Preventing the Spread of Infectious Diseases

Lydia Bourouiba

Esther and Harold E. Edgerton Assistant Professor and Director of the Fluid Dynamics of Disease Transmission Laboratory

CURRENT RESEARCH

Applying fluid dynamics and physics to better understand and restrain pathogen transmission

Though the presence of epidemics and pandemics has plagued humanity for centuries, infectious disease transmission remains poorly understood. The classification of transmission of disease continues to rely on notions of routes of transmission introduced in the 1930s. Although contact tracing aiming at gathering data from survey of populations and tracking case reports to infer routes of transmission are also now more accessible, the biases and accuracy such Big Data sets are difficult to assess. Hence, further limiting our understanding the mechanisms of contagion. There remain a major knowledge gap between the results in basic microbiology performed at the cellular scale (e.g., how does one virus infect one cell) and the attempts to model contagion and patterns of epidemic spread at the population level. Dr. Lydia Bourouiba, Esther and Harold E. Edgerton Assistant Professor Director of the Fluid Dynamics of Disease Transmission Laboratory at the Massachusetts Institute of Technology, is using her research to fill this gap and connect the small scales to the population scale. In particular, Dr. Bourouiba focuses on understanding how the pathogens of one individual become those of another. Using a unique combination of methods that join physical sciences, including fluid dynamics, with microbiology and epidemiology, Dr. Bourouiba examines the dynamics of peer-to-peer transmission and transport of pathogens in the air and water, with implications on transmission of diseases in an office, airplane, hospital, or any public spaces. The insights gained will enable better risk assessment, improved and targeted intervention and mitigation strategies and better design of spaces and protective equipment in healthcare settings...

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AFFILIATION

Massachusetts Institute of Technology

EDUCATION

- Ph.D. in Fluid Dynamics and Turbulence, 2008, McGill University

AWARDS

- Sigma Xi
- Esther and Harold E. Edgerton Assistant Professor Chair at Massachusetts Institute of Technology

RESEARCH AREAS

Life Science, Infectious, Respiratory, Computational Sciences / Mathematics

FUNDING REQUEST

Your funding will help Dr. Bourouiba and her team guarantee an impact in controlling disease transmission. A $100K donation will support one graduate student for a year; if funded throughout their program, a Name Fellowship will result. A $1M donation will cover 3-5 years of research, funding costs for personnel, equipment, and experimental materials. Your contributions will help bring a new generation of scientists to this emerging and exciting field of disease transmission to save lives.