University of Pavia

Department of Brain and Behavioral Sciences

CAUSAL INFERENCE
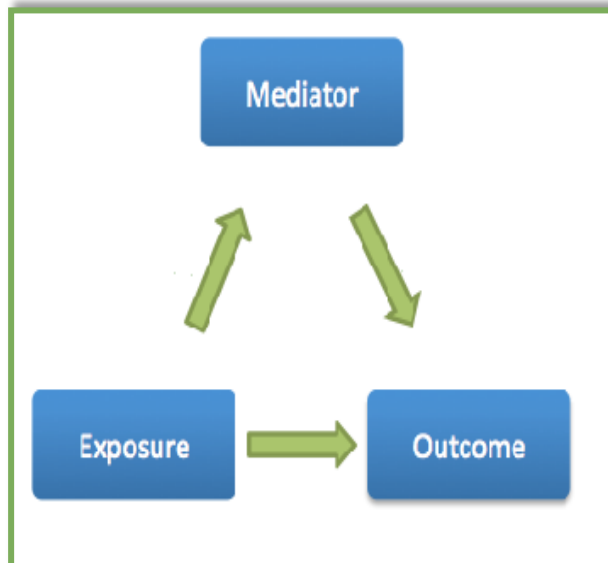
Pavia, 7-10 May 2018

Prof. Stijn Vansteelandt
Ghent University
Prof. Carlo Berzuini
University of Manchester
Dr. Wen Wei Loh
Ghent University

Professor Stijn Vansteelandt, Ghent University

Stijn Vansteelandt is Professor of Statistics at Ghent University, and Professor of Statistical Methodology at the London School of Hygiene and Tropical Medicine. He did postdoctoral research at the Harvard School of Public Health and Ghent University. He is a leading expert in causal inference: a fast-growing field within statistics, which focuses on the development of statistical methods for inferring the causal effect of an exposure on an outcome from experimental and observational data under minimal and well-understood assumptions. He has authored over 140 peer-reviewed publications in international journals on a variety of topics in biostatistics, epidemiology and medicine, such as the analysis of longitudinal and clustered data, missing data, mediation and moderation/interaction, instrumental variables, family-based genetic association studies, analysis of outcome-dependent samples and phylogenetic inference. He is Co-Editor of Biometrics, the flagship journal of the International Biometric Society, and has previously served on the editorial boards of Biometrics (2006-2012), Biostatistics (2010-2015), Epidemiological Methods (2011-2015), Journal of Causal Inference (2011-2015), and Epidemiology (2013-2015)

Professor Carlo Berzuini, University of Manchester

Carlo Berzuini has been Professor of Biostatistics at the University of Pavia (1983-2008), Italy, Research Project PI at the Faculty of Mathematics of the University of Cambridge (2009-2011), UK, and is currently holding the Chair in Biostatistics at the University of Manchester (2011-), UK. He has also worked at Cambridge's MRC Biostatistics Unit. He is responsible for important methodological developments in Bayesian inference, as a pioneer of particle-based Markov chain Monte Carlo (MCMC) methods for real time inference, and of the first (1996) practical method for a joint analysis of longitudinal and event history data. He has introduced Bayesian MCMC approaches in the field of disease monitoring and prediction. He also worked in Statistical Genetics, Neuroscience and Computational Biology, and is a leading expert in Causal Inference, with notable contributions in Causative Interaction, Mediation and Bayesian Mendelian Randomization. In 2009 he co-organized (jointly with A.P. Dawid and L. Bernardinelli) a landmark international conference on Causal Inference, in Cambridge, and lead-edited for Wiley the landmark book on Statistical Causality that took inspiration from that historical meeting. He has a strong record of interdisciplinary research in a wide spectrum of substantive areas, and in 2014 his collaboration with Cambridge Abcodia Ltd for developing a biomarker-based approach to early diagnosis of pancreatic cancer earned him a Horizon 2020 nomination. He counts about 130 peer-reviewed papers. He has participated with PI capacity in European Research Projects.

