

# Fabrizio Frati

## Curriculum Vitae

### Personal Data, Education, and Positions

#### *Date and Place of Birth*

17/04/1980, Rome, Italy

#### *Affiliation*

Department of Engineering, Roma Tre University

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### Degrees and Habilitations

*Abilitazione Scientifica Nazionale Professore di Seconda Fascia settore 09/H1.*

Validità Abilitazione: dal 03/12/2013 al 03/12/2017

*Abilitazione Scientifica Nazionale Professore di Seconda Fascia settore 01/B1.*

Validità Abilitazione: dal 29/01/2014 al 29/01/2018

*Ph.D. in Computer Science.* Advisor: Prof. Giuseppe Di Battista, Roma Tre University, April 2009.

Title: “Small Screens and Large Graphs: Area-Efficient Drawings of Planar Combinatorial Structures”.

*Abilitazione per l’esercizio della professione di Ingegnere.*

Superamento dell’Esame di Stato nel 2006.

*M.D. in Computer Science.* Advisor: Prof. Giuseppe Di Battista, Roma Tre University, May 2005.

Title: “Visualizzazione di grafi outerplanar”. Grade: 110/110 *cum laude*

### Employment

*Associate Professor* at Roma Tre University

From January 2015 – current.

*DECRA fellow* at The University of Sydney

From January 2014 to December 2016 (Interrupted in January 2015).

*Postdoctoral Researcher* at The University of Sydney  
From September 2011 to December 2013. Supervisor: *Peter Eades*

*Postdoctoral Researcher* at EPFL Lausanne  
From September 2010 to July 2011. Supervisor: *János Pach*

*Postdoctoral Researcher* at Roma Tre University  
From June 2009 to May 2011. Supervisor: *Giuseppe Di Battista*

*Research Collaborator* at Roma Tre University  
From November 2008 to May 2009. Supervisor: *Giuseppe Di Battista*

*Ph.D. Student with Fellowship* at Roma Tre University  
From November 2005 to October 2008. Advisor: *Giuseppe Di Battista*

*Research Collaborator* at Roma Tre University  
September 2005. Supervisor: *Giuseppe Di Battista*

## **Grants and Projects**

### **Principal Investigator**

Grant Scheme: *PRIN 2015 - Programmi di Ricerca scientifica di rilevante Interesse Nazionale (COFIN)*

Funded amount: *144.695 €*

Principal Investigator: *Fabrizio Frati*

Project Title: *MORphing graph Drawings Efficiently (MODE)*

Grant ID: *20157EFM5C*

Duration: *36 months*, starting in January 2017

Role: *Principal investigator and grant holder*

The MIUR considered a total of 4431 proposals, out of which 300 were accepted (6.7%).

Grant Scheme: *ARC Discovery Early Career Researcher Award*

Funded amount: *AUD\$ 297,003*

Principal Investigator: *Fabrizio Frati*

Project Title: *Morphing Graph Drawings*

Grant ID: *DE140100708*

Duration: *36 months*, starting in January 2014

Role: *Principal investigator and grant holder*

The objectives of the Australian Research Council (ARC) Discovery Early Career Researcher Award (DECRA) are to: “support and advance promising early career researchers, promote enhanced opportunities for diverse career pathways, focus research effort in the National Research Priority areas to improve research capacity and policy outcomes, and enable research and research training in high quality and supportive environments.” The ARC considered a total of 1468 DECRA proposals for funds starting in 2014, out of which 200 were accepted (13.6%).

### **Participant**

Grant Scheme: *PRIN 2012 - Programmi di Ricerca scientifica di rilevante Interesse Nazionale (COFIN)*

Principal Investigator: *Giuseppe Di Battista*

Project Title: *AMANDA - Algorithmics for MASSive and Networked DATA*

Duration: *36 months*, starting in March 2014

Role: *Participant*

The MIUR considered a total of 4431 proposals, out of which 300 were accepted (6.7%). Grant Scheme: *ARC Discovery Project*

Funded amount: *AUD\$ 300,000*

Principal Investigators: *P. Eades*

Project Title: *Algorithms for Geometric Turan-type Problems and Network Visualization*

Project ID: *DP110104937*

Duration: *28 months*, starting in September 2011

Role: *Research associate*, employed within the project.

