

Full CV for Anders Yeo

Anders Yeo

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- **Name:** Anders James Anthony Yeo
- **Nationality:** Australian
- **Birth date:** 14 October 1970
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- **Homepage URL:** <http://www.cs.rhul.ac.uk/home/anders>
- **Hobbies:** Squash (previously on the Danish national team), tennis, bridge, golf, running, mathematics and computer science.
- **Family:** Wife Angela Yeo and son Lukas Yeo (born 26-09-2008).
- **Languages:** Danish (fluent), English (fluent), Swedish (fluent), German (intermediate).

1 Education and Employment

Feb-2012 to Aug-2012: Senior Research Fellow at the University of Johannesburg, South Africa. This is a full time research position and I am able to work out of Singapore.

March-2003 to Jan-2012: Reader in computer science, Department of Computer Science, Royal Holloway, University of London, London, U.K. The academic year 2009/2010 was spent in Singapore (at the National Institute of Education) on sabbatical leave.

September-2001 to March-2003: Lecturer at the Department of Computer Science, Royal Holloway, University of London, London, U.K.

September-1999 to September-2001: Post.Doc. at the University of Aarhus, Denmark.

September-1998 to September-1999: Post.Doc. at the University of Victoria, Victoria, Canada. This was financed by the Danish Natural Science Research Council.

January-1998 to July-1998: Employed as a research assistant at Odense University.

September-1993 to December-1997: I did my Ph.D., titled "Generalisations of Tournaments", at the Department of Mathematics and Computer Science, Odense University, Denmark. (Note that the Ph.D. was on the so-called 4+4 program, which means that no masters thesis is required, but the Ph.D. is set out to take four years.)

September-1992 to September-1993: One further year of undergraduate studies at the Department of Mathematics and Computer Science, Odense University, Denmark, as required by the 4+4 Ph.D. program.

September-1989 to September-1992: I did a Bachelor at the Department of Mathematics and Computer Science, Odense University, Denmark. My bachelor project was titled "Optimal Game Strategy for Black Jack". During my undergraduate degree I submitted my first research paper titled *Selecting a Satisfactory Secretary*.

2 Administrative duties at Royal Holloway

My administrative duties for the department of computer science at Royal Holloway include the following major posts.

2010-2011: *Member of the Admissions Team.*

This involved tasks such as the following. Going through all borderline admission cases. Doing scholarship interviews. Telephoning and e-mailing with prospective students. Showing prospective students (who visit on non-UCAS days) around the department. Participating in the clearing week (which involves personal communication with a large number of students). Participating in admission meetings.

2006-2009: *Head of the Third Year Project Committee.*

This involved tasks such as the following. Giving introductory information and talks to the students. Organising and conducting x-mas vivas. Taking care of struggling students who may be degraded to half-unit projects. Organising the final marking (assigning markers to projects). Overseeing the final submissions and possible extensions. Organising and doing 3rd marking of borderline projects. Collecting and computing final marks and filling out annual report forms. Answering questions from staff and students concerning projects and regularly e-mailing students to inform them about rules and deadlines.

2004-2005: *Director of Graduate Studies.*

I took over this job from Steve Schneider when he left the department. It involved tasks such as the following. Admissions (going through all applications and getting input from other members of staff) for both M.Sc. and Ph.D.. Organising and conducting annual progression meetings for all students and organising the relevant M.Phil. to Ph.D transfers. Assigning advisers to Ph.D. students. Organising M.Sc. vivas and assisting in the organisation of Ph.D. vivas. Holding postgraduate committee meetings. Attending college meetings for Directors of Graduate Studies. Liaising with the college in general (for example concerning international recruitment). Answering all postgraduate enquiries from outside the college. Filling out annual reports. Answering questions from within the department and in general making sure there is a good environment for our postgraduate students.

2003-2005: *Director of Research.*

This involved tasks such as preparing a dummy RAE run (that is, collecting information from all members of staff and putting it into one concise document), holding committee meetings, corresponding with college and keeping the department updated on research matters.

Note that due to a one year sabbatical I had no administrative duties in the academic year 2009/2010. Other administrative duties for the department have included posts such as *joint*

Library Representative, member (before becoming the head) of the Third Year Project Committee, Director of M.Sc. Computer Science by Research, Postgraduate Admissions and Degree Programme Director for CS with Optimisation.

