Anna Melnykova

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Born on 28 February 1994 in Kiev, Ukraine.
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Currently I am a PhD student in University of Cergy-Pontoise (in co-direction with University of Grenoble Alpes). My thesis is devoted to statistical methods for stochastic diffusions with degenerate variance coefficient. In particular, I work on parametric inference, approximation schemes and hypothesis testing. On applied level, I am interested in stochastic models arising in biology and neuroscience.

Language proficiency:
English (fluent)
French (advanced)
German (advanced)
Russian, Ukrainian (native)

Programming language proficiency:
R: `RCpp`, `RMarkdown`
Python: `numpy`, `scipy`, `pelican`
Notions of **Julia**, **MatLab** and **Mathematica**
LaTeX, Markdown, `vim`

Education

2017–2020 PhD candidate in Mathematics — Université de Cergy-Pontoise
Subject: Statistics for Neuroscience.
Supervisors: Eva Löcherbach (Sorbonne Université), Adeline Samson (Université Grenoble Alpes)

2016–2017 M.Sc. in Statistics — Université Grenoble Alpes
Thesis: Parametric estimation techniques in hypoelliptic ergodic diffusions.
Supervisor: Adeline Samson (Université Grenoble Alpes)

2014–2016 M.Sc. in Mathematics — National Technical University of Ukraine
Thesis: Asymptotic behaviour of solutions of SDEs.
Supervisor: Oleg Klesov (NTUU "KPI")

2015–2016 Exchange student in Financial Mathematics — University of Ulm
During my stay I was also employed by University of Ulm as a teacher assistant (*"Studentische Hilfskraft"*) at the undergraduate course *"Höhere Mathematik I für Physiker"*.

Scholarships & Grants

2019 "Research in Pairs" grant from Oberwolfach research center
Jointly with Irene Tubikanec (JKU Linz, Austria)

2018 Travel grant to a Master Class organized by Henri Lebesgue Centre in Angers — 200 Euro

2018 "Young Researcher" grant for participation in CEMRACS research session — 2500 Euro

2016 IDEX Academical Excellence Scholarship for international Master students — 5000 Euro

2015 Baden-Württemberg Stiftung Scholarship for exchange students — 2400 Euro

Schools & Formations during PhD

2018 Masterclass on Ergodicity of Stochastic Processes — Angers, France
Markov processes • Coupling Methods • Functional Inequalities • Gibbs sampling • Quasi-Stationary Distributions

2018 Health Data Challenge — Aussois, France
Matrix factorization • deconvolution methods • tumor heterogeneity in cancer research

2018 CEMRACS 2018 (summer school + 5 weeks research session) — Luminy, France
Horizontal gene transfer in bacteria populations • Numerical simulation of birth and death process • Hamilton-Jacobi PDE • Asymptotic-preserving numerical scheme

2017 Winter School on Deterministic and Stochastic models in Neuroscience — Toulouse, France
Mean field models • neural field equations • numerical methods • kinetic models of neuronal networks

Talks

Conferences

June 2020 DynStoch 2020 — Aarhus, Denmark
Theoretical analysis and simulation methods of Hawkes processes with Erlang memory kernels

Aug. 2019 Conference on Stochastic Analysis and Applications **(invited)** — Risør, Norway
Statistical testing of the covariance matrix rank in multidimensional neuronal models

June 2019 DynStoch 2019 — Delft, Netherlands
Statistical testing of the covariance matrix rank in multidimensional neuronal models

June 2019 51èmes Journées de Statistique — Nancy, France
Statistical testing of the covariance matrix rank in multidimensional neuronal models

Sept. 2018 Stochastic Equations, Limit Theorems and Statistics of Stochastic Processes — Kiev, Ukraine
Statistical challenges in Neuroscience

June 2018 DynStoch 2018 — Porto, Portugal
Parametric inference for multidimensional hypoelliptic diffusion

May 2018 50èmes Journées de Statistique — Paris Saclay, France
Parametric inference for multidimensional hypoelliptic diffusion

Seminars & Working groups:

Nov. 2019 Demi-journée des doctorants — Grenoble, France
Estimation in a multi-class system of interacting neurons

Nov. 2019 Seminar of LJAD team — Nice, France
Concentration inequalities for a covariance rank estimation in multidimensional neuronal models

Sep. 2019 Seminar of SAMM team, Sorbonne Université — Paris, France
Parameter estimation in hypoelliptic ergodic diffusion with full observations

April 2019 Seminaire du departement DATA — Grenoble, France
Statistical testing of the covariance matrix rank in multidimensional neuronal models

Nov. 2018 Demi-journée des doctorants — Grenoble, France
Parametric inference for multidimensional hypoelliptic diffusion

Nov. 2018 Groupe de Travail Math-Bio — Grenoble, France
Horizontal Gene Transfer: numerical comparison between stochastic and deterministic approach

Various:

March-May 2019 2 lectures at Probability Reading Group — LJK, Grenoble
1st: *Construction of the Lebesgue Integral*
2d: *Ergodicity for dynamical systems*

Scientific stays

Jan. 2020	2 weeks stay to work with Irene Tubikanec	Oberwolfach, Germany
Oct. 2019	2 weeks stay to work with Susanne Ditlevsen	Copenhagen, Denmark
2019	Several short stays to work with Patricia Reynaud-Bouret	Nice, France

Teaching

2018-2020	*Méthodes statistiques pour la biologie*	L3 in UFR IM2AG	36h/an, TP
2018-2020	*Statistique et Probabilité Inférentielles*	L2 in UFR Science et Économie	20h/an, TD

Various organizational activities

2019 *Congrès MATh.en.JEANS 2019* — Grenoble, France
Member of local [volunteering] organizing committee

Publications

Accepted:

2019 V. Calvez, S.F. Iglesias, H. Hivert, S. Méléard, **A. Melnykova**, S. Nordmann "*Horizontal gene transfer: numerical comparison between stochastic and deterministic approaches*" (to appear in "ESAIM: Proceedings and Surveys")

Submitted:

2019 **A. Melnykova** *"Parametric inference for multidimensional hypoelliptic ergodic diffusion with full observations"*

2020 J. Chevallier, **A. Melnykova**, I. Tubikanec *"Theoretical analysis and simulation methods for Hawkes processes and their diffusion approximation"*

In preparation:

2019 **A. Melnykova**, P. Reynaud-Bouret, A. Samson "Concentration inequalities for an estimator of covariance matrix rank in neuronal models"

2020 S. Ditlevsen, **A. Melnykova**, A. Samson "Estimation in a multi-class systems of interacting neurons"