The availability of off-campus housing was ranked similarly by those who did and did not attend MIT, with approximately 25% of students considering it either extremely important or somewhat important. In contrast, availability of on-campus housing was considered significantly more important by students who did not enroll at MIT (21% extremely important and 36% somewhat important) than by those who did (8% extremely important and 20% somewhat important). It is also worth noting that decreased availability or more expensive housing could contribute to the "campus visit" factor, as students are a major factor in these visits.



	Availability of off-campus housing in the area		Availability of on-campus housing	
	Chose MIT	Did not choose MIT	Chose MIT	Did not choose MIT
Not at all important	38%	46%	44%	16%
Not very important	35%	29%	29%	27%
Somewhat important	21%	20%	20%	36%
Extremely important	6%	5%	8%	21%

Table 5.4. Graduate applicants who chose not to attend MIT found the availability of on-campus housing more important than students who chose to attend MIT. *Source: 2013 MIT Admitted Graduate Student Survey, Office of Institutional Research, Office of the Provost*

4. What is the graduate housing situation at peer institutions?

The graduate housing situation at peer institutions varies widely. Based on the list of peers presented earlier, the working group identified schools that can be regarded as housing peers. The choice of these schools considered three criteria: 1) schools that compete with MIT for graduate students; 2) schools whose students compete with MIT students for housing; or 3) schools that are located in similar urban areas.

Boston College, Boston University, Northeastern University, Harvard University, Harvard Medical School, and Tufts University graduate students compete with MIT graduate students in the local housing market. A number of institutions face similar challenges by virtue of their location or the high cost of local housing (Chicago,

Columbia, Georgia Tech, Stanford, University of Pennsylvania, Johns Hopkins University, UC San Francisco, and UCLA).

We were especially interested in the size of the graduate population, the relative size of the undergraduate population, whether the institution provided on-campus graduate housing, and what percentage of graduate students were housed on campus. We also investigated the vacancy rate for rental housing in the area and the average RA stipend.

At most institutions, the percentage of graduate students housed on campus is quite low. Exceptions are Princeton, Stanford, UC San Francisco, MIT, and Harvard. The amount of on-campus housing at these institutions is driven by the lack of off-campus housing stock and the cost of off-campus housing, particularly in high-cost urban settings. Princeton is particularly high (70%) because of the lack of housing stock in Princeton, New Jersey. Students who live off campus frequently live in Philadelphia or New York City, resulting in long commute times.

The high cost of off-campus housing in the Palo Alto area led Stanford to add large amounts of on-campus housing over the past 15 years. Similarly, when UCSF moved its campus to the Mission Hill area of San Francisco, it was considered essential to provide large on-campus dorms due to the high cost of local housing. It is noteworthy that even under these conditions, a significant number of students choose to live off campus.

Finally, MIT and Harvard (perhaps the most comparable peer) provide comparable levels of on-campus housing. It should be noted, however, that Harvard has added to its on-campus housing for graduate students over the past decade and will continue to do so as part of its Allston development (http://news.harvard.edu/gazette/story/2013/10/bra-approves-allston-development-plan/). Harvard has also leased a block of apartments in a new building in the Fenway area.

Stipends at most institutions were in the same range (~$30,000) regardless of the local cost of living. Most institutions provide housing at a cost equal to market rate. Exceptions are Columbia University, Princeton, and Stanford.

As we have noted, graduate families and international students have special concerns. We did not find written policies about advantaging specific groups (first-year or international students) with regard to accessing on-campus housing.

At present, MIT is in a strong competitive position relative to graduate housing. Our housing meets a critical need, and our students give it high marks. This strength is working for us. It will be important to preserve it for the future.

3.0 Recommendations

Introduction

The review in Section 1.0 of the evolution of the on-campus graduate housing experience at MIT makes clear that MIT's strong residential campus tradition, for graduate students as well as undergraduates, is a direct result of the clear intentions of past administrations. While there has never been an officially adopted goal to house 50% (or any other fraction) of graduate students on campus, the Institute has consistently expanded housing stock for its growing graduate student body for more than a half-century. In the past, we have relied on the local market to provide the majority of housing opportunities, both because of student preferences and because students were attractive tenants to some private landlords.

