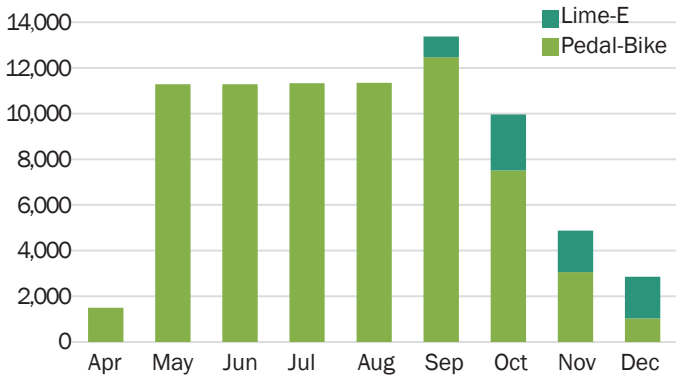


Bike Walk Tompkins conducted a bikesharing analysis based on the 2018 trip data provided by Lime. The dataset contains coordinate data, time data, and vehicle type data, allowing the investigation of patterns in people's use of Lime bikes, including the count, duration, distance, and elevation of trips. Additionally, the analysis focused on traffic flow between neighborhoods to evaluate how bikesharing connects our communities. On August 17th, 2018, Lime expanded into Collegetown and East Hill. Therefore, part of the analysis is separated into two periods: "summer" (April through August) and "fall" (September through December). This executive summary highlights several key findings from the analysis. The full report from BWT can be accessed online at bikewalktompkins.org/2018-lime-analysis.

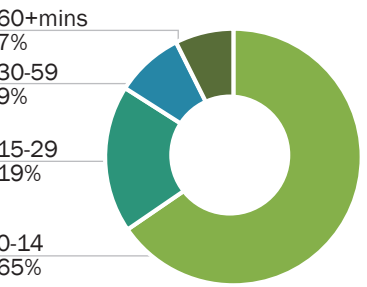
When do people ride Lime bikes?

Ridership is highest during the warmer months and peaks when students return in the fall, then declines gradually as winter sets in. As shown in Figure 1, after launching at the end of April 2018, Lime had consistent ridership of around **11,250** rides per month from May to August. With the return of students to Ithaca, Lime's expansion into Collegetown, and the introduction of its Lime-E electric bikes, Lime's ridership reached nearly **13,500** in September. In October and November, the ridership dropped as colder weather arrived and promotional offers ended. In December, the return of winter and subsequent fleet reduction brought ridership further down to **2,850**.

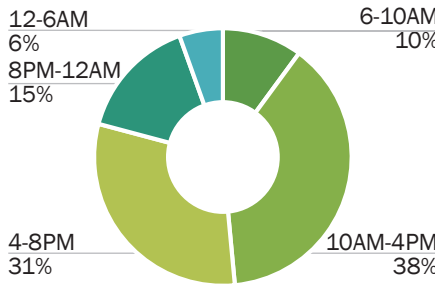
Rides by Month and Vehicle Type **Figure 1**



Ridership by Trip Duration **Figure 2**



Ridership by Time of Day **Figure 3**

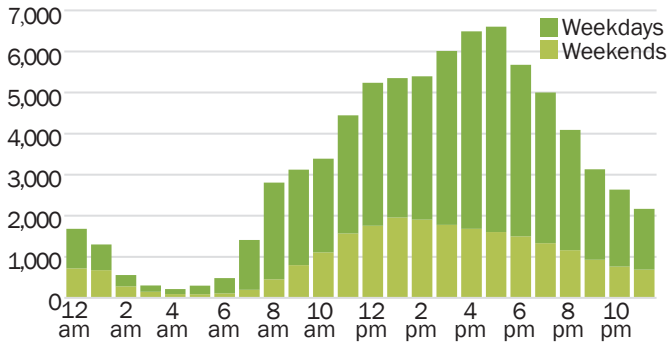


During its stable period, the Lime system in Tompkins County averaged between 350-400 rides per day, with a slight increase in rides on weekend days compared to weekdays.

The median trip duration is 10 minutes, and the average trip duration is 26 minutes. As shown in Figure 2, **65%** of the trips are between 0-14 minutes, while only **7%** of the trips last longer than 60 minutes.

