Frans Schalekamp

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Research Interests

- Approximation Algorithms and Combinatorial Optimization

Academic Experience

- **Senior Lecturer** Cornell University
  School of Operations Research & Information Engineering — from July 2020
- **Visiting Assistant Professor** Cornell University
  School of Operations Research & Information Engineering — August 2019 – June 2020; August 2017 – June 2018; August 2015 – June 2016
  Department of Computer Science — January 2017 – June 2017
- **Visiting Assistant Professor** SUTD (Singapore University of Technology and Design), Singapore — Spring 2019
- **Part-Time Faculty** CUHK-SZ (Chinese University of Hong Kong, Shenzhen) — Fall 2018
  Shenzhen, China
- **Visiting Assistant Professor** College of William & Mary — August 2012 – August 2015
  Department of Mathematics
- **Postdoctoral Researcher** Tsinghua University, Beijing, China — August 2008 – August 2010
  Institute for Theoretical Computer Science (ITCS)
- **Lecturer** Cornell University — Summer 2004
- **Research Assistant** Cornell University — 2005, Spring 2006
- **Research Assistant** Vrije University — 1993 – 1994

Industry Experience

- **Senior Analyst** CarMax — August 2016 – December 2016
  Richmond, VA
- **Research Scientist** Nature Source Genetics — July 2006 – June 2008
  Ithaca, NY
- **Junior Developer/Programmer** Ortec Systems — 2000 – 2001
  Gouda, Netherlands

Education

- **PhD** Operations Research Cornell University — May 2007
- **MA** Operations Research Vrije University, Amsterdam, Netherlands — August 2000

Awards

- ORIE Teaching Award (awarded by the students of ORIE), 2021
- Sonny Yau '72 Excellence in Teaching Award, 2021
- Simon Prize for Excellence in the Teaching of Mathematics, 2014
- Cornell Graduate Fellowship, 2002
- MacMullen Operations Research Fellowship, 2001
- 1/2 MIT Presidential Fellowship, 2001 (declined)
- VVS Scriptieprijs, 2001
  (award for best Master's thesis by Dutch Society for Operations Research and Statistics 2001) for thesis *On Shuffling Cards* (together with Anke van Zuylen)

Publications

Journal Articles

- "Layers and Matroids for the Traveling Salesman's Paths (with András Sebő, Vera Traub and Anke van Zuylen), *Operations Research Letters* 46(1) (2018), pp. 60–63.
- "Scheduling over Scenarios on Two Machines" (with Esteban Feuerstein, Alberto Marchetti-Spaccamela, René Sitters, Suzanne van der Ster, Leen Stougie and Anke van Zuylen), *Journal of Scheduling* 20(6) (2017), pp. 545–555.
- "An Upper Bound on the Number of Circular Transpositions to Sort a Permutation" (with Anke van Zuylen, James Bieron and Gexin Yu), *Information Processing Letters* 116(11) (2016), pp. 718-722.
- "A Flow Based Algorithm for Mobile Element Path Planning in Wireless Sensor Networks" (with Khaled Almi'ani, Anastasios Viglas and Reza Abrishambaf), *International Journal of Wireless and Mobile Computing*, 10(1) (2016), pp. 1–12.
- "On the Integrality Gap of the Subtour LP for the 1,2-TSP" (with Jiawei Qian, David P. Williamson and Anke van Zuylen), *Mathematical Programming Series B* 150(1) (2015), pp. 131-151.
- "Split Scheduling with Uniform Setup Times" (with René Sitters, Suzanne van der Ster, Leen Stougie, Víctor Verdugo and Anke van Zuylen), *Journal of Scheduling* 18(2) (2015), pp. 119-129.
- "2-Matchings, the Traveling Salesman Problem, and the Subtour LP: A Proof of the Boyd-Carr Conjecture" (with David P. Williamson and Anke van Zuylen), *Mathematics of Operations Research* 39(2) (2014), pp. 403-417.
- "Popular Ranking" (with Anke van Zuylen and David P. Williamson), *Discrete Applied Mathematics* 165 (2014), pp. 312-316.
- "Clustering with or without the Approximation" (with Michael Yu and Anke van Zuylen), *Journal of Combinatorial Optimization* 25(3) (2013), pp. 393–429.
- "Algorithms for the universal and *a priori* TSP" (with David Shmoys), *Operations Research Letters*, 36 (2008), no. 1, pp. 1–3.
- "The Achilles' heel of the GSR-shuffle — A note on New Age Solitaire" (with Anke van Zuylen) *Probability in the Engineering and Informational Sciences*, 18 (2004), no. 3, pp. 315–328.
- "Simulation of the Matching Problem of Montmort" *Probability in the Engineering and Informational Sciences*, 12 (1998), no. 3, pp. 325–328.

