

## O-joung Kwon

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Assistant Professor at Department of Mathematics, Incheon National University, Incheon, South Korea  
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Ph.D Advisor : Sang-il Oum (<http://mathsci.kaist.ac.kr/~sangil>)

### RESEARCH INTERESTS

Graph theory, Combinatorial Optimization, Structural Graph Theory, Parameterized Complexity.

### PREVIOUS POSITIONS

**Researcher (Postdoc)**, Institut für Softwaretechnik und Theoretische Informatik, Technische Universität Berlin, Berlin, Germany

Advisor: Stephan Kreutzer

Jul, 2016 ~ Feb, 2018

Joined in ERC consolidator grant DISTRUCT : Structure Theory for Directed Graphs

**Researcher (Postdoc)**, Institute for Computer Science and Control (MTA SZTAKI), Hungarian Academy of Sciences, Budapest, Hungary

Advisor: Dániel Marx

Jul, 2015 ~ Jun, 2016

Joined in ERC Project PARAMTIGHT : Parameterized complexity and the search for tight complexity results

### EDUCATION

**Ph.D.** Department of Mathematical Sciences

Sep, 2012 ~ Aug, 2015

**KAIST**, Daejeon, South Korea

Advisor: Sang-il Oum

Thesis title: Structural and algorithmic properties of linear rank-width

**M.S.** Department of Mathematical Sciences

Sep, 2010 ~ Aug, 2012

**KAIST**, Daejeon, South Korea

Thesis title: Connecting rank-width and tree-width via pivot-minors

**B.S.** Department of Mathematics

Mar, 2003 ~ Aug, 2010

Hanyang University, Seoul, South Korea

(including 2 years for military service)

### JOURNAL PAPERS

30. Packing and covering induced subdivisions (with Jean-Florent Raymond) SIAM Journal on Discrete Mathematics accepted, arXiv:1803.07581

29. The grid theorem for vertex-minors (with Jim Geelen, Rose McCarty and Paul Wollan) Journal of Combinatorial Theory Ser. B accepted, arXiv:1909.08113

28. Obstructions for bounded shrub-depth and rank-depth (with Rose McCarty, Sang-il Oum, and Paul Wollan) Journal of Combinatorial Theory Ser. B. 149 (Jul, 2021), pp 76-91 arXiv:1911.00230

27. A Menger-like property of tree-cut width (with Archontia Giannopoulou, Jean-Florent Raymond, and Dimitrios M. Thilikos) Journal of Combinatorial Theory Ser. B. 148 (May, 2021), pp 1-22, arXiv:1808.00863

26. Graphs of bounded depth-2 rank-brittleness (with Sang-il Oum) Journal of Graph Theory. 96(3) (Mar, 2021), pp 361-378, arXiv:1906.05753

