

Guilherme Dias da Fonseca

Curriculum Vitæ

Établissement : Aix-Marseille Université
IUT d'informatique
Arles, France
Laboratoire : LIS (équipe ACRO)
Grade : Maître de conférences en informatique (section 27)
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Parcours Je suis maître de conférences en informatique à l'Aix-Marseille Université depuis Septembre 2019. Mon enseignement se passe à l'IUT d'Informatique à Arles et ma recherche à l'équipe ACRO du LIS. Avant, j'étais à l'Université Clermont Auvergne (LIMOS), depuis 2015. En 2017-18, j'ai été en délégation à l'INRIA Sophia Antipolis et j'ai obtenu mon habilitation à diriger des recherches (HDR). En 2014-15, j'ai travaillé comme ATER à l'Université de Montpellier (LIRMM). Entre 2009 et 2012, j'ai travaillé comme professeur à l'Université Fédérale de l'État de Rio de Janeiro (UNIRIO) au Brésil. En 2008, j'ai réalisé un postdoctorat à l'Université Fédérale de Rio de Janeiro (UFRJ), au Brésil. J'ai obtenu mon doctorat en informatique à l'Université du Maryland aux États-Unis en 2007.

Spécialisations : géométrie algorithmique, algorithmes, structures des données, mathématiques pour l'informatique, graphes, approximation

Expérience professionnelle et pédagogique

Depuis 2019 : **Maître de conférences**

AIX-MARSEILLE UNIVERSITÉ, IUT D'INFORMATIQUE
Laboratoire : LIS

Cours dispensés (800h) : *algorithmique avancée, programmation répartie, programmation orientée objet, introduction à l'algorithmique et à la programmation, modélisations mathématiques, recherche opérationnelle, systèmes d'exploitation*

2015 – 2019 : **Maître de conférences**

UNIVERSITÉ CLERMONT AUVERGNE, IUT D'INFORMATIQUE
Laboratoire : LIMOS

Cours dispensés (800h) : *outils mathématiques, modélisations mathématiques, documents et interfaces numériques, algorithmique avancée, programmation répartie, graphes et langages*

Cours dispensé au doctorat : géométrie algorithmique

2017 – 2018 : **Délégation**

INRIA, SOPHIA ANTIPOLIS, FRANCE
Équipe : Datashape

Directeur : Jean-Daniel Boissonnat

2014 – 2015 : **Attaché temporaire d'enseignement et recherche**

UNIVERSITÉ DE MONTPELLIER
Laboratoire : LIRMM

Cours dispensés (100h) : *programmation impérative, algorithmique et complexité*

2009 – 2012 : Professeur

UNIVERSIDADE FEDERAL DO ESTADO DO RIO DE JANEIRO (UNIRIO), BRÉSIL

Cours dispensés (900h) : *analyse de la complexité des algorithmes, géométrie algorithmique, langages formels et automates, probabilité, infographie, structures de données, programmation***2008 – 2009 : Post-doctorat**

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (UFRJ), BRÉSIL

Cours dispensés au doctorat (200h) : *analyse de la complexité des algorithmes, géométrie algorithmique, structures de données***2006 (été) : Vacataire**

UNIVERSITY OF MARYLAND, ÉTATS-UNIS

Cours dispensé (48h) : *langages de programmation***2003 – 2007 : Moniteur**

UNIVERSITY OF MARYLAND, ÉTATS-UNIS

Cours : *analyse de la complexité des algorithmes, géométrie algorithmique, langages de programmation, structures de données***Expérience d'enseignement de programmation***C, C++, Java, OCaml, Perl, Prolog, Python, Ruby, Scheme***Parcours universitaire****2018 : Habilitation à diriger des recherches**

UNIVERSITÉ CÔTE D'AZUR

Garant : Jean-Daniel Boissonnat

Thèse : *Approximate Polytope Membership Queries and Applications*

Articles correspondants : [8, 38, 39, 44, 45]

2008 – 2009 : Post-doctorat

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (UFRJ), BRÉSIL

Professeur directeur : Celina M. H. de Figueiredo

Articles correspondants : [18, 19, 47]

2003 – 2007 : Doctorat en informatique

UNIVERSITY OF MARYLAND, ÉTATS-UNIS

Professeur directeur : David M. Mount

Thèse : *Approximate Range Searching in the Absolute Error Model*

Articles correspondants : [17, 49]

2001 – 2003 : Master en informatique

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (UFRJ), BRÉSIL

Professeur directeur : Celina M. H. de Figueiredo

Mémoire : *Files de priorités cinétiques*

Articles correspondants : [21, 23]

1996 – 2000 : Licence en informatique

UNIVERSIDADE FEDERAL DO RIO DE JANEIRO (UFRJ), BRÉSIL

Professeur directeur : Celina M. H. de Figueiredo

Mémoire : *Problème des mariages stables avec des couples interdits*

Article correspondant : [22]

Langues

Anglais : courant Français : courant Portugais : langue maternelle

Encadrement doctoral

2020 – 2023 : Encadrement de Bastien Rivier [2, 26, 28, 29], codirigé avec Yan Gerard. Le titre de thèse est : Untangling Segments in the Plane. Le doctorant est financé par le projet ANR ADDS.