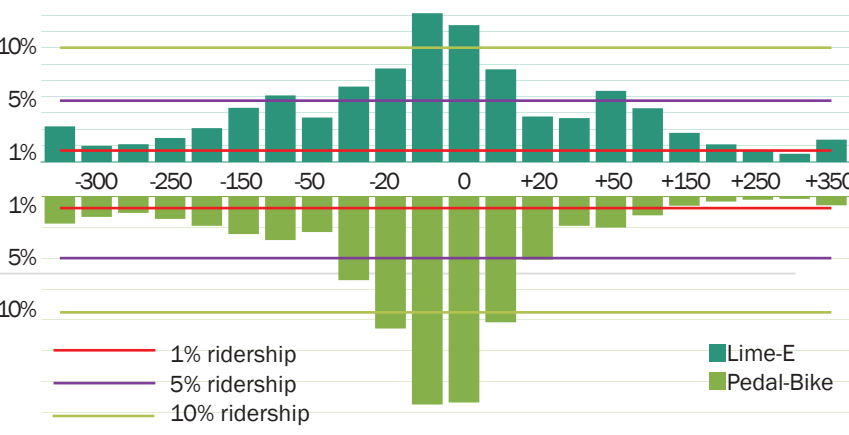
While the majority of riding activities occur during the daytime, the peak hours of the activities vary by weekday/weekend. Figure 3 demonstrates that over **69%** of the rides happen between 10 AM and 8 PM on average. A close look at Figure 4 shows that because one can take Lime trips one-way, **the weekday peak hour for the Lime system in Tompkins County is 5 PM with no corresponding AM peak.** **On weekends, activity peaks at 1 PM** and steadily decreases after that. Activity after midnight is minimal but still exists, even at 4 AM. Activity picks up again at 8 AM.

All 2018 Rides by Hour of Day and Weekday/Weekend **Figure 4**



Where do people go with Lime bikes?

Fall Semester Rides by Elevation Change Intervals **Figure 5**



Ithaca's steep hills are a significant barrier for bike users, and electric bikes contribute to alleviating the problem. More than 60% of rides went up or down less than 20 feet in elevation on average. Uphill rides that climbed 150 feet or more made up less than 5% of all trips combined.

Introduction of Lime-E pedal-assist electric bikes in late September increased the average ride elevation. Figure 5 compares the ridership percentage between Lime-E bike and the pedal bike in each elevation interval. In every elevation interval above +20 feet and below -50 feet, Lime-E has a higher ridership percentage. This means people tend to use Lime-E bikes to go uphill and downhill more often.

Most trips started and ended within the City of Ithaca, and users of the Lime system have visited nearly all streets in the Flats (see Figure 6 and 7). These maps show downtown Ithaca as a very strong hub of activity, but also highly active are the West State Street corridor, Greenstar, Wegmans, Collegetown, the Ithaca Farmers Market, and TCAT bus stops with frequent service, among other areas.

All 2018 Trip Start Locations (Orange)

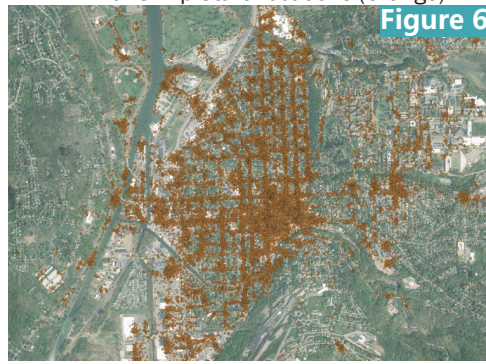


Figure 6

All 2018 Trip End Locations (Blue)

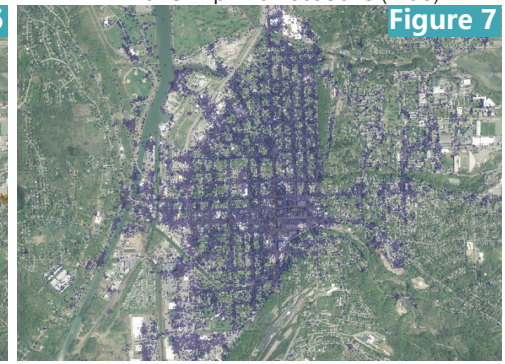


Figure 7

Map of Ithaca Urbanized Area Neighborhoods



Figure 8

To understand the use of Lime within the City of Ithaca and surrounding urban and suburban neighborhoods, we separated the Urbanized Area of Ithaca into 13 distinct neighborhoods to be able to count the number of rides starting and ending in each neighborhood (see Figure 8). While some neighborhoods are consistent with the general community consensus of their boundaries (ex. Fall Creek, Southside), other neighborhoods used in this analysis are an amalgamation of different neighborhoods and even municipalities. This is because the number of Lime rides would be too low to be noticeable if these amalgamated areas were subdivided into the actual neighborhoods.

How do Lime Bikes connect communities?

