Alexander Lundervold

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Personal Data

Born: July 27, 1983 in Oslo, Norway

Citizenship: Norwegian

Employment

Postdoctoral researcher (Marie Curie fellow), Inria Bordeaux, France, 2013–present

Temporary associate professor, Norwegian University of Science and Technology, 2011–2013

Doctoral research fellow, University of Bergen, 2007–2010

Teaching assistant, University of Bergen, 2003–2007

Education

PhD, Numerical analysis, University of Bergen, 2011. Thesis advisors: Hans Z. Munthe-Kaas (Bergen), Kurusch Ebrahimi-Fard (ICMAT, Spain). Evaluation committee: Martin Bordemann (LMIA, France), Ander Murua (EHU, Spain). Thesis title: *Lie–Butcher series and geometric numerical integration on manifolds*

MSc., Topology, University of Bergen, 2007. Thesis advisor: Bjørn I. Dundas. Thesis title: *Higher order cyclic homology for rational algebras*

BSc. Mathematics, University of Bergen, 2005

Papers

A. Lundervold and H.Z. Munthe-Kaas. *On algebraic structures of numerical integration on vector spaces and manifolds*, to appear in IRMA Lectures in Mathematics and Theoretical Physics, 2013

H.Z. Munthe-Kaas and A. Lundervold. *On post-Lie algebras, Lie-Butcher series and moving frames*, Foundations of Computational Mathematics, Volume 13, Issue 4, 2013

A. Lundervold and H.Z. Munthe-Kaas. *Backward error analysis and the substitution law for Lie group integrators*, Foundations of Computational Mathematics, Volume 13, Issue 2, 2013

K. Ebrahimi-Fard, A. Lundervold, S.J.A. Malham, H.Z. Munthe-Kaas, A. Wiese. *Algebraic structure of stochastic expansions and universally accurate simulation*, Proceedings of the Royal Society. Mathematical, Physical and Engineering Sciences, Volume 468 (2144), 2012

A. Lundervold and H.Z. Munthe-Kaas. *Hopf algebras of formal diffeomorphisms and numerical integration on manifolds*, Contemporary Mathematics, 539, 2011

A. Lundervold, A. Lundervold, H. Nordby, A.J. Lundervold, I. Reinvang. *Application of nonlinear time series analysis to single-trial ERPs*, Human Brain Mapping Conference, June 18–22, 2003, New York City.

Grants

ERCIM Alain Bensoussan Fellowship (Marie Curie Fellow), 2013

Abel Extraordinary Chair from the NILS Mobility Project, 2009

Abelstipend from the Norwegian Mathematical Society, 2005

Carl Johan Storetvedts legat (awarded to hardworking and talented students at the University of Bergen), 2004

Teaching Experience

Lecturer, NTNU. TMA4125 – Matematikk 4, 2013

Lecturer, NTNU. TMA4100 – Matematikk 1, 2012

Lecturer, NTNU. MA0002 - Brukerkurs B, 2012

Lecturer, NTNU. TMA4100 – Matematikk 1, 2011

Substitute lecturer in two lectures, UoB. MAT212 – Functions of several variables, 2010

Substitute lecturer in two lectures, Université de Strasbourg, France. Course: *Les algèbres de Hopf combinatoires en théorie quantique des champs perturbative*, 2009

Substitute lecturer in two lectures, UoB, MAT235 – Vector and tensor analysis, 2008

Teaching assistant, UoB. STAT101 – Elementary Statistics, 2007

Teaching assistant, UoB. MAT121 – Linear Algebra, 2007

Teaching assistant, UoB. MAT111 – Calculus I, 2006

Teaching assistant, UoB. MAT121 – Linear Algebra, 2006

Teaching assistant, UoB. MAT111 – Calculus I, 2005

Teaching assistant, UoB. MAT213 – Functions of a Complex Variable, 2005

Teaching assistant, UoB. MAT112 – Calculus II, 2004

Teaching assistant, UoB. MAT111 – Calculus I, 2003

Administrative Experience

Secretary of COCO2010, Madrid, Spain, April–June, 2010

Member of the Department Council, UoB, 2010

Student Member of "Programstyret", UoB, 2006–2007

Student Member of the Library Council, UoB, 2005–2006

Student Member of the Department Council, UoB, 2006–2007

Travels and Conferences

Visit to Dominique Manchon, Université Blaise Pascal, Clermont-Ferrand, France, October 29–December 13, 2013

Workshop on Renormalisation from Quantum Field Theory to Random and Dynamical Systems, University of Potsdam, Germany, November 7–9, 2013

School on Multiple Zeta Values, Multiple Polylogarithms and Quantum Field Theory, ICMAT, Madrid, Spain, October 7–11, 2013

