GEOMED
2019   GLASGOW

27th - 29th August 2019

Glasgow - Scotland

XI INTERNATIONAL, INTERDISCIPLINARY CONFERENCE ON SPATIAL STATISTICS, GEOGRAPHICAL EPIDEMIOLOGY AND GEOGRAPHICAL ASPECTS OF PUBLIC HEALTH.

University of Glasgow | School of Mathematics & Statistics

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Contents

Welcome to GEOMED 2019

GEOMED 2019 is the XI international, interdisciplinary conference on spatial statistics, geographical epidemiology and geographical aspects of public health. The conference aims to bring together statisticians, geographers, epidemiologists, computer scientists, and public health professionals to discuss methods of spatial analysis, as well as present and debate the results of such analyses. Previous GEOMED meetings have been held in:

1997 - Rostock, Germany.

1999 - Paris, France.

2001 - Paris, France.

2003 - Baltimore, USA.

2005 - Cambridge, England.

2009 - Charleston, USA.

2011 - Victoria, Canada.

2013 - Sheffield, England.

2015 - Florence, Italy.

2017 - Porto, Portugal.

We are delighted to welcome you to Glasgow for GEOMED 2019, which is the first GEOMED to be held in Scotland. The conference will be held in the University of Glasgow, which is located in the beautiful and vibrant west end of the city. We hope you enjoy the conference, the many sites that the city and surrounding area has to offer, and the famous Glasgow hospitality.

The organising committee - Duncan, Craig, Nema, Gary and Eilidh.

Sponsors
We are grateful to the following organisations for sponsoring the conference.

Organisation

The conference was a joint effort organised by many people.

Conference chair
Duncan Lee

Scientific committee
Renato Assunção
Veronica Berrocal
Annibale Biggeri
Marta Blangiardo
Annette ErsbØll
Sue Grady
Robert Haining
Andrew Lawson
Alastair Leyland
Ravi Maheswaran
Richard Mitchell
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Chris Robertson
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Organising committee
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Nema Dean
George Gerogiannis
Riham Hamza
Eilidh Jack
Lynsey-Anne Moffat
Sharon Mullen
Gary Napier
Yoana Napier
Kamol Sanittham
Michael Waltenberger
Xueqing Yin

Contact us
Email - stats-geomed@glasgow.ac.uk
Website - www.geomed2019.org.uk
Twitter - @GEOMED2019

Venues

Conference venue

All conference activities except the conference dinner will be held at the University of Glasgow, in the heart of the cities' west end. The conference is held in two buildings close to or on University Avenue (post code G12 8QQ), near the intersection with Byres road.

- **Wolfson Medical School building**

    - **Atrium (WMA)** is the foyer / entrance hall - lunches, tea / coffee breaks, poster sessions, and whisky tasting.
    - **Gannochy room (WMG)** - 1 of the parallel sessions.
    - **Yudowitz room (WMY)** - 1 of the parallel sessions.

- **Graham Kerr building (GK)** - room 224 on the ground floor. The plenary sessions and 1 of the parallel sessions.

Wolfson Medical School building

**Graham Kerr building**

Conference dinner

The conference dinner will be held in **Òran Mór** (https://oran-mor.co.uk), which is a converted church and only 5 minutes walk away from the conference venue.

Òran Mór
Top of Byres Road,
Glasgow,
G12 8QX.

A map of the west end of Glasgow with the 3 locations is shown below. The easiest way to get to the city centre is via the subway (underground train), and the nearest stop is Hillhead marked on the map below. It is a 15 minute trip to the city centre (either Buchanan Street or St Enoch stations).
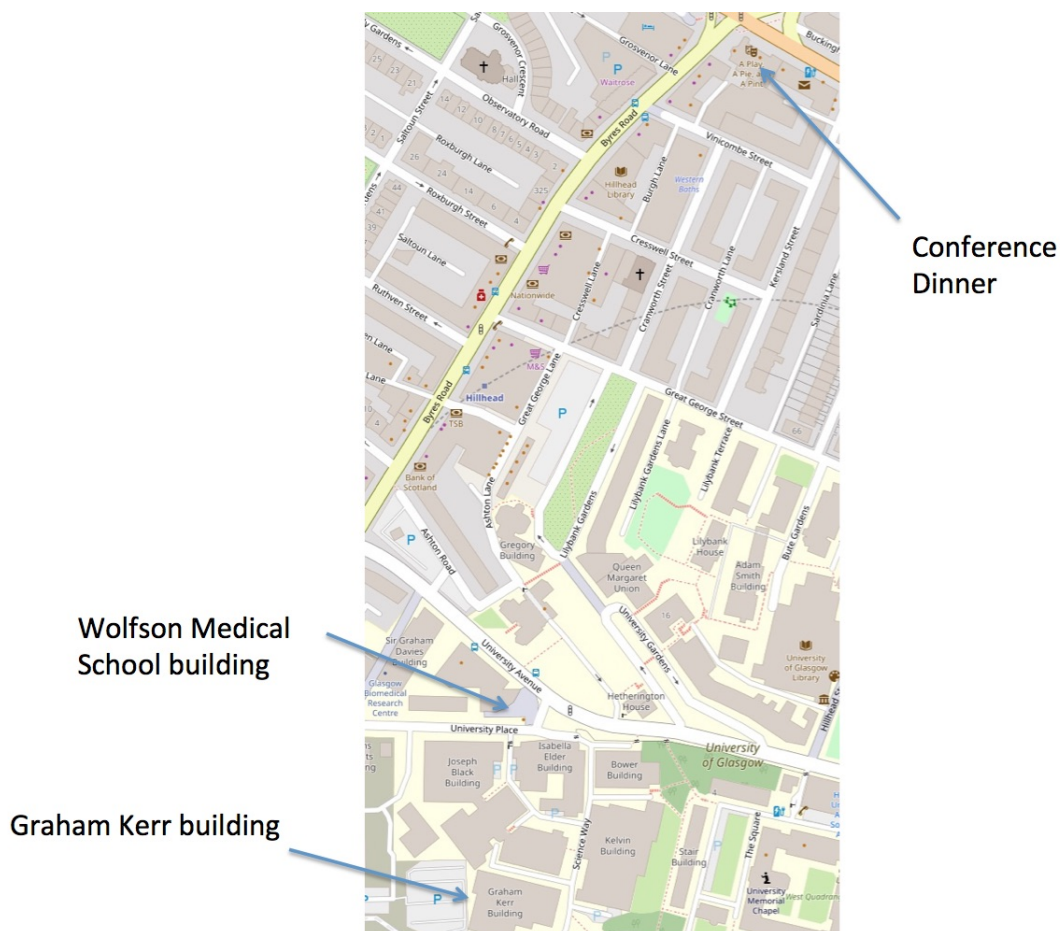
General information

