Curriculum Vitae

Personal Details

Name:	Stéphan Thomassé
Date of birth:	28-12-1968
Nationality:	French
Marital Status:	Civil Marriage. One Child.

Contact

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Academic Positions

Sept. 2006 -	Computer Science Professor	Université Montpellier 2
Sept. 2005 - Sept. 2006	CNRS Associate Researcher	Sophia-Antipolis
Sept. 1997 - Sept. 2005	Mathematics Assistant Professor	Université Lyon 1

Academic Degrees

Dec. 2005	Habilitation à diriger les recherches	Université Lyon 1
Oct. 1995	Doctorat	Université Lyon 1
June 1992	DEA de Mathématiques	Université de Provence

Academic Duties

Sept. 2006 -	Co-head	AlGCo Team	LIRMM
Sept. 2007 -	Assistant Director	CS Department	LIRMM
Sept. 2006 -	Member	Scientific Committee	LIRMM
Sept. 2008 -	Member	CS Hiring Committee	Université Montpellier 2

Teaching

Spring 2008	Analysis of Algorithms	Undergraduate
Spring 2008	Linear Programming	Undergraduate
Fall 2008	Graph Algorithms	Undergraduate
Fall 2008	Parameterized Complexity	Graduate

Doctoral Students

2001-2003	Stéphane Bessy	Advisor
2003-2005	Pierre Charbit	Co-advisor
2007-	Jean Daligault	Advisor

Research Interests

1992- ... Infinite Relational Structures
1992- ... Graph Theory
2001- ... Combinatorial Optimization
2005- ... Tree Decompositions
2008- ... Parameterized Complexity

Significative Results

1. *Cyclic Orders.* Our proof, with Stéphane Bessy, of Gallai's conjecture asserting that every digraph D can be spanned by α circuits, is based on the introduction of some cyclic order on the vertices of D. Basically, we prove that, when the digraph D is endowed by a cyclic order C, the usual NP-hard graph theory invariants, once reinterpreted in this setting, become easy to compute. Indeed, with this additional cyclic structure, some min/max inequalities arise, giving good certificates for stability and minimum number of circuits needed to span the graph. This method also extend to other invariants. This is definitely my favourite result.

2. *Submodular partition functions.* My interest in this topic starts with our work with Frédéric Mazoit on the equality of the branchwidth of a graph and of its cycle matroid (conjectured by Thomas, and later on by Geelen, Gerards, Robertson, Whittle). Our proof was the starting point of a fruitful collaboration (with Omid Amini, Nicolas Nisse and Laurent Lyaudet) on the duality results of tree decomposition parameters, like for instance tree-width and brambles. Our approach led to a new definition of submodularity of functions defined on the partitions of a set. This new tool gives a generic duality theorem which in turn implies all the existing duality results for tree-width, path-width, branch-width, matroid tree-width,...

3. *Kernelization.* In fixed-parameter complexity, a kernelization algorithm computes, from an instance I and parameter k, an equivalent instance (I', k') in polytime in

$|I|$, with $k' \leq k$, and such that the size of I' only depends of k. When the size of I' is polynomial in terms of k, we speak of polynomial kernel. While reducing the size of the input is not really a new idea in computing, kernelization is a very active field today, both on the practical and the theoretical point of view. My contribution to this area is a $4k^2$ kernel for k-feedback vertex set, a polynomial kernel for k-multicut in trees (with Nicolas Bousquet, Jean Daligault and Anders Yeo), and the non-existence of polykernel for both the k-linkage problem (known to be FPT by Robertson and Seymour) and the k-disjoint cycle problem (with Hans Bodlaender and Anders Yeo).

Articles in Refereed Journals

1. With F. Havet and A. Yeo, The Hòang-Reed conjecture holds for tournaments, *Discrete Math.*, **308** (2008), 3412–3415.

2. With P. Charbit, E. Jeandel, P. Koiran and S. Perifel, Finding a Vector Orthogonal to Roughly Half a Collection of Vectors, *Jour. of Complexity*, **24** (2008), 39–53.