25. Branch-depth: Generalizing tree-depth of graphs (with Matt DeVos and Sang-il Oum) *European Journal of Combinatorics*. 90 (Dec, 2020), 103186, arXiv:1903.11988
24. Erdos-Posa property of chordless cycles and its applications (with Eun Jung Kim) *Journal of Combinatorial Theory Ser. B*. 145 (Nov, 2020), pp 65-112, (SODA 2018, arXiv:1711.00667)
- 23) Graphs without two vertex-disjoint S-cycles (with Minjeong Kang and Myounghwan Lee) *Discrete Mathematics*. 343(10) (Oct 2020) 111997. (arXiv:1908.09065)
22. An optimal XP algorithm for Hamiltonian cycle on graphs of bounded clique-width (with Benjamin Bergougnoux and Mamadou Kant) *Algorithmica*. 82(6) (June, 2020), pp 1654-1674, WADS 2017, arXiv:1702.06095
21. Mim-width I. Induced path problems (with Lars Jaffke and Jan Arne Telle) *Discrete Applied Mathematics*. 278 (15 May, 2020), pp 153-168, IPEC 2017, arXiv:1708.04536
20. Scattered classes of graphs (with Sang-il Oum) *SIAM Journal on Discrete Mathematics* 34(1) (Mar. 2020), pp 972999, arXiv:1801.06004
19. Mim-width II. The feedback vertex set problem (with Lars Jaffke and Jan Arne Telle) *Algorithmica*. 82(1). (Jan, 2020), pp 118-145, STACS 2018, arXiv:1710.07148
18. On low rank-width colorings (with Michal Pilipczuk and Sebastian Siebertz) *European Journal of Combinatorics*. 83. (Jan, 2020), WG 2017, arXiv:1703.03304
17. Classes of graphs with no long cycle as a vertex-minor are polynomially chi-bounded (with Ringi Kim, Sang-il Oum, and Vaidy Sivaraman) *Journal of Combinatorial Theory Ser. B*. 140 (Jan. 2020), pp 372-386, arXiv:1809.04278
16. Mim-Width III. Graph Powers and Generalized Distance Domination Problems (with Lars Jaffke, Torstein Stromme, and Jan Arne Telle) *Theoretical Computer Sciences*. 796. (Dec, 2019) pp 216-236, IPEC 2018, arXiv:1803.03514
15. Generalized feedback vertex set problems on bounded-treewidth graphs: chordality is the key to single-exponential parameterized algorithms (with Edouard Bonnet, Nick Brettell, and Dniel Marx) *Algorithmica*. 81(10) (Oct 2019), pp 3890-3935, IPEC 2017, arXiv:1704.06757
14. Chi-boundedness of graph classes excluding wheel vertex-minors (with Hojin Choi, Sang-il Oum and Paul Wollan) *Journal of Combinatorial Theory Ser. B*. 135 (Mar. 2019), pp 319-348, arXiv:1702.07851
13. Linear rank-width of distance-hereditary graphs II. Vertex-minor obstructions (with Mamadou Kant) *European Journal of Combinatorics*. 74 (Dec. 2018), pp 110-139, arXiv:1508.04718
12. A single-exponential fixed-parameter algorithm for Distance-Hereditary Vertex Deletion (with Eduard Eiben and Robert Ganian) *Journal of Computer and System Sciences*. 97 (Nov. 2018), pp 121-146, arXiv:1604.06056
11. A width parameter useful for chordal and co-comparability graphs (with Dong Yeup Kang, Torstein Stromme, and Jan Arne Telle) *Theoretical Computer Sci.* 704 (15. Dec. 2017), pp 1-17, WALCOM 2017
10. Packing and covering immersion models of planar subcubic graphs (with Archontia Giannopoulou, Jean-Florent Raymond, and Dimitrios M. Thilikos) *European. J. Combin.* 65 (Oct. 2017), pp 154-167, WG 2016
9. A polynomial kernel for Block Graph Deletion (with Eun Jung Kim) *Algorithmica*. 79 (Sep,

2017), pp 251-270, IPEC 2015

8. An FPT algorithm and a polynomial kernel for Linear Rankwidth-1 Vertex Deletion (with Mamadou Kant, Eun Jung Kim, and Christophe Paul) *Algorithmica*. 79 (Sep, 2017), pp 66-95, IPEC 2015

7. Linear rank-width of distance-hereditary graphs I. A polynomial time algorithm (with Isolde Adler and Mamadou Kant) *Algorithmica*. 78 (May, 2017), pp 342-377, WG 2014

6. Coloring graphs without fan vertex-minors and graphs without cycle pivot-minors (with Ilkyoo Choi and Sang-il Oum) *Journal of Combinatorial Theory Ser. B*. 123 (March, 2017), pp. 126-147

5. Characterizing width two for variants of treewidth (with Hans L. Bodlaender, Stefan Kratsch, Vincent Kreuzen, and Seongmin Ok) *Discrete Applied Math*. 216(Jan 10, 2017), pp. 29-46

4. Tree-depth and vertex-minors (with Ptr Hlineny, Jan Obdrzalek, and Sebastian Ordyniak) *European J. Combin*. 56 (August, 2016), pp. 46-56

3. Excluded vertex-minors for graphs of linear rank-width at most  $k$  (with Jisu Jeong and Sang-il Oum) *European J. Combin*. 41(October, 2014), pp. 242-257, STACS 2013

2. Unavoidable vertex-minors in large prime graphs (with Sang-il Oum) *European J. Combin*. 41(October, 2014), pp. 100-127

1. Graphs of small rank-width are pivot-minors of graphs of small tree-width (with Sang-il Oum) *Discrete Applied Math*. 168(May 11, 2014), pp. 108-118