Registration
Registration will take place in the Atrium (entrance hall) of the Wolfson Medical School building. The main registration sessions will be:

- Tuesday 27th August 8:30 - 9:00 and 12:50 - 13:40.

- Wednesday 28th August 8:30 - 9:00.

However, registration will be possible throughout the duration of the conference.

Name badges
Please ensure you wear your name badges you receive at registration for security and identification purposes throughout the conference.

Presentation instructions
Talks are 20 minutes long with an additional 5 minutes for questions. Please give your talk in PDF format to the conference team before your session. This can be done by either emailing your talk to stats-geomed@glasgow.ac.uk before the conference begins, or by bringing your talk to the registration desk on a pen drive where we will upload it onto a laptop for you. Please name the PDF file of your talk with your name in the format `firstname surname.pdf`.

Poster instructions
Poster boards (A1 in size) will be available in the atrium of the Wolfson Medical School building, and the poster sessions will be in the afternoon coffee breaks every day of the conference. Note, you will only display your poster at one of the three poster sessions, due to the number of posters being displayed. A list of which posters are in which session can be found at the end of this programme. Please make sure your posters are displayed by the lunch break on the day of your poster session, and are removed by the end of the day. Velcro fixings will be provided and no other fixings (e.g. drawing pins) can be used as this will damage the boards.

WI-FI
Free WI-FI will be available throughout the university conference venue. All delegates will be emailed their unique username and password for the `GUvisitor` network once they have registered. If you forget these details just ask one of our local organisers at the registration desk. Alternatively, `eduroam` is available throughout the university. See `https://www.eduroam.org` for details.

Meals and tea / coffee breaks
All lunches and tea / coffee breaks will be in the Atrium of the Wolfson Medical School building. If you have any dietary requirements or allergies then please mention this when you register for the conference.

Prizes
There will be a prizes for the best poster and the best student presentation, which will be voted on democratically. In your registration pack you will find a voting slip to fill in for each category. Once you have completed your voting slips please post them in the box at the registration desk in the atrium of the Wolfson Medical School

building. In the interests of fairness, please do not vote for somebody in your own institution.

Journal special issues

There will be the following special issues of journal publications that delegates of GEOMED 2019 can submit to.

- **Statistical Methods in Medical Research** - General GEOMED 2019 conference theme, contact Andrew Lawson and Craig Anderson.

- **Spatial and Spatio-temporal Epidemiology** - Themed special issue on "Infectious disease and disease surveillance", contact Andrew Lawson and Rob Deardon.

Social programme

The social programme has two main components:

- **Whisky tasting** - Join us for a traditional taste of Scotland, with a selection of fine Whisky's to try. The whisky tasting will be in the Atrium of the Wolfson Medical School building after the final invited sessions on Tuesday 27th August at 18:00. There will be a group photograph at 18:30.

- **Conference dinner** - The conference dinner will be held at **Òran Mór** on Wednesday 28th August at 19:00, and the location is shown on the map on the previous page. The conference dinner will be followed by a Ceilidh, traditional Scottish dancing.

Pre-conference workshops

There are two pre-conference workshops on the morning of Tuesday 27th August 2019, which will run from 9:00 to 12:50 with a coffee break in the middle. Each participant can only attend one workshop.

Workshop 1 - R and GIS, or R as GIS: handling and analysing spatial data

Professor Roger Bivand
Department of Economics,
Norwegian School of Economics.

    Workshop goal - Provide enough understanding of how spatial (and maybe spatio-temporal) data is (and will be) represented in R.

    First part - The representation of spatial and spatio-temporal data is important to its handling and preparation for analysis. While the sp package has provided legacy representations still used by many, the sf package introduces more modern spatial vector representations, and the stars package is moving towards a similar modernisation of raster array representations. As yet no replacement for the spacetime package has been proposed, although stars does reach out towards spatio-temporal data. The first session will also describe ongoing changes in external software used for representing spatial reference systems.

    Second part - GIS and R: bridges or R as GIS? The second session will present general principles of GIS in R - R as GIS is becoming more feasible as new contributed packages appear, and/or R bridges to GIS to permit GIS operations to be done in GIS but statistical operations in R. The session will conclude by presenting ongoing improvements in thematic maps in the tmap and cartography packages, and interactive mapping in mapview. The workshop material can be found at the link below.

```
https://github.com/rsbivand/geomed19-workshop
```

Workshop 2 - Spatial and Spatio-temporal Bayesian Models with R-INLA

Professor Marta Blangiardo
School of Public Health,
Imperial College London,

Dr Michela Cameletti
Department of Management, Economics and
Quantitative Methods,
University of Bergamo.

Workshop goal - Provide an introduction to the Integrated Nested Laplace Approximation approach (INLA) for the analysis of spatial and spatio-temporal data at the small area level.

First part - We will go through the basic of INLA for Bayesian inference and will then see how to model hierarchical structures, in particular focusing on spatially structured random effects through conditional autoregressive specifications; we will then extend the approach to include temporal dependency and touch briefly on spatio-temporal interactions.