Accepted

- "A Duality Based 2-Approximation Algorithm for Maximum Agreement Forest" (with Neil Olver, Suzanne van der Ster, Leen Stougie and Anke van Zuylen). Accepted to *Mathematical Programming*.

Refereed Proceedings

- "Optimally Discriminative Choice Sets in Discrete Choice Models: Application to Data-Driven Test Design" (with Igor Labutov, Kelvin Luu, Hod Lipson, Christoph Studer), KDD 2016.
- "A Duality Based 2-Approximation Algorithm for Maximum Agreement Forest" (with Anke van Zuylen and Suzanne van der Ster), ICALP 2016.
- "Scheduling over Scenarios on Two Machines" (with Esteban Feuerstein, Alberto Marchetti-Spaccamela, René Sitters, Suzanne van der Ster, Leen Stougie and Anke van Zuylen), COCOON 2014 (20th Annual International Computing and Combinatorics Conference), in Lecture Notes in Computer Science, Vol. 8591, pp. 559–571.

- "Brief Announcement: On the Complexity of the Minimum Latency Scheduling Problem on the Euclidean Plane" (with Henry Lin), SPAA 2012 (24th ACM Symposium on Parallelism in Algorithms and Architectures), pp. 80–81.
- "On the Integrality Gap of the Subtour LP for the 1,2-TSP" (with Jiawei Qian, David P. Williamson and Anke van Zuylen), LATIN 2012 (10th Latin American Theoretical INformatics Symposium), pp. 606–617.
- "A Proof of the Boyd-Carr Conjecture" (with David P. Williamson and Anke van Zuylen). SODA 2012 (The Twenty-Third Annual ACM-SIAM Symposium on Discrete Algorithms), pp. 1477–1486.
- "Popular Ranking" (with Anke van Zuylen and David Williamson), CTW 2011 (10th Cologne-Twente Workshop on Graphs and Combinatorial Optimization).
- "Clustering with or without the Approximation" (with Michael Yu and Anke van Zuylen), COCOON 2010 (16th Annual International Computing and Combinatorics Conference), in Lecture Notes in Computer Science, Vol. 6196, pp. 70–79.
- "Rank Aggregation: Together We're Strong" (with Anke van Zuylen), ALENEX 2009 (workshop on Algorithm Engineering and Experiments), pp. 38–51.

Manuscripts

- "On the Complexity of the Minimum Latency Scheduling Problem on the Euclidean Plane" (with Henry Lin), available on arXiv at `http://arxiv.org/abs/1203.2725`
- "Mapping from a Random Walk Perspective with Two Applications", manuscript
- "Partitio et Emergo — On computing eigenvalues of shuffle matrices" (with Anke van Zuylen), manuscript

Theses

- Some Results in Universal and A Priori Optimization (PhD Thesis, advisor David Shmoys), 2007
- Over het schudden van kaarten (Master's Thesis, with Anke van Zuylen, in Dutch, advisor Henk Tijms), 2000

Teaching Experience

Cornell University

- ENGRI 1101 Engineering Applications of Operations Research — Summer 2004, Fall 2015, Spring 2016, Fall 2017, Spring 2022
- ENGRD 2700 Basic Engineering Probability and Statistics — Spring 2021
- ORIE 3310/5310 Optimization II — Spring 2018, Spring 2020, Spring 2021
- ORIE 4350 Introduction to Game Theory — Fall 2020, Spring 2022
- ORIE 4580/5580/5581 Simulation Modeling and Analysis — Fall 2019
- CS 2800 Discrete Structures (cotaught) — Fall 2021
- CS 4820 Introduction to Analysis of Algorithms (cotaught) — Spring 2017
- Teaching Assistant — 2003 – 2004

  In 2021 I received both the **ORIE Teaching Award** (awarded by the students of ORIE) and the **Sonny Yau '72 Excellence in Teaching Award** (awarded by the College of Engineering).

Chinese University of Hong Kong, Shenzhen

- Math 2040 Linear Algebra — Fall 2019

Tsinghua University

- Advanced Algorithms (cotaught) — Spring 2010
- Introduction to Computer Science (cotaught) — Fall 2008, Fall 2009

College of William & Mary

- Math 111 Calculus I — Fall 2012, Fall 2013, Spring 2015
- Math 112 Calculus II — Spring 2014
- Math 150 Freshman Seminar "The Computational Universe" — Fall 2013
- Math 211 Linear Algebra — Spring 2013, Fall 2014
- Math 323 Introduction to Operations Research — Fall 2012
- CSci 638 Nonlinear Optimization — Spring 2013, Fall 2014
- CSci 688 Combinatorial Optimization — Spring 2014
- CSci 688 Stochastic Optimization — Spring 2015

  In 2014 I received the **Simon Prize for Excellence in the Teaching of Mathematics**.