**REFEREED  
CONFERENCE  
PAPERS  
WITHOUT  
JOURNAL  
VERSION**

12. Three problems on well-partitioned chordal graphs (with Jungho Ahn, Lars Jaffke, and Paloma T. Lima) CIAC 2021 accepted

11. Close relatives of Feedback Vertex Set without single-exponential algorithms parameterized by treewidth (with Benjamin Bergougnoux, Edouard Bonnet, and Nick Brettell) IPEC 2020 accepted arXiv:2007.14179

10. A polynomial kernel for 3-leaf power deletion (with Jungho Ahn, Eduard Eiben, and Sang-il Oum) MFCS 2020 accepted arXiv:1911.04249

9. Well-partitioned chordal graphs: obstruction set and disjoint paths (with Jungho Ahn, Lars Jaffke, and Paloma T. Lima) WG 2020 accepted arXiv:2002.10859

8. The Directed Flat Wall Theorem (with Archontia Giannopoulou, Ken-ichi Kawarabayashi, and Stephan Kreutzer) SODA 2020 accepted

7. Tree pivot-minors and linear rank-width (with Konrad Dabrowski, Francois Dross, Jisu Jeong, Mamadou Kant, Sang-il Oum, and Daniel Paulusma) EUROCOMB 2019 (arXiv:2008.00561)

6. Measuring what Matters: A Hybrid Approach to Dynamic Programming with Treewidth (with Eduard Eiben, Robert Ganian and Thekla Hamm) MFCS 2019 (arXiv:1908.10132)

5. Lean tree-cut decompositions: obstructions and algorithms (with Archontia Giannopoulou, Jean-Florent Raymond, and Dimitrios M. Thilikos) STACS 2019 (arXiv:1808.00863)

4. Recognizing small pivot-minors (with Konrad Dabrowski, Francois Dross, Jisu Jeong, Mamadou Kant, Sang-il Oum, and Daniel Paulusma) WG 2018 (submitted file)

3. Neighborhood complexity and kernelization for nowhere dense classes of graphs (with Kord Eickmeyer, Archontia Giannopoulou, Stephan Kreutzer, Michal Pilipczuk, Roman Rabinovich, and

Sebastian Siebertz) ICALP 2017 (full version : arXiv:1612.08197)

2. A polynomial kernel of Distance-Hereditary Vertex Deletion (with Eun Jung Kim) WADS 2017 (full version : arXiv:1610.07229)

1. Parameterized vertex deletion problems for hereditary graph classes with a block property (with Edouard Bonnet, Nick Brettell, and Dniel Marx) WG 2016 (full version : arXiv:1603.05945)

**NEW  
SUBMITTED  
MANUSCRIPTS**

5. A unified half-integral Erds-Psa theorem for cycles in graphs labelled by multiple abelian groups (with J. Pascal Gollin, Kevin Hendrey, Ken-ichi Kawarabayashi, and Sang-il Oum) arXiv:2102.01986 submitted

4. A system of disjoint representatives of line segments with given k directions (with Jinha Kim and Minki Kim) arXiv:2101.02887 submitted

3. Half-integral Erdos-Posa property of directed odd cycles (with Ken-ichi Kawarabayashi, Stephan Kreutzer, and Qiqin Xie) arXiv:2007.12257 submitted

2. Rainbow independent sets on dense graph classes (with Jinha Kim and Minki Kim) arXiv:2001.10566 submitted

1. Erdos-Posa property of minor-models with prescribed vertex sets (with Dniel Marx) arXiv:1904.00879 manuscript

**HONORS AND  
GRANTS**

RWTH Aachen University Research Fellowship Korea Jan - Mar, 2015

KIAS Fellowship for Seoul ICM 2014 August, 2014

SIAM Student Travel Award for SIAM Conference on Discrete Mathematics June, 2014

Travel Grants for graduate students and young researchers for 14th Max Planck Advanced Course on the Foundations of Computer Science Aug, 2013

National Research Scholarship by the Korea Student Aid Foundation Sep, 2010 ~

National Scholarship for Science and Engineering Students (KOSAF) - Tuition exemption 03-04, 08-10

**RESEARCH  
VISITINGS**

University of Bari, Bari, Italy Hosted by Prof. Paul Wollan 13-17. Nov. 2017

University of Waterloo, Waterloo, Canada Hosted by Dr. Ringi Kim 24-28. Jul. 2017