Second part - After the coffee break participants will have the opportunity of running a tutorial on their computers, implementing some of the models seen in the first part of the workshop. It is recommended that people attending are familiar with R (https://www.r-project.org/) and with the basic of the Bayesian approach. It would be beneficial if attendees could bring their laptop with the latest version of R and INLA installed. The workshop material can be found at the link below.

```
https://github.com/martablangiardo/INLA-Workshop-Glasgow2019
```

Plenary lectures

There are 3 plenary lectures during the conference, which specialise in the fields of epidemiology, geography and statistics. Our three speakers are:

Professor Ana Diez Roux
Dornsife School of Public Health
Drexel University

Places and health: history, concepts, and emerging directions
This plenary will provide an overview of epidemiologic work on places and health over the past 25 years, identifying key conceptualizations, summarizing main methodologic approaches and their limitations, and identifying promising areas for future exploration. It will reflect on what we have learned, what questions remain unanswered, and what emerging areas present new opportunities for the field.

Professor Robert Haining
Department of Geography,
University of Cambridge

Spatial precision, statistical precision – having the best of both worlds
Developments in the collection, storage, retrieval and display of social, economic, health and environmental data enable us to observe and study our world in ever finer geographical detail. With increasing temporal frequency we are also better able to observe and measure changes taking place over short time spans. But to reap the benefits of spatial and spatial-temporal data precision we need to be able to obtain reliable estimates of attribute properties for these small spatial and spatial-temporal units. Unreliable estimation of variability associated with small area estimates undermines the benefits that can be derived from such data. The question is then: how can we have the best of both worlds – spatial and spatial-temporal precision and statistical precision?

This presentation will overview four main challenges in reaching this goal through data modelling: dependency, heterogeneity, data sparsity and uncertainty. We then discuss two modelling approaches - hierarchical modelling and spatial econometric modelling – and also consider the benefits of adopting a Bayesian (rather than frequentist) approach to inference. We conclude by looking briefly at some examples of both types of data modelling that illustrate some of the opportunities that arise in the areas of ecological modelling, infectious disease modelling and space-time disease forecasting.

Professor Peter Diggle
Centre for Health Informatics, Computing, and Statistics
Lancaster University

Design and Analysis of Elimination Surveys for Neglected Tropical Diseases

Neglected tropical diseases are "a diverse group of communicable diseases that prevail in tropical and subtropical conditions in 149 countries... Populations living in poverty, without adequate sanitation and in close contact with infectious vectors and domestic animals and livestock are those worst affected" (WHO web-site). International efforts to control these diseases have led to considerable reductions in prevalence to the point where, for many NTDs, their elimination as a public health problem has become a realistic proposition.

A strategy to confirm (or not) that elimination has been achieved requires consideration of (at least) the following issues.

1. What is the definition of elimination? Typically, this is that average prevalence over a defined geographical region, A, does not exceed a specified threshold, but other definitions are possible. For example, a low average prevalence could conceal isolated hot-spots of residual infection.

2. What is the appropriate choice for A? Typically, this will be an administrative region corresponding to a geographical unit on which a policy decision will be made (for example, cessation of mass treatment with prophylactic medication).

3. What level of uncertainty is acceptable to those responsible for making policy decisions? In low resource settings, where population-wide testing is impractical, some level of uncertainty is inevitable.

4. What data should be collected, and how should they be analysed?

In this talk, I will argue that the correct inferential framework for this problem is neither estimation nor testing, but rather prediction. This point of view leads to the following working definition of elimination, with obvious variations. Let $n(x)$ be the population density at location x and $p(x)$ the probability that an individual at x has the disease in question. The population-weighted average prevalence over A is

$$AP = \int_A p(x)dn(x),$$

and elimination is achieved if, given user-specified values for two positive constants, c and q,

$$\text{Prob}(AP < c) > q.$$

It follows that the goal of the study-design should be to deliver as tight as possible a predictive distribution for AP when its true value is close to c, subject to context-specific practical constraints. In my experience, this requires a statistical model for spatially referenced prevalence data that takes account of both measured covariate effects and unexplained stochastic spatial variation in $p(x)$.

Acknowledgement

Programme

Below is the scientific programme for the conference, which uses the following acronyms

WMA - Wolfson Medical School building Atrium - ground floor.

WMG - Wolfson Medical School building Gannochy room - ground floor.

WMY - Wolfson Medical School building Yudowitz room - ground floor.

GK - Graham Kerr building room 224 - ground floor.

Student presenters
So you know who is eligible to win the best student prize, all MSc / PhD students presenting have a ^{S} after their surname.

Key
^{C} - Contributed talk.
^{P} - Plenary talk.
^{S} - Student talk.
^{I} - Invited talk.
^{W} - Invited workshop.

Day 1 - 27th August 2019

8:30 - 9:00 - **Registration (WMA).**

9:00 -10:40 - **Workshops**

> **R and GIS, or R as GIS: handling and analysing spatial data (WMG)**
> Roger Bivand^W, Norwegian School of Economics

> **Spatial and Spatio-temporal Bayesian Models with R-INLA (WMY)**
> Marta Blangiardo^W, Imperial College London
> Michela Cameletti^W, University of Bergamo

10:40 - 11:10 - **Tea / Coffee break (WMA).**

11:10 -12:50 - **Workshops**

> **R and GIS, or R as GIS: handling and analysing spatial data (WMG)**
> Roger Bivand^W, Norwegian School of Economics

Spatial and Spatio-temporal Bayesian Models with R-INLA (WMY)
Marta Blangiardo[W], Imperial College London
Michela Cameletti[W], University of Bergamo

12:50 - 13:40 - Lunch and registration (WMA).

