

# Kwo Lik Lax Chan

## PERSONAL INFORMATION

Date of birth: 07/07/1991

Address: Dipartimento di Studi per l'Economia e l'Impresa Università del Piemonte Orientale "A. Avogadro" Via Perrone, 18 - 28100 Novara

## RESEARCH INTERESTS

- Functional data analysis
- $U$ -statistics
- Time series analysis
- Multiple systems estimation
- Multivariate statistics/ Data analytics

## PRESENT POSITION

### **Assistant professor (RTD-A)**

02/2022-present |

DISEI, UNIVERSITÀ DEL PIEMONTE ORIENTALE "A. AVOGADRO"

Research theme: Small-Ball probability, Functional data analysis

Scientific advisers: Prof. Enea Bongiorno, Professor Aldo Goia

## PAST POSITIONS

### **Postdoctoral associate**

09/2020-01/2022 |

DISEI, UNIVERSITÀ DEL PIEMONTE ORIENTALE "A. AVOGADRO"

Research theme: Small-Ball probability, Functional data analysis

Scientific advisers: Prof. Enea Bongiorno, Professor Aldo Goia

### **Research Associate**

09/2019-03/2020 |

KNOWLEDGE MEDIA INSTITUTE, THE OPEN UNIVERSITY, MILTON KEYNES

Research theme: Time-series analysis, Factorial Hidden Markov Models, Combinatorial optimisation, Data analytics

Scientific adviser: Dr. Danica Greetham

### **Research fellow**

08/2018-07/2019 |

RIGHTS LAB AT THE UNIVERSITY OF NOTTINGHAM, UNITED KINGDOM

Research theme: Multiple systems estimation, Capture-Recapture, heterogeneity, data analytics

Scientific adviser: Sir Bernard W. Silverman, Fellow of the Royal Society

### **Research assistant**

08/2017-08/2018 |

HORIZON INSTITUTE AT THE UNIVERSITY OF NOTTINGHAM, UNITED KINGDOM

Research theme: Clustering, classification, stochastic processes, Bayesian inference

Scientific advisers: Dr. Iker Perez, Dr. Mercedes Torres Torres

## EDUCATION

### **Doctor of Philosophy in Mathematics**

2014-2018 |

THE OPEN UNIVERSITY, MILTON KEYNES, UNITED KINGDOM

Thesis title: Continuous spectra for substitution-based sequences

Supervisors: Prof. Uwe Grimm and Dr. Ian Short

### **Master of Science in Mathematics**

2013-2014 |

THE UNIVERSITY OF LIVERPOOL, UNITED KINGDOM

### **Bachelor of Science in Mathematics with Honours**

2010-2013 |

## PUBLICATION IN REVIEWED JOURNALS

(2023)

Available at arXiv:2303.17856

### **BOOTSTRAPPING MULTIPLE SYSTEMS ESTIMATES TO ACCOUNT FOR MODEL SELECTION**

Bernard W. Silverman, Lax Chan, Kyle Vincent

Statistics and Computing (2023)

### **DETECTING THE COMPLEXITY OF A FUNCTIONAL TIME SERIES**

Enea G. Bongiorno, Lax Chan, Aldo Goia

Journal of Nonparametric Statistics (2023)

### **A LINK FUNCTION SPECIFICATION TEST IN THE SINGLE FUNCTIONAL INDEX MODEL**

Lax Chan, Laurent Delsol, Aldo Goia

Advances in Data Analysis and Classification (2023)

### **MULTIPLE SYSTEMS ESTIMATION FOR SPARSE CAPTURE DATA: INFERENCE CHALLENGES WHEN THERE ARE NON-OVERLAPPING LISTS**

Lax Chan, Bernard W. Silverman, Kyle Vincent

Journal of American Statistical Association (Theory and methods) **116** (535) (2021), 1297-1306

### **DISCUSSION OF MULTIPLE SYSTEMS ANALYSIS FOR THE QUANTIFICATION OF MODERN SLAVERY: CLASSICAL AND BAYESIAN APPROACHES BY SILVERMAN**

