**2018 Helmholtz – OCPC – Program**

**for the involvement of postdocs in bilateral collaboration projects**

**PART A**

**Title of the project:** Evaluation of Mortality Effects of Air Pollution Multipollutant Mixtures

**Helmholtz Centre and institute:** Helmholtz Zentrum München, Institute of Epidemiology

**Project leader:** Dr.Alexandra Schneider

**Web-address:** <https://www.helmholtz-muenchen.de/epi/research/research-groups/environmental-risks/objectives/index.html>

**Description of the project** (max. 1 page)**:**

Epidemiological studies of the health effects of air pollution have largely focused on estimating the associations between single pollutants and health outcomes. However, the air we breathe is a complex mixture of particulate and gaseous pollutants that come from different emission sources or atmospheric conditions. For single-pollutant models, it is not clear if an observed association reflects the effect of the analysed air pollutant or if it acts as a surrogate for a combination of pollutants originating from the same sources. It also may reflect other frequently unmeasured pollutants. Unravelling the cumulative health effects of air pollution mixtures or simultaneous effects of pollutants (multipollutant approach) has become a growing research focus.

Conventional statistical methods are inadequate for addressing the cumulative health effects of multiple air pollutants. Traditionally, copollutant models have been widely used to examine the role of a single pollutant in the air mixture after adjusting for other measured copollutants, which may lead to highly unstable estimates due to the usually high correlation between these air pollutants. In the last few years, several statistical approaches have been proposed to correctly estimate the independent and joint effects of multiple correlated exposures on human health.

The research proposed here aims at applying and evaluating the newly developed multipollutant methods for assessing the health effects of the air pollution mixtures in a European multicity dataset. Specifically, this project will address the following aims: 1) Application and evaluation of methods for dimension reduction, variable selection, and grouping of observations in estimating the short-term effects of multipollutants on mortality in four European urban areas; 2) Address the potential role of ultrafine particles and black carbon within the pollutants mixtures and quantify their contribution to the cumulative effect of air pollution mixtures in European urban areas.

The proposed project is a time-series study of daily cause-specific mortality data in four different European cities over several years. This project will identify and apply proper multipollutant statistical methods for a multicity time-series analysis to assess the cumulative mortality effects of air pollution mixtures in four European cities (specific aim 1). This project will expand the methodology to address the question of combining different profiles identified by specific methods. Comparisons among different approaches, models with interaction effects and with single-pollutant models will be conducted. Furthermore, this project will specifically address the potential role of ultrafine particles and black carbon within the pollutants mixtures and quantify their contributions to the cumulative effect of air pollution mixtures in European cities (specific aim 2).

**Description of existing or sought Chinese collaboration partner institute** (max. half page)**:**

Chinese Universities or institutions with strong programme and expertise in air pollution epidemiology, such as Peking University, Tsinghua University, Fudan University, are welcome to apply. The expertise in the following list are beneficial: (1) epidemiology, (2) biostatistics, (3) environmental health sciences.

**Required qualification of the post-doc:**

* + PhD in environmental science, public health, or biostatistics
  + Strong knowledge of statistics (e.g., time-series analysis, cluster analysis) and coding   
     (SAS or R), basic knowledge of environmental epidemiology and air pollution sciences
  + Additional skills with regard to proficient written and spoken English as well as the   
     ability to work interactively with colleagues in an international and interdisciplinary   
     setting

**PART B**

**Documents to be provided by the post-doc, necessary for an application to OCPC via a postdoc-station:**

* + Detailed description of the interest in joining the project (motivation letter)
  + Curriculum vitae, copies of degrees
  + List of publications
  + Two letters of recommendation
  + Proof of command of English language

**PART C**

**Additional requirements to be fulfilled by the post-doc:**

* + Max. age of 35 years
  + PhD degree not older than 5 years
  + Very good command of the English language
  + Strong ability to work independently and in a team