13:40 - 13:50 - Welcome to GEOMED 2019 (GK)
Duncan Lee, University of Glasgow

13:50 - 14:35 - Plenary lecture 1 (GK)
Chair - Marian Scott, University of Glasgow

Design and Analysis of Elimination Surveys for Neglected Tropical Diseases
Peter Diggle[P], Lancaster University

14:40 - 15:30 - Contributed sessions

Air pollution and health (GK)
Chair - Marcos Prates, Universidade Federal de Minas Gerais

14:40 - 15:05 Estimation of health co-benefits gained through the reduction of air pollution through the implementation of global climate mitigation commitments
Gavin Shaddick[C], University of Exeter

15:05 - 15:30 A multivariate hierarchical model for the use of polluting fuels for cooking
Oliver Stoner[C], University of Exeter

Spatial inequalities 1 (WMG)
Chair - Margherita Silan, University of Padua

14:40 - 15:05 Spatial variations and differences in incidence rates from 1986 to 2015 in atrial fibrillation and atrial flutter in Denmark
Kristine Bihrmann[C], University of Southern Denmark

15:05 - 15:30 Does survival after acute myocardial infarction depend on where you live?
Annette Ersbøll[C], University of Southern Denmark

Childhood ill health 1 (WMY)
    Chair - Michael Kramer, Emory University

14:40 - 15:05 A geospatial analysis of childhood immunisation and associated factors: a cross-sectional study in New Zealand
    Lukas Marek[C], University of Canterbury

15:05 - 15:30 Latent classes for meaningful chemical mixtures analyses in epidemiology: An example using phthalate and phenol exposure biomarkers in pregnant women
    Rachel Carroll[C], University of North Carolina at Wilmington

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15:30 - 16:10 - Tea / Coffee break and posters (WMA).

16:10 - 17:50 - Invited sessions

Spatio-temporal infectious disease modeling (GK)
    Chair - Chawarat Rotejanaprasert, Mahidol University

16:10 - 16:35 GEM: A domain-specific modelling language for rapid development of inference and simulation for epidemic models
    Chris Jewell[I], Lancaster University

16:35 - 17:00 Forecasting based on surveillance data
    Sebastian Meyer[I], University of Erlangen-Nuremberg

17:00 - 17:25 Identifying spatial dynamics of infectious disease spread via machine learning classifiers
    Rob Deardon[I], University of Calgary

17:25 - 17:50 Real Time Decision Making for Infectious Disease Outbreaks
    Will Probert[I], University of Oxford

Small area deprivation and health (WMG)
    Chair - Alastair Leyland, University of Glasgow

16:10 - 16:35 Inequalities in mortality in Scotland: what happens when we change the level of geography used to assess area deprivation?
    Denise Brown[I], University of Glasgow

16:35 - 17:00 Using the NZ Index of Multiple Deprivation (IMD) to inform research, policy and populations
    Daniel Exeter[I], University of Auckland

17:00 - 17:25 Creating a small area deprivation index for Brazil to assess inequalities in mortality
    Elzo Júnior[I], Center for Data Integration and Health Knowledge

17:25 - 17:50 Exploring patterns of association between Experian's Mosaic classification and all-cause mortality in England: implications for further research
Welcome Wami[I], University of Glasgow

Spatial and temporal epidemiology across the lifecourse I (WMY)
Chair - Jamie Pearce, University of Edinburgh

16:10 - 16:35 Historical Air Pollution and Brain Health: Life Course Epidemiology Insights from the Lothian Birth Cohort 1936
Tom Russ[I], University of Edinburgh

16:35 - 17:00 Greenspace and mental wellbeing: a study of residential relocation among mid-older aged adults
Alison Carver[I], Australian Catholic University

17:00 - 17:25 Is the association between the density of fast food outlets and obesity confounded by socioeconomic context? A longitudinal analysis of children in the Millennium Cohort Study
Mark Green[I], University of Liverpool

17:25 - 17:50 Recent rises buck long-term reductions in subnational Infant Mortality Rates: UK 1981 to 2017
Paul Norman[I], University of Leeds

18:00 - 19:00 - Whisky tasting (WMA) and group photo.

Day 2 - 28th August 2019

8:30 - 9:00 - **Registration (WMA).**

9:00 - 10:40 - **Invited sessions**

Learning from aggregated spatial epidemiological and survey data (GK)
Chair - Nema Dean, University of Glasgow.

9:00 - 9:25 Ecological inference for infectious disease data, with application to vaccination strategies
Leigh Fisher[I], Fred Hutchinson Cancer Research center

9:25 - 9:50 Bayesian spatial smoothing methods for analysis of spatial survey data
Christel Faes[I], Hasselt University

9:50 - 10:15 Accounting for survey design in Bayesian disaggregation of survey-based areal estimates of proportions
Marco H. Benedetti[SI], University of Michigan

10:15 -10:40 Pseudo-continuous spatial inference from aggregated disease count data
Duncan Lee[I], University of Glasgow

Public health spatial epidemiology (WMG)
Chair - Chris Robertson, University of Strathclyde

9:00 - 9:25 An epidemiological risk assessment for arsenic in private water supplies based on geology
Helen Crabbe[I], Public Health England

9:25 - 9:50 Investigating the variation of antibiotic prescribing rates between NHS Scotland health-boards and GP practices through the use of maps, principal components and spatial analysis
Florence Tydeman[SI], University of Strathclyde

9:50 - 10:15 Estimating the impact of air pollution in Scotland and potential benefits of pollutant concentration reductions
Colin Ramsay[I], Health Protection Scotland

10:15 -10:40 Public Health Applications of a Bayesian space–time model for clustering areal units based on their disease trends
Chris Robertson[I], University of Strathclyde

Spatial and temporal epidemiology across the lifecourse II (WMY)
Chair - Jamie Pearce, University of Edinburgh

9:00 - 9:25 Life course neighbourhood deprivation effects on body mass index: quantifying the importance of selective migration.
Paul Norman[I], University Leeds (on behalf of Emily Murray)

9:25 - 9:50 Illness and the lifecourse: does the relationship vary by cohort?
Lucy Prior[SI], University of Bristol

9:50 - 10:15 A longitudinal analysis of police-recorded crime and mental health in Scotland
Gergő Baranyi[SI], University of Edinburgh

10:15 - 10:40 Exposure to air pollution in early life and cognitive ability: a prospective 1936 birth cohort
Chris Dibben[I], University of Edinburgh

10:40 - 11:10 - Tea / Coffee break (WMA).