3. With F. Mazoit, Branchwidth of graphic matroids, Surveys in combinatorics, *London Math. Soc. Lecture Note Ser.*, **346** (2007), 275–286.

4. With L. Addario-Berry and F. Havet, Paths with two blocks in n-chromatic digraphs, *J. Combin. Theory Ser. B*, **97** (2007), 620–626.

5. With P. Charbit and A. Yeo, The minimum feedback arc set problem is NP-hard for tournaments, *Combinatorics, Probability and Computing*, **16** (2007), 1–4.

6. With S. Bessy, Spanning a strong digraph by α circuits: A proof of Gallai's conjecture, *Combinatorica*, **27** (2007), 659–667.

7. With R. Diestel, I. Leader and A. Scott. Partitions and orientations of the Rado graph, *Trans. Amer. Math. Soc.*, **359** (2007), 2395–2405.

8. With P. Charbit, Graphs with large girth not embeddable in the sphere, *Combinatorics, Probability and Computing*, **16** (2007), 829–832.

9. With A. Yeo, Total domination of graphs and small transversals of hypergraphs, *Combinatorica* **27** (2007), 473–487.

10. With A. Bondy, J. Shen and C. Thomassen, Density conditions implying triangles in k-partite graphs, *Combinatorica*, **26** (2006), 121–131.

11. With S. Bessy, The categorical product of two five chromatic digraphs can be three chromatic, *Discrete Math.*, **305** (2005), 344–346.

12. With A. Boussaïri, P. Ille and G. Lopez, The C_3-structure of the tournaments, *Discrete maths*, **277** (2004), 29–43.

13. With S. Bessy, Every Strong Digraph has a Spanning Strong Subgraph with at most $n + 2\alpha - 2$ arcs, *J. Combin. Theory Ser. B*, **87** (2003), 289–299.

14. With J. Bang-Jensen, Highly connected hypergraphs containing no two edge-disjoint spanning connected subhypergraphs, *Discrete Applied Math.*, **131** (2003), 555–559.

15. With J. Bang-Jensen and A. Yeo, Small degree out-branchings, *J. Graph Theory*, **42** (2003), 297–307.

16. With A. Bonato, P. Cameron and D. Delić, Generalized pigeonhole properties of graphs and oriented graphs, *European J. Combin.*, **23** (2002), 257–274.

17. Covering a Strong Digraph by $\alpha - 1$ Disjoint Paths. A proof of Las Vergnas' Conjecture, *J. Combin. Theory Ser. B*, **83** (2001), 331–333.

18. With J.L. Rullière, Countable α-extendable graphs, *Discrete Mathematics*, **239** (2001), 53–67.

19. With F. Havet, Median orders of tournaments: a tool for the second neighborhood problem and Sumner's conjecture, *J. Graph Theory*, **35** (2000), no. 4, 244–256.

20. With F. Havet, Oriented Hamiltonian paths in tournaments: a proof of Rosenfeld's conjecture, *J. Combin. Theory Ser. B*, **78** (2000), no. 2, 243–273.

21. On Better-Quasi-Ordering Countable Series-Parallel Orders, *Trans. Amer. Math. Soc.* 352 (2000), 2491–2505.

22. With B. Guiduli, A. Gyárfás and P. Weidl, 2-partition-Transitive Tournaments, *Journal of Combinatorial Theory Sér.B*, **72** (1998), 181–196.

23. Indivisibility and Alpha-Morphisms, *European Journal of Combinatorics*, **18** (1997), 445–454.

24. With L. Rigollet, Relations Infinies Indécomposables Critiques, *C.R. Acad. Sci.*, Paris, Série 1, t. 324, 249-252 (1997).

25. With A. Boussaïri, P. Ille and G. Lopez, Hypomorphie et Inversion Locale entre Graphes, *C.R. Acad. Sci.*, Paris, Série 1, **317**, 125-128 (1993).

