



Cramér Society: Autumn meeting 2020, November 19-20

Presentations from departments

PhD Education in Statistics STIMA, IDA, LiU

Cramérsällskapet — Autumn Meeting 2020

Krzysztof Bartoszek

Division history

1970–2006 Avdelningen för Statistik at MAI

1998 beginning of PhD programme in Statistics

2006–2013 Avdelningen för Statistik at IDA

2013– Div. of Statistics and Machine Learning at IDA

Previous PhD students

11 in 2002–2013 (3 supervisors)

2018 Måns Magnusson, “Scalable and efficient probabilistic topic model inference for textual data” (Mattias Villani)

2020 Per Sidén, “Scalable Bayesian spatial analysis with Gaussian Markov random fields” (Mattias Villani)

Current situation with PhD students

11 PhD students

7 Statistics, 4 Computer Science

5 supervisors (5, 3, 1, 1, 1)

1 professor, 2 bitr. professor, 2 docents

co-supervisors are from STIMA, other division, industry

Work structure

Mostly directly with supervisor or co-supervisor
Sometimes a collaborator from another institution or university
Ad hoc collaborations

Courses: Statistical, Probabilistic, Mathematical,
Machine Learning

Obligatory courses:

Computational Statistics, Inference, Probability Theory,
Stochastic Processes, Methods/Ethics, Basic course in
Pedagogy

Common activities

PhD student seminars

Games night

Fikas

Possible improvements

Making it easier to find PhD-level courses

More national level courses, making contacts

Remote courses from other countries

Easier access to computational resources
for code development (not HPCs)

www.liu.se

Mathematical Statistics

Linköping University

Cramér Society - November 19-20, 2020

Martin Singull

Department of Mathematics

at Linköping University

Divisions at the department

For the moment there are four divisions at the department

- Computational Mathematics (3+)
- ***Mathematical Statistics*** (5+)
- *Mathematics and Applied Mathematics* ($\approx 40+$)
- *Optimization* (6+)

From 2021 there will be new divisions

- Analysis and Didactics ($\approx 20+$)
- Algebra, geometry and discrete mathematics ($\approx 20+$)
- *Applied Mathematics (CM, MS and Opt $\approx 15+$)*

PhD studies in Mathematics

at Linköping University

Mathematical Sciences

PhD studies in Mathematical Sciences includes five specialisations:

- Computational Mathematics
- Mathematics
- **Mathematical Statistics**
- Optimization
- Interdisciplinary Mathematics (Research school)

Specific eligibility requirements

- Admission to PhD Studies in the research area of Mathematical Sciences requires completion of courses of at least 60 ECTS at the master level in a field relevant to the research area.
- These 60 ECTS should include an independent project (degree project) of at least 30 ECTS in a field relevant to the research area in PhD studies, or in more mathematics oriented, applied topics.

Degree and credits

- The total number of course credits in Math, MS, Opt and Interdisciplinary Math is 60 ECTS for a Degree of Licentiate, and 120 ECTS for a Degree of Doctor. The thesis makes up the remaining credits.
- The total number of course credits in CM is 60 ECTS for a Degree of Licentiate, and 100-120 ECTS for a Degree of Doctor. The thesis makes up the remaining credits.

Mathematical Statistics

- The subject area *mathematical statistics* consists of probability theory and statistical inference.

Specialisation-specific course requirements

- The courses should contain at least 30 ECTS from each of the following subject areas:
 - Probability theory (including stochastic processes),
 - Statistical inference (theory or practice).

PhD Courses in Mathematical Statistics

Courses are given “on demand” within the areas

- Probability theory
- Stochastic Processes
- Stochastic Calculus
- Statistical inference
- Linear Statistical Multivariate Models / Inference
- Applied Statistical Methods

or other areas such as optimization, measure and integration theory, combinatorics, algebra, etc.

Today

- Last five years - 5 PhDs graduated
- 6 ongoing PhD students in MS
 - One more in the admission process
- Sida funding (Moz, Rw, Tz, Ug and *ISP*)
- No yearly intake

Martin Singull

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Forskarutbildning i matematisk statistik i Uppsala

Rolf Larsson

19 november 2020

- Inte längre möjligt att formellt disputerar i ämnet matematisk statistik.
- Möjliga forskarutbildningsämnen på matematiska institutionen:
 - Matematik (varav 120hp kurser)
 - Tillämpad matematik och statistik (varav 90hp kurser)
- Exempel på kurser på masterutbildningen, kan tillgodoräknas på forskarutbildningen:
 - Integrationsteori 10hp
 - Teoretisk statistik 10hp
 - Sannolikhetsteori 10hp
 - Stokastiska processer 10hp
- Exempel på kurser på forskarutbildningen:
 - Avancerad kombinatorik 5hp
 - Sannolikhet och statistik 5hp
 - Kurser inom Center för Interdisciplinär Matematik (CIM)