SciCADE 2013, Valladolid, Spain, September 16–20, 2013

CEMRACS 2013 Summer School, Modelling and simulation of complex systems: stochastic and deterministic approaches, CIRM, Marseille, France, July 22-26, 2013

Visit to DAMTP, Centre for Mathematical Sciences, University of Cambridge, UK, December 4–8, 2011

Visit to Université Blaise Pascal, Clermont-Ferrand, France, May 9–13, 2011

MaGIC 2011, Finse, Norway, March 1–4, 2011

International Conference on Combinatorics and Control, La Cristalera, Spain, June 20–25, 2010

European Science Foundation's Forward Look on Mathematics and Industry, Consensus Conference, Madrid, Spain, April 26–27, 2010

School on Combinatorics and Control, Benasque, Spain, April 12–16, 2010

Workshop on Combinatorics and Control, Madrid, Spain, April 6–9, 2010

Trimester on Combinatorics and Control, Madrid, Spain, April 6–June 25, 2010 (financed by the NILS grant)

MaGIC 2010, Ustaoset, Norway, March 2–5, 2010

Visit to Universidad de Zaragoza, Zaragoza, Spain, February 15–28, 2010

Visit to Heriot-Watt University, Edinburgh, Scotland, December 6–10, 2009

SciCADE 2009, Beijing, China, May 25–29, 2009

Ecole thématique sur les opérades, CIRM, Luminy, France, April 20–24, 2009

MaGIC 2009, Lillehammer, Norway, March 3–6, 2009

Visit to Institut de Recherche Mathématique Avancée, Université de Strasbourg, France, Jan–Feb, 2009

KoMiN 2008, Bergen, Norway, November 7–9, 2008

Méthodes numériques et algébres de Hopf d'arbres, Université Blaise Pascal, Clermont-Ferrand, France, October 23–24, 2008

Foundations of Computational Mathematics, Hong Kong, China, June 16–26, 2008

Conférence Algèbre combinatoire et Arbres, Lyon, France, May 26–30, 2008

MaGIC 2008, Renon, Bolzano, Italy, February 18–21, 2008

KoMiN 2007, Oslo, Norway, November 2–4, 2007

Nasjonalt algebramøte, Oslo, Norway, November 1–2, 2007

The Nordic Conference in Topology, Trondheim, Norway, November 24–25, 2006

KoMiN 2006, Trondheim, Norway, November 3–5, 2006

Workshop on Triangulated Categories, Leeds, UK, August 13–19, 2006

Fifth NRW Topology Meeting, Bielefeld, Germany, April 28–29, 2006

25th Anniversary of MPIM, Bonn, Germany, April 1–5, 2006

Guest of Prof. Stefan Schwede, Mathematisches Institut, Rheinischen Friedrich-Wilhelms-Universität Bonn, Germany, March 31–May 5, 2006

Membership in Scientific Societies

Norwegian Mathematical Society, 2003–present

American Mathematical Society, 2004–present

Relevant Independent Coursework

CS262 - Programming Languages, 2012. Online class offered at Udacity. Taught by Westley Weimer, University of Virginia. Completed with highest distinction.

> This seven weeks course gave an introduction to the fundamentals of programming languages. Key concepts included regular expressions, lexical analysis, grammars, parsing and interpreting. The course culminated in the construction of a simple web browser in Python, able to parse HTML and Javascript. The course had six homework assignments and a final exam.

Machine Learning, 2012. Online class offered through Coursera. Taught by Andrew Ng, Stanford University. Completed with a score of 100%.

> A ten weeks course discussing linear and logistic regression, neural networks, support vector machines, K-means clustering, principal component analysis, anomaly detection and recommender systems. The course had a practical focus, aiming to develop the practical know-how needed to apply these techniques to new problems. There were eight programming assignments (using Octave/Matlab) and a final exam.

Algorithms: Design and Analysis, Part 1, 2012. Online class offered through Coursera. Taught by Tim Roughgarden, Stanford University. Completed with a score of 90.6%.

> A six weeks course on the fundamental principles of algorithm design: divide-and-conquer methods, graph algorithms, practical data structures, randomized algorithms, and more. There were five problem sets, five programming assignments, and a final exam. The programming was done in Python.

CS188.1x Artificial Intelligence, Part I, 2012. Online class offered through edX. Taught by Dan Klein and Pieter Abbeel, UC Berkeley. Completed with distinction.

> An eight week course introducing the basic ideas and techniques underlying the design of intelligent computer systems. Specific emphasis was put on the statistical and decision-theoretic modeling paradigm. During the course's three projects I built autonomous agents that efficiently make decisions in stochastic and adversarial settings, draw inferences in uncertain environments, and optimize actions for arbitrary reward structures.

Probabilistic Graphical Models, basic track, 2012. Online class offered through Coursera. Taught by Daphne Koller, Stanford University.