11:10 - 12:50 - Invited sessions

Spatial statistics and the new digital data collection technologies (GK)
Chair - Renato Assunção, Universidade Federal de Minas gerais

11:10 - 11:35 The Australian Cancer Atlas: mapping reliable small-area estimates of cancer incidence and survival
Earl Duncan[I], Queensland University of Technology

11:35 - 12:00 Alleviating spatial confounding for areal data problems by displacing the geographical centroids
Marcos Prates[I], Universidade Federal de Minas Gerais

12:00 - 12:25 Projection-based Methods for Fitting Spatial Generalized Linear Mixed Models
Murali Haran[I], Penn State University

12:25 -12:50 Univariate and Multivariate Directed Acyclic Graphical Models for Disease Mapping
Sudipto Banerjee[I], University of California Los Angeles

Geostatistical methods for global health (WMG)
Chair - Annibale Biggeri, University of Florence

11:10 - 11:35 A geostatistical framework for combining spatially referenced prevalence data from multiple diagnostics
Benjamin Amoah[SI], Lancaster University

11:35 - 12:00 Reconciling health facility case counts of malarial fevers with parasite prevalence survey data via Bayesian hierarchical modelling
Ewan Cameron[I], Oxford University

12:00 - 12:25 Spatio-temporal Geostatistical Modelling to jointly Predict Exposure and Disease
Giorgia Stoppa[I], University of Florence

12:25 -12:50 Spatiotemporal geostatistical preferential sampling modelling for exposure assessment in epidemiological cohort study on air pollution and maternal health
Annibale Biggeri[I], University of Florence

GIS and Public Health (WMY)
Chair - Bob Haining, University of Cambridge

11:10 - 11:35 Measuring the Access to Healthy Assets and Hazards for Great Britain
Konstantinos Daras[I], University of Liverpool

11:35 - 12:00 Developing a locally adaptive spatial multi-level logistic model to analyse ecological effects on health
Guanpeng (Gavin) Dong[I], University of Liverpool

12:00 - 12:25 Exploring spatial patterns of greenspace use derived from GPS data from a mobile phone app
Paul Brindley[I], University of Sheffield

12:25 -12:50 Alcohol outlet density and alcohol-related hospital admissions in England
Ravi Maheswaran[I], University of Sheffield

12:50 - 13:50 - Lunch (WMA).
The editorial board meeting for Spatial and Spatio-Temporal Epidemiology will take place between 13:00 - 13:50 in the Hugh Fraser room in the Wolfson Medical School building.

13:50 - 14:35 - Plenary lecture 2 (GK)
Chair - Andrew Lawson, Medical University of South Carolina

Places and health: history, concepts, and emerging directions
Ana Diez Roux[P], Drexel University

14:40 - 15:30 - Contributed sessions

Spatio-temporal clustering (GK)
Chair - Rachel Lowe, London School of Hygiene & Tropical Medicine

14:40 - 15:05 Spatial scan statistics can be dangerous
Toshiro Tango[C], Center for Medical Statistics, Japan & Teikyo University

15:05 - 15:30 Detecting Spatial Clusters of Disease Infection Risk Using Sparsely Sampled Social Media Mobility Patterns
Renato Assunção[C], Universidade Federal de Minas Gerais

Spatio-temporal variation in mental health (WMG)
Chair - Alison Carver, Australian Catholic University

14:40 - 15:05 Do spatiotemporal social fragmentation and deprivation affect suicide risk? A Dutch register-based case-control study
Paulien Hagedoorn[C], Utrecht University

15:05 - 15:30 Development of the Australian Neighbourhood Social Fragmentation Index and its association with spatial variation in depression across communities
Nasser Bagheri[C], The Australian National University

Childhood ill health 2 (WMY)
Chair - Annette Annette Ersbøll, University of Southern Denmark

14:40 - 15:05 Spatial distribution of wasting, stunting, and underweight among children aged 5 and under in Kenya: A shared components modelling approach
Thomas Achia[C], University of the Witwatersrand

15:05 - 15:30 Estimating under-five mortality and the coverage of health service provision in Kenya: A subnational spatio-temporal analysis, 1965-2015
Peter M Macharia[SC], KEMRI Wellcome Trust Research programme, Nairobi

15:30 - 16:10 - Tea / Coffee break and posters (WMA).

16:10 - 17:50 - Invited sessions

Spatial modelling of health in Scotland (GK)
Chair - Nema Dean, University of Glasgow

16:10 - 16:35 Spatial clustering of risks in disease mapping
Craig Anderson[I], University of Glasgow

16:35 - 17:00 A multivariate space-time model for trend examination and prediction of acute respiratory infection
Gary Napier[I], University of Glasgow

17:00 - 17:25 Grid square level inference in Bayesian disease mapping
Kamol Sanittham[SI], University of Glasgow

17:25 - 17:50 Estimating the changing nature of Scotland's health inequalities using a multivariate spatio-temporal model
Eilidh Jack[I], University of Glasgow

Modelling and inference in environmental epidemiology (WMG)
Chair - Theresa Smith, University of Bath

16:10 - 16:35 Using propensity score to adjust for residual confounding in area-referenced environmental health studies
Monica Pirani[I], Imperial College London

16:35 - 17:00 Daily mortality and air quality: using multivariate time series with seasonally-varying covariances
Guowen Huang[I], University of Toronto

17:00 - 17:25 Data integration for high-resolution, continental-scale estimation of air pollution concentrations
Matt Thomas[SI], University of Bath

17:25 - 17:50 Mapping 'Rattiness' to understand leptospirosis transmission in Salvador, Brazil: A geostatistical modelling approach to combining three rat metrics.
Max Eyre[SI], Lancaster University

Spatial and temporal epidemiology across the lifecourse III (WMY)
Chair - Jamie Pearce, University of Edinburgh

16:10 - 16:35 Detecting time-series horizontal and vertical building density at neighbourhood scales with open access remote sensing data
Tzu-Hsin Karen Chen[SI], Aarhus University

16:35 - 17:00 The great recession, austerity and mental health in Scotland: moderating roles of green space and social cohesion
Mark Cherrie[I], University of Edinburgh

17:00 - 17:25 The effect of neighbourhood crime and deprivation on pregnancy outcomes. A quasi-experimental study using routine administrative records
Tom Clemens[I], University of Edinburgh

17:25 - 17:50 To what extent do Green and Blue Spaces improve our mental health and wellbeing?
Amy Mizen[I], Swansea University