Grant Scheme: *ESF EuroGiga*

Principal Investigators: *J. Kratochvil*

Project Title: *Graph Drawings and Representations*

Project ID: *10-EuroGIGA-OP-003*

Duration: *36 months*, starting in January 2011

Role: *Participant*.

Grant Scheme: *PRIN 2008 - Programmi di Ricerca scientifica di rilevante Interesse Nazionale (COFIN)*

Principal Investigators: *A. A. Pietracaprina*

Project Title: *AlgoDEEP – Algorithmic challenges for Data-intensivE processing on Emerging computing Platforms*

Duration: *24 months*, starting in March 2010

Role: *Participant*

Grant Scheme: *PRIN 2006 - Programmi di Ricerca scientifica di rilevante Interesse Nazionale (COFIN)*

Principal Investigators: *G. Ausiello*

Project Title: *MAINSTREAM – Algorithms for Massive Information Structures and Data Streams*

Duration: *24 months*, starting in February 2007

Role: *Participant*.

Grant Scheme: *PRIN 2004 - Programmi di Ricerca scientifica di rilevante Interesse Nazionale (COFIN)*

Principal Investigators: *G. Italiano*

Project Title: *ALGO-NEXT – Algorithms for the Next Generation Internet and Web: Methodologies, Design and Applications*

Duration: *24 months*, starting in December 2004

Role: *Participant*.

## **Teaching Activities**

### *Teaching*

2009-2010	Algorithmic Techniques for Graphs and Networks, Roma Tre University
2014-2015	Foundations of Computer Science, Roma Tre University
2015-2016	Foundations of Computer Science, Roma Tre University
2016-2017	Foundations of Computer Science, Roma Tre University

### *Teaching Assistance*

2006-2007	Theoretical Computer Science I, Roma Tre University
2006-2007	Theoretical Computer Science II, Roma Tre University
2007-2008	Theoretical Computer Science I, Roma Tre University
2007-2008	Theoretical Computer Science II, Roma Tre University
2008-2009	Theoretical Computer Science I, Roma Tre University
2008-2009	Theoretical Computer Science II, Roma Tre University
2010-2011	Linear Algebra I, EPFL Lausanne
2010-2011	Linear Algebra II, EPFL Lausanne
2010-2011	Analysis, EPFL Lausanne
2011-2012	Information Visualization, The University of Sydney
2011-2012	Computational Geometry, The University of Sydney
2013-2014	Information Visualization, The University of Sydney

#### *Master Students (Co-)Supervised*

2007	Guido Drovandi: How to Draw a Clustered Tree
2010	Stefano Saraulli: Book Embedding of Upward Planar Directed Graphs
2010	Enrico Colasante: Monotone Graph Drawing
2010	Vincenzo Roselli: Morphing Planar Graph Drawings

## Research Activities

#### *Research Interests*

My primary area of research is **Graph Drawing**, which studies algorithms and bounds to construct geometric and topological representations of graphs. Graph Drawing has applications in several fields of computer science and beyond, including *Information Visualization*, *Social Network Analysis*, *Cartography*, and *Bioinformatics*. A typical algorithmic Graph Drawing question asks for the complexity of deciding whether a graph from a certain graph class (e.g., a planar graph or a bounded-degree graph) admits a representation satisfying certain constraints (e.g., every edge is a straight-line segment and no two edges cross). A typical combinatorial Graph Drawing question asks to determine worst-case asymptotic bounds for some measure (e.g., the number of edge crossings or the area occupied by the representation) among all possible representations of a graph from a certain graph class.

My secondary areas of research are **Combinatorial Geometry** and **Graph Theory**. Combinatorial Geometry problems study combinatorial properties of discrete sets of geometric objects (e.g., the maximum number of distinct planar geometric graphs spanning any given point set with  $n$  points). Graph Theory problems concern the study of abstract graphs, both from an algorithmic and from a combinatorial point of view; designing a linear-time algorithm to four-color any planar graph or proving that every planar 3-connected 3-regular bipartite graph is Hamiltonian are examples of algorithmic and combinatorial Graph Theory problems, respectively. Graph Theory finds applications in several areas of Science, including *Physics*, *Biology*, and *Chemistry*.

