A Spatial Analysis of the
M.S. Engineering Management Graduate Program

INTRODUCTION

The Tufts Gordon Institute (TGI) is a subdivision of Tufts University School of Engineering. This is project is a spatial analysis of the Masters of Engineering Management (MSEM) program. The program is designed for working professionals seeking to improve their technical and quantitative skills. The program offers students the ability to strengthen their leadership skills through project based learning. The MSEM program is structured for working professionals, to facilitate the application of techniques and skills obtained through coursework and in class exercises. The department was seeking to better understand their unique population of students using a spatial analysis in Arc GIS. Prior to the creation of these maps the department was aware the MSEM students mostly enroll while working for Life Science and Defense companies. Using a spatial analysis the team was seeking a visual display to understand trends of their student population, and how that information could be applied to the MSEM program and Tufts University Campus.
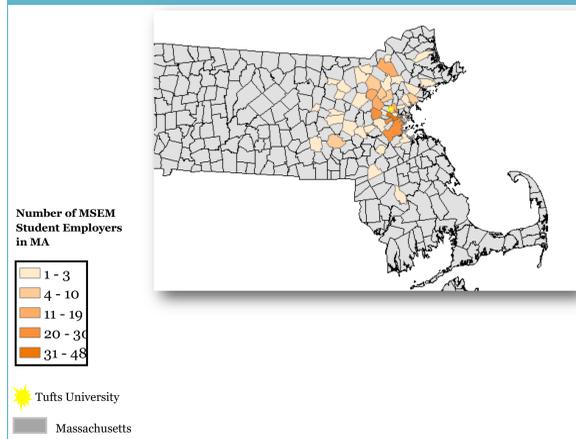
Research Questions

Where in Massachusetts, New Hampshire, and Rhode Island did the 2014-2018 enrolling MSEM students live, and work in relation to the Tufts University Campus at the time of enrollment?
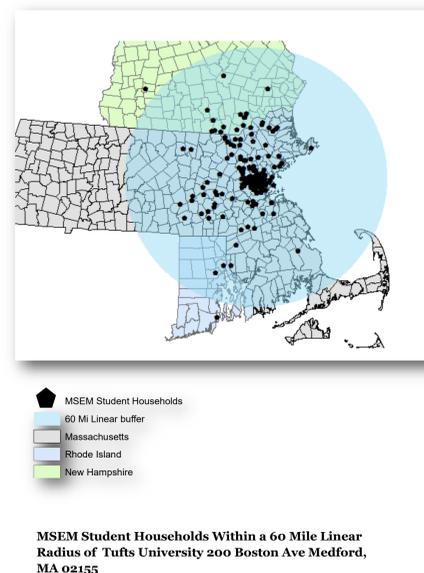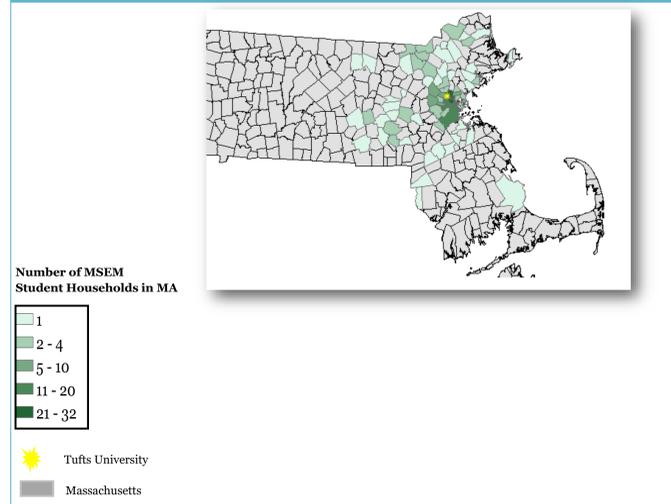
Where are the Life Science/Defense companies in Massachusetts, New Hampshire, and Rhode Island that MSEM students work for?

Where are the largest Life Sciences and Defense companies in Boston that the enrolling classes of 2014-2018 did not work for at the time of enrollment?

RESULTS

The MSEM student population is a unique set of the Tufts graduate student population. The majority of the students commute to Tufts after work. MSEM students often attend classes in the evening during the week and on weekends. Using the count tool I was able to determine there are 242 MSEM Student Homes within a 60 mile linear distance from Tufts. I was able to calculate that there are 250 employer addresses for MSEM students within a 60 mile linear distance from Tufts. The maps display 85 of the largest Life Science and Defense Companies in Boston that the MSEM students enrolling from 2014-2018 did not work for at the time of enrollment. The maps display a concentration of MSEM students working in Cambridge, Medford, Boston, and Waltham. The student households at enrollment, are distributed more loosely to include bordering the Massachusetts states, Rhode Island and New Hampshire. The maps also display a concentration of MSEM students living and working in Somerville, Medford, Boston, and Cambridge. Although many MSEM students work for Life Sciences and Defense Companies in Boston many of them work for different companies then the list identified by Boston Business Journal.

MSEM STUDENT EMPLOYERS

Number of MSEM Student Employers in MA

- 1 - 3
- 4 - 10
- 11 - 19
- 20 - 30
- 31 - 48

★ Tufts University

Massachusetts

MSEM STUDENT HOUSEHOLDS

Number of MSEM Student Households in MA

- 1
- 2 - 4
- 5 - 10
- 11 - 20
- 21 - 32

★ Tufts University

Massachusetts

⬠ MSEM Student Households
○ 60 Mi Linear buffer
Massachusetts
Rhode Island
New Hampshire

MSEM Student Households Within a 60 Mile Linear Radius of Tufts University 200 Boston Ave Medford, MA 02155

CONCLUSION

Prior to this project TGI did not have a visual display to demonstrate the data. These maps have helped our organization to spatially understand our MSEM enrollment student patterns. For future use these may be used to determine cities and towns for prospecting. In addition, the maps can help identify companies we do not have MSEM students enrolling while working for. This information can help to develop future leads along with impact program changes. Many of our students work for the same company's these maps may help shape decision making for a future, such as online programming, satellite class locations, information session, or corporate relations opportunities.

METHODS

MSEM Student employer names and home addresses were obtained from student the information system and surveys distributed at student enrollment. This data was aggregated and anonymize. The employer names were carefully searched to identify the physical address of each company headquarters. The data was geoprocessed and entered in Arc Map to display concentration of student employers and home addresses. Using the Buffer tool I created a 60 Mile buffer around the 200 Boston Ave building near the Tufts University Medford Campus. I chose not to use the spatial density tools on my map. The points demonstrated the data with stronger visibility. Data for the largest Life Science and Defense companies in Boston was collected from the Boston Business Journal. This data was geoprocessed and displayed in Arc Map to demonstrate proximity and density in the relation to the Tufts University Campus and TGI Program Headquarters. The list of data obtained from the Boston Business Journal was compared against the student data and any duplicated companies were removed.

★ Tufts University
Largest Life Science and Defense Companies in Massachusetts
Massachusetts

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Image Source: Tufts Gordon Institute, Marketing
Coordinate System: North American Datum of 1983 Zone 19N
Introduction to GIS, UEP 0232

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