

# Marc Renault

Computer Sciences Department  
University of Wisconsin – Madison  
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## EDUCATION

**PhD in Computer Science with distinction** 2014

(Doctorat d’informatique, mention “Très Honorable”)

LIAFA, Université Paris Diderot-Paris 7, Paris, France

Thesis: Lower and Upper Bounds for Online Algorithms with Advice

Members of the jury:

Thesis Director: Adi Rosén, DR., CNRS, Paris 7

President: Frédéric Mangniez, DR., CNRS, Paris 7

Reader: Nikhil Bansal, Prof., Eindhoven University of Technology.

Reader: Christoph Dürr, DR., CNRS, Paris 6

Examiner: Pierre Fraigniaud, DR., CNRS, Paris 7

Examiner: Seffi Naor, Prof., Technion - Israel Institute of Technology

Examiner: Rob Van Stee, Lecturer, University of Leicester

**Master of Research in Computer Science, *cum laude*** 2010

(Master Parisien de Recherche en Informatique (MPRI), mention “Assez Bien”)

Université Paris Diderot-Paris 7, Paris, France

Thesis: Online Algorithms with Advice

Supervisor: Adi Rosén, DR2. LRI, Paris 11

**Bachelor of Computer Science, Sexton Distinction** 2002

Dalhousie University, Halifax, Nova Scotia, Canada

## ACADEMIC APPOINTMENTS

**Assistant Faculty Associate,** Aug 2017  
**Computer Sciences Department,** – Present  
**University of Wisconsin – Madison**  
Madison, WI, USA

**Assistant Professor,** Jan 2017  
**Department of Mathematics & Computer Science,** – Aug 2017  
**Mount Allison University**  
Sackville, NB, Canada

- Associate Researcher,**  
**LIP6, Université Pierre et Marie Curie-Paris 6**  
Paris, France Oct 2016  
– Sept 2017
- Postdoctoral Researcher,**  
**CNRS, IRIF, Université Paris Diderot-Paris 7**  
Paris, France Oct 2015  
– Sept 2016
- 1 yr Researcher/Lecturer** (Attaché temporaire d'enseignement et de recherche),  
**UFR 919 d'ingénierie, Université Pierre et Marie Curie-Paris 6**  
Full teaching load (192h) Sept 2014  
Paris, France – Aug 2015

## TEACHING EXPERIENCE

- Computer Sciences Department,**  
**University of Wisconsin – Madison**  
Madison, WI, USA Aug 2017  
– Present
- CS200 – Programming I (2017-2018, 2018-2019, Fall 2019, Fall 2020)
  - CS298 – Research Directed Study (Spring 2018, 2018-2019, 2019-2020, Fall 2020)
  - CS368 – C++ for Java Programmers (Spring 2020)
  - CS577 – Introductions to Algorithms (Spring 2020, Spring 2021)
- Department of Mathematics & Computer Science,**  
**Mount Allison University**  
Sackville, NB, Canada Jan 2017  
– Aug 2017
- COMP2931 – Introduction to Systems Programming (2016-2017)
  - COMP4721 – Software Design (2016-2017)
- UFR 919 d'ingénierie, Université Pierre et Marie Curie-Paris 6**  
Paris, France Sept 2014  
– Aug 2015
- 1I001 – Éléments de programmation 1 [Elements of programming 1] (2014-2015)
  - LI345 – Bases de données et sites web [Databases and websites] (2014-2015)
  - LI353 – Modélisation et résolution de problèmes [Modelling and problem solving] (2014-2015)
  - LI355 – Programmation des architectures clients-serveur [Programming on client-server architectures] (2014-2015)
- UFR d'informatique, Université Paris Diderot-Paris 7**  
Paris, France Oct 2011  
– Aug 2014
- IF1 – Introduction à l'informatique [Introduction to computer science] (2011-2012, 2013-2014)
  - IK3 – Projet informatique [Computer science project] (2013-2014)
  - EA4 – Éléments d'algorithmique [Algorithmic elements] (2012-2013)
  - LC4 – Langage C et outils de développement [C language and programming tools] (2012-2013)
  - BD6 – Bases de données [Databases] (2011-2012, 2012-2013, 2013-2014)
  - PR6 – Programmation réseaux [Network programming] (2013-2014)