Apart from my one year sabbatical I have furthermore been the departments representative on the Science Faculty Board since early 2009.

3 Grants

I have obtained the grants listed below. Apart from these grants, I have received travel money from my collaborators grants for visits to countries such as South Africa, Denmark, USA, France, Canada and Germany.

2007-2010: Professor Gregory Gutin (PI) and myself obtained an EPSRC grant titled *Parameterized Problems on Directed Graphs*. (Approximate value £403,000).

2009: Professor Michael Henning received £10,000 from the prestigious Harry Oppenheimer Trust for the purpose of supporting the collaboration between myself and Michael Henning. It is meant to cover our respective visits to South Africa and U.K. (Value £10,000).

2008/2009: Professor Michael Henning and myself obtained a joint travel grant from The Royal Society (UK) and the National Research Foundation (SA) under their *South African - UK Network Agreement* scheme. Note that this involved a complete separate application from the previous year's grant. (Value £1,780).

2007-2008: Together with researchers from LSE and two French universities we obtained an Alliance grant under the Franco-British Partnership Programme. This is sponsored by the British Council and the French Ministry. (Approximate value £2,000 per year adding up to £4,000).

2007/2008: Professor Michael Henning and myself obtained a joint travel grant from The Royal Society (UK) and the National Research Foundation (SA) under their *South African - UK Network Agreement* scheme. (Value £1,892).

2003-2005: Professor Gregory Gutin (PI) and myself obtained a Leverhulme Trust grant titled *Domination Analysis in Combinatorial Optimisation*. (Approximate value £74,000).

1998/1999: I received a very prestigious grant from the Danish natural science research council which funded my one year Post.Doc. at the University of Victoria, Victoria, Canada. There was only 1 such grant given each year across Denmark. (Approximate value £35,000).

4 Conferences and Collaborations

I have been an invited speaker to several conferences and workshops, such as the *DREI meetings in DIMACS*, the *Oberwolfach meetings*, the *Dagstuhl meetings* and the *Danish Graph Theory Meetings*. Below I list the most recent such conferences.

Invited speaker: Dagstuhl (Germany, 8-13/07/2007), The Danish Graph Theory Meeting (Denmark, 6-9/12/2007), Graph Theory 2008 at Sandbjerg Manor (Denmark, 17-23/08/2008, where I gave one of the main invited talks) and the International Conference on Recent Trends in Graph Theory and Combinatorics (India, 12-15/08/2010).

Plenary speaker: The Erster Aachener Tag der Graphentheorie (Germany, 9/01/2004) where I gave the main plenary talk of the conference.

The 52nd annual congress of the South African Mathematical Society (South Africa, 2-4/11/2009) where I was one of the six plenary speakers.

Worker 2011 (The Third Workshop on Kernelization) in Vienna, where I am a keynote speaker.

Apart from the conferences mentioned above I regularly attend general combinatorial conferences (such as the *British Combinatorial Conference* which I attended in 2001, 2003, 2005, 2009 and 2011) and algorithm conferences (such as *OLA 2004* and *Algorithms and Complexity in Durham 2005*).

I have also been invited to visit universities in countries such as Australia, South Africa, Canada, USA, Germany and France. My most recent collaborations are with people from the University of Johannesburg (South Africa), East Tennessee State University (U.S.A), University of Southern Denmark (Denmark), University of Durham (United Kingdom), Simon Fraser University (Canada), University of Canterbury (New Zealand), Technische Universiteit Eindhoven (the Netherlands) and Royal Holloway (United Kingdom).

5 Refereeing and Editorial Memberships

In the last 5 years I have been called upon by the following journals as a referee, *Acta Informatica*, *Algorithmica*, *Ars Combinatorica*, *Australasian Journal of Combinatorics*, *Central European Journal of Mathematics*, *Discrete Applied Mathematics*, *Discrete Mathematics*, *Discrete Optimization*, *Discussiones Mathematicae Graph Theory*, *Electronic Journal of Combinatorics*, *European Journal of Operational Research*, *Graphs and Combinatorics*, *Information Processing Letters*, *INFORMS Journal on Computing*, *International Journal of Mathematics and Mathematical Sciences*, *Journal Collectanea Mathematica*, *Journal of Algorithms - Algorithms in Cognition, Informatics and Logic*, *Journal of Combinatorial Mathematics and Combinatorial Computing*, *Journal of Combinatorial Optimization*, *Journal of Combinatorial Theory (Series B)*, *Journal of Computer and System Sciences*, *Journal of Discrete Algorithms*, *Journal of Graph Theory*, *Journal of Inequalities and Applications*, *Matematicki Vesnik*, *Networks*, *SIAM Journal on Discrete Mathematics* and *Theory of Computing Systems*. I have also been a referee for several conferences such as *IPCO*, *SODA*, *IPEC*, *International Workshop Frontiers of Algorithms* and *International Symposium on Mathematical Programming for Decision Making at Indian Statistical Institute*.

