

# 19th European Young Statisticians Meeting

August 31 – September 4, 2015  
Prague

## PROGRAMME



## MONDAY August 31

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**8:00 – 9:15**

*Registration*

Room K2 at the second floor of the conference venue.

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**9:15 – 9:30**

*Opening (Room K1)*

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**9:30 – 10:30 Keynote lecture**

Chair: *Daniel Hlubinka*

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**Richard Samworth** (*University of Cambridge, Great Britain*)

Random projection ensemble classification

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**10:30 – 11:00**

*Coffee break*

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**11:00 – 12:30 Invited talks**

Chair: *Jiří Dvořák*

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**Jari Miettinen** (*Finland*)

ICA based on fourth moments

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**Mohamed Amghar** (*Belgium*)

Optimal bandwidth for multiscale local polynomial

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**Radim Navrátil** (*Czech Republic*)

Behavior of rank tests and R-estimates in measurement error models

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**Slav Emilov Angelov** (*Bulgary*)

Modelling company's performance based on financial ratios

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**12:30 – 14:00**

*Lunch (Restaurant Panonia)*

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## MONDAY August 31

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**14:00 – 15:30**    **Invited talks**

Chair: *Dessislava Nikolaeva Koleva*

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**Ivo Ugrina** (*Croatia*)

Overview of some interesting statistical problems in biochemical analysis of glycans

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**Damian Karol Brzyski** (*Poland*)

The selection of relevant groups of explanatory variables in GWA studies

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**José Sánchez** (*Sweden*)

Network sparsity selection and robust estimation via bootstrap with applications to genomic data

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**Yi Yu** (*United Kingdom*)

Estimating whole brain dynamics using spectral clustering

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**15:30 – 16:00**

*Coffee break*

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**16:00 – 17:30**    **Invited talks**

Chair: *Bogdan Corneliu Biolan*

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**Adriana Irina Băncescu** (*Romania*)

A maintenance model with a quasi generalized Lindley distribution

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**Ioanna Papatsouma** (*Greece*)

Polynomial Approach to Distributions via Sampling

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**François Bachoc** (*Austria*)

Valid confidence intervals for post-model-selection predictors

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**Eduardo García-Portugués** (*Spain*)

Kernel density estimation for directional data under rotational symmetry

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**18:00 – 20:00**

*Welcome reception*

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Room K2 at the conference venue

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## TUESDAY September 1

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**9:00 – 10:00**    **Keynote lecture**

Chair: *Marie Hušková*

**Adam Jakubowski** (*Nicolaus Copernicus University, Poland*)

Convergence in distribution in metric and submetric spaces

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**10:00 – 10:30**

*Coffee break*

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**10:30 – 12:00**    **Invited talks**

Chair: *Mélanie Blazère*

**Maurizia Rossi** (*Italy*)

On the High Energy Behaviour of Nonlinear Functionals of  
Random Eigenfunctions on  $S^d$

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**Johannes Heiny** (*Denmark*)

Asymptotic theory for heavy-tailed random matrices

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**Bettina Livia Lukácsné Porvázsnyik** (*Hungary*)

A random graph evolution procedure and asymptotic results

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**Tobias Kley** (*Germany*)

Asymptotic Theory for Copula Rank-Based Periodograms

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**12:00 – 13:30**

*Lunch (Restaurant Panonia)*

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## TUESDAY September 1

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**13:30 – 15:00**     **Invited talks**

Chair: *Jozef Jakubik*

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**Katarína Burclová** (*Slovakia*)

Experience with linear programming for experimental design

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**Emil Aas Stoltenberg** (*Norway*)

The c-Loss Function: Balancing Total and Individual Risk in the Simultaneous Estimation of Poisson Means

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**Ksenia Yuryevna Volkova** (*Russia*)

Goodness-of-fit tests for exponentiality based on Yanev-Chakraborty characterization and their efficiencies