## SUPERVISORY EXPERIENCE

### HONOURS PROJECTS

#### University of Wisconsin – Madison

Mikhail Nedbai Junior *Bijection Analysis Inspired Algorithms for the Online Steiner Tree Problem.* 2019 - 2020

### DIRECTED STUDIES

#### University of Wisconsin – Madison

Connor Waity	Senior	<i>List Update: DOA and Free Move Optimum.</i>	Fall 2020
Yatin Sangwan	Sophomore	<i>Dual Bin Packing: First-Fit with Advice</i>	Spring 2019
Naman Ladsaria	Junior	<i>Free Move Optimum for the List Update Problem.</i>	Spring 2019
Ritvik Bhawnani	Junior	<i>Bijection Analysis Inspired Algorithms for the <math>k</math>-Server Problem on General Metric Spaces.</i>	Fall 2019
Pranav Julakanti	Junior	<i>Simulations of Randomized Bijection Analysis.</i>	Fall 2019
Mikhail Nedbai	Junior	<i>Bijection Analysis Inspired Algorithms for the Online Steiner Tree Problem.</i>	Spring 2019
Zhiyue Ding	Sophomore	<i>Bijection Analysis Inspired Algorithms for the <math>k</math>-Server Problem.</i>	Spring 2019
Nicholas Pavlakovic	Junior	<i>Bijection Analysis of Greedy for the <math>k</math>-Server on the Line.</i>	Fall 2018
Alexander Taylor	Junior	<i>Canadian Traveller Problem and Ants.</i>	Fall 2018
Alex Elevathingal	Freshman	<i>Lower Bound of the BIT algorithm.</i>	Spring 2018
Max Huddleston	Freshman	<i>Advice algorithms for online matching on the line.</i>	Spring 2018

## RELEVANT INDUSTRY EXPERIENCE

#### Ren Solutions – Owner and Head Developer

Halifax, NS, Canada

Jul 2003

– Aug 2009

- Designed custom programs that integrated with the SYSPRO ERP, focusing on streamlining and automating business processes in order to improve efficiency, increase productivity and gather more information.
- Performed technical support for clients with SYSPRO ERP.
- Aided various research projects in the Department of Pathology, Dalhousie University, by providing custom programs to analyse biological data, resulting in two journal publications.
- Developed numerous websites using a variety of technologies including: HTML, CSS, SSI, MySQL, PHP, JavaScript, Java Servlets and Joomla.
- Hired and managed one programmer and one sales representative.

## RESEARCH GRANTS

<i>Gaspard Monge Optimization and Operations Research Grant for</i> <b>Bijjective and Stochastic Dominance in Online Computation</b> joint with Spyros Angelopoulos (LIP6, UPMC - Paris 6, France), Christoph Dürr (LIP6, UPMC - Paris 6, France), and Pascal Schweitzer (RTWH Aachen University, Germany)	€7,000	2017 – 2019
<i>Gaspard Monge Optimization and Operations Research Grant for</i> <b>Search and Surveillance Games: Theory, Algorithms and Ap- plications</b> joint with Spyros Angelopoulos (LIP6, UPMC - Paris 6, France), Christoph Dürr (LIP6, UPMC - Paris 6, France), Thomas Lidbetter (LSE, UK) and Katerina Papadiki (LSE, UK)	€7,000	2015 – 2017
<i>French National Research Agency program Blanc for</i> <b>NeTOC (New Techniques in Online Computation)</b> [ANR-11-BS02-0015] joint with Spyros Angelopoulos (LIP6, UPMC - Paris 6, France), Christoph Dürr (LIP6, UPMC - Paris 6, France), Pierre Fraigniaud (LIAFA, Paris 7, France), Giorgio Lucarelli (LIP6 - Paris 6, France), and Adi Rosén (LIAFA, Paris 7, France).	€236,080	2011 – 2015

