

**Xiaoting SUN**

**Tsinghua University**

**Title of Submission: The long-term socioeconomic impacts of COVID19 on urban air pollution of 1<sup>st</sup> tier cities in China**

To mitigate and overcome the negative impact of COVID 19, society must undertake socioeconomic measures to transform itself and people must shift certain aspects of our lifestyle and work to adapt to these transformations. Using comprehensive air quality, particulate matter and socioeconomic data from 1<sup>st</sup> tier cities of China, we evaluated the impacts of socioeconomic factors such as GDP, GDP growth, population and employment on air quality and particulate matters emitted. To infer these causal relationships, we employed the instrumental variable method as natural experimentation is infeasible and simultaneous equation to find a status quo of the socioeconomic system. We found that employment has had no impact on air quality and particulate matter emission before and during the pandemic. Although employment is thought to be linked with economic performance but employment outcome during the pandemic has demonstrated that interventions can be utilized to promote socioeconomic development and stability even during lockdown. We also found that employment rate remained stable even when China underwent lockdown and even when economic growth was negative. This further demonstrates that socioeconomic stability as well as mitigating environmental challenges can be met even under such circumstances. We remain hopeful that other regions with similar socioeconomic and infrastructure can obtain similar, if not better improvements in promoting air quality improvements within reasonable costs, as city lockdowns are an unsustainable option to address environmental issues.