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**Yurii Yuriyovych Mlavets** (*Ukraine*)

On calculation of the integrals depending on a parameter by Monte-Carlo method

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**15:00 – 15:30**

*Coffee break*

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**15:30 – 16:45**     **Invited talks**

Chair: *Mark Joseph Alba Fiecas*

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**Frederik Riis Mikkelsen** (*Denmark*)

Computational aspects of Parameter Estimation in Ordinary Differential Equation Systems

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**Kristóf Körmendy** (*Hungary*)

Estimation of the offspring mean matrix in 2-type critical Galton-Watson processes

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**Ivan Vujačić** (*the Netherlands*)

Simultaneous perturbation gradient approximation Metropolis adjusted Langevin Markov chain Monte Carlo for inference of ordinary differential equations

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**17:30 – 20:00**

*Short guided tour through Prague*

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Meeting point - room K3 at the conference venue at 17:15.

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## WEDNESDAY September 2

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**9:00 – 10:00**    **Keynote lecture**

Chair: *Matúš Maciak*

**Geurt Jongbloed** (*TU Delft, the Netherlands*)

Shape constrained inference

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**10:00 – 10:30**

*Coffee break*

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**10:30 – 12:00**    **Invited talks**

Chair: *Eda Özkul*

**Massimo Cannas** (*Italy*)

Propensity score matching with clustered data.

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**Öyküm Esra Aşkin** (*Turkey*)

Weibull-Poisson Regression Model with Shared Gamma Frailty

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**Mélanie Blazère** (*France*)

Partial Least Squares: a new statistical insight through orthogonal polynomials

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**Jozef Jakubík** (*Slovakia*)

Comparison of methods for variable selection in high-dimensional linear mixed models

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**12:00 – 13:30**

*Lunch (Restaurant Panonia)*

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**14:45 – 18:15**

*Social programme*

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(a) Canoeing course on the Vltava river

(b) Guided tour through the Old waste water treatment plant

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**19:00 – 22:00**

*Conference dinner*

Charles University in Prague

Malostranské náměstí 2/25, Malá Strana (Lesser Town)

Profesní dům restaurant (in the basement of the building)

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## THURSDAY September 3

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**9:00 – 10:00**    **A keynote lecture**

Chair: *Zuzana Prášková*

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**Irène Gijbels** (*KU Leuven, Belgium*)

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**10:00 – 10:30**

*Coffee break*

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**10:30 – 12:00**    **Invited talks**

Chair: *José Sánchez*

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**Thomas Gueuning** (*Belgium*)

Statistical inference for the sparse parameter of a partially linear single-index model

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**Stéphanie van der Pas** (*the Netherlands*)

The Horseshoe and More General Sparsity Priors

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**Hubert Szymanowski** (*Poland*)

Selection consistency of Generalized Information Criterion for sparse logistic model

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**Jana Janková** (*Switzerland*)

Confidence regions for high-dimensional sparse models

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**12:00 – 13:30**

*Lunch (Restaurant Panonia)*

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## THURSDAY September 3

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**13:30 – 15:00**    **Invited talks 11**

Chair: *Maurizia Rossi*

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**Jurgita Markeviciute** (*Lithuania*)

Invariance principle under self-normalization for AR(1) process

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**David Preinerstorfer** (*Austria*)

Finite Sample Properties of Tests Based on Prewhitened Nonparametric Covariance Estimators.

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**Antoine Godichon** (*France*)

Recursive estimation of the Median Covariation Matrix in Hilbert spaces

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**Mark Joseph Alba Fiecas** (*United Kingdom*)

The Evolving Evolutionary Spectrum

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**15:00 – 15:30**

*Coffee break*

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**15:30 – 17:00**    **Invited talks**

Chair: *Yurii Yuriyovych Mlavets*

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**Iurii Ganychenko** (*Ukraine*)

Weak rates of approximation of integral-type functionals of Markov processes

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**Bogdan Corneliu Biolan** (*Romania*)

The Weighted Log-Lindley distribution and its applications to lifetime data modeling

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**Beatriz Pateiro-López** (*Spain*)

On the estimation of the central core of a set. Algorithms to estimate the  $\lambda$ -medial axis.

