

biological discovery, we develop a statistical framework to detect gene co-expression patterns in a spatially structured tissue consisting of different clusters in the form of cell classes or tissue domains. We develop SpaceX (spatially dependent gene co-expression network), a Bayesian methodology to identify both shared and cluster-specific co-expression network across genes. SpaceX uses an over-dispersed spatial Poisson model coupled with a high-dimensional factor model which is based on a dimension reduction technique for computational efficiency. We show via simulations, accuracy gains in co-expression network estimation and structure by accounting for (increasing) spatial correlation and appropriate noise distributions. In-depth analysis of two spatial transcriptomics datasets in mouse hypothalamus and human breast cancer using SpaceX, detected multiple hub genes which are related to cognitive abilities for the hypothalamus data and multiple cancer genes (e.g. collagen family) from the tumor region for the breast cancer data.

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2.

Presenter (First Name, Last Name): Tatiane Bahia Do Vale Silva

Affiliation: Fundação Oswaldo Cruz and Universidade Do Estado Do Pará

Title: Admission and lethality trends for ambulatory care sensitive condition (ACSC) in primary care in the state of Pará from 2008-2017

Abstract:

This study aims to describe the sociodemographic characteristics of Hospitalizations of Sensitive Conditions to Primary Care (ACSC) of elderly people living in the state of Pará, and evaluate the association between hospitalization and lethality trends by ACSC with social vulnerability variables and primary care coverage (CAB) in the state of Pará in the years 2008 to 2017. This is an ecological study that used secondary data from the Hospital Information System (SIH-SUS), the E-Manager System and the Social Vulnerability Index (IVS-IPEA). In the period investigated, ACSC accounted for 45% of admissions, with males and long-lived elderly being the most affected. The fatality rate at 6%. The results showed an association between ACSC, CAB and IVS-IPEA, with infectious gastroenteritis and complications as the main ACSC group, and ACSC rates with heterogeneous distribution among municipalities, factors that highlight the need for actions focused on interventions for primary health care, aimed at this age group.

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Presenter (First Name, Last Name): Thibault Catry

Affiliation: IRD/UMR Espace-Dev

Title: Predicting Tiger mosquito breeding sites through Earth Observation and statistical analysis

Abstract:

Reunion Island is a densely populated French region of the Indian Ocean. There, the Asian Tiger mosquito, *Aedes albopictus*, is the main vector of arboviroses such as dengue and chikungunya. Recently, vector control services have been collecting in situ data on potential breeding sites

covering about 10% of the districts of the island. This study investigates the capability of environmental features extracted from earth observation data to be used in predicting the distribution of potential breeding sites of *Ae. albopictus* in Reunion Island. Spectral indices (NDVI, NDWI and Brightness index) were calculated from a very-high spatial resolution Pléiades mosaic of 2020 images over the island, while data on the annual cumulative rainfall and the annual average temperature were obtained from the Météo-France / CIRAD network. Textural information over urban areas was also extracted from the Pléiades mosaic. Corresponding textural indices highlight different district typologies based on spatial arrangements between buildings and vegetation. For each district, we analyzed the correlations between i) the number of potential observed breeding sites and ii) the mean values of textural and spectral indices, as well as the mean precipitation and annual temperature, through both univariate and multivariate analysis; the most significant variables were eventually combined using a generalized linear model. We found that the correlation between those combined variables and in situ data on breeding sites of *Ae. albopictus* is significant. This statistical relationship makes it possible to use earth observation environmental variables as predictors of the number of potential breeding sites for all areas in the island.

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Presenter (First Name, Last Name): Jonelle Campbell

Affiliation: Medical College of Wisconsin

Title: Associations among neighborhood green space, air pollution and sleep duration in children: Evidence from the Survey of the Health of Wisconsin

Abstract:

Introduction: Sleep plays an important role in child health and is affected by neighborhood physical and social environments. Neighborhood green space and air pollution have received little attention in relation to sleep among children. This study examined relationships between both neighborhood green space and air pollution ($PM_{2.5}$, O_3) and sleep duration in children.

Methods: Survey data was obtained from the Survey of the Health of Wisconsin (SHOW) database (n=482) and linked to air pollution data from EJSCREEN (2014-2016) and landcover data from the Wisconsin Department of Natural Resources (2010-2014). Participants included Wisconsin residents ages 3-17. Survey regression analysis was used to examine the relationship between green space (percent forested or grassland areas, in three equal interval categories), $PM_{2.5}$, and O_3 and the outcomes of healthy weekday and weekend sleep duration, as defined by the National Sleep Foundation, controlling for covariates.

Results: There is a small but significant relationship between percent green space as a continuous predictor and healthy weekday sleep duration (OR 1.011 [1.00, 1.02]) but not weekend sleep duration (OR 1.005 [0.99, 1.02]) in adjusted models. Fully adjusted models showed no statistically significant relationship between O_3 or $PM_{2.5}$ and weekday/weekend sleep duration.

Conclusions: Neighborhood green space may be associated with healthier weekday sleep duration in children and is one neighborhood level intervention that may be useful in ensuring that children meet daily sleep recommendations.