University of Lyon, Lyon, France Hosted by Dr. Valia Mitsou 3-7. Apr. 2017

Universidad Politecnica de Valencia, Valencia, Spain Hosted by Prof. Jan Arne Telle 27. Mar. 2017 - 1. Apr. 2017

Durham University, Durham, UK Hosted by Prof. Daniel Paulusma 27. Feb. 2017 - 3. Mar. 2017

University of Warsaw, Warsaw, Poland 11-13. Jan. 2017

Hosted by Prof. Marcin Pilipczuk	
Universite Blaise Pascal in Clermont-ferrand, France Hosted by Prof. Mamadou Moustapha Kanté	7–12. Nov. 2016
University of Bergen in Bergen, Norway Hosted by Prof. Jan Arne Telle	22–28. May. 2016
TU Wien in Vienna, Austria Hosted by Dr. Robert Ganian	14–18. Mar. 2016
Masaryk University in Brno, Czech Hosted by Prof. Pétr Hlineny	16–20, Nov, 2015
MTA SZTAKI in Budapest, Hungary Hosted by Prof. Dániel Marx	22–28, Mar, 2015
Denmark Technical University in Lyngby, Denmark Hosted by Prof. Carsten Thomassen	23–27, Feb, 2015
Bonn University in Bonn, Germany Hosted by Prof. Stefan Kratsch	16–18, Feb, 2015
LIRMM in Montpellier, France Hosted by Prof. Christophe Paul	26–30, Jan, 2015
RWTH Aachen University in Aachen, Germany Hosted by Prof. Peter Rossmanith	6, Jan, 2015 - 31, Mar, 2015
Universite Blaise Pascal in Clermont-ferrand, France Hosted by Prof. Mamadou Moustapha Kanté	7–21, Jul, 2014
Utrecht University in Utrecht, Netherlands Hosted by Prof. Hans Bodlaender	15, Feb, 2014 - 7, Mar, 2014
Universite Blaise Pascal in Clermont-ferrand, France Hosted by Prof. Mamadou Moustapha Kanté	8–21, Jul, 2013
Masaryk University in Brno, Czech Hosted by Prof. Pétr Hlineny	19–24, May, 2013
University of Hamburg in Hamburg, Germany Hosted by Prof. Reinhard Diestel	13, Feb, 2013 - 31, Aug, 2013

**RESEARCH  
TALKS**

A unified half-integral Erdos-Posa theorem for cycles labelled by multiple abelian groups Graphs and matroids seminar	1st, Mar, 2021
Directed tangles and applications Seminar at Institute for Basic Science	5th, Jan, 2021
Close relatives of Feedback Vertex Set without single-exponential algorithms parameterized by treewidth 15th International Symposium on Parameterized and Exact Computation (IPEC) 2020 Online virtual conference organized by The Hong Kong Polytechnic University	15th, Dec, 2020
Half-integral Erdos-Posa property of directed odd cycles 2020 KMS Fall Annual Meeting	23th-24th, Oct, 2020