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**Dessislava Nikolaeva Koleva** (*Bulgaria*)

Application of Dividend Policies to Finite Difference Methods in Option Pricing

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## FRIDAY September 4

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**9:00 – 10:00**    **Keynote lecture**

Chair: *Tomáš Cipra*

**Thomas Mikosch** (*University of Copenhagen, Denmark*)

Power-law tails in applied probability

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**10:00 – 10:30**

*Coffee break*

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**10:30 – 11:45**    **Invited talks**

Chair: *Tobias Kley*

**Jiří Dvořák** (*Czech Republic*)

Model fitting for space-time point patterns using projection processes

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**Eda Özkul** (*Turkey*)

Recognition of the Objects in Digital Images Using Weighted Fuzzy C-Means Clustering Algorithm for Directional Data (W-FCM4DD)

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**Måns Thulin** (*Sweden*)

k-sample tests for multivariate censored data

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**11:45 – 12:00**

*Bye bye EYSM 2015*

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**12:00 – 13:30**

*Lunch (Restaurant Panonia)*

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## Abstracts of the keynote lectures

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### **Irène Gijbels: Flexible regression modelling and P-splines approximations**

For statistical analyses of complex data, and in particular to disentangle relationships between the (many) covariates and the variable of interest (the response variable), flexible regression models are a useful tool. Among the commonly-used models are additive models, single-index models and varying coefficient models. Approximating the unknown functions by means of P-splines approximations is another element of flexible regression modelling. In this talk we mainly focus on varying coefficient models, in a longitudinal data setting, and discuss estimation of mean and quantile functions. In case of a large number of covariates that possibly influence the response variable there is also an interest in statistical techniques for selecting the important variables.

In this talk we discuss estimation and variable selection techniques in flexible regression models, providing also a brief overview of variable selection techniques.

### **Adam Jakubowski: Convergence in distribution in metric and submetric spaces**

We shall motivate and introduce a new definition of the notion of convergence in distribution of random elements with *tight laws*. This new definition coincides with the usual one on metric spaces and spaces of distributions (like  $\mathcal{S}'$ ,  $\mathcal{D}'$ ).

The advantage is that the new definition allows us to preserve the whole power of the metric theory (including the direct and the converse Prohorov theorems and the Skorokhod a.s. representation) in a large class of topological spaces, called submetric spaces.

The developed theory brings a new light even in the case of metric spaces, by showing that the crucial property is rather the shape of compact sets and not the completeness.

The tools of the theory are presently used in the area of stochastic partial differential equations, stochastic analysis and mathematical finance.

### **Geurt Jongbloed: Shape constrained inference**

In practice, the problem of estimating some kind of function based on data is often encountered. Think of density functions and regression functions. Choosing an appropriate statistical model is then an important issue. Parametric models can be too rigid to adequately model the data and also there may not be a convincing reason to use such a model. Therefore, many nonparametric models have been studied and applied. In this talk, I will introduce the basic ideas behind shape constrained inference. In this branch of statistics, the model is not parametric, but some qualitative information on the functions is assumed. For instance monotonicity or unimodality. The starting point is the simplest but at the same time key shape constrained model: isotonic regression. Then, the problem of estimating a decreasing density will be addressed. The latter problem will be illustrated using the so-called current durations model. It will be seen that this current durations model leads to the problem of estimating a decreasing density quite naturally. Finally, some other examples of shape constrained inference will be described briefly.

