

CV

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Personal information

Name: Øyvind Ryan

Born: 090969

Status: Married

Address: Olaf Bulls vei 78, 0765 Oslo, Norway.

Email: oyvindry@ifi.uio.no

Homepage: <http://folk.uio.no/oyvindry>

Experience

2007 -

Participation in the Computers in Science Education project (CSE) at the Centre of Mathematics for Applications Research (CMA), University of Oslo. The work in the CSE project focuses on integrating numerical computations (including tools such as Matlab/Python) as a basic ingredient in undergraduate courses. My focus has been on several undergraduate math courses (first four semesters, MAT-INF1100, MAT1100, MAT1110, MAT1120, MAT-INF2360), through teaching and making new course material. Research has centered on eigen-inference methods involving random Vandermonde- and Gaussian matrices, and the use of random matrix results in wireless applications [7, 8, 6, 10, 9]. This has been in collaboration with the research insitute SUPELEC, Paris.

2004 - 2007

Postdoctoral fellowship at the Department of informatics, University of Oslo, and research at Institut Eurecom, Sophia Antipolis, France,. New techniques for efficient image processing are studied [5], in particular *runlength-based image processing*. A large part of the project was to implement well known image standards from scratch (like JPEG2000, GIF, PNG and TIFF) in C++, in order to utilize low level optimizations. Server-side applications were also developed to demonstrate the technology.

2003 - 2004

Raster Imaging AS. Development of an image processing framework in C++ and accompanying web application framework. The framework addresses, among

other things, efficient processing of bi-level images, vector formats and color images. Server-side application areas are addressed in particular. The work initiated in Raster Imaging lead to a postdoctoral project at the University of Oslo.

2000 - 2003

Birdstep Technology ASA. Various C++ and Java development for the Birdstep product suite. Java API for the Birdstep Database Engine (a small footprint native XML database). Java Native Interface (JNI) was used in integrating Java and native code.

1997 - 2000

Computas AS. Development in different projects as a a consultant:

- Arbeidsdirektoratet (Arena) (January 2000 -November 2000). Further development of Computas Java-based framework for knowledgebased systems (fsb).
- KnowledgeEditors (January 1999 - May 2000). An integrated rule and process editor for editing information to be fed to fsb-enabled systems.
- Sonata II (February 1999 - June 1999). Research project for ESA/Estec. System for model-based diagnostics for design and testing of satellittes. Java-based development.
- Corin (August 1999 - December 1999). Webbased course-catalogue for Det Norske Veritas. Java-based development.
- Paga (October 1997 - January 1999). Big knowledge-based personnel and salary system for Posten SDS. Smalltalk-based development.

1998 - 2001

Technical writer for the Norwegian space science magazine "Nytt Om Romfart". The papers are about diverse topics like development of new ground-breaking rocket engines and the next generation space planes, and new satellite projects. See the enclosed publication list for further details.

Pedagogical experience

- Writes the course material and lectures the course MAT-INF2360, which is new in 2012. The material is planned to be released as a book in 2013.
- Plenary lecturer in MAT-INF1100 (modelling and computations) 2011-2012.
- Plenary lecturer in MAT1100 (Calculus) 2010.
- Plenary lecturer in MAT1110 (multivariable analysis and linear algebra) 2008-2011.

- Plenary lecturer in MAT1120 (linear algebra) 2007-2009.
- Lecturer in the beginning course in signal processing (INF2400) at the University of Oslo, 2005-2007.
- 1991-1997: teaching assistant and stand-in lecturer several times in the courses MA001, MA100, and MA105 at the University of Oslo
- Numerous talks at workshops, seminars, and conferences, at many departments and in many countries. These are listed at <http://www.ifi.uio.no/~oyvindry/talks>

Education

1994 - 1997

PhD in Mathematics at the University of Oslo [2]. Functional analysis, operator algebra theory and probability theory. Awarded His Majesty the King's gold medal for best PhD at the faculty in 1997. Thesis includes two journal papers [3, 4]. The thesis is directed towards a probabilistic setting for operator algebra theory. Parts of the thesis aim at finding similarities between well known concepts in classical probability and the corresponding less studied, more general concepts in the operator algebraic probabilistic setting. 18 credits worth in theoretical courses were also part of the PhD-study: Manifold theory (MA352), dynamical systems (MA382) and numerical analysis (IN333).

1993 - 1994

Military duty. Two months with preliminary military training. The rest of the time spent as Adult teaching assistant at the military camp; organizing courses, arranging my own course and helping the soldiers out on applying for schools and other educational facilities.

1988 - 1993

Masters thesis in Mathematics at the Department of Mathematics, University of Oslo [1]. Professor Erling Størmer is supervisor. Besides the thesis, and the theoretical topic worth 10 credits (MA364,MA365), the study also included 20 credits worth of courses in computer science, statistics and astronomy.

Other education

Numerical analysis courses at the University of Oslo, including MA-IN109, MA-IN125, IN333. Basic courses in computer science.

1985 - 1988

Stabekk videregående skole.

Affiliation	Name	Title	Email	Phone
UIO	Knut Mørken	Professor	knutm@ifi.uio.no	91 69 38 59
Simula	Tarik Cicic	Postdoc	tarikc@simula.no	93 05 02 49

Table 1: References

Language skills

Very good English skills due to writing, reading and collaborating on research material and in work over several years. Basic knowledge in German.

Other interests

Mountain-biking and mountain-trekking. Sports and wild-life. On the more technical side, I have always been interested in astronomy and space science.

Research interests

- Wavelet-based applications, like wavelet-based image compression. Image standards.
- Random matrices and free probability theory with applications to signal processing, mobile communication technologies, image processing and finance

There is more information on my research interests and ongoing research projects on my homepage. My publications can also be found at <http://folk.uio.no/~oyvindry/publications>

References

- [1] Ø. Ryan. C^* -algebras generated by toeplitz operators. Master's thesis, Univerity of Oslo, 1993.
- [2] Ø. Ryan. *Construction of free Random Variables*. PhD thesis, Univerity of Oslo, 1997.
- [3] Ø. Ryan. On the construction of free random variables. *J. Funct. Anal.*, 154(2):291–322, 1998.
- [4] Ø. Ryan. On the limit distributions of random matrices with independent or free entries. *Comm. Math. Phys.*, 193(3):595–626, 1998.
- [5] Ø. Ryan. Runlength based processing methods for low bit-depth images. *IEEE Trans. Image Process.*, 18(9):2048–2059, 2009.
- [6] Ø. Ryan. On the optimal stacking of information-plus-noise matrices. *IEEE Trans. Signal Process.*, 59(2):506–514, 2011.
- [7] Ø. Ryan and M. Debbah. Channel capacity estimation using free probability theory. *IEEE Trans. Signal Process.*, 56(11):5654–5667, November 2008.

- [8] Ø. Ryan and M. Debbah. Asymptotic behaviour of random Vandermonde matrices with entries on the unit circle. *IEEE Trans. on Information Theory*, 55(7):3115–3148, 2009.
- [9] Ø. Ryan and M. Debbah. Convolution operations arising from Vandermonde matrices. *IEEE Trans. on Information Theory*, 57(7):4647–4660, 2011.
- [10] Ø. Ryan, A. Masucci, S. Yang, and M. Debbah. Finite dimensional statistical inference. *IEEE Trans. on Information Theory*, 57(4):2457–2474, 2011.