> The course covered the basics of the PGM representation and how to construct them, using both human knowledge and machine learning techniques. It also discussed algorithms for using a PGM to reach conclusions about the world from limited and noisy evidence, and for making good decisions under uncertainty. It covered both theoretical underpinnings of the PGM framework and practical skills needed to apply the techniques to new problems. Topics included: the Bayesian network and Markov network representation; reasoning and inference methods, including exact inference (variable elimination, clique trees) and approximate inference (belief propagation message passing, Markov chain Monte Carlo methods); learning parameters and structure in PGMs; using a PGM for decision making under uncertainty.

Computational Methods for Data Analysis, 2013. Online class offered through Coursera. Taught by Nathan Kutz, University of Washington. Completed with a score of 96.3%.

> Exploratory and objective data analysis methods applied to the physical, engineering, and biological sciences. Brief review of statistical methods and their computational implementation for studying time series analysis, spectral analysis, filtering methods, principal component analysis, orthogonal mode decomposition, and image processing and compression.

Transcript of Records

Term	Course code	Course name	Exam system	Exam	Exam date	Result	Credits
Spring 2011	MAT930	Seminar on Self-Selected Topic	Participated	Participated		Passed	1.0
Autumn 2010	MAT905	Special Readinglist	Participated	Participated		Withdrawal	
Autumn 2010	MAT930	Seminar on Self-Selected Topic	Participated	Participated		Withdrawal	
Autumn 2009	MNF490	Theory of Science and Ethics	Assignment	Approved Assignment		Passed	3.0
Spring 2008	ZSPDG-00A	Special Course	Participated	Participated		A	10.0
Spring 2008	ZSPDG-00B	Special Course	Participated	Participated		B	10.0
Autumn 2007	MNF400	Knowledge Transmission	Participated	Participated		Passed	3.0
Spring 2007	MATTOP	Master's Thesis in Mathematics - Topology	Assignment	Approved assignment		B	60.0
Autumn 2006	MAT321	Algebraic Geometry I	Oral examination	Oral examination		B	15.0
Spring 2006	ZMNSP-00	Special Subject Examination - Faculty of Mathematics and Natural Sciences	Participated	Participated		A	15.0
Spring 2006	ZMNSP-15	Special Subject Examination - Faculty of Mathematics and Natural Sciences	Participated	Participated		B	15.0
Autumn 2005	MAT223	Algebra	Oral examination	Oral examination		B	10.0
Autumn 2005	MAT323	Representation Theory	Oral examination	Oral examination		B	10.0
Spring 2005	INF262	Signal and Image Processing	Oral examination	Oral examination		B	10.0
Spring 2005	MAT224	Commutative Algebra	Oral examination	Oral examination		A	10.0
Autumn 2004	MAT214	Theory of Complex Functions	Oral examination	Oral examination		A	10.0
Autumn 2004	MAT242	Topology	Oral examination	Oral examination		A	10.0
Autumn 2004	PHYS111	Mechanics 1	Written examination	Written examination		A	10.0
				Laboratorieøvelser		*Passed*	
Autumn 2004	STAT110	Basic Course in Statistics	Two written exams	Two written exams		A	10.0
				Obl. øvelser		*Passed*	
Spring 2004	MAT213	Functions of a Complex Variable	Written examination	Written examination		A	10.0
Spring 2004	MAT222	Algebra and Number Theory	Written examination	Written examination		A	10.0
Spring 2004	MAT232	Functional Analysis	Oral examination	Oral examination		A	10.0
				Obl. øvelser		*Passed*	
				Obl.øvelser		*Passed*	
				Obl.øvelser		*Passed*	
Autumn 2003	BER100	Computational Science I	Written examination	Written examination		A	10.0
				Obl. oppgaver		*Passed*	
Autumn 2003	MAT211	Real Analysis	Oral examination	Oral examination		A	10.0
Autumn 2003	MAT212	Functions of Several Variables	Written examination	Written examination		A	10.0
Spring 2003	M101	Introductory Mathematics II	Written examination	Written examination		1.3	9.0
Spring 2003	M102	Linear Algebra	Written examination	Written examination		1.0	9.0
Spring 2003	M117	Mathematical Methods	Written examination	Written examination		1.1	12.0
Autumn 2002	*M100*	*Introductory Mathematics I*		*Obligatoriske øvinger*		*Passed*	
Autumn 2002	EXPHIL	Examen Philosophicum	Portfolio assesment	Portfolio assesment		1.7	15.0
				FIL		*1.5*	
				VIT		*1.4*	
				LOG		*2.3*	
Autumn 2002	M100	Introductory Mathematics I	Written examination	Written examination		1.4	15.0
				Obligatoriske øvinger		*Passed*	
						Total points:	**332.0**