As we undertook this latest review of the state of graduate housing at MIT, we were driven in large part, but not entirely, by the likelihood that local off-campus housing options will become scarcer over the next decade. As we saw in Section 2.2, fewer students will be able to live close to campus because what is being built, renovated, or converted will be either too expensive or unavailable for rent. Some of the currently affordable rental housing options are being sold at prices that require that future rents be significantly higher, if units are available for rent at all. What can MIT do over the next decade to make the MIT graduate experience attractive, sustainable, and affordable for another generation?

In making the recommendations below, our intentions are to:

- Increase the supply of campus housing, and support securing affordable off-campus housing when practicable
- Sustain the campus's residential character and improve housing support for graduate students on campus
- Accommodate affirmatively different student household types — single students and families, international students, and others who are integrating not only into Boston-area housing but also into the U.S. culture
- Strengthen the quality of the existing housing inventory through renewal and service enhancement
- Contribute to campus planning so that MIT's provision of quality housing contributes to the creation of a broader residential academic environment that defines MIT and its environs as a vigorous and embracing academic community integrated with the revitalized Kendall Square

Meeting graduate student housing needs

Our analysis suggests that demand currently exists for new housing to accommodate 500–600 graduate students. We believe that if these beds were available today, new students and current off-campus students would occupy them. We share below several ways this bed increase could be achieved.

Rather than building a traditional dorm, we recommend that MIT construct buildings that could house student families as well as single students. Apartments could include "micro units," studios, and multiple-bedroom suites. A two-bedroom apartment, for example, could house a family one year and two unmarried roommates the next.

The alternative would be to build a residence hall for single students and a facility for married students. We believe this distinction between different student household types is no longer useful, though some architectural treatments might isolate some features of the building as family-oriented spaces.

This type of building could be designed with essential amenities and common spaces that are more modest than those in recent projects, which have approached 15% non-revenue-generating space. This more modest construction could reduce both capital and operating costs. Students have made it clear to us that they want adequate and well-designed common space that they see as essential for community, but they do not advocate "frills" if adding them increases the cost of the housing.

We believe such a building would be sustainable financially because, unlike a traditional dormitory, it would be usable by a range of student household types. It would also create a community more closely representative of current student body demographics.

We are confident in our estimation of present demand, and we believe that as rents rise and availability declines in Cambridge, demand for on-campus housing will increase beyond what it is presently. In Section 2.1 we observed that 30% of off-campus residents choose to live off campus because of price, and that students are already paying about half of their income for housing.

Our charge does not include attention to postdoctoral fellows, and we did not assess their needs, but we do note (Section 2.4) that this staff population has grown dramatically, and that they rent in the same off-campus market as our graduate students. Our recommendation to build apartment-style on-campus graduate housing is supported by the fact that the growing population of postdocs increases competition for Cambridge housing still further.[8]

[8] Presently, MIT provides postdocs access to graduate housing only by exception, and rarely.

Facilitating capital renewal

Over the next decade, MIT will renovate several residences, including Eastgate (201 units), Westgate (207 units), and Tang (404 beds). Because each of these facilities will need to be empty for a year or more, MIT will need a new residence hall to provide "swing space" to house the students and families displaced when these residences are temporarily taken off line. Based on the scope of renewal work, we estimate that MIT needs swing space to accommodate 400 students. This swing-space need is in addition to the need outlined above.

After the renovation period (which might be as little as five years, or as long as 10 years if used for undergraduate residence hall renewal), this swing-space housing would be added to the graduate housing stock to meet the demand that will develop over the next decade.

This swing space should also be a building capable of housing both single students (from Tang) and families (from Eastgate and Westgate), and even undergraduates if necessary.

Renewal of existing graduate residences

Eastgate, Westgate, and Tang are already slated for renewal, but no schedule has yet been set. The requirement for capital renewal in these three residences presents an opportunity to review these buildings for alternatives beyond the simple "as-is" renovation. For example, units could be added to a site by demolishing a low-density element of the project and building a taller, high-density element on the same footprint. It is also possible to demolish the entire structure(s) and build a more dense facility. This approach preserves land resources and allows new structures to reflect different goals.