## Abstracts of the keynote lectures

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### **Thomas Mikosch: Power-law tails in applied probability**

Distributions with power-law tails occur in a natural way in probability theory and statistics, often as domain of attraction condition in limit theory for sums and maxima or for solutions to iterative stochastic recurrence equations. Random objects whose distributions have power-law tails are called regularly varying. Over the last 20 years regular variation has been studied for random vectors, time series and more general stochastic processes. These developments are triggered by heavy-tail phenomena in time series analysis, extreme value theory, random matrix theory, risk analysis, and other areas.

The goal of this talk is to give a gentle introduction to regular variation and to point at various directions of research related to it.

### **Richard Samworth: Random projection ensemble classification**

We introduce a very general method for high-dimensional classification, based on careful combination of the results of applying an arbitrary base classifier to random projections of the feature vectors into a lower-dimensional space. In one special case that we study in detail, the random projections are divided into non-overlapping blocks, and within each block we select the projection yielding the smallest estimate of the test error. Our random projection ensemble classifier then aggregates the results of applying the base classifier on the selected projections, with a data-driven voting threshold to determine the final assignment. Our theoretical results elucidate the effect on performance of increasing the number of projections. Moreover, under a boundary condition implied by the sufficient dimension reduction assumption, we show that the test excess risk of the random projection ensemble classifier can be controlled by terms that do not depend on the original data dimension. The classifier is also compared empirically with several other popular high-dimensional classifiers via an extensive simulation study, which reveals its excellent finite-sample performance.

## Additional abstracts not included in the proceedings

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### **Eduardo García-Portugués\***, Christophe Ley and Thomas Verdebout: **Kernel density estimation for directional data under rotational symmetry**

Rotational symmetry is a common hypothesis when dealing with directional or axial data. Most of the classical distributions for this kind of data are rotationally symmetric (Fisher-von Mises-Langevin, Watson, Wrapped Normal, etc) and the roots of recently developed statistical methods rely on this property. This work exploits rotational symmetry for constructing a constrained semiparametric Kernel Density Estimator (KDE). The estimator is obtained by means of a new operator, termed *rotasymmetrizer*: applied to a KDE, it ensures that the resulting estimator, the RKDE, is rotationally symmetric. The operator is based on the tangent-normal decomposition and links the RKDE with a KDE in the domain  $[-1, 1]$ . The main properties of the RKDE are derived (bias, variance, asymptotic normality, error measurement), being the most relevant the variance order  $(nh)^{-1}$  for arbitrary dimension. These properties hold with the axis of rotational symmetry either known or estimated  $\sqrt{n}$ -consistently. The improvement in performance with respect to the KDE is checked empirically in a simulation study. Finally, some comments are given on a consistent estimator of the axis of rotational symmetry under mild shape assumptions.

### **François Bachoc\***, Hannes Leeb and Benedikt Pötscher: **Valid confidence intervals for post-model-selection predictors**

We consider inference post-model-selection in linear regression. In this setting, Berk et al. (Annals of Statistics, 2013) recently introduced a class of confidence sets, the so-called PoSI intervals, that cover a certain non-standard quantity of interest with a user-specified minimal coverage probability, irrespective of the model selection procedure that is being used. In this talk, we generalize the PoSI intervals to post-model-selection predictors. We define two non-standard predictors: the first one being the natural extension of the quantity of interest of Berk et al., the second one having more relevant optimality properties. For these two predictors, we construct confidence intervals, extending those of Berk et al., and give corresponding algorithms and exact and asymptotic coverage properties. We reinforce these results by a simulation study.

## INTERNET CONNECTION

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Two wireless (wifi) options are available to conference participants to connect to the internet in the venue building.

1. The eduroam (**education roaming**) network is available to participants who have access to this network through their institutions participating in this project (currently about 5 500 institutions from 54 countries world wide).
2. The wireless network with the SSID `guest-karlin` is available to all EYSM participants. There is no password to this network. Frequent complications that prevent successful internet connection through this network include:
  - The wireless adapter is not set up to assign IP address from a DHCP server.
  - The browser has a proxy server.