

# 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 UNIVERSITEIT 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 UNIVERSITEIT, Amsterdam, Netherlands August 2000

## AWARDS

- Department of Mathematics Senior Faculty Award for excellent teaching, 2024
- ORIE Teaching Award (awarded by the students of ORIE), 2021, 2022
- 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*

- “A Duality Based 2-Approximation Algorithm for Maximum Agreement Forest” (with Neil Olver, Suzanne van der Ster, Leen Stougie and Anke van Zuylen), *Mathematical Programming* (2022).
- “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.

### *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

- ENGR 1101 Engineering Applications of Operations Research Summer 2004, Fall 2015, Spring 2016, Fall 2017, Spring 2022, Fall 2023, Fall 2024
- 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 4390 Optimization Models for Logistics, Networks and Markets Fall 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
- MATH 2940 Linear Algebra for Engineers Spring 2023, Spring 2024
- 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).

In 2022 I again received the **ORIE Teaching Award** (awarded by the students of ORIE).

In 2024 I received the **Department of Mathematics Senior Faculty Award** for excellent teaching.

### 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*

- Advisor for MEng project team (won first prize in Silent Hoist and Crane Award for best MEng project) Spring 2024
- Advisor for MEng project team (won shared first prize in Silent Hoist and Crane Award for best MEng project) Spring 2023
- Undergraduate research advisor to one student January 2022-May 2022
- Undergraduate research advisor to one student January 2020-May 2021
- Co-advisor for MEng project team (with David Shmoys) Spring 2022, Spring 2021
- Co-advisor for two MEng project teams (with Sid Banerjee) (one of which won first prize in Silent Hoist and Crane Award for best MEng project) Spring 2020
- Advisor for two MEng project teams Spring 2018
- Co-advisor for MEng project team (with David Shmoys) (won second prize in Silent Hoist and Crane Award for best MEng project) Spring 2017
- Co-advisor for MEng project team (with Sid Banerjee) (won first prize in Silent Hoist and Crane Award for best MEng project) Spring 2016

### *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

## 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), Twi (beginner)