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**Alessandro Vespignani/Network Science Institute Case Statement**

**Faculty Expert:** Alessandro Vespignani, Sternberg Family Distinguished University Professor

**Fundraising Contact:** James Poulos, Associate Dean for Development, College of Science

**Mapping an Invisible Foe: Predicting the Path of COVID-19**

As COVID-19 spreads like wildfire, it is upending every facet of human life—and our very existence is being forever transformed minute by minute. Beyond endangering lives worldwide, the pandemic is disrupting daily pursuits and changing the ways people interact with one another, overloading the healthcare system, confounding workplaces and educational institutions, and threatening the economy.

To mitigate the calamitous effects of COVID-19, Northeastern University’s acclaimed researchers at its Network Science Institute (NetSI) have rapidly mobilized to assess, model, and predict the virus’s growth. Alessandro Vespignani, director of NetSI and the Sternberg Family Distinguished University Professor, is helming an interdisciplinary team harnessing today’s enormous computing power to build and expand a data modeling pipeline that uses publicly available statistics—such as air travel and ground mobility numbers—to generate real-time global maps of the virus’s expected transmission.

Vespignani’s predictive modeling is vital to slowing the onward march of COVID-19, and in developing hundreds of possible scenarios, he is fronting the race to identify and deploy intervention strategies. But to accelerate his work, he urgently requires financial resources—now and for the foreseeable future—that will help bolster personnel, meet computational expenses, and purchase datasets. With this backing, Vespignani will remain at the fore of COVID-19, and we will not only be better informed because of him, but also better prepared to fight and halt the virus’s spread and human toll.

**Forecasting the Future: A Self-Described Weatherman**

Alessandro Vespignani has an elevator pitch of sorts: “I’m the weatherman of epidemics,” he says. He spots pockets of infectious diseases in one location and wonders, what will happen in the future? Today, in his Laboratory for the Modeling of Biological and Sociotechnical Systems (MOBS Lab), housed in NetSI, Vespignani and his team are developing data-driven models that predict the spread of infectious diseases. Lacking a vaccine or cure for COVID-19, the lone containment tactic is modifying social behaviors. By analyzing patters of human behavior that fuel or suppress the virus, Vespignani is developing hundreds of possible COVID-19 scenarios that are guiding policymaking worldwide.

As the COVID-19 pandemic intensifies, health officials and government leaders are consulting with social network modelers on a daily basis. The MOBS Lab is part of a consortium that advises the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC), and each day, Vespignani participates in a conference call with more than 60 representatives from those organizations who seek his acumen. He has been invited into dialogues with the White House, governors across the United States, and international task forces. Vespignani is also in demand at the local level, fielding inquiries from officials to help inform crucial and unprecedented decisions that have a direct impact on communities. For example, he participated in a summit of Boston-area mayors to evaluate measures to combat COVID-19, and as a result, the decision was made to close the region’s public schools.

**Boosting Critical Resources: Opportunities for Support**

The demand on the MOBS Lab is acute and growing as each new case of COVID-19 is diagnosed. To meet this persistent call, Vespignani is coordinating the response among his NetSI colleagues, who are embracing interdisciplinary teamwork on the effort to battle the virus. But to confront a crisis of this magnitude, his available resources must keep pace with the growth of the pandemic.

Opportunities for support include:

**Personnel**—As the research effort intensifies, the MOBS Lab seeks to grow its staff by adding contract researchers, software developers, PhD students, and technical writers who will amplify Vespignani’s ability to model and forecast the pandemic and inform key decision makers.

**Computation**—Since January, Vespignani’s monthly costs in this area have more than tripled. Computation is the essence of the lab’s modeling, and additional financial support will boost processing more computational packets—collections of data that are used by computers—through powerful cloud computing systems run by Google and IBM.

**Datasets**—These groupings of data show routes of human activity in a network, such as travel in and out of a community. With funds to purchase even more datasets, Vespignani will have additional information at his fingertips, and will be better able to more accurately predict the evolution of COVID-19.

As COVID-19 triggers fears and uncertainties, society looks toward researches to not only find a cure, but to lead us in protecting ourselves and our loved ones from the virus. By investing in the work of Alessandro Vespignani, members of the Northeastern community wield the power to make a real-time, lasting difference by empowering him to continue leading the fight against the COVID-19 pandemic.