Generally, there is an outward flow of rides from the downtown core to outlying neighborhoods. A closer examination of the start and end location data shows the travel pattern between neighborhood origin-destination (O-D) pairs. Figure 9 shows the top 4 rides in fall season happen between Downtown and Fall Creek, making almost 1 in 5 Lime rides in fall, this pattern also applies for summer. The chord diagrams of O-D pairs for both summer and fall can be accessed on our website.

Chord Diagram of O-D Pairs in the Fall

Figure 9

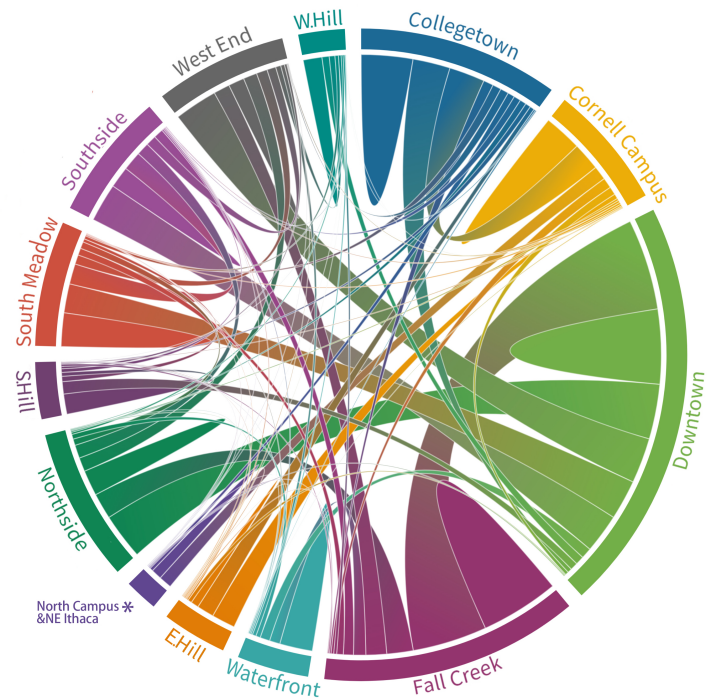
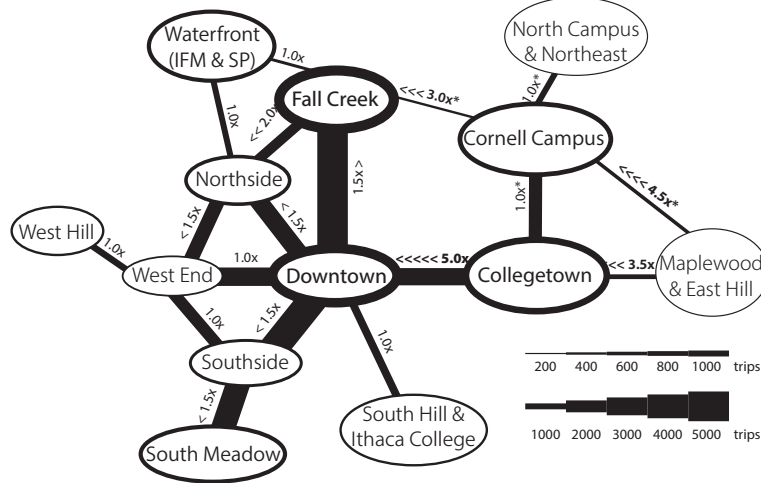


Figure 10 Schematic Diagram of Trips Between Neighborhoods (Fall)



Conclusion

- Ridership is highest during the warmer months and peaks when students return in the fall, then declines gradually as winter sets in.
- Electric bikes contribute to alleviate the hill-climbing problem caused by Ithaca's unique geography.
- Most trips started and ended within the City of Ithaca, and users of the Lime system have visited nearly all streets in the Flats.
- The Fall Creek–Downtown–Southside–South Meadow axis carries the highest proportion of Lime rides.

Using the neighborhood origin-destination pair data and some logical assumptions, we generated a schematic diagram of Lime rides' flow between neighborhoods. The thickness of the lines between and around neighborhoods represents the estimated number of trips for each neighborhood link.

As shown in Figure 10, the Fall Creek–Downtown–Southside–South Meadow axis carries a significant proportion of Lime rides in summer and fall. Other strong links across both seasons include the Downtown–West End and the Downtown–Northside links.

East Hill neighborhoods see an increase of trips that start on the hill end up in the Flats. We also see trips along an emerging Collegetown–Cornell–North Campus axis, which has shallower gradients particularly well-suited to the Lime-E pedal-assist electric bikes.