#### *Invited Talks*

- University of Arizona, U.S.A. “Drawing Planar Graphs in Small Area”, January 2008.
- Universität Tübingen, Germany. “Drawing Planar Graphs in Small Area”, February 2008.
- University of Rome La Sapienza, Italy. “Testing Planarity of Partially Embedded Graphs”, January 2010.
- The University of Calgary, Canada. “On the Number of Upward Planar Orientations of Maximal Planar Graphs”, September 2012.
- Universität Würzburg, Germany. “Graph Embeddings with Low Distortion” invited talk for the PhD school “Recent Trends in Graph Drawing – Curves, Crossings, and Constraints”, held in conjunction with the 22nd International Symposium on Graph Drawing (GD ’14), September 2014.

## Conference Talks

- 13th International Symposium on Graph Drawing (GD '05): “Small Area Drawings of Outerplanar Graphs”. Limerick, Ireland.
- 14th International Symposium on Graph Drawing (GD '06): “Three Dimensional Drawings of Bounded Degree Trees”. Karlsruhe, Germany.
- 14th International Symposium on Graph Drawing (GD '06): “Embedding Graphs Simultaneously with Fixed Edges”. Karlsruhe, Germany.
- 3rd Workshop on Combinatorial and Algorithmic Aspects of the Networks (CAAN '06): “On the Topologies of Local Minimum Spanning Trees”. Chester, United Kingdom.
- 33rd International Workshop on Graph-Theoretic Concepts in Computer Science (WG '07): “On Minimum Area Planar Upward Drawings of Directed Trees and Other Families of Directed Acyclic Graphs”. Dornburg, Germany.
- 10th Workshop on Algorithms and Data Structures (WADS '07): “How to Draw a Clustered Tree”. Halifax, Canada.
- 19th Canadian Conference on Computational Geometry (CCCG '07): “Straight-line Drawings of Outerplanar Graphs in  $O(dn \log n)$  Area”. Ottawa, Canada.
- 15th International Symposium on Graph Drawing (GD '07): “Straight-line Orthogonal Drawings of Binary and Ternary Trees”. Sydney, Australia.
- 15th International Symposium on Graph Drawing (GD '07): “Efficient C-Planarity Testing for Embedded Flat Clustered Graphs with Small Faces”. Sydney, Australia.
- 16th International Symposium on Graph Drawing (GD '08): “Non-Convex Representations of Graphs”. Heraklion, Greece.
- 34th International Workshop on Graph-Theoretic Concepts in Computer Science (WG '08): “A Lower Bound on the Area Requirements of Series-Parallel Graphs”. Durham, United Kingdom.
- 21st Canadian Conference on Computational Geometry (CCCG '09): “Planar Packing of Diameter-Four Trees”. Vancouver, Canada.
- 21st Canadian Conference on Computational Geometry (CCCG '09): “Directed Graphs with an Upward Straight-line Embedding into Every Point Set”. Vancouver, Canada.
- 17th International Symposium on Graph Drawing (GD '09): “Succinct Greedy Drawings Do Not Always Exist”. Chicago, U.S.A.
- 18th International Symposium on Graph Drawing (GD '10): “Improved Lower Bounds on the Area Requirements of Series-Parallel Graphs”. Konstanz, Germany.
- 51st Symposium on Foundations of Computer Science (FOCS '10): “On the Queue Number of Planar Graphs”. Las Vegas, U.S.A.
- 14th Spanish Meeting on Computational Geometry (EGC '11): “RAC and LAC Drawings of Planar Graphs in Subquadratic Area”. Alcalá, Spain.
- 22nd International Symposium on Algorithms and Computation (ISAAC '11): “Simultaneous Embedding of Embedded Graphs”. Yokohama, Japan.
- 18th Annual International Computing and Combinatorics Conference (COCOON '12): “Multilevel Drawings of Clustered Graphs”. Sydney, Australia.

- 20th International Symposium on Graph Drawing (GD '12): “Representing Graphs by Touching Cuboids”. Redmond, U.S.A.
- 23rd International Symposium on Algorithms and Computation (ISAAC '12): “On the Number of Upward Planar Orientations of Maximal Planar Graphs”. Taipei, Taiwan.
- 36th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing (ACCMCC '12): “A Planar Graph Decomposition with Applications to Graph Layout”. Sydney, Australia.
- 21st International Symposium on Graph Drawing (GD '13): “On the Upward Planarity of Mixed Plane Graphs”. Bordeaux, France.
- 22nd International Symposium on Graph Drawing (GD '14): “Increasing-Chord Graphs on Point Sets”. Würzburg, Germany.
- 22nd International Symposium on Graph Drawing (GD '14): “Drawing Partially Embedded and Simultaneously Planar Graphs”. Würzburg, Germany.
- 24th International Symposium on Graph Drawing and Network Visualization (GD '16): “Stack and Queue Layouts via Layered Separators”. Athens, Greece.
- 24th International Symposium on Graph Drawing and Network Visualization (GD '16): “Drawing Planar Graphs with Many Collinear Vertices”. Athens, Greece.