26. Belordre des Série-Parallèles Dénombrables, *C.R. Acad. Sci.*, Paris, Série 1, t. 317, 909-912 (1993).

Articles in Conferences

1. With N. Bousquet, J. Daligault and A. Yeo, A polynomial kernel for Multicut In Trees, STACS09.

2. A quadratic kernel for feedback vertex set, SODA 2009.

3. With L. Addario-Berry, O. Amini and J.S. Sereni, Guarding art galleries: The extra cost for sculptures is linear, SWAT 2008, LNCS, **5124** (2008), 41–52

4. With J. Daligault and M. Rao, Well-quasi-order of relabel functions, ROGICS 08.

5. With S. Bessy, Three min-max theorems concerning cyclic orders of strong digraphs, *Integer programming and combinatorial optimization*, LNCS, **3064**, *Springer*, Berlin, 2004.

6. With N. Thiéry, Convex cones and SAGBI bases of permutation invariants, *Invariant theory in all characteristics* , 259–263, CRM Proc. Lecture Notes, 35, *Amer. Math. Soc.*, Providence, RI, 2004.

Forthcoming Papers

1. With S. Brandt, Dense triangle-free graphs are four colorable: A solution to the Erdős-Simonovits problem, to appear in *J. Combin. Theory Ser. B.*

2. With O. Amini, F. Mazoit and N. Nisse, Partition submodular functions, to appear in *Discrete Math.*

3. With F. Havet, Complexity of (p,1)-total labelling, submitted.

4. With S. Bessy, Partitioning a graph into a cycle and an anticycle: a proof of Lehel's conjecture, submitted.

5. With H. Bodlaender and A. Yeo, Analysis of data reduction: Transformations give evidence for non-existence of polynomial kernels, submitted.

6. With F. Guíñez and M. Matamala, Realizing disjoint degree sequences of span two: a solvable discrete tomography problem, submitted.

7. With O. Amini, F. Havet and F. Huc, WDM and directed star arboricity, submitted.

Invited Plenary Talks

BCC 2007	Branchwidth of Graphic Matroids
LAGOS 2007	Cyclic Orderings of Matroids
EUROCOMB 2009	tba

Invited Conferences and Workshops

1. Oberwolfach Graph Theory Workshop: *Submodular Partition functions*, March 26-30, 2007.

2. SIAM Conference on Discrete Mathematics, Victoria, Canada: *Branchwidth of graphic matroids*, June 25-28, 2006.

3. 6^{th} Haifa Workshop on Graph-theory, Combinatorics and Algorithms: *Dense triangle-free graphs in the sphere*, May 29-31, 2006.

4. The Caccetta-Haggkvist conjecture. American Institute of Mathematics, Palo Alto, California, Jan. 30 - Feb. 3, 2006.

5. Graph Theory 2005, Nyborg (Danemark): *Branchwidth of graphic matroids*, Dec. 1-4, 2005.

6. Princeton-Oxford Workshop, Oxford: *The feedback-arc set problem is NP-hard for tournaments*, July 3-4, 2005.

7. University College London, One-Day Meeting in Combinatorics: *Dense triangle-free graphs are four colorable*, Feb. 2, 2005.

8. Oberwolfach Graph Theory Workshop: *Dense triangle-free graphs are four colorable*, Jan. 16-22, 2005.

9. France-Israel Expert Workshop on Graph Classes and Graph Algorithms, (Haifa, Israel): *Three min-max theorems on cyclic orders of strong digraphs*, Apr. 25-30, 2004.

10. Eigth Aussois Workshop on Combinatorial Optimization, Aussois, France: *Three new min/max theorems in graph theory*, Jan. 4-10, 2004.

11. Graph Theory 2003, Nyborg (Danemark): *Median orders and coherent cyclic orders of digraphs*, Nov. 27-30, 2003.

12. Graph Theory 2002, University of Southern Denmark, Odense: *Strong spanning subgraph versus stability*, Aug. 19-23, 2002.

13. DCI 2001 Tournaments, Rutgers University USA: *Median orders of tournaments*, July 16-21, 2001.