



## **Letter of Understanding**

From: STATCOM Leadership Team

Date: November 13, 2022.

### *Purpose of the Document*

The purpose of this document is to outline responsibilities and goals for the relationship between **Statistics in the Community (STATCOM)** and **Yao Song** for the **Fall and Winter semester, 2022-23** for a partnership with **Poverty Solutions**.

### *STATCOM*

STATCOM at the University of Michigan is a community outreach program provided by graduate students at the University of Michigan. The program offers the expertise of statistics graduate students, free of charge, to non-profit governmental and community organizations in the areas of data organization, analysis, and interpretation. Our faculty advisors, Cathie Spino ([spino@umich.edu](mailto:spino@umich.edu)), Jean Morrison ([jvmorr@umich.edu](mailto:jvmorr@umich.edu)) and Matt Zawistowski ([mattz@umich.edu](mailto:mattz@umich.edu)) are faculty members at the School of Public Health.

### *STATCOM administrative contacts:*

Ben Brennan, Co-president ([brennben@umich.edu](mailto:brennben@umich.edu))

Soumik Purkayastha, Co-president ([soumikp@umich.edu](mailto:soumikp@umich.edu))

### *Goals of the partnership*

The project is with Poverty Solutions, a University of Michigan initiative working in collaboration with the Detroit Housing Commission and United Way to reduce the number of evictions among families with children in Detroit by connecting people with financial assistance and case managers.

### *STATCOM's responsibilities*

We understand that we are working with real data concerning real people and will follow all confidentiality policies. We value the opportunity to work within the community and strive to provide the highest quality work we are able to.

1. STATCOM leadership team member Soumik Purkayastha is the primary contact between Poverty Solutions, the STATCOM leadership team and the STATCOM project team. If you have any questions or concerns please email [soumikp@umich.edu](mailto:soumikp@umich.edu)
2. STATCOM is committed to aiding student volunteers to engage with pro-bono statistical consulting opportunities in a responsible and respectful way.

### *Volunteer's responsibilities*



We consider our volunteers to be an integral part of our service. Our most successful partnerships exist when all parties involved clearly communicate expectations regarding work and desirable outcomes.

1. Handling sensitive data: As a member of STATCOM, and steward of University information resources, volunteers have a responsibility to handle sensitive data appropriately. Irresponsible use of sensitive data is a serious offense that can lead to discipline and/or possible dismissal. Please explore [university resources](#) to help you make informed security and compliance decisions about which IT services to use when collecting, processing, storing, or sharing university data.
2. Time and effort commitment: For the duration of the project, STATCOM would expect you to meet with the project team a minimum of once a week. Volunteers typically commit to spending 3-4 hours per week. We understand this is not always possible for volunteers. Should changes happen to the scope of work or difficulties arise, then volunteers will inform the primary contact of these changes or problems.

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### ***Project details***

*Project team members:* Sophia Luo, Ebo Essilfie-Amoah, Victoria Fisher, Mengbing Li, Manpreet Dhankhar, Yao Song and Jack Li.

### ***Introduction***

More than 8 million renters across the US are behind on rent payments. With data from The Detroit Housing Commission and United Way, the Poverty Solutions project aims to reduce the number of evictions among families with children in subsidized housing in Detroit. Previous studies have shown that families of larger sizes are more likely to miss rent payments on time, and that the late rent payment patterns vary significantly depending on the quality of infrastructure in buildings. In our analysis, we focus on investigating the most important factors that may impact a family's ability to make rent payments on time. Our results will provide vital insights into determining the type of assistance a renter family may need and can help tailor interventions according to family characteristics. Our data-driven solutions enable potential financial assistance and connection to case managers, provided to the renter families.

Our analysis has two primary objectives. First, what is the relationship between income, household composition, and rental payment patterns? Second, did rental pattern payment behavior change significantly after the onset of the COVID-19 pandemic in March 2020, and after the first COVID-19 related eviction prevention rental assistance dollars were distributed to Michigan families in March 2021?



### *Materials and Methods*

The study cohort includes 1310 tenants who lived in subsidized apartment housing consisting of twelve buildings in Detroit over the past ten years. Demographic variables at baseline including age, sex, income, and household composition were collected from housing application forms completed by tenants. Time-varying rent charge and payment records were collected from the rent ledgers for each building, including rent amounts, age of rent-paying tenants, age of other household members, annual income of rent-paying tenants, addresses, and indicators of late payment status. Our analysis will focus on the subset of rent payment data from June 2016 to February 2021, because the data is sparse outside of this time frame.

*Variables of interest:* Household composition (age of tenant paying rent, age of household members, number of household members under the age of 18) [continuous], Income [continuous], buildings [12 categories], Was rent payment due before the COVID-19 outbreak (March 1st, 2020) [Binary], Rent amount category (low, medium, high) or proportion of income [continuous]. Time [continuous, unit:month], June 2016 is set as the first month of investigation

*Outcomes of interest:* The proportion of late payments is defined as the ratio of the number of late payments to the number of total charges. We are interested in the two following outcomes, namely proportion of late payments per tenant and proportion of late payments per building.

Our exploratory analysis shows that some tenants had a proportion of late charges greater than one, which implies we are missing data on some of their regular rent charges. For these tenants, we imputed the maximum proportion of late charges among tenants in the same building. We propose controlling for buildings as building location may impact the tenant makeup and may confound the proportion of late rent payments if, for example, tenants in a certain building withhold rent as a means to protest poor living conditions.

Generalized linear models (GLMs) or generalized estimating equation (GEE) based logistic regression models will be considered for the two outcomes of interests with all covariate of interest while accounting for correlation with different working structures. We will use AIC/BIC for model selection. Further, an analysis of variance (ANOVA) will be



carried out to investigate the significance of correlation between the outcome of interest and the effect of main covariates (i.e, building, time and income). We will also describe rent payment trends (before and after Covid-19 outbreak), and find out how trends differ between buildings.

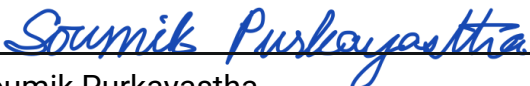

#### *Deliverables*

In addition to statistical outputs and code, we propose presenting the final analysis results in an easily digestible report such that our partners would be able to share this document with clients, building managers, or future collaborators. Thus, the project will result in two outputs: one quantitative compilation and one qualitative.

#### *Timeline*

	<i>November</i>	<i>December</i>	<i>January</i>
<i>Analysis</i>			
<i>Update</i>			
<i>End deliverables due</i>			

**By signing below, all parties commit to the specific elements and general spirit of partnership outlined above.**

	
Soumik Purkayastha, STATCOM Co-president Date: 2022-11-13	Yao Song STATCOM volunteer Date: 2022-11-14

**By signing this document, the volunteer indicates their agreement with the responsibilities and details outlined above.**