Ian Dryden, James Goulding, Simon Preston, Lax Chan

Journal of the Royal Statistical Society: Series A **183** (2020)

### **SUBSTITUTION-BASED STRUCTURES WITH ABSOLUTELY CONTINUOUS SPECTRUM**

Lax Chan, Uwe Grimm, Ian Short

Indagationes Mathematicae **29**(4) (2018), 1072-1086

### **SPECTRUM OF A RUDIN--SHAPIRO-LIKE SEQUENCE**

Lax Chan, Uwe Grimm

Advances in Applied Mathematics **87** (2017), 16-23

### **PROBLEMS IN STRONG UNIFORM DISTRIBUTION**

Kwo Chan<sup>1</sup>, Radhakrishnan Nair

Tatra Mt. Math. Publ. **59** (2014), 51-64

### **A REMARK ON THE DISTRIBUTION OF CHEBYSHEV POLYNOMIALS ON $[-1, 1]$**

Kwo Chan, Radhakrishnan Nair

Uniform Distribution Theory **9** (2014), no.2, 125-134

## CONFERENCE PROCEEDINGS, ABSTRACT IN BOOKS AND CONFERENCES, AND THESIS

### **NON-PARAMETRIC DIMENSIONALITY DETECTION FOR FUNCTIONAL DATA**

Enea G. Bongiorno, Lax Chan, Aldo Goia

In Book of Abstracts of the 25th International Conference on Computational Statistics (COMPSTAT) (2023)

### **ON SPECIFYING A LINK FUNCTION OF A SINGLE FUNCTIONAL INDEX MODEL**

Lax Chan

In Book of Abstracts of the 25th International Conference on Computational Statistics (COMPSTAT) (2023)

### **GOODNESS-OF-FIT TEST FOR THE SINGLE FUNCTIONAL INDEX MODEL**

Lax Chan, Aldo Goia

Book of Short Papers - CLADAG 2023 [in press]

### **A SPECIFICATION TEST FOR THE SINGLE FUNCTIONAL INDEX MODEL.**

<sup>1</sup>This was my registered name when I was at the University of Liverpool.

Lax Chan

In Book of Abstracts of the 15th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics)(2022)

## **EVALUATING THE COMPLEXITY OF A FUNCTIONAL TIME SERIES**

Enea G. Bongiorno, Lax Chan, Aldo Goia

In Book of Abstracts of the 14th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics)(2021)

## **ABOUT THE COMPLEXITY OF A FUNCTIONAL TIME SERIES**

Enea G. Bongiorno, Lax Chan, Aldo Goia, Philippe Vieu

In Book of Abstracts of the 5th International Workshop On Functional and Operatorial Statistics (2021)

## **CONTINUOUS SPECTRA FOR SUBSTITUTION-BASED SEQUENCES**

Lax Chan

PhD thesis (2018)

## **SUBSTITUTION-BASED SEQUENCES WITH ABSOLUTELY CONTINUOUS DIFFRACTION**

Lax Chan, Uwe Grimm

Journal of Physics: conference series, **809** (2017) 012027

## TECHNICAL REPORT

### **ON BAYESIAN INFERENCE TASKS WITH INFINITE-STATE JUMP PROCESSES: EFFICIENT DATA AUGMENTATION**

Iker Perez, Lax Chan, Mercedes Torres Torres, James Goulding, Theodore Kypraios

arXiv: 1806.02458

## PREPRINTS

- Bootstrapping multiple systems estimates to account for model selection (2023)  
Available at arXiv:2303.17856  
Bernard W. Silverman, Lax Chan, Kyle Vincent