Mim-width: a width parameter beyond rank-width Seminar at Institute for Basic Science	19th, May, 2020
Seminar at Kyunghee University	29th, Nov, 2019
The 2nd East Asia Workshop on Extremal and Structural graph theory	31th, Oct-4th, Nov, 2019
2019 KMS Fall Annual Meeting	26th, Oct-27th, Oct, 2019
The grid theorem for vertex-minors IBS Summer program on Algorithms and Complexity in Discrete Structures	26, July, 2019
Branch-depth: generalizing tree-depth of graphs Seminar at University of Hamburg	9, July, 2019
Classes with no long cycle as a vertex-minor are polynomially chi-bounded Dagstuhl workshop on graph colouring: from structure to algorithms	1-5, July, 2019
Workshop on graph coloring and related topics, Konkuk University, Seoul, Korea	31 May, 2019.
2019 spring annual meeting of the KMS, Kangwon University, Chuncheon, Korea	20 Apr, 2019.
Colloquium at Ajou University, Suwon, South Korea	19 Apr, 2019.
Erdos-Posa property of H-induced subdivisions Oberwolfach workshop on graph theory	7-11, Jan, 2019
A unified poly-time algorithm for FVS on graphs of bounded mim-width KSIAM conference	2-4, Nov, 2018
Ajou Combinatorics Workshop	26, Oct, 2018
13th International Symposium on Parameterized and Exact Computation (IPEC) 2018 at Aalto University in Helsinki, Finland	22-24, Aug, 2018.
Invited talk at 2018 Combinatorics Workshop, SNU, Korea	17-18, Aug, 2018.
2018 SIAM Discrete Math Conference, University of Colorado, Denver, USA	4-8 June, 2018.
Seminar at SUNY Korea, Incheon, South Korea	1 June, 2018.
86th KPPY Combinatorics Workshop at PNU, Pusan, South Korea	4 May, 2018.
Seminar at Hanyang University, Seoul, South Korea	1 May, 2018
2018 spring annual meeting of the KMS, Kyunghee University, Seoul, Korea	21 Apr, 2018
Erdos-Posa property of chordless cycles and applications Discrete Math Seminar at KAIST	12 Jan, 2018.
Eurocomb 2017 at TU Vienna, Vienna, Austria	31th Aug, 2017.
A polynomial kernel for Distance-Hereditary Vertex Deletion An optimal XP algorithm for Hamiltonian Cycle on graphs of bounded clique-width Algorithms and Data Structures Symposium 2017 at Memorial Univ of Newfoundland, St. John's, Canada 31 July-2 Aug, 2017.	

Chi-boundedness of graph classes excluding wheel vertex-minors Structure in Graphs and Matroids 2017 at Univ. of Waterloo, Waterloo, Canada	19 July, 2017.
ICALP satellite conference. Algorithms and Structure for Sparse Graphs at Univ. Warsaw, Warsaw, Poland	16 July, 2017.
Discrete Math Seminar at KAIST	9 Jun, 2017.
Seminar at TU Berlin, Berlin, Germany	28 Apr, 2017
Low rank-width colorings Graphes at Lyon, Lyon, France	7 Apr, 2017
Algorithmic perspective of rank-width Acid Seminar at Durham University, Durham, UK	27 Feb, 2017
Seminar at University of Warsaw, Warsaw, Poland	12 Jan, 2017
The 14th KIAS Combinatorics Workshop at Busan	19 Dec, 2016
80th KPPY Combinatorics Workshop at Yeungnam Univ, Daegu	17 Dec, 2016
Generalized feedback vertex set problems on bounded-treewidth graphs KAIST Discrete Math Seminar at KAIST	25 Nov, 2016
Parameterized complexity of measuring distances to dense graph classes Colloquium talk on Methods for Discrete Structures, Berlin, Germany	24 Oct, 2016
Coloring graphs without fan vertex-minors and cycle pivot-minors Southern Italian Workshop on Algorithms and Graphs 2016, Bari, Italy	26 Sep, 2016
A single-exponential fixed parameter algorithm for Distance-Hereditary Vertex Deletion MFCS 2016, Krakow, Poland	22 Aug, 2016
Seminar at University of Bergen, Bergen, Norway	27 May, 2016
Seminar at MTA SZTAKI, Budapest, Hungary	5 May, 2016
Deletion problems regarding graphs of bounded rank-width Seminar at TU Wien in Vienna, Austria	14. Mar, 2016
Seminar at Masaryk University, Brno, Czech	16, Nov, 2015
Seminar at MTA SZTAKI, Budapest, Hungary	28, Oct, 2015
Erdős-Pósa property of planar- $H$ -minor models with prescribed vertex sets 7th GROW, Aussois, France	12, Oct, 2015
A polynomial kernel for Block Graph Deletion IPEC 2015, Patras, Greece	16, Sep, 2015
An FPT algorithm and a polynomial kernel for linear rank-width one vertex deletion IPEC 2015, Patras, Greece	16, Sep, 2015
A polynomial kernel for Block Graph Deletion Seminar at MTA SZTAKI, Budapest, Hungary	29, Jul, 2015