More-extreme options also exist. For example, Eastgate could be replaced with the sort of mixed-use structure that is transforming Kendall Square. A reimagined Eastgate, which we offer here only for illustration, might have not only graduate housing (no fewer units than exist at present) but also upper-market or luxury units (to generate revenue or to cross-subsidize), MIT academic space, and nonresidential, noninstitutional spaces that serve as a bridge between Kendall Square and the MIT campus. This is just one possibility for a "triple bottom line" outcome: a renewal that would increase or preserve graduate student housing stock, reduce the draw on the Institute balance sheet, and create a better-planned and more MIT-centric gateway to the campus.

Enhancing housing operations

Our graduate students are very satisfied with on-campus housing. They made a number of suggestions for improving housing office operations, housing information, flexibility of student assignments, the lottery, maintenance, and various lease elements. Student families on the west end of campus are concerned about limited weekend shuttle

service and the resulting isolation. The background for these suggestions is presented in Section 2.3.

We did not assess these suggestions, and we make no recommendation on them, as they mainly concern operational matters, but we do urge the dean's office and the GSC to consider them. They are important for improving campus-housing satisfaction, promoting graduate housing flexibility, and managing the churn that will result from capital renewal and development over the next decade.

Redeployment of existing facilities

The housing needs described above could be met through either new construction or conversion of existing nonresidential structures. We do not take it as part of our charge to specify how the Institute meets these needs, but we do note that peer institutions have converted area properties to graduate housing. Both Harvard and Boston University have purchased and transformed hotels into student residences, and our own original Ashdown resulted from this kind of purchase and transformation. We did not seek or discover any obvious transformation opportunities off campus. There may also be transformational opportunities in existing MIT buildings that are not presently residential.

Housing enterprise

We recommend appointing staff to explore enterprise opportunities for off-campus graduate housing. This recommendation is made with the understanding that it is unlikely that any housing will be produced nearby that would be affordable to our students. Any new housing that students could afford will come because of special development or leasing arrangements that MIT initiates or joins. These enterprises could include partnerships with other institutions or local developers as well as MIT's own efforts to secure medium-term or long-term arrangements for graduate students. For example, MIT might consider master leases and other arrangements that do not compete for a place on the balance sheet or displace Cambridge residents but do provide more affordable housing opportunities for students. MIT might leverage its land or other tools in its real estate arsenal. Creative options could also include or require regulatory incentives or relief from local government.

The primary purpose of this effort would be to provide housing, not general MIT real estate investment. (It might also provide rental housing to other members of the community, such as postdocs and junior faculty, who face a crunch in the local market.)

We do not propose these options as charitable or highly subsidized arrangements. These enterprise efforts are different from current MIT real estate practice only to the extent that they have a different goal: to provide housing rather than opportunities for long-term economic gain. We make no recommendation regarding the location of such initiatives. They need not be limited to Cambridge, but they should be accessible by public transportation.

Monitoring and service

The Dean for Student Life provides an off-campus housing office to assist graduate students in finding non-MIT housing. We urge strong support for enhancing this service with a more robust effort to identify housing opportunities, outreach and information to international students, and other services to improve the housing search process in Cambridge and beyond. This office should also explore ways to better coordinate housing information with transportation information. Finally, we recommend that this office, in connection with the Provost's office, collect necessary data to monitor efforts to advance graduate housing. Yearly reports should be made available to the community. We recommend a full repeat of the analysis in this report in 2017.

Campus transportation

Transportation is an important part of the graduate housing puzzle. We offer no proposals for new services. Students did convey real concerns about nighttime and weekend shuttle service on the west campus; we pass these on to the appropriate parties.

We do have one transportation recommendation: information about the shuttle transportation resources of MIT and its partners should be included in the housing search information given to students who are making choices about where to live in Cambridge and nearby communities. This would mitigate the sense of isolation that some students feel as they move into areas where public transportation is not convenient. Advance information about whether the shuttle service mitigates the isolation would be helpful in their decision-making. Joining with Cambridge residents to advocate for a review of existing MBTA routes might also be helpful.