## R PACKAGES

### **SPARSEMSE 2.0.1**

Lax Chan (maintainer and creator), Bernard W. Silverman, Kyle Vincent

## INVITED TALKS AND SEMINARS

### **A link function specification test in semi-parametric regression**

07/09/2023 |

DATA SCIENCE AND COMPUTATIONAL STATISTICS SEMINAR, UNIVERSITY OF BIRMINGHAM, UK

### **On specifying a link function of a single functional index model**

22-25/08/2023 |

INVITED TALK AT THE 25TH INTERNATIONAL CONFERENCE ON COMPUTATIONAL STATISTICS, LONDON

### **Goodness-of-fit test for the Single Functional Index Model**

04/07/2023 |

SEMINARI DI MATEMATICA E STATISTICA, UNIVERSITÀ DEL PIEMONTE ORIENTALE, ITALY

### **A specification test for the single functional index model**

17-19/12/2022 |

INVITED TALK AT THE 15TH INTERNATIONAL CONFERENCE OF THE ERCIM WG ON COMPUTATIONAL AND METHODOLOGICAL STATISTICS (CMSTATISTICS), LONDON

### **On the complexity index of a functional time series**

20-24/06/2022 |

INVITED TALK AT THE INTERNATIONAL SYMPOSIUM OF NONPARAMETRIC STATISTICS, PATHOS, CYPRUS

### **Evaluating the complexity of a Functional Time Series**

18-20/12/2021 |

INVITED TALK AT THE 14TH INTERNATIONAL CONFERENCE OF THE ERCIM WG ON COMPUTATIONAL AND METHODOLOGICAL STATISTICS (CMSTATISTICS), ONLINE

### **Substitution-based structures with absolutely continuous spectrum**

29/03/2017 |

INVITED TALK AT OPEN STATISTICAL PHYSICS, MILTON KEYNES, UK

**Diffraction spectrum of a Rudin--Shapiro-like sequence**

07/06/2016 |

PLENARY TALK, TRANSVERSAL ASPECTS OF TILINGS AT OLÉRON, FRANCE

## CONTRIBUTED TALKS AND POSTER PRESENTATIONS

**Goodness-of-fit test for the Single Functional Index Model**

11-13/09/2023 |

CONTRIBUTED TALK AT THE 14TH SCIENTIFIC MEETING CLASSIFICATION AND DATA ANALYSIS GROUP

**About the complexity of a Functional Time Series**

23/06/2021 |

CONTRIBUTED TALK AT THE INTERNATIONAL WORKSHOP FOR FUNCTIONAL AND OPERATORIAL STATISTICS, ONLINE

**Inflation-based sequences with absolutely continuous spectrum**

16-24/09/2016 |

POSTER PRESENTATION AT INTERNATIONAL CONFERENCE ON QUASICRYSTALS, KATHMANDU, NEPAL

## MEMBER OF RESEARCH GRANTS AND AWARDS

**COST Action CA21163 "HiTEc", "Text, functional and other high-dimensional data in econometrics: New models, methods, applications"**

2022-2026 |

GRANT FUNDED BY EUROPEAN UNION

**FSE REACT-EU, PON Ricerca e Innovazione 2014-2020**

2022-2025 |

GRANT FUNDED BY EUROPEAN UNION

- Young scientist award to attend International conference on Quasicrystals 2016
- Partial funding to attend thematic month at Oléron, France 2016
- Fully funded studentship with stipend 2014-2017
- Liverpool affinity award 2013-2014
- Faculty of physical sciences and engineering postgraduate scholarship 2013-2014
- Departmental scholarship for M.Sc. students 2013-2014
- University of Liverpool regional award 2010-2013

## SUPERVISION

**Bachelor and master theses co-supervisors**

2020-present |

UNIVERSITA DEL PIEMONTE ORIENTALE, ITALY

**Mentored German exchange student Marcus Voss on energy disaggregation project**

2019 |

KNOWLEDGE MEDIA INSTITUTE, THE OPEN UNIVERSITY

- I co-supervised Marcus with Dr. Danica Greetham on energy disaggregation. During his time here, he implemented deep learning algorithms on energy disaggregation. His results formed part of our report back to the industry partner.