- Holmgren, C (2010) Split trees, Cuttings and Explosions.
- Renlund, H (2011) Recursive methods in Urn Models and First-Passage Percolation.
- Amiri, S (2011) On the Application of the Bootstrap: Coefficient of Variation, Contingency Table, Information Theory and Ranked Set Sampling.
- Jonsson, F (2012) Self-Normalized Sums and Directional Conclusions.
- Thulin, M (2014) On Confidence Intervals and Two-Sided Hypothesis Testing.
- Görgens, M (2014) Gaussian Bridges: Modeling and Inference.
- Ranganathan, S (2015) Non-linear modelling for panel data in the social sciences.
- Gabrysch, K (2016) On Directed Random Graphs and Greedy Random Walks on Point Processes.
- Valcenavicus, J (2017) Optimal Sequential Decisions in Hidden-State Models.
- Thörnblad, E (2018) Degrees in Random Graphs and Tournament Limits.
- Blomqvist B (2018) Gaussian process models of social change.
- Ryznik, Y (2019) Optimal adaptive designs and adaptive randomization techniques for clinical trials.
- Tahir, D (2019) Multi-trait Branching Models with Applications to Species Evolution.
- Mussini, F (2019) Selected Topics in Continuum Percolation: Phase Transitions, Cover Times and random Fractals.

PhD programme in Statistics

Autumn meeting 2020 - Cramér Society



UPPSALA
UNIVERSITET

Ingeborg Waernbaum

Department of Statistics
Uppsala University

Department of Statistics, Uppsala University

- Department of Statistics part of the faculty of Social sciences, organizing departments within behavioural, economic and political sciences. The faculty organizes 11 departments and 2 institutes.
- Around 30 employees, four professors, two docents, in total 30 % of employees are women.
- All administrative staff are shared with the Department of Media and Informatics.

PhD Programme

- Admission prerequisites are: Master degree with at least 90 credits in statistics (at least 60 advanced level). Other criteria can also be specified in a particular opening, e.g., specific skills considered as plus. Mathematics and programming recommended.
- At present, 10 PhD students (employed), 3 women.
- Most PhD students financed with faculty funds, but also external grants to some extent.
- PhD-students get the opportunity to teach 20%, thereby obtaining 5 years of PhD education.
- The two control documents for the PhD programme is the general and the individual study plan.

Content

		Credits
Compulsory courses	Inference theory (15hp) Asymptotic theory (7.5hp) Philosophy of Science (5hp) Scientific communication (5hp) Research ethics (2hp)	34.5hp
Elective courses	Specific for thesis (at least 15hp) Not specific for thesis (at least 15 hp)	55.5 hp
Thesis work	≈ four papers	150 hp

Challenges and opportunities

- Many applicants for the PhD position openings.
- High performing students at the master program, good theoretical background.
- Location provides an opportunity to participate in courses, seminars etc in the region (SU, KI). Also, taking courses at other UU departments (math, IT).

Cramer society Autumn20 - PhD education

Unit of Statistics, Örebro University School of Business

Pettersson, Nicklas

2020-11-19



Basic Information

Main field of study:	Statistics
Degree level:	Doctoral
Duration:	4 years
Number of credits:	240
Established:	2007-05-10 ¹
Latest revision:	2014-12-12 (valid from 2014-12-15)
Number of doctoral students by December 31, 2018:	3

¹ Research education in Statistics started January 1, 1999. The programme syllabus was revised and established in its current form in the context of the Bologna process in 2007.

- Two PhD:s graduated in the last five years (2016, 2017).
- Due to a lack of funding only one new student admitted recently (Spring 2019).

Doctoral Programme in Statistics (ORUSB)

Prerequisites are:

- Bachelor in statistics (180 credits)
- and 30 credits in Mathematics.

The doctoral programme encompasses

- three and a half semesters of course work (105 credits) and
- four and a half semesters of thesis work (135 credits).

The courses include five compulsory courses (35 credits) and courses within two blocks (70 credits) in which courses are electable with minimum and maximum number of credits to ensure a balance of core courses related to

- the thesis work (which provides depth and specialised knowledge) and
- complementary courses (providing a broad set of skills in Statistics).

Doctoral Programme in Statistics (ORUSB)

- The doctoral programme is based on a core set of compulsory courses providing the fundamental tools and skill sets needed for research in Statistics as well as an orientation on ethical issues and philosophy of science.
- In addition to this, students are required to take two courses directly related to their thesis work and courses that provide a broader set of skills within the field of Statistics.
- The aim of the structure is to ensure that the students have deep and specialised knowledge as well as a good command in the field of Statistics as a whole.