19:00 - late - Conference dinner and Ceilidh

Day 3 - 29th August 2019

9:00 - 10:40 - Invited sessions

On disease mapping: modelling and fitting techniques (GK)
Chair - Maria Dolores Ugarte, Universidad Publica de Navarra

9:00 - 9:25 Disease mapping using complex survey data
Geir-Arne Fuglstad[I], Norwegian University of Science and Technology

9:25 - 9:50 Disease risk estimation in small areas exploiting the underlying clustering structure of the data
Guzman Santafe[I], Universidad Publica de Navarra

9:50 - 10:15 Trends in Tract-Level Obesity Rates in Philadelphia by Race/Ethnicity, Space, and Time
Harrison Quick[I], Drexel University

10:15 -10:40 Spatial Smoothing in Stan: insights from implementations of the ICAR prior and the BYM2 model
Mitzi Morris[I], Columbia University

Mapping zoonotic vectors for public health (WMG)
Chair - George Gunn, Scotland's Rural College

9:00 - 9:25 What information do we need to model the spatial distribution of zoonotic vectors
William Wint[I], Environmental Research Group Oxford

9:25 - 9:50 Field Sampling strategy for spatial distribution modelling
Cedric Marsboom[I], AVIA-GIS

9:50 - 10:15 Modelling spatial distribution of ticks in Scotland
Rita Ribeiro[SI], Scotland's Rural College

10:15 -10:40 Predicting tsetse abundance: remote sensing and the impact of insecticide treated cattle in Tanzania
Rachel Lea[SI], Liverpool School of Tropical Medicine

Application of geospatial technologies in health geography and spatial epidemiology (WMY)
Chair - Sue C. Grady, Michigan State University

9:00 - 9:25 From spatial data to health action: The March of Dimes Geo-Equity App
Michael Kramer[I], Emory University

9:25 - 9:50 Maternal and Infant Health in Central-Michigan: Environmental Investigation of Industrial Emitted Neurotoxins on Adverse Birth Outcomes
Amanda Kreuze[SI], Michigan State University

9:50 - 10:15 Environmental Health: A LiDAR Assessment of Urban Neighbourhoods
Sue C. Grady[I], Michigan State University

10:15 -10:40 Utilising an 'adaptive raster' approach to reduce uncertainty in sub-national c-section estimates in Tanzania, 2015
Corrine Warren Ruktanonchai[SC], University of Southampton

10:40 - 11:10 - Tea / Coffee break (WMA).

11:10 - 12:50 - Invited / Contributed sessions

Statistical advances in environmental epidemiology (Invited, GK)
Chair - Marta Blangiardo, Imperial College London

11:10 - 11:35 Mitigating the effects of preferentially selected pollution monitoring sites for inference on population health
Joe Watson[SI], University of British Columbia

11:35 - 12:00 Mapping vaccination coverage rates at high resolution to explore the effects of delivery mechanisms
Chigozie Edson Utazi[I], University of Southampton

12:00 - 12:25 Mapping Trypansoma cruzi infection prevalence
Andre Python[I], University of Oxford

12:25 -12:50 Spatio-temporal two-stage models for environmental research
Antonio Gasparrini[I], London School of Hygiene and Tropical Medicine

Infectious disease 1 (WMG)
Chair - Kathryn Hacker, University of Pennsylvania

11:10 - 11:35 Spatio-temporal modeling of neighborhood level risks for dengue, chikungunya, and Zika in Cali, Colombia
Michael R. Desjardins[SC], University of North Carolina at Charlotte

11:35 - 12:00 A coupled model framework to detect nonlinear and delayed impacts of climate on dengue risk
Rachel Lowe[C], London School of Hygiene & Tropical Medicine

12:00 - 12:25 Environmental change and socio-political drivers of malaria risk in El Oro province, Ecuador
Isabel Fletcher[SC], London School of Hygiene & Tropical Medicine

12:25 -12:50 Mapping environmental receptivity to dengue and chikungunya
Claudia Torres Codeço[C], Fundação Oswaldo Cruz

Spatial epidemiology (WMY)

Chair - Russell Kirby, University of South Florida

11:10 - 11:35 Association between low-level arsenic concentration in drinking water and incidence rate of stroke
Annette Ersbøll[C], University of Southern Denmark

11:35 - 12:00 Distance sampling for epidemiology: estimating under-reporting of cases from clinic data
Luca Nelli[C], University of Glasgow

12:00 - 12:25 When theory and practice collide: A study of ground ambulance bases in Southern Norway
Jo Røislien[C], University of Stavanger

12:25 -12:50 A bayesian factor model for spatial panel data
Maura Mezzetti[C], Università Tor Vergata

12:50 - 13:40 - Lunch (WMA).

13:40 - 15:20 - Invited sessions

Spatio-temporal disease surveillance (GK)

Chair - Andrew Lawson, Medical University of South Carolina

13:40 - 14:05 A spatio-temporal hierarchical Markov switching model for the early detection of influenza outbreaks
David Conesa[I], University of Valencia

14:05 - 14:30 Geographically-dependent individual-level models (GD-ILMs) for infectious diseases transmission
MD Mahsin[SI], University of Calgary

14:30 - 14:55 Distributed lagged modelling for spatio-temporal areal data with excessive zeros
Chawarat Rotejanaprasert[I], Mahidol University

14:55 -15:20 Spatial tracking of the current Ebola outbreak in Congo
Ashok Krishnamurthy[I], Mount Royal University

Urban Health (WMG)

Chair - Eilidh Jack, University of Glasgow

13:40 - 14:05 Urbanization and health in Latin America: the SALUR-BAL Study
Ana Diez Roux[I], Drexel University

14:05 - 14:30 Household survey on influenza-like illness and health related behaviour in urban quarters of Basel, Switzerland
Nina Goldman[SI], University of Basel

14:30 - 14:55 Mental wellbeing of older urban residents: the MINDMAP project
Frank J. van Lenthe[I], Utrecht University

14:55 -15:20 Neighbourhoods, selection bias and the MARMoT approach to compare unbalanced groups
Margherita Silan[C], University of Padua

Spatial mobility and simulation; new tools for understanding how environment affects health (WMY)
Chair - Richard Mitchell, University of Glasgow

13:40 - 14:05 Relationships between individual and urban characteristics and mobility for 122 individuals living in Antwerp, Barcelona and London
Jonathan Olsen[I], University of Glasgow

14:05 - 14:30 The relationship between children's objectively measured time spent outdoors, contact with nature, and emotional and behavioural resilience
Paul McCrorie[I], University of Glasgow

14:30 - 14:55 The influence of space and social mix on patterns of urban green space usage. An Agent-based model
Stefano Picascia[I], University of Glasgow

14:55 -15:20 Using an agent-based model to investigate the impact of neighbourhood settings on children's physical activities
Jonatan Almagor[I], University of Glasgow

15:20 - 16:00 - Tea / Coffee break and posters (WMA).

