

REPORT

Report on participation of the ICMR International Fellow (ICMR-IF) in Training/Research abroad.

1. Name and designation of ICMR- IF : Dr. SukhDev Mishra, Scientist C
2. Address : Department of Bio-Statistics & Data Management
ICMR-National Institute of Occupational Health
Meghani Nagar, Ahmedabad -380016
3. Frontline area of research in which training/research was carried out : Statistical Modelling of Health Data
4. Name & address of Professor and host institute : Prof. Sujit K Ghosh
Department of Statistics,
NC State University
2311 K. Stinson Drive, Raleigh,
North Carolina - 27606, USA
5. Duration of fellowship : Jan 01 – May 20, 2019
6. Highlights of work conducted :
 - i) Technique/expertise acquired
 - Robust Fitting of Linear Models using R
 - Imputation of missing data using missForest in R
 - Fitting of Multiple linear regression model using R
 - Application of Unimodal Density Estimation Using Bernstein Polynomials (Turnbull, B. and Ghosh, S. K. (2014))
 - Geospatial Visualization of Data in ArcGIS and QGIS
 - ii) Research results, including any papers, prepared/submitted for publication

Statistical assessment of health outcome in form of COPD was investigated among women due to indoor air pollution. Health outcome in question was observed associated with type of fuel use in kitchen along with some other variables but model predictability was very low. We investigated some pro-inflammatory cytokines (such as IL-6) in relation to COPD which were recorded as missing in large proportion in datasets, the analysis presented no significant evidence of association between COPD and cytokines, similar results were observed post-imputation of missing data. A manuscript based on study findings will be prepared and submitted to relevant journal.

Based on discussions and data analysis insights, a statistical methodology based new concept proposal entitled "Permissible Exposure Limit (PEL) linked Health Risk Assessment for Lead Industry Workers" has also been prepared and being developed fully for by fellow for future research work.

New Collaboration: ICMR-IF has developed one more collaboration at NC state in area of application of Geospatial statistics. A project entitled " Geospatial Mapping: A framework to find the hidden Visceral Leishmaniasis cases in India" has been prepared in collaboration with the investigators Gustavo Machado(NC State University, USA), Joaquin Prada(University of Surrey, UK), Victor del-rios (University of Surrey, UK), Brian Reich(NC State University, USA), Suresh Yadav(National Institute of Occupational Health, India), Sukhdev Mishra (National Institute of Occupational Health, India). The project has been submitted to Bill & Melinda Gates Foundation for funding. The sought funding amount is \$100,000.

Workshop/Seminars attended:

Attended the following workshops which were conducted by Data & Visualization lab:

- Mapping and Geospatial Visualization in QGIS
- GIS-powered Data Visualization with Insights

Attended the following seminars:

- Unit Root Testing: A Historical Perspective (Speaker : Dr. David A. Dickey, NCSU)
- Integrative linear discriminant analysis with guaranteed error rate improvement (Quefeng Li, UNC Chapel Hill)
- Online Controlled Experiments, Learning From Running A/B/n Tests at Scale (Kaska Adoteye, Microsoft)
- Understanding drivers of human health and chronic disease development in global health (Speaker: Jessica Islam, UNC Chapel Hill)
- State of the Sciences: Creativity Across Disciplines (Speaker: Robert Root-Bernstein, Michigan State University)

iii) Proposed utilization of the experience in India :

The gained training and research exposure will be utilized to adopt more advanced methodology for evaluation of health data in India and develop new training programs and collaborative research projects.

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Signature of ICMR-IF