Singapore University of Technology and Design

- Systems World — Spring 2019

  Full teaching evaluations are available on my website `http://fransschalekamp.com`.

Academic Advising

Cornell University

- *Undergraduate research advisor* to one student — since January 2022
- *Undergraduate research advisor* to one student — January 2020-May 2021
- *Co-advisor* for MEng project teams (with David Shmoys) — Spring 2022
- *Co-advisor* for MEng project teams (with David Shmoys) — Spring 2021
- *Co-advisor* for two MEng project teams (with Sid Banerjee) — Spring 2020
  (one of which won first prize in Silent Hoist and Crane Award for best MEng project)
- *Advisor* for two MEng project teams — Spring 2018
- *Co-advisor* for MEng project team (with David Shmoys) — Spring 2017
  (won second prize in Silent Hoist and Crane Award for best MEng project)
- *Co-advisor* for MEng project team (with Sid Banerjee) — Spring 2016
  (won first prize in Silent Hoist and Crane Award for best MEng project)

College of William & Mary

- *Advisor Freshman Monroe Scholar Summer Research Project* — Summer 2014
- *Committee Member* Honors Thesis

Tsinghua University

- *Co-advisor* Undergraduate Summer Project Student — Summer 2009
  resulting in a publication in Journal of Combinatorial Optimization, and presented at COCOON 2010

Other Work Experience

- **Senior Analyst** CarMax, Richmond VA — August 2016 – December 2016
- **Researcher** (unaffiliated) — September 2010 – July 2012
  - independent research, resulting in publications in conferences SODA 2012, LATIN 2012 and CTW 2011, and journals *Mathematics of Operations Research* and *Discrete Applied Mathematics*.
  - research collaboration visits to TU Berlin, Vrije University Amsterdam, Cornell University and Kyoto University

- **Research Scientist**

  Nature Source Genetics, Ithaca NY July 2006 – June 2008

  Nature Source Genetics is a computational genomics company started in 2006, dedicated to the development and application of new algorithms designed to harness natural genetic variation in the improvement of crop plants. In particular, NSG develops algorithms for optimizing population structure/design, QTL (Quantitative Trait Loci) detection/validation and QTL deployment in commercial breeding programs.

- **Junior Developer/Programmer**

  Ortec Systems, Gouda, The Netherlands, project EuroPlanner 2000 – 2001

  ORTEC is an Operations Research consulting company based in the Netherlands.

Presentations

- May 2015, Richmond University, Richmond, VA
- January 2015, Virginia Commonwealth University, Richmond, VA
- December 2014, College of William & Mary, Williamsburg, VA
- November 2014, Virginia Commonwealth University, Richmond, VA
- August 2014, COCOON 2014, Atlanta, GA
- October 2012, College of William & Mary, Williamsburg, VA
- August 2012, ISMP, Berlin, Germany
- October 2011, Tinbergen Insititute, Amsterdam, Netherlands
- March 2011, Technische Universität Berlin, Germany
- March 2011, Carnegie Melon Qatar, Qatar
- July 2010, COCOON 2010, Nha Trang, Vietnam
- February 2010, Max-Planck-Institut für Informatik, Saarbrücken, Germany
- December 2009, ITCS seminar, Tsinghua University, Beijing, China
- April 2009, Tokyo University, Tokyo, Japan
- March 2009, Workshop with Aarhus University, "Current Trends in Algorithms, Complexity Theory, and Cryptography", Tsinghua University, Beijing, China
- February 2009, ITCSC seminar, The Chinese University of Hong Kong, Hong Kong
- January 2009, ALENEX 2009, New York, NY
- November 2006, INFORMS (Sponsored Session), Pittsburgh, PA

Service

- Referee for SIAM Journal on Discrete Mathematics, Mathematical Programming, Mathematics of Operations Research, SIAM Journal on Computing, IPCO (Conference on Integer and Combinatorial Optimization), ALENEX (Algorithm Engineering and Experiments), Journal of Mathematical Modelling and Algorithms, Cambridge University Press, International Journal of Foundations of Computer Science, ISAAC (International Symposium on Algorithms and Computation), ACSC (Australasian Computer Science Conference), Portuguese Foundation for Science and Technology (FCT)

Skills

- Computer: Java, Gurobi, AMPL, CPLEX, C, C++, R, Jupyter, Python, Matlab, Pascal, LaTeX, SQL, HTML, Postscript
- Languages: English (near native), Dutch (native), German (good), French (average), Chinese (beginner)