16:00 - 16:50 - Contributed sessions

Statistical methods for infectious disease (GK)
Chair - Marco H. Benedetti, University of Michigan

16:00 - 16:25 Outfoxing rabies: a case study for fitting non-separable space-time log-Gaussian Cox models using R-INLA
Laurie Baker[C], University of Glasgow

16:25 - 16:50 Computational approaches to Bayesian Spatio-Temporal Surveillance of small area health data
Andrew Lawson[C], Medical University of South Carolina

Infectious disease 2 (WMG)
Chair - Chawarat Rotejanaprasert, Mahidol University

16:00 - 16:25 Estimating the spread of tick-borne encephalitis virus in ticks and hosts
Melanie Walter[C], University of Veterinary Medicine Vienna

16:25 - 16:50 Mapping the burden of dengue in Indonesia to guide future Wolbachia programmes
Oliver J Brady[C], London School of Hygiene & Tropical Medicine, London

Spatial inequalities 2 (WMY)
Chair - Rachel Carroll, University of North Carolina at Wilmington

16:00 - 16:25 Antibiotic Prescribing Patterns in General Medical Practices in England: Does Area matter?
Anna Molter[C], University of Manchester

16:25 - 16:50 Evaluation of spatial and spatio-temporal variation in distribution and determinants of female genital cutting among girls aged 0-14 years in Nigeria, 2003-2017
Glory Atilola[C], Northumbria University

16:55 - 17:40 - Plenary lecture 3 (GK)
Chair - Ravi Maheswaran, University of Sheffield

Spatial precision, statistical precision – having the best of both worlds
Robert Haining[P], University of Cambridge

17:40 - 18:00 - Awards and introducing GEOMED 2021 (GK)
Duncan Lee, University of Glasgow

List of posters

Below is a list of the posters being exhibited on each day of the conference.

Session 1 - Tuesday 27th August 15:30pm - 16:10pm

1. **Simulating spatial distribution of Dengue in Rio de Janeiro using a SIR model coupled to environmental forcing**
   Leon Diniz Alves, Fundação Getúlio Vargas

2. **Risk maps, spatial coverage and incentives: An innovative approach for Chagas disease surveillance**
   Claudia Arévalo-Nieto, Universidad Peruana Cayetano Heredia

3. **Skin cancer geography in Germany**
   Jobst Augustin, University Medical Center Hamburg-Eppendorf

4. **Random Tree Boosting for Automated Regionalization of Disease Patterns**
   Mark Janikas, ESRI

5. **Multivariate Space-Time Disease Mapping via Nonparametric Exploration of Disease Risk**
   Daniel Baer, Medical University of South Carolina

6. **Health and mobility: exploring access to primary health care through mobile medical clinics in rural Honduras**
   Liam Barrett, NHS and Lancaster University

7. **Multivariate modelling of geographical differences in three cardiovascular diseases**
   Kristine Bihrmann, University of Southern Denmark

8. **Population mapping and estimation for more targeted vaccination campaigns in the Democratic Republic of Congo**
   Gianluca Boo, University of Southampton

9. **Predicting the TBE and Lyme borreliosis vector Ixodes ricinus in space and time**
   Katharina Brugge, University of Veterinary Medicine Vienna

10. **MU-MAP (Managing Uncertainties in Modelling Air Pollution)**
    David Cameron, Centre for Ecology and Hydrology

11. **Spatial inequalities of food retail in the municipality of Rio De Janeiro**
    Leticia Cardoso, Fundação Oswaldo Cruz

12. **An analysis of event impact across multiple cancers: Accessing spatio-temporal variation in cancer-specific mortality for Louisiana SEER data**
    Rachel Carroll, University of North Carolina at Wilmington

13. **Detecting spatio-temporal hotspots of scarlet fever in Taiwan with spatio-temporal Gi* statistic**
    Ta-Chien Chan, Academia Sinica

14. **Geostatistical analysis of Malawi's changing malaria transmission from 2010 to 2017**
    Michael Give Chipeta, University of Oxford

15. **Bayesian Spatio-temporal SIR model for Epidemic data in Korea**
    Jungsoon Choi, Hanyang University

16. **Mobile population and risk of malaria in the Amazon Basin**
    Claudia Torres Codeço, Fundação Oswaldo Cruz

17. **Evaluating dengue forecasting model to predict Zika and Chikungunya in Brazil**
    Flávio Codeço Coelho, Fundação Getulio Vargas

18. **Assessing Spatial Variation in Cognitive Health in Relation to Neighborhood Environment**
    Anne E Corrigan, Johns Hopkins Bloomberg

19. **Spatial sampling in the absence of a national census**
    Édith Darin, University of Southampton

20. **Bayesian spatial modelling and prediction of terrestrial background radiation in Switzerland**
    Christophe Folly, University of Bern

21. **Transmission of multidrug resistant tuberculosis in Shanghai: a population-based study**
    Erjia Ge, University of Toronto

22. **Social and physical geographies of children's neighbourhood mobility: Findings from Neighbourhoods for Active Kids**
    Melody Smith, University of Auckland

Session 2 - Wednesday 28th August 15:30pm - 16:10pm

23. **Methodological considerations in constructing a space-time model of asthma emergency department risk: a case study in South Carolina 1999-2015**
Matthew Bozigar, Medical University of South Carolina