## AWARDS AND DISTINCTIONS

Spring 2020 Honored Instructor, UW–Madison		2020
Fall 2019 Honored Instructor, UW–Madison		2019
Spring 2019 Honored Instructor, UW–Madison		2019
Spring 2018 Honored Instructor, UW–Madison		2018
Fall 2017 Honored Instructor, UW–Madison		2017
xxxii EURO Summer Institute Laureate, University of Szeged, Hungary		2015
Contrat Doctoral from Université Pierre et Marie Curie	~ €60,000	2010 – 2013
Contrat Doctoral from Université Paris-Sud 11 (Declined)	~ €60,000	2010 – 2013
Joseph Duncan Stewart Scholarship, Dalhousie University	\$1,000 CAD	1999 - 2000
One of the top five students in Canada identified by the Selection Com- mittee, Lucent Global Science Scholars Program Scholarship	\$500 CAD	1999
Entrance Amalgamation Scholarship, Dalhousie University	\$3,000 CAD	1998 - 1999

## PUBLICATIONS

### Theoretical Computer Science

(Note that authors are listed in alphabetical order <sup>1</sup>)

#### Peer-reviewed Journal Papers:

- Angelopoulos S, **Renault MP**, Schweitzer P. Stochastic Dominance and the Bijjective Ratio of Online Algorithms. *Algorithmica*, 2019, in press.

<sup>1</sup>The custom for theoretical computer science and mathematics is to list the authors in alphabetical order (cf. Remark by AMS: <http://www.ams.org/profession/leaders/culture/CultureStatement04.pdf>).

5. Angelopoulos S, Dürr C, Kamali S, **Renault MP**, Rosén A. Online Bin Packing with Advice of Small Size. *Theory of Computing Systems; to appear*, 2018. (Preliminary version appeared in WADS 2015.)
4. **Renault MP**. Online Algorithms with Advice for the Dual Bin Packing Problem. *Central European Journal of Operations Research*; 25 (4): 953–966, 2017.
3. Adamaszek A, **Renault MP**, Rosén A, van Stee R. Reordering Buffer Management with Advice. *Journal of Scheduling*; 20 (5): 423–442, 2017. (Preliminary version appeared in WAOA 2013.)
2. **Renault MP**, Rosén A, van Stee R. Online Algorithms with Advice for Bin Packing and Scheduling Problems. *Theoretical Computer Science*; 600: 155–170, 2015.
1. **Renault MP**, Rosén A. On Online Algorithms with Advice for the  $k$ -Server Problem. *Theory of Computing Systems*; 56 (1): 3–21, 2015. (Preliminary version appeared in WAOA 2011.)

### Peer-reviewed Conference Papers:

6. Boczkowski L, Guinard B, Korman A, Lotker Z and **Renault MP**. Random Walks with Multiple Step Lengths. In *Proc. of Latin American Theoretical Informatics 2018 (LATIN 2018)*; to appear.
5. Dürr C, Konrad C, **Renault MP**. On the Power of Advice and Randomization for Online Bipartite Matching. In *Proc. of the 24th Annual European Symposium on Algorithms (ESA 2016)*; LIPIcs 57: 37:1–37:16, 2016.
4. Angelopoulos S, Dürr C, Kamali S, **Renault MP**, Rosén A. Online Bin Packing with Advice of Small Size. In *Proc. of Algorithms and Data Structures - 14th International Symposium (WADS 2015)*; LNCS 9214: 40–53, 2015.
3. López-Ortiz A, **Renault MP**, Rosén A. Paid Exchanges are Worth the Price. In *Proc. of the 32nd Symposium on Theoretical Aspects of Computer Science (STACS 2015)*; LIPIcs 30: 636–648, 2015.
2. Adamaszek A, **Renault MP**, Rosén A, van Stee R. Reordering Buffer Management with Advice. In *Proc. of the 11th Workshop on Approximation and Online Algorithms (WAOA 2013)*; LNCS 8447: 132–143, 2014.
1. **Renault MP**, Rosén A. On Online Algorithms with Advice for the  $k$ -Server Problem. In *Proc. of the 9th Workshop on Approximation and Online Algorithms (WAOA 2011)*; LNCS 7164: 198–210, 2012. (Invited to Theory of Computing Systems, special issue for WAOA 2011.)