#### *Invited Academic Visits*

- 2006 June - 2006 August, Universität Tübingen, Germany. Invited by Prof. Michael Kaufmann.
- 2007 November - 2008 May, New York University, U.S.A. Invited by Prof. János Pach.
- 2008 January, University of Arizona, U.S.A. Invited by Prof. Stephen Kobourov.
- 2009 June, Charles University, Czech Republic. Invited by Prof. Jan Kratochvíl.
- 2009 September, University of California at Irvine, U.S.A. Invited by Prof. David Eppstein and Prof. Michael Goodrich.
- 2012 January, The University of Melbourne, Australia. Invited by Prof. David R. Wood.
- 2012 September, The University of Calgary, Canada. Invited by Prof. Csaba Tóth.

#### *Workshop Organization*

- I organized an invitation-only workshop on “Geometric Graph Theory”, held in Lennox Head, NSW, Australia, in 2012. Attendance: Prof. P. Eades and Prof. S.-H. Hong from The University of Sydney (Australia), Prof. B. McKay from Australian National University (Australia), Prof. D. R. Wood and Prof. G. Farr from Monash University (Australia), Prof. M. Kaufmann from Tübingen University (Germany), Prof. Janos Pach from EPFL (Switzerland), and Prof. C. Tóth from California State University (U.S.A.).
- I co-organized (with S.-H. Hong and K. Klein from The University of Sydney) a workshop on “Theory and Practice of Graph Drawing”, held at the Microsoft Research Office Redmond (U.S.A.) in 2012, in conjunction with the 20th International Symposium on Graph Drawing (GD '12). Attendance: 43 participants.

#### *Workshop Attendance*

- Seven invitations to the invitation-only Bertinoro Workshop on Graph Drawing (2008–2014) – three attended.
- Four invitations to invitation-only Dagstuhl Seminars (2012–2013) – two attended.
- Five invitations to the invitation-only “Problems in Computational Geometry” (2012) and “Geometric Graph Theory” (2013–2016) workshops at McGill’s Bellairs Research Institute in Barbados – five attended.

## Service to the Community

### *Program Committees*

- 19th International Symposium on Graph Drawing (GD ’11).
- 19th Australasian Theory Symposium (CATS ’13).
- 21st International Symposium on Graph Drawing (GD ’13).
- 23st International Symposium on Graph Drawing (GD ’15).
- 2nd Conference on Algorithms and Discrete Applied Mathematics (CALDAM ’16).
- 27th International Symposium on Algorithms and Computation (ISAAC ’16).
- 3rd Conference on Algorithms and Discrete Applied Mathematics (CALDAM ’17).

### *Reviews*

- Journals: Journal of Graph Algorithms and Applications, Discrete and Computational Geometry, Computational Geometry: Theory and Applications, Transactions on Computers, Algorithmica, Journal of Combinatorial Optimization, Journal of Discrete Algorithms, Information Processing Letters, The Computer Journal, International Journal of Computational Geometry and Applications, European Journal of Operational Research, Electronic Journal on Combinatorics, Discrete Applied Mathematics, Journal of Computational Geometry, Transactions on Visualization and Computer Graphics, Theoretical Computer Science.
- Conferences: GD ’06, GD ’07, GD ’08, IWOCA ’09, CIAC ’10, GD ’10, SoCG ’11, FOCS ’11, CCCG ’11, FSTTCS ’11, FAW ’12, COCOON ’12, GD ’12, ISAAC ’12, COCOON ’13, SEA ’13, ICALP ’13, SODA ’14, LATIN ’14, STACS ’14, ICALP ’14, WG ’14, CCCG ’14, GD ’14, SODA ’15, SoCG ’15, CSR ’15, SODA ’16, SoCG ’16, GD ’16.