I am also a section editor for the journal **Discrete Mathematics and Theoretical Computer Science** (DMTCS).

6 Research Statement and Publications

My main areas of research are graph theory, graph algorithms, combinatorial optimization, combinatorics and fixed parameter tractability. I will outline my current areas of research in more detail below. I will try to keep subject specific notation to a minimum and explain these areas in as general terms as possible.

- Together with Professor Gregory Gutin (from Royal Holloway) and our two Ph.D. students, I am working intensively in the area of *fixed parameter tractability*. This area involves designing algorithms for solving hard problems (which normally means \mathcal{NP} -hard). As it is not believed that fast algorithms (meaning polynomial algorithms) exist for such problems, we focus our attention on instances of these problems where some parameter is small and show that these problems can be solved fast. This is an exciting new area which is rapidly gaining popularity. There are now several conferences devoted to this topic as well as a webpage (<http://fpt.wikidot.com/>), which lists over 50 people who have grants funding this kind of research. One of the main reasons this area is becoming so popular is both its many real-world applications (see <http://fpt.wikidot.com/>) and the interesting new theory that is being developed.

- Together with Professor Michael Henning (who has a full-time research position at the University of Johannesburg) I am working in the area of *Transversals in Hypergraphs* and in the area of *Total Domination in Graphs*. Professor Michael Henning is a world leading researcher with over 250 peer reviewed journal articles and several awards (see his profile on <http://www.uj.ac.za/EN/Research/NewsAnnouncements/A-RatedResearcherProfiles/Pages/ProfMichaelHenning.aspx> where I am mentioned as his only collaborator).

Transversals in Hypergraphs is a very useful concept which has many real-world applications (for example in the area of computational biology and computational optimization to mention just a few). Another example of the usefulness of transversals in hypergraphs is the fact that the majority of bounds discovered for total domination in graphs are obtained by transforming the problem to hypergraph problems and using results on the transversal number of these hypergraphs.

Some of this work is jointly carried out with Professor Teresa W. Haynes, who is a co-author of several famous books on domination in graphs. This research has also been supported by several grants (one held by Teresa Haynes and one from the very prestigious Oppenheimer Trust and some held jointly by myself and Michael Henning from the Royal Society and the NRF).

Professor Michael Henning and myself furthermore have an outline of a book that we are planning to write together on transversals in hypergraphs, with applications to total domination in graphs.

- I also do research in the area of *digraphs* and in the area of *paths and cycles*. This was the topic of my Ph.D., during which I produced over 20 papers. Since then I have regularly returned to this area and as recently as 2010 submitted two papers in this area. My most common collaborators in this area are Professor Gregory Gutin (Royal Holloway), Professor Jørgen Bang-Jensen (Denmark) and Professor Stéphan Thomassé (France).

7 Publications

The papers in the below bibliography are the papers I have published or which are to appear. I have furthermore written two chapters for the book *The Travelling Salesman Problem and its*

Variations (G. Gutin and A. Punnen, eds.). See the following link for a full list of all my papers, including statistics on my co-authors and journals.

http://www.cs.rhul.ac.uk/home/anders/PAPERS/Anders_Yeo_papers_overview.html

Furthermore note that practically all the below papers are published in very strong journals, with a considerable number of the publications being in the absolute top journals in the area (such as *Combinatorica*, *Journal of Graph Theory* and *Journal of Combinatorial Theory, Series B*).

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8 Teaching

In this section I will give a an outline of which courses I have taught and designed as well as some statistics and reviews on how my teaching has been received.

Before starting at Royal Holloway in 2001 I have taught (meaning, been in charge of and lectured) the following courses:

At Odense University: Discrete Mathematics (1998).

At Aarhus University: Graph Algorithms (2000 and 2001) and Discrete Mathematics (2000).

At Royal Holloway I have taught the following courses. See the explanation of each course code below the table.