### Applied Bioinformatics

#### Peer-reviewed Journal Papers:

3. El Harane N, Kervadec A, Bellamy V, Pidial L, Nemetalla H, Perier MC, Lima Correa B, Thiebault L, Cagnard N, Duché A, Brunaud C, Lemitre M, Gauthier J, Tan Bourdillon A, **Renault MP**, Hovhannisyan Y, Paiva S, Colas A, Agbulut O, Hagege A, Silvestre JS, Menasché P, Renault NKE. Acellular therapeutic approach for heart failure: in vitro production of extracellular vesicles from human cardiovascular progenitors. *European Heart Journal*; 39 (20), 1835–1847, 2018.
2. Copeland E, Renault NKE, **Renault MP**, Dyack S, Bulman DE, Bedard K, Otley A, Magee F, Acott P, Greer WL. A Novel Splice-Site Mutation in ATP8B1 Results in Atypical Progressive Familial Intrahepatic Cholestasis Type 1. *Journal of Gastroenterology and Hepatology*; 28 (3): 560–564, 2013.
1. Renault NKE, **Renault MP**, Copeland E, Howell RE, Greer WL. Familial skewed X-chromosome inactivation linked to a component of the cohesin complex, SA2. *Journal of Human Genetics*; 56 (5): 390–397, 2011.

**Published Abstracts:**

4. Renault N, Kervadec A, Bellamy V, El Harane N, Thiebault L, Nematalla H, Pidial L, Lemitre M, Cagnard N, Smit N, Meijborg V, Brunaud C, **Renault MP**, Colas A, Hagège A, Coronel R, Mercola M, Silvestre JS, Menasché P. Extracellular Vesicles Secreted by Human Cardiac Progenitors Are an Effective Alternative to Cell Transplantation for Chronic Heart Failure. *Circulation*; 134 (Suppl 1): A16533, 2016.
3. Kervadec A, Bellamy V, El Harane N, Smit N, Meijborg V, Nematalla H, Périer MC, **Renault MP**, Colas A, Hagège A, Coronel R, Mercola M, Silvestre JS, Menasché P, Renault NKE. Extracellular vesicles as effective substitutes for cell therapy for chronic heart failure. *European Heart Journal, European Society of Cardiology Congress supplement*; 37 (Supp 1): 397, 2016.
2. Renault NKE, Copeland E, **Renault MP**, Riddell DC, Dobson MJ, Howell RE, Dyack S, Greer WL. STAG2 may influence X-chromosome inactivation choice in a family with hemophilia expression in females. *Pathology – Research and Practice*; 206: 209, 2010.
1. Copeland E, Dyack S, Renault NKE, **Renault MP**, Bulman DE, Greer WL. Genetic Analysis of a Nova Scotia Kindred with an Alagille-Like Syndrome. *Pathology – Research and Practice*; 206: 207, 2010.

**PRESENTATIONS**

(\* indicates presenter)

**Theoretical Computer Science****International Conference Presentations:**

11. Boczkowski L\*, Guinard B, Korman A, Lotker Z and **Renault MP**. Random Walks with Multiple Step Lengths. Latin American Theoretical Informatics 2018 (LATIN 2018), Buenos Aires, Argentina, April 16–19, 2018.
10. Dürr C, Konrad C\*, **Renault MP**. On the Power of Advice and Randomization for Online Bipartite Matching. 24th Annual European Symposium on Algorithms (ESA 2015), Aarhus, Denmark, Aug 22–24, 2016.
9. Korman A, **Renault MP\***, Yovel Y. Social foraging and non-persistent food patches. Lorentz Center – Search Games: Theory and Algorithms, Leiden, Netherlands, Jun 26 - Jul 1, 2016.
8. Angelopoulos S, Dürr C, Kamali S, **Renault MP\***, Rosén A. Online Bin Packing with Small Advice. Workshop - New Techniques in Online Algorithms, Paris, France, Nov 12–13, 2015.
7. Angelopoulos S, Dürr C, Kamali S\*, **Renault MP**, Rosén A. Online Bin Packing with Advice of Small Size. 14th Algorithms and Data Structures Symposium (WADS 2015), Victoria, BC, Canada, Aug 5–7, 2015.
6. **Renault MP\***. Online Algorithms with Advice for the Dual Bin Packing Problem. XXXII Euro Summer Institute (ESI 2015), Szeged, Hungary, June 15–27, 2015.
5. López-Ortiz A, **Renault MP\***, Rosén A. Paid Exchanges are Worth the Price. 4th French-Israeli Workshop on Foundations of Computer Science (FILOFOCS 2014), Tel Aviv, Israel, May 25–27, 2015.
4. López-Ortiz A, **Renault MP\***, Rosén A. Paid Exchanges are Worth the Price. 32nd Symposium on Theoretical Aspects of Computer Science (STACS 2015), Munich, Germany, Mar 4–7, 2015.
3. Adamaszek A, **Renault MP\***, Rosén A, van Stee R. Reordering Buffer Management with Advice. 11th Workshop on Approximation and Online Algorithms (WAOA 2013), Sophia Antipolis, France, Sept 5–6, 2013.