24. **Web data mining: validity of a new tool for food retail data – First results from Rio de Janeiro, Brazil**
Leticia Cardoso, Fundação Oswaldo Cruz

25. **New guidance for investigating non-infectious disease clusters from potential environmental causes**
Helen Crabbe, Public Health England

26. **Floods and Leptospirosis in Brazilian Municipalities – 2003 to 2013**
Renata Gracie, Oswaldo Cruz Foundation-Fiocruz

27. **Surveillance of the emergence of anthelmintic resistance in human population with soil-transmitted helminths in southern Mozambique**
Berta Grau-Pujol, Barcelona Institute for Global Health

28. **Mapping the Effects of Bed Bug Policy in New York City**
Kathryn Hacker, University of Pennsylvania

29. **Comparing spatio-temporal methods of non-communicable disease surveillance**
Mico Hamlyn, Imperial College London

30. **E-cigarette and Menthol Use Disparities between San Francisco Bay Area Young Adults Living in Cities with and without Flavored Tobacco Sales Restrictions**
Louisa M. Holmes, Binghamton University

31. **Malaria resurgence and illegal gold mining activities in the state of Bolivar, Venezuela**
Christopher Jarvis, London School of Hygiene & Tropical Medicine

32. **Subnational disparities on immunization coverage and spatial access to immunizing facilities in Kenya**
Noel Kanini Joseph, KEMRI-Wellcome Trust Research Programme, Nairobi

33. **Bayesian spatio-temporal boundary detection methods for disease mapping**
Dayun Kang, Hanyang University

34. **Bayesian Inference for Crime Incidence in the USA**
Nadeen Khaleel, University of Bath

35. **Investigation of the environmental connection between cattle and human EHEC cases**
Hyeyoung Kim, National Veterinary Institute

36. **Regional health care and demographic change in Germany**
Anne Kis, University Medical Center Hamburg-Eppendorf

37. **Temporal Associations of Determinants on Cardiovascular and Respiratory Emergency Department Visits**
Anne Krefis, University Medical Center Hamburg-Eppendorf

38. **Adjusted, non-Euclidean cluster detection of Vibrio parahaemolyticus in the Chesapeake Bay**
Anton Kvit, Johns Hopkins Bloomberg

39. **Onde é o garimpo? A mobile application to map cases of malaria on clandestine gold mining sites in French Guiana**
Yann Lambert, Centre d'Investigation Clinique Antilles-Guyane

40. **Bayesian Spatial Analysis of Drug Mortality Rates in Virginia**
Jong Hyung Lee, Virginia Commonwealth University

41. **The role of climate, cities and connectivity in the spread of mosquito-borne diseases in Brazil**
Sophie Lee, London School of Hygiene and Tropical Medicine

42. **Spatial models for infants HIV/AIDS incidence using an integrated nested laplace approximation approach**
Susan Nzula, Strathmore University

Session 3 - Thursday 29th August 15:20pm - 16:00pm

43. **The Eco-epidemiology of leptospirosis: mapping spill-over infection in complex environments**
    Kathryn Hacker, University of Pennsylvania

44. **Detecting Local Clusters of Childhood Malnutrition in the Island Province of Marinduque, Philippines**
    Novee Lor C. Leyso, University of the Philippines Manila

45. **Survivable road-trauma resulting in a pre-hospital death: a geospatial examination of access to timely advanced trauma care in New Zealand, 2009-2012**
    Rebbecca Lilley, University of Otago

46. **Tuberculosis and its socioeconomic determinants in Rio de Janeiro: a study applying Geographically Weighted Regression**
    Mônica de Avelar Figueiredo Mafra Magalhães, Oswaldo Cruz Foundation

47. **MUsing nationwide linked microdata to examine the effect of transience on the long-term health conditions and health services utilisation**
    Lukas Marek, University of Canterbury

48. **Burn the clipboard: Using a mobile app to bring site evaluation into the digital era**
    Anna Mölter, University of Manchester

49. **Comparison of machine learning and geostatistical models in regions of low malaria risk using a combination of point surveys and aggregated surveillance data**
    Anita Nandi, University of Oxford

50. **Short-term spatial forecasting to aid the elimination of Visceral Leishmaniasis in India**
    Emily Nightingale, London School of Hygiene & Tropical Medicine

51. **Timely access to emergency services in Brazil**
    Ricardo Antunes Dantas de Oliveira, Oswaldo Cruz Foundation

52. **Classifying areas into hot/coldspots and studying the temporal dynamic of these areas within each risk category: A Bayesian two stage method applied to severe malaria in Burkina Faso**
    Mady Ouédraogo, Université libre de Bruxelles

53. **Measuring spatiotemporal dependence of disease using the tau and phi statistics: a literature review, normative commentary and new avenues**
    Timothy Pollington, University of Warwick

54. **Use of Spatial Analysis to Assess Seasonal Differences of Access to Care in Rural Zambia**
    Timothy Shields, Johns Hopkins Bloomberg

55. **District vulnerability to extreme heat temperatures in Mainland Portugal**
    Susana Pereira da Silva, Nacional de Saúde Doutor Ricardo Jorge

56. **Colorectal cancer survival in England and Wales by socio-economic status and area deprivation**
    Charlotte Sturley, University of Leeds

57. **Association between magnesium in drinking water and cardiovascular mortality**
    Charlotte Friis Theisen, University of Southern Denmark

58. **Using related parent-child data to examine associations between childhood, parental and environmental characteristics and childhood obesity**
    Melanie Tomintz, University of Canterbury

59. **Prevalence and geographical variation of dementia in New Zealand from 2012-2015: utilising big data within the Integrated Data Infrastructure**
    Katherine Walesby, University of Edinburgh

60. **Spatial clustering of suicide death rate in Kanagawa prefecture, Japan**
    Kazue Yamaoka, Teikyo University

61. **Patient's willingness to bypass the nearest physician – Findings from outpatient dermatological care in Germany**
    Nicole Zander, University Medical Center Hamburg-Eppendorf