Doctoral Programme in Statistics (ORUSB)

Courses	Credits	Examples of courses	Credits
Compulsory courses	35	Probability	7.5
		Inference	11
		Computational Statistics	6
		Philosophy of Science	7.5
		Research Ethics and Good Research Practice	3
Elective courses	70	Block I: specialised courses - shall facilitate specialised study within the scope of the student's thesis	15-55
		Block II: complementary courses - to fall outside the specific scope of the thesis and shall provide the student with a broad set of skills within statistics	15-55
Doctoral thesis and public defense	135		

Doctoral Programme in Statistics (ORUSB)

The Swedish Higher Education Act(SHEA) & Higher Education Ordinance (SHEO) and ORU-rules specifying details therein, ensures for example

- A general study plan for each programme that includes the learning goals stated in the SHEA och SHEO.
- An Individual Study Plan written by the student and the supervisor(s) that is updated every year for each student.
- The right to student representation in decision-making bodies.
- The right to supervision.
- Only admission of applicants who have secure funding for the whole programme (so most PhD students funded/employed by ORUSB).

In addition, ORUSB has a school-of-business-accreditation by the Association to Advance Collegiate Schools of Business(AACSB) requiring an ongoing quality assurance from a programme perspective.

Programme: Doctorate in Statistics

	Probability	Inference	Computational Statistics	Philosophy of Science	Research Ethics and Good Research Practice	Specialised courses	Optional courses	Thesis
Demonstrate a good command of current research within the main field of research	1	1	0	-	-	2, 3	0	3, X
On the basis of scholarly reflection, identify and use or design appropriate models and methods to solve scientific problems	1	1	1	1	-	2	2	3, X
Produce scientific documents that are publishable in high quality academic outlets	-	-	0	0	0	1, 2	1, 2	3, X
Make autonomous and critical scientific assessments of new and complex problems within their field of research	0	0	0	1	1	2	2	3, X

1 = introduced

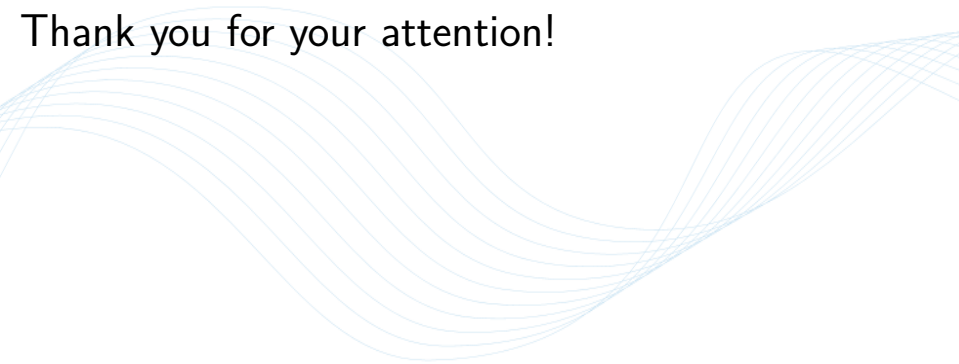
2 = practiced

3 = fulfilled

0 = covered incidentally

X = measuring point

Thank you for your attention!

A series of thin, light blue wavy lines that flow from the left side of the slide, under the 'Thank you' text, and extend towards the right edge, creating a decorative background element.

SLU: Doctoral education in (mathematical) statistics

Jesper Rydén

Department of Energy and Technology
Swedish University of Agricultural Sciences

SLU, Swedish University of Agricultural Sciences.

Four main campuses in Sweden:

Umeå

Uppsala

Skara

Alnarp



Doctoral programme in BIOMETRICS

General syllabus for the doctoral programme in the
subject of:

BIOMETRICS

Valid from 1 July 2016

Department to which the study plan applies
ENERGY AND TECHNOLOGY

Subject code:
NJBiom00

The subject of biometrics (“biometri”) includes the following:
statistics/mathematical statistics with a focus on planning, modelling and validation
of trials and processes; bio-mathematical modelling focusing on understanding
mechanisms and interactions in biological systems, processes and their
surroundings; environ-metrics and geo-informatics with a focus on landscape
systems and processes.



Biometrics?



Biometrics!

Three specialisations:

- Statistics/mathematical statistics
- Biomathematical modelling
- Environmetrics and geoinformatics

NOTE: **Biometry** is the better word.



Some facts on course work

PhD thesis: *Course work: 60-120 HEC*

Lic thesis: *Course work: 30-60 HEC*

Course studies: “suitable general courses as well as elective subject courses”.

“Among the general courses, an introduction to philosophy of science is of particular importance”



Degrees, 2019-2020

Harimurti Buntaran, lic 2019.

*Assessment of statistical analysis of Swedish cultivar testing:
A cross-validation study for model selection*

Supervisor: Johannes Forkman

Cigdem Cengiz, lic 2020.

*A new approach in profile analysis with high-dimensional data
using scores*

Supervisor: Dietrich von Rosen



PhD courses in statistics for applied researchers

- Statistics I: Basic statistics
- Statistics II: Experimental design and ANOVA
- Statistics III: Regression analysis
- Statistics IV: Generalised linear models

Statistical methods – an overview (Alnarp)

Sampling (Umeå)

Statistical learning [upcoming ...]