Block Graph Deletion Seminar at Korea University, Seoul, Korea	29, May, 2015
Linear Rank-width One Vertex Deletion 2015 spring annual meeting of the KMS, Pusan National University	25, Apr, 2015
Length constraint versions of Gallai's $A$ -path Theorem Seminar at KAIST	15, Apr, 2015
A fixed parameter tractable algorithm for the Rank-width 1 Vertex Deletion problem Seminar at Bonn University, Bonn, Germany	18, Feb, 2015
Linear rank-width of distance-hereditary graphs CIRM workshop on Graph Decompositions, Marseille, France	22, Jan, 2015
Fixed parameter tractability of the thread vertex deletion problem 66th KPPY Combinatorics Workshop, Yeungnam University	20, Sep, 2014
Excluded vertex-minors for linear rank-width at most $k$ ICM 2014, COEX, Seoul, Korea	13, August, 2014
Linear rank-width of distance-hereditary graphs ICM 2014 Satellite Conference on Extremal and Structural Graph Theory The-K Gyeongju Hotel, Gyeongju, Korea	8, August, 2014
Linear rank-width of distance-hereditary graphs WG 2014, Le Domaine de Chales, Orleans, France	26, June, 2014
Excluded vertex-minors for linear rank-width at most $k$ 2014 SIAM Discrete Math Conference Hyatt Regency Minneapolis Minneapolis, Minnesota, USA	18, June, 2014
Linear rank-width of distance-hereditary graphs The 4th KIAS Combinatorics Workshop, KIAS	30, May, 2014
Characterizing width two for variants of tree-width 2014 spring annual meeting of the KMS, Wonju University	25, Apr, 2014
Characterizing width two for variants of tree-width 6th GRASTA, Institut d'Etudes Scientifiques of Cargse, Corsica, France	31, Mar, 2014
Characterizing width two for variants of tree-width Seminar at Utrecht University in Utrecht, Netherlands	28, Feb, 2014
Characterizing width two for variants of tree-width Dagstuhl seminar on Graph Modification Problems, Dagstuhl, Germany	14, Feb, 2014
Unavoidable vertex-minors in large prime graphs 12th Korea-Japan Workshop on Algebra and Combinatorics, KAIST	23, Jan, 2014
Tree-like structure of distance-hereditary graphs Seminar at Hanyang University Hanyang University	29, Nov, 2013
Characterizing width two for variants of tree-width NIMS Workshop, Daejeon, Korea	28, Nov, 2013
Tree-like structure of distance-hereditary graphs	



60th KPPY Combinatorics Workshop, Kyungbook University	9, Nov, 2013
Unavoidable vertex-minors in large prime graphs 2013 annual meeting of the KMS University of Seoul	25, Oct, 2013
Unavoidable vertex-minors in large prime graphs Discrete Math Seminar at KAIST	4, Oct, 2013
Unavoidable vertex-minors in large prime graphs Seminar at University of Hamburg in Hamburg, Germany	5, June, 2013
Graphs of small rank-width are pivot-minors of graphs of small tree-width Seminar at Masaryk University, Brno, Czech	20, May, 2013
Excluded vertex-minors for graphs of linear rank-width at most $k$ STACS 2013, University of Kiel, Kiel, Germany	28, Feb, 2013
Graphs of small rank-width are pivot-minors of graphs of small tree-width 2012 annual meeting of the KMS, Daejeon, Korea	6, Oct, 2012
Graphs of small rank-width are pivot-minors of graphs of small tree-width 2012 SIAM Discrete Math Conference Dalhousie university, Halifax, Canada	22, June, 2012
Binary matroid and fundamental graph Seminar for graduate students KAIST, Daejeon, Korea	1, May, 2012
Pivot-minors and vertex-minors of trees and paths 5th GROW, KAIST, Daejeon, Korea	28, Oct, 2011

**TEACHING  
EXPERIENCES**

Spring 2019 : Combinatorics and graph theory, Abstract algebra, Mathematical programming  
 Fall 2018 : Combinatorics and graph theory  
 Spring 2018 : Number theory, Combinatorial optimization

<i>Teaching assistant</i> : Introduction to Graph Theory (MAS477)	Fall 2014
<i>Teaching assistant</i> : Discrete mathematics (MAS255)	Spring 2014
<i>Teaching assistant</i> : Introduction to Graph Theory (MAS477)	Fall 2012
<i>Teaching assistant</i> : Discrete mathematics (MAS255)	Spring 2012
<i>Teaching assistant</i> : Introduction to Graph Theory (MAS477)	Fall 2011
<i>Teaching assistant</i> : Discrete mathematics (MAS255)	Spring 2011