## Publications and Citations

### *Journal Publications*

1. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati. Strip Planarity Testing for Embedded Planar Graphs. *Algorithmica*, 2017. To appear.
2. T. Chan, F. Frati, C. Gutwenger, A. Lubiw, P. Mutzel, M. Schaefer. Drawing Partially Embedded and Simultaneously Planar Graphs. *Journal of Graph Algorithms and Applications*, 19(2): 681-706, 2015.
3. G. Aloupis, L. Barba, P. Carmi, V. Dujmovic, F. Frati, P. Morin. Compatible Connectivity-Augmentation of Disconnected Graphs. *Discrete & Computational Geometry*, 54(2): 459-480, 2015.
4. P. Angelini, W. Evans, F. Frati, J. Gudmundsson. SEFE with No Mapping via Large Induced Outerplane Graphs in Plane Graphs. *Journal of Graph Theory*, 82(1): 45-64, 2016.

5. H. R. Dehkordi, F. Frati, J. Gudmundsson. Increasing-Chord Graphs On Point Sets. *Journal of Graph Algorithms and Applications*, 19(2): 761-778, 2015.
6. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati, V. Roselli. The Importance of Being Proper (In Clustered-Level Planarity and T-Level Planarity). *Theoretical Computer Science*, 571: 1-9, 2015.
7. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati, M. Patrignani, V. Roselli. Relaxing the Constraints of Clustered Planarity. *Computational Geometry: Theory and Applications*. 48(2):42-75, 2015.
8. P. Angelini, G. Di Battista, F. Frati, V. Jelinek, J. Kratochvil, M. Patrignani, I. Rutter. Testing Planarity of Partially Embedded Graphs. *IEEE Transactions on Algorithms*, 11(4), article no. 32, 2015.
9. F. Frati, J. Gudmundsson, S. Gaspers, L. Mathieson. Augmenting Graphs to Minimize the Diameter. *Algorithmica*, 72(4):995–1010, 2015.
10. F. Frati. Multilayer Drawings of Clustered Graphs. *Journal of Graph Algorithms and Applications*, 18(5): 633–675, 2014.
11. F. Frati, J. Gudmundsson, E. Welzl. On the Number of Upward Planar Orientations of Maximal Planar Graphs. *Theoretical Computer Science*, 544: 32-59, 2014.
12. P. Angelini, D. Eppstein, F. Frati, M. Kaufmann, S. Lazard, T. Mchedlidze, M. Teillaud, A. Wolff. Universal Point Sets for Planar Graph Drawings with Circular Arcs. *Journal of Graph Algorithms and Applications*, 18(3): 313–324, 2014.
13. F. Frati, M. Kaufmann, J. Pach, C. Tóth, D. Wood. On the Upward Planarity of Mixed Plane Graphs. *Journal of Graph Algorithms and Applications*, 18(2): 253–279, 2014.
14. P. Angelini, T. Bruckdorfer, M. Chiesa, F. Frati, M. Kaufmann, C. Squarcella. On the Area Requirements of Euclidean Minimum Spanning Trees. *Computational Geometry: Theory and Applications*, 47(2): 200–213, 2014.
15. G. Di Battista, F. Frati, J. Pach. On the Queue Number of Planar Graphs. *SIAM Journal on Computing*, 42(6): 2243–2285, 2013.
16. F. Frati, R. Fulek, A. R. Vargas. On the Page Number of Upward Planar Directed Graphs. *Journal of Graph Algorithms and Applications*, 17(3):221–244, 2013.
17. E. Di Giacomo, F. Frati, R. Fulek, L. Grilli, M. Krug. Orthogeodesic Point-Set Embedding of Trees. *Computational Geometry: Theory and Applications*, 46(8):924–944, 2013.
18. P. Angelini, G. Di Battista, F. Frati. Simultaneous Embedding of Embedded Planar Graphs. *International Journal on Computational Geometry and Applications*, 23(2): 93–126, 2013.
19. V. Dujmović, F. Frati, G. Joret, D. R. Wood. Nonrepetitive Colourings of Planar Graphs with  $O(\log n)$  Colours. *Electronic Journal of Combinatorics*: 20(1):P51, 2013.
20. G. Di Battista, F. Frati, M. Patrignani. Nonconvex Representations of Plane Graphs. *SIAM Journal on Discrete Mathematics*, 26(4):1670–1681, 2012.
21. F. Frati. Straight-line Drawings of Outerplanar Graphs in  $O(dn \log n)$  Area. *Computational Geometry: Theory and Applications*, 45:524–533, 2012.
22. P. Angelini, G. Di Battista, F. Frati. Succinct Greedy Drawings Do Not Always Exist. *Networks*, 59(3):267–274, 2012.
23. P. Angelini, F. Frati. Acyclically 3-Colorable Planar Graphs. *Journal of Combinatorial Optimization*, 24(2): 116–130, 2012.
24. P. Angelini, G. Di Battista, F. Frati, M. Patrignani, I. Rutter. Testing the Simultaneous Embeddability of Two Graphs whose Intersection is a Biconnected or a Connected Graph. *Journal of Discrete Algorithms*, 14:150–172, 2012.