2. **Renault MP\***, Rosén A, van Stee R. Online Scheduling and Bin Packing with Advice. 2nd French-Israeli Workshop on Foundations of Computer Science (FILOFOCS 2013), Tel Aviv, Israel, April 9–11, 2013.
1. **Renault MP\***, Rosén A. On Online Algorithms for the  $k$ -Server Problem with Advice. 9th Workshop on Approximation and Online Algorithms (WAOA 2011), Saarbrücken, Germany, Sept 8–9, 2011.

#### Invited Presentations:

2. Adamaszek A, **Renault MP\***, Rosén A, van Stee R. A PTAS-Like Online Algorithm with Advice for the Reordering Buffer Management Problem. Algorithmique à Garantie de Performance (GDR RO - AGaPE), Université Pierre et Marie Curie - Paris 6, Paris, France, Dec 12, 2014.
1. **Renault MP\***. Online Algorithms with Advice. 31ème Journées Franciliennes de Recherche Opérationnelle (JFRO), Université Pierre et Marie Curie - Paris 6, Paris, France, June 25, 2014.

#### National Conference Presentations:

1. Angelopoulos S, Dürr C, Lidbetter T, Papadaki KP, **Renault MP\***. Star Search Problems. Programme Gaspard Monge pour l'Optimisation (PGMO), ENSTA Paris Tech, Palaiseau, France, Oct 27–28, 2015.

#### Seminar Presentations:

12. Angelopoulos S, **Renault MP\***, Schweitzer P. New techniques for analysing online algorithms: matching theory to practice. Mount Allison University, Sackville, NB, Canada, Jan 23, 2017.
11. Angelopoulos S, **Renault MP\***, Schweitzer P. Stochastic dominance and bijective analysis of online algorithms: matching theory to practice. St. Francis Xavier University, Antigonish, NS, Canada, Oct 31, 2016.
10. Angelopoulos S, **Renault MP\***, Schweitzer P. Stochastic dominance and bijective analysis of online algorithms: matching theory to practice. Saint Mary's University, Halifax, NS, Canada, Oct 26, 2016.
9. Angelopoulos S, **Renault MP\***, Schweitzer P. Stochastic dominance and bijective analysis of online algorithms: matching theory to practice. Dalhousie University, Halifax, NS, Canada, Oct 25, 2016.
8. Angelopoulos S, **Renault MP\***, Schweitzer P. New techniques for analysing online algorithms: matching theory to practice. University of Prince Edward Island, Charlottetown, PEI, Canada, Oct 24, 2016.
7. Angelopoulos S, **Renault MP\***, Schweitzer P. Stochastic dominance and bijective analysis of online algorithms: matching theory to practice. Acadia University, Wolfville, NS, Canada, Oct 21, 2016.
6. Angelopoulos S, **Renault MP\***, Schweitzer P. The bijective ratio of online algorithms. London School of Economics, London, United Kingdom, June 15, 2016.
5. **Renault MP\***, Rosén A. Lower and upper Bounds for Online Algorithms with Advice:  $k$ -Server Problem. Université Pierre et Marie Curie - Paris 6, Paris, France, Oct 2, 2014.
4. Adamaszek A, **Renault MP\***, Rosén A, van Stee R. On Online Algorithms with Advice for the Reordering Buffer Management Problem. Reykjavik University, Reykjavik, Iceland, June 13, 2014.
3. **Renault MP\***, Rosén A. The  $k$ -Server Problem with Advice. Waterloo University, Waterloo, ON, Canada, July 18, 2012.