Year	Course	Course	Course
2001/2002	CS2490		
2002/2003	CS2490	Second term CS1201	
2003/2004	CS2490	Second term CS1201	
2004/2005	CS2490	Second term CS2201	
2005/2006	CS2700/CS2711	CS3490	
2006/2007	CS2700/CS2711	CS3490	
2007/2008	CS2700/CS2711	50% of CS3490	25% of CS1211 + tutorials
2008/2009	CS2700/CS2711	50% of CS3490	CS1801 lab-sessions
2009/2010	----- On sabbatical -----		
2010/2011	CS2860	CS3490	

CS2490: Algorithms and Complexity.

CS2700/CS2711: First half of Algorithms and Complexity, which could be taken by itself as a 0.5 unit course (CS2700) or part of a full unit course (CS2711). I rewrote 80% of the CS2490 book in order to produce the course material for CS2700/CS2711.

CS2860: Algorithms and Complexity I, which is now a 0.5 unit course and which is based on the CS2700 course.

CS1201: Our first year C++ programming course (I taught the second term). This was the main programming course we offered.

CS2201: Our main second year software development course. I taught and organized the second term together with Professor Fionn Murtagh.

CS1211 (+ tutorials): I taught the first half of the first term of CS1211, which was our first year Java programming course. I furthermore organised the tutorials for CS1211, which was the first year they ran.

CS1801 lab-sessions: I designed and organised the lab-sessions for the second term of CS1801, which is our first year Java programming course (based on CS1211).

CS3490: Computational Optimization.

8.1 Design of courses

I designed both the courses *Graph Algorithms* and *Discrete Mathematics* from scratch at Aarhus University in 2000.

At Royal Holloway I completely redesigned the course CS2700 (first half of CS2711) in 2005. This involved rewriting about 80% of the CS2490 book and including several sections which I wrote from scratch. It also involved a move from C++ to Java.

8.2 Evaluation of my teaching

My teaching gets evaluated in the following ways.

1. I hand out my own questionnaires at the lectures.
2. We have standard college questionnaires that get handed out at the lectures.
3. We have internal and external peer review/evaluation of our teaching.

I have always got very good (and well above average) evaluations in the questionnaires handed out to the students. The latest external review on my teaching, done by the Educational Development Centre at Royal Holloway was very positive. I list the comments given below.

Planning and start of session It was good to give the students a clear time-frame for settling before the lecture, and to use the opportunity for administrative purposes. The slide with the information for completing the questionnaires was a good time-management strategy. Clear connections were made with the previous session, to help the students take a joined-up approach to their learning.

Presentation Speech was very clear and audible. The work on the board worked well to modulate the pace of the session, and repeating the board work verbally will have accommodated student preferences and helped in case of illegibility (the latter being unlikely as the writing was all clear). The explanations were presented in very clear step-wise ways. Repetition and paraphrasing helped to focus on important points and ensure comprehension.

Student participation There was a very good class atmosphere, and you demonstrated a clear concern for the learning of all of the students. When you asked for any questions, you allowed a good time for the students to respond. The task engaged the students well, and provided a good opportunity for them to engage in activity and reflect on their learning. Are there perhaps more opportunities for active learning and interactivity, for example through asking the students to contribute stages of the problem solving?

Methods and approaches The slides were very clear in supporting the lecture: on a very few occasions where code was presented the font size may have been a little small. The particular room (Win 2-3) is problematic as the screen is too low down for a level room, especially for those seated at the back whose vision of the bottom of the screen is likely to be impeded. You noted this, and responded well by writing up an important line from the bottom of a slide. We discussed that, at various points in the course, connections were made with real-world applications: regular references are likely to promote engagement and aid retention. Linked exercises and lab sessions will provide learning experiences to accommodate wide student preferences, and promote further opportunities for teacher- and self-evaluation of learning.

General Good communication was achieved in the lecture and, coupled with the linked activities, the outcomes are very likely to have been met while accommodating diverse student preferences.

Aspects to improve Not to improve, but perhaps for future consideration: Could more active learning and interactivity be promoted, for example through getting the students to contribute to problem working?

Strengths Very clear communication, with good pace.

Good linked resources (visual/electronic) and activities, to allow evaluation and accommodate diverse preferences.

A clear commitment to developing interactivity and active learning.

Use of real-world examples for engagement and retention.

A very clear commitment to the learning of all of the students.