25. P. Angelini, E. Colasante, G. Di Battista, F. Frati, M. Patrignani. Monotone Drawings of Graphs. *Journal of Graph Algorithms and Applications*, 16(1): 5–35, 2012.
26. F. Frati, M. Kaufmann. Polynomial Area Bounds for MST Embeddings of Trees. *Computational Geometry: Theory and Applications*, 44: 529–543, 2011.
27. F. Frati. Lower Bounds on the Area Requirements of Series-Parallel Graphs. *Discrete Mathematics and Theoretical Computer Science*, 12(5):139–174, 2010.
28. P. Angelini, F. Frati, M. Kaufmann. Straight-line Rectangular Drawings of Clustered Graphs. *Discrete and Computational Geometry*, 45(1):88–140, 2011.
29. U. Brandes, C. Erten, J. Fowler, F. Frati, M. Geyer, C. Gutwenger, S.-H. Hong, M. Kaufmann, S. Kobourov, G. Liotta, P. Mutzel, A. Symvonis. Colored Simultaneous Geometric Embeddings and Universal Pointsets. *Algorithmica*, 60(3):569–592, 2011.
30. P. Angelini, L. Cittadini, G. Di Battista, W. Didimo, F. Frati, M. Kaufmann, A. Symvonis. On the Perspectives Opened by Right Angle Crossing Drawings. *Journal of Graph Algorithms and Applications*, 15(1):53–78, 2011.
31. F. Frati. A Note on Isosceles Planar Graph Drawing. *Information Processing Letters*, 110(12–13):507–509, 2010.
32. P. Angelini, F. Frati, L. Grilli. An Algorithm to Construct Greedy Drawings of Triangulations. *Journal of Graph Algorithms and Applications*, 14(1):19–51, 2010.
33. C. Binucci, E. Di Giacomo, W. Didimo, A. Estrella-Balderrama, F. Frati, S. Kobourov, G. Liotta. *Upward Straight-line Embeddings of Directed Graphs into Point Sets*. *Computational Geometry: Theory and Applications*, 43:219–232, 2010.
34. G. Di Battista, F. Frati. Efficient C-Planarity Testing for Embedded Flat Clustered Graphs with Small Faces. *Journal of Graph Algorithms and Applications*, 13(3):349–378, 2009.
35. F. Frati, M. Kaufmann, S. Kobourov. Constrained Simultaneous and Near Simultaneous Embeddings. *Journal of Graph Algorithms and Applications*, 13(3):447–465, 2009.
36. G. Di Battista, G. Drovandi, F. Frati. How to Draw a Clustered Tree. *Journal of Discrete Algorithms*, 7(4):479–499, 2009.
37. F. Frati, M. Geyer, M. Kaufmann. Planar Packings of Trees and Spider Trees. *Information Processing Letters*, 109(6):301–307, 2009.
38. G. Di Battista, F. Frati, M. Patrignani. On Embedding a Graph on the Grid with the Maximum Number of Bends and Other Bad Features. *Theory of Computing Systems*, 44:143–159, 2009.
39. G. Di Battista, F. Frati. Small Area Drawings of Outerplanar Graphs. *Algorithmica*, 54(1):25–53, 2009.
40. P. F. Cortese, G. Di Battista, F. Frati, M. Patrignani, M. Pizzonia. C-Planarity of C-Connected Clustered Graphs. *Journal of Graph Algorithms and Applications*, 12(2):225–262, 2008.
41. F. Frati. On Minimum Area Planar Upward Drawings of Directed Trees and Other Families of Directed Acyclic Graphs. *International Journal of Computational Geometry and Applications*, 18(3):251–271, 2008.