2. **Renault MP\***, Rosén A. On Online Algorithms with Advice for the  $k$ -Server Problem. Max Planck Institut Informatik, Saarbrücken, Germany, April 4, 2012.
1. **Renault MP\***, Rosén A. On Online Algorithms for the  $k$ -Server Problem with Advice. Dalhousie University, Halifax, NS, Canada, Dec 21, 2011.

## Applied Bioinformatics

### International Conference Presentations:

4. Kervadec A\*, Bellamy V, El Harane N, Smit N, Meijborg V, Nematalla H, Périer MC, **Renault MP**, Colas A, Hagège A, Coronel R, Mercola M, Silvestre JS, Menasché P, Renault NKE. Extracellular vesicles as effective substitutes for cell therapy for chronic heart failure. European Society of Cardiology Congress 2016, Rome, Italy, Aug 27–31, 2016.
3. Renault NKE\*, Copeland E, **Renault MP**, Howell RE, Greer WL. Human X-chromosome inactivation is genetically controlled. Poster presentation, EMBO/EMBL Human Variation: Cause and Consequence, Heidelberg, Germany, June 20–23, 2010.
2. Renault NKE, Howell RE, **Renault MP**, Dyack S, Greer WL\*. Hemophilia A in carriers, due to skewed X-chromosome inactivation, impacts the quality of life of affected females. Abstract #31 PO 10. XXVIII International Congress of the World Federation of Hemophilia, Istanbul, Turkey, June 1–5, 2008.
1. Renault NKE\*, Dobson MJ, Costa T, **Renault MP**, Howell RE, Mitnitski A, Greer WL. Hemophilia A in multiple heterozygous females due to familial skewed X-chromosome inactivation. Poster presentation, 2nd International Conference on X-chromosome Inactivation, Paris, France, Sept 17–22, 2006.

## ACTIVITIES AND CONTRIBUTIONS

### Committees/Advising

- Teaching Faculty Liaison, Computer Sciences Department, UW–Madison: 2020 - 2021.
- Data Science Curriculum Committee, Computer Sciences Department, UW–Madison: Fall 2019.
- Undergraduate Advising, Computer Sciences Department, UW–Madison: 2018 - 2019
- Hiring Committee for Faculty Associate Positions, Computer Sciences Department, UW–Madison: Spring 2018, Fall 2017.

### Administrative activities

- Co-organiser for 6th French-Israeli Workshop on Foundations of Computer Science (FILOFOCS) 2017.
- Member of Local Organising Committee for Random-Approx 2016 Conference in Paris, France.
- Co-organiser for 5th FILOFOCS 2016.
- Co-organiser for 3rd FILOFOCS 2014.

### Participation in Invitation-Only Conferences

- Workshop on Search Games and Rendezvous 2017, London, UK, July 6–7, 2017
- GRASTA 2017: Workshop on Graph Searching Theory and Applications, Anogia, Greece, April 10–13, 2017



- Lorentz Center – Search Games: Theory and Algorithms, Leiden, Netherlands, June 26 – July 1, 2016.
- Workshop on Search Games and Rendezvous 2015, London, UK, July 6–7, 2015
- XXXII Euro Summer Institute (ESI 2015), Szeged, Hungary, June 15–27, 2015.

### Open source projects

- Contributor to the cURL project, curl.haxx.se (2014)

### Peer-review activities

- 2020: Operations Research Letters; Symposium on Theoretical Aspects of Computer Science (STACS)
- 2019: European Symposium on Algorithms (ESA); International Workshop on Combinatorial Algorithms (IWOCA); Theory of Computing Systems (TOCS); Workshop on Approximation and Online Algorithms (WAOA)
- 2018: Algorithmica; Israel Science Foundation Grant Review; Journal of Universal Computer Science; Theoretical Computer Science
- 2017: Algorithmica; Conference on Algorithms and Complexity (CIAC); International Colloquium on Automata, Languages and Programming (ICALP); TOCS
- 2016: ACM Computing Surveys; Scandinavian Symposium and Workshops on Algorithm Theory (SWAT); STACS; TOCS
- 2015: Information and Computation
- 2014: Journal of Discrete Algorithms; TOCS
- 2013: WAOA
- 2012: Latin American Theoretical Informatics Symposium (LATIN); International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM); WAOA

### LANGUAGES

English (native) and French (fluent).