Graduate housing and campus planning

As development proceeds in Kendall Square and renewal and development proceed on the eastern edge of MIT's campus, MIT has a unique and time-limited opportunity both to create uses and value for the MIT community and the endowment and to create a place that can produce escalating returns and iconic value to the Institute and the city of Cambridge for generations. Kendall Square should be an attractive and magnetic place characterized by mixed-use development and a permanent MIT life presence.

The gateway to our campus should be a "strong place" with powerful attraction and meaning. Unlike places arising from the simple addition of buildings, strong places are formed by activities, services, and functions serving many uses and demographics 24 hours a day. A strong place empowers activities that stimulate even greater excitement, and it develops a brand that outsiders will pay a premium to be affiliated with. Such a place is the opposite of a campus that, while surrounded by concrete and glass towers, generates no passion or iconic identity and is defined mainly by flags and ephemera.

From our point of view, residential options for graduate students are an important component to consider in the planning of the east end of campus and Kendall Square. Graduate students would be an ideal demographic, and the demand for the resource is certain. A short-term concession on maximum return will be offset by the strength and higher value of a more impressive place. Regulatory flexibility by the city of Cambridge will help considerably.

We make no recommendation about site or development details except to note that we have immense leverage at present, and that each decision we make reduces future degrees of freedom and raises the cost for addressing this issue at a later date. Architectural solutions to the "gateway" issue will be important, but the active presence of students will speak volumes.

Graduate students and the Campaign

A majority of MIT students are graduate students. Alumni activities have typically centered on undergraduate alumni. We are approaching a time when a majority of living alumni will be graduate alumni. Our alumni engagement approach will need to respond to this new reality.

Historically, campaign contributions for graduate student support have been difficult to attract. We cannot change the past, but we can impress upon all of our alumni the importance of graduate students and their centrality to present-day MIT.

The Campaign for Students (2008–2011) went a long way toward shattering the notion that donors will not give generously to support graduate students. Donors did contribute to supporting graduate students through fellowships tied to articulated research visions. We believe that MIT has an excellent story to tell about graduate education and the importance of graduate students to our many research interests. The residential campus is an important part of the story that could be better articulated.

We recommend that the administration commit to tell the story about graduate education, including the important role of the residential campus in maintaining MIT's attractiveness and competitiveness. Graduate students with a broad intellectual range learning from one another as campus soul-mates is part of a compelling vision that donors might support, either generally for financial aid, via support for research programs, or in other ways if we make a compelling case.

Non-housing financial support

One option suggested for addressing housing problems is for MIT to provide students with increased stipends or other direct funding to help them pay for increasingly more expensive housing. We considered this option and do not recommend it, for several reasons.

First, increases at or outside what sponsors allow in student stipends would reduce our faculty's competitiveness in attracting research funding. We are already at or near the

upper limit of what sponsors will support. While we will need to increase stipend support modestly, the increases will be nothing like the rates at which local rents increase. Second, giving students more money would likely heighten competition and tensions with local residents. Last, we believe that if students had more cash for local private rents, it would not increase the supply of affordable housing, but it very well might further inflate the cost of area housing.

Beyond all of these considerations, we see no basis for distinguishing among students in providing such cash assistance. Supporting all graduate students to a meaningful level with cash assistance would be cost-prohibitive and, for reasons mentioned above, counterproductive to the goal of increasing the supply of affordable housing.

Final word

Our vision is essentially the vision embedded in the Bush-Brown report excerpted in Section 1.0. The residential campus has been and will continue to be vitally important to graduate education at MIT. The Institute should take decisive steps to preserve this vision, including:

- Increasing the supply of campus housing, as well as off-campus opportunities
- Sustaining the campus's residential character and improving housing support
- Accommodating affirmatively different student demographics, especially families and international students
- Strengthening the existing housing inventory
- Planning the campus as a positive accommodation for students, an attractive space that is both a campus and a community magnet, and an iconic presentation to visitors of the power of this place

As an inclusive intellectual and social community, MIT should support the kind of physical place that empowers and engages, a vibrant environment that honors our traditions and mission. We should want nothing less.