Wen Wei Loh, Post-doc Research Associate, Ghent University

Wen Wei's research focuses on developing statistical methods for inferring causal effects in applications motivated by behavioral and social sciences. His primary interests are in mediation analyses and in randomization-based approaches for randomized studies. He has presented at statistics, biostatistics, machine learning, and psychology conferences, and has given invited talks at biostatistics, epidemiology and machine learning seminars. Wen Wei is a postdoctoral research fellow in the Department of Data Analysis at Ghent University in Belgium. He was previously a Biostatistics postdoctoral research fellow at the University of North Carolina Chapel Hill. He received his PhD in Statistics from University of Washington and MA in Statistics from Harvard University.

Within fields spanning drug testing, epidemiology and social sciences, researchers are often faced with the challenge of assessing the effect of an exposure on an outcome. Standard statistical methods are commonly used for this purpose, but often not targeted towards the causal question of interest, or even misleading. In this course we will introduce modern causal inference theory to infer causal effects from data.

The course will in particular introduce popular tools such as causal diagrams, standardisation, propensity score methods, and mediation analysis for inferring causal pathways. All theoretical concepts will be set into the context of real life research problems, taken from medicine, epidemiology and the social sciences. Exercise sessions in R throughout the course will ensure that participants actively use the just taught concepts.

Program

DAY 1

- Introduction to causal inference
- Causal diagrams
- Counterfactuals and effect measures
- Regression and standardisation
- **PC lab**

DAY 2

- Limitations of standard regression methods
- Propensity scores
- Subclassification and matching
- Regression adjustment for the propensity score
- Inverse probability weighting
- **PC Lab**

DAY 3

- Introduction to mediation analysis
- Natural direct and indirect effects
- Single and multiple mediator studies
- **PC Lab**

DAY 4

- The Instrumental Variable estimator
- Mendelian Randomisation assumptions
- Existing frequentist approaches (Egger regression and median estimators) to Mendelian Randomisation with multiple instruments
- Estimation from individual-level data and from summary statistics.
- Two sample approaches. Incorporating information from eQTL databases.
- A Bayesian approach to Mendelian Randomisation.

REGISTRATION FEES

Academic	€ 300,00
Student	€ 200,00
Non Academic	€ 400,00

Deadline for sending application 2 May 2018

Venue
Department of Brain and Behavioral Science, Cascina Cravino, via Bassi, 21. University of Pavia, Italy

Secretary
Dr. Gianfranca Corbellini,
Department of Brain and Behavioral Science.
University of Pavia, Italy
Telephone : 0382 987526
Fax: 0382 987527
Email: dbbs.master@unipv.it

Causal Inference

COURSE REGISTRATION

The registration form, completed in all its part, must be sent to the secretary by email at dbbs.master@unipv.it together with the proof of payment.

Surname: …………………………………………………………………

Name: ……………………………………………………...

Place and date of birth: ………………………………...

Address: ……………………….………………………………………………….

City/Zip:…………………………… **State:** …………………………………..

Phone: ………………….. **Fax:** ………………………………….....

Italian Fiscal Code (or copy of the passport to be used for issuing the invoice) ……………..…………………………………...

Email: …………………………………………………...

Institution: …………….. …………………………………………………….

………………………………………………………...

Department……..…………………………………………………………..

……………………………………………………...

Qualification*: …………………………………………………………..

Under the Italian Law 196/2003, the personal data will be processed by the University of Pavia, Via Bassi 21

REGISTRATION FEES	
Academic	**€ 300,00**
Student	**€ 200,00**
Non Academic	**€ 400,00**

If the payment is done by a **private person or private company** please use the following bank details:

Private person	
Account Number	**54714**
Account holder	**DIP. SCIENZE SIST.NERVOSO E DEL COMPORTAMENTO**
Bank name	**UBI Banca S.p.A.**
Istitution code	**301139**
IBAN	**IT62 N 03111 11300 000000054714**
SWIFT code	**BLOPIT22**

If the payment is done by an **Italian public institution** please use the following bank details and for the invoice please provide us the following information

Institution: …………………………………………………………………....

…………………………………………………..

Department: …...……………………………………………………………..

………………………………………………..

 Address: ...…………………...……………………………………………….

City/Zip:…………………………. **State:** ………………………...................

P.IVA or VAT or Fiscal Code: ……...…………………………………………..

City/Zip:…………………… **State:** ………………………...................

Public institution /private company /university etc.	
Account Number	**37198**
Account holder	**Un. Pavia – Dip. Sc. Sist. Nerv. Comp.**
Bank name	**Banca d'Italia**
IBAN	**IT 25 W 01000 03245 1363 00037198**