**Mentored French exchange student Nicolas Laube on aperiodic tiling**

2017 |

SCHOOL OF MATHEMATICS AND STATISTICS, THE OPEN UNIVERSITY

- Organized meeting and planned goals to be achieved during his stay. Discussed with him on his weekly reading. Assessed his progress made each week. He produced a report and Python code that generated aperiodic tilings.

## TEACHING EXPERIENCE

**Lecturer**

2020-present |

UNIVERSITA DEL PIEMONTE ORIENTALE

- Statistics for finance (Master level) (60 hours)
- Laboratorio di Statistica (Statistics laboratory) (Bachelor level) (40 hours)

**Teaching assistant to Prof. Aldo Goia**

2021-2022 |

UNIVERSITA DEL PIEMONTE ORIENTALE

- Statistics for finance (Master level) (60 hours).

### **Teaching assistant to Prof. Uwe Grimm**

2014-2015 |

LONDON TAUGHT COURSE CENTRE'S PHD COURSE

- Aperiodic order: Marking assignments (10 hours) and assisting in tutorials (2.5 hours).

### **Teaching assistant to the following undergraduate/postgraduate courses**

2013-2014 |

THE UNIVERSITY OF LIVERPOOL

- Calculus I (first year): Teaching in tutorials (10 hours) and marking assignments (25 hours)
- Calculus II (first year): Teaching in tutorials (10 hours) and marking assignments (20 hours)
- Introduction to Statistics (first year): Teaching in tutorials (5 hours)
- Complex functions (Second year): Teaching in tutorials (10 hours) and marking assignments (20 hours)
- Geometry of curves (third year): Teaching in tutorials (5 hours) and marking assignments (15 hours)
- Group theory (third year): Teaching in tutorials (5 hours) and marking assignments (10 hours)
- Analysis and number theory (third year): Teaching in tutorials (10 hours)

## COURSE MATERIAL DESIGN ASSISTANCE

### **Professor Uwe Grimm's course: Aperiodic order**

2014-2015 |

LONDON TAUGHT COURSE CENTRE

- I proof-read his online slides and homework. Further, I proof-read and gave suggestion to a condensed version of his course material which later became a chapter in the book *Dynamical and Complex Systems, LTCC Advanced Mathematics Series volume 5*.

### **Online course material (textbooks)**

2014-2015 |

SCHOOL OF MATHEMATICS AND STATISTICS, THE OPEN UNIVERSITY

- I proof-read, went through textbooks material and provided feedback for M337 Complex analysis and MST124 Essential Mathematics I. The latest version of the textbook materials are now in print.

## GRANTS REVIEW EXPERIENCE

- UK research and innovation future leaders fellowships (2023)

## ORGANISATION OF SESSIONS IN CONFERENCES

**Advances in functional data: Theory and applications, Joint with Prof. Enea Bongiorno** 22-25/08/2023 |

ORGANISED SESSION AT THE 25TH INTERNATIONAL CONFERENCES ON COMPUTATIONAL STATISTICS, LONDON

## DEPARTMENTAL ADMINISTRATION

### **Committee for evaluation of applications of contracted professors or teachers**

2022-present |

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### **Committee for evaluation of English capability for entry to master level courses**

2022-present |

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### **Founder and coordinator of postgraduate students seminar**

2014-2017 |

SCHOOL OF MATHEMATICS AND STATISTICS, THE OPEN UNIVERSITY

### **Student chair of modules and teaching review committee**

2010-2013 |

THE UNIVERSITY OF LIVERPOOL

- Led a team of seven to process students reviews of all the courses the department offered. Wrote summary reports and delivered them to lecturers. Presented findings to the student-staff committee and lead to better teaching qualities.

## PROFESSIONAL MEMBERSHIP

- Member of Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni, InDAM

## COMPUTER SKILLS

- R (with experience of writing CRAN approved package)
- Python (Implemented Factorial Hidden Markov Models and Combinatorial optimisation on energy data set)
- Matlab (Implemented state of the art classification algorithms)
- $\text{\LaTeX}$  (Articles and report writing)

## LANGUAGE SKILLS

- Mother tongue: Cantonese
- Other languages: English (C1), Italian (basic written).