#### Book Chapters

1. F. Frati. Clustered Graph Drawing. In *Encyclopedia of Algorithms*, 2nd Edition, M. Y. Kao editor, Springer Science + Business Media New York, pages 1–6, 2015.
2. G. Di Battista, F. Frati. Drawing Trees, Outerplanar Graphs, Series-Parallel Graphs, and Planar Graphs in Small Area. In *Geometric Graph Theory*, J. Pach editor, Springer, pages 121–165, 2013.

3. P. Angelini, G. Di Battista, W. Didimo, F. Frati, S.-H. Hong, M. Kaufmann, G. Liotta, A. Lubiw. RAC and LAC Drawings of Planar Graphs in Subquadratic Area. In *Special Festschrift volume*, Springer-Verlag, volume 7579 of LNCS, pages 200–209, 2012.
4. J. Fox, F. Frati, J. Pach, R. Pinchasi. Crossings Between Curves with Many Tangencies. In *An Irregular Mind (Szemerédi is 70)*, Bolyai Society Mathematical Studies, vol. 21, pages 1–10, 2010.

#### *International Conference Publications*

1. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati, M. Patrignani, I. Rutter. Beyond Level Planarity. In *24th International Symposium on Graph Drawing and Network Visualization (GD '16)*, Springer-Verlag, LNCS, 2016. To appear.
2. G. Da Lozzo, G. Di Battista, F. Frati, M. Patrignani. Computing NodeTrix Representations of Clustered Graphs. In *24th International Symposium on Graph Drawing and Network Visualization (GD '16)*, Springer-Verlag, LNCS, 2016. To appear.
3. G. Da Lozzo, V. Dujmovic, F. Frati, T. Mchedlidze, V. Roselli. Drawing Planar Graphs with Many Collinear Vertices. In *24th International Symposium on Graph Drawing and Network Visualization (GD '16)*, Springer-Verlag, LNCS, 2016. To appear.
4. V. Dujmovic, F. Frati. Stack and Queue Layouts via Layered Separators. In *24th International Symposium on Graph Drawing and Network Visualization (GD '16)*, Springer-Verlag, LNCS, 2016. To appear.
5. F. Frati, M. Hoffmann, V. Kusters. Simultaneous Embeddings with Few Bends and Crossings. In *23rd International Symposium on Graph Drawing and Network Visualization (GD '15)*, Springer-Verlag, volume 9411 of LNCS, pages 166–179, 2015.
6. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati, M. Patrignani, I. Rutter. Intersection-Link Representations of Graphs. In *23rd International Symposium on Graph Drawing and Network Visualization (GD '15)*, Springer-Verlag, volume 9411 of LNCS, pages 217–230, 2015.
7. P. Angelini, G. Da Lozzo, F. Frati, A. Lubiw, M. Patrignani, V. Roselli. Optimal Morph of Convex Drawings. In *31st Symposium on Computational Geometry (SoCG '15)*, volume 34 of LIPIcs, pages 126–140, 2015.
8. G. Aloupis, L. Barba, P. Carmi, V. Dujmovic, F. Frati, P. Morin. Compatible Connectivity-Augmentation of Disconnected Graphs. In *26th ACM-SIAM Symposium on Discrete Algorithms (SODA '15)*, ACM, pages 1602–1615, 2015.
9. H. R. Dehkordi, F. Frati, J. Gudmundsson. Increasing-Chord Graphs On Point Sets. In *22nd International Symposium on Graph Drawing (GD '14)*, Springer-Verlag, volume 8871 of LNCS, pages 464–475, 2014.
10. T. Chan, F. Frati, C. Gutwenger, A. Lubiw, P. Mutzel, M. Schaefer. Drawing Partially Embedded and Simultaneously Planar Graphs. In *22nd International Symposium on Graph Drawing (GD '14)*, Springer-Verlag, volume 8871 of LNCS, pages 25–39, 2014.
11. M. Chimani, G. Di Battista, F. Frati, K. Klein. Advances on Testing C-Planarity of Embedded Flat Clustered Graphs. In *22nd International Symposium on Graph Drawing (GD '14)*, Springer-Verlag, volume 8871 of LNCS, pages 416–427, 2014.
12. P. Angelini, G. Da Lozzo, G. Di Battista, F. Frati, V. Roselli. The Importance of Being Proper (In Clustered-Level Planarity and T-Level Planarity). In *22nd International Symposium on Graph Drawing (GD '14)*, Springer-Verlag, volume 8871 of LNCS, pages 246–258, 2014.
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*Ph.D. Thesis*

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*Citations*

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