2017 – 2021 : Encadrement de Loïc Crombez [6, 33, 34, 36], codirigé avec Yan Gerard. Le titre de thèse est : Finding Digital Convexity. Le doctorant est financé par une action associée au projet I-site cap 20-25 de l'Université Clermont Auvergne.

Publications scientifiques

Le texte complet de toutes les publications est disponible sur <https://pageperso.lis-lab.fr/guilherme.fonseca/>.

Reuves internationales

- [1] Loïc Crombez, Guilherme D. da Fonseca, Florian Fontan, Yan Gerard, Aldo Gonzalez-Lorenzo, Pascal Lafourcade, Luc Libralesso, Benjamin Momege, Jack Spalding-Jamieson, Brandon Zhang, and Da Wei Zheng. Conflict optimization for binary CSP applied to minimum partition into plane subgraphs and graph coloring. *ACM Journal of Experimental Algorithmics*, 28:1–13, 2023.
- [2] Arun Kumar Das, Sandip Das, Guilherme D. da Fonseca, Yan Gerard, and Bastien Rivier. Complexity results on untangling red-blue matchings. *Computational Geometry*, 111:101974, 2023.
- [3] Rahul Arya, Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Optimal bound on the combinatorial complexity of approximating polytopes. *ACM Transactions on Algorithms*, 18(4):1–29, 2022.
- [4] Loïc Crombez, Guilherme D. da Fonseca, Yan Gerard, Aldo Gonzalez-Lorenzo, Pascal Lafourcade, and Luc Libralesso. Shadoks approach to low-makespan coordinated motion planning. *ACM Journal of Experimental Algorithms*, 27:1–17, 2022.
- [5] Loïc Crombez, Guilherme D. da Fonseca, and Yan Gerard. Greedy and local search heuristics to build area-optimal polygons. *ACM Journal of Experimental Algorithms*, 27:1–11, 2022.
- [6] Loïc Crombez, Guilherme D. da Fonseca, and Yan Gerard. Efficiently testing digital convexity and recognizing digital convex polygons. *Journal of Mathematical Imaging and Vision*, 62:693–703, 2020.
- [7] Gautam K. Das, Guilherme D. da Fonseca, and Ramesh K. Jallu. Efficient independent set approximation in unit disk graphs. *Discrete Applied Mathematics*, 280:63–70, 2020.
- [8] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Approximate polytope membership queries. *SIAM Journal on Computing*, 47(1):1–51, 2018.
- [9] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. On the combinatorial complexity of approximating polytopes. *Discrete and Computational Geometry*, 58(4):849–870, 2017.
- [10] Guilherme D. da Fonseca, Vinícius G. P. de Sá, and Celina M. H. de Figueiredo. Shifting coresets: Obtaining linear-time approximations for unit disk graphs and other geometric intersection graphs. *International Journal of Computational Geometry and Applications*, 27(4):255–276, 2017.
- [11] Guilherme D. da Fonseca, Diana Sasaki, and Bernard Ries. On the ratio between perfect matchings and maximum weight matchings of grids. *Discrete Applied Mathematics*, 207:45–55, 2016.
- [12] Emilio Vital Brazil, Guilherme D. da Fonseca, Celina M. H. de Figueiredo, and Diana Sasaki. The cost of perfection for matchings in graphs. *Discrete Applied Mathematics*, 210:112–122, 2016.

- [13] Guilherme D. da Fonseca, Vinícius G. P. de Sá, Raphael Machado, and Celina M. H. de Figueiredo. On the recognition of unit disk graphs and the distance geometry problem with ranges. *Discrete Applied Mathematics*, 197:3–19, 2015.
- [14] Guilherme D. da Fonseca, Vinícius G. P. de Sá, Celina M. H. de Figueiredo, and Raphael Machado. Efficient sub-5 approximations for minimum dominating sets in unit disk graphs. *Theoretical Computer Science*, 540–541(5):70–81, 2014.
- [15] Guilherme D. da Fonseca. Fitting flats to points with outliers. *International Journal of Computational Geometry and Applications*, 21(5):559–569, 2011.
- [16] Vinícius G. P. de Sá, Celina M. H. de Figueiredo, Guilherme D. da Fonseca, and Raphael Machado. Complexity dichotomy on partial grid recognition. *Theoretical Computer Science*, 412(22):2370–2379, 2011.
- [17] Guilherme D. da Fonseca and David M. Mount. Approximate range searching: The absolute model. *Computational Geometry*, 43(4):434–444, 2010.
- [18] Celina M. H. de Figueiredo and Guilherme D. da Fonseca. Enclosing weighted points with an almost-unit ball. *Information Processing Letters*, 109(21-22):1216–1221, 2009.
- [19] Letícia R. Bueno, Luerbio Faria, Celina M. H. de Figueiredo, and Guilherme D. da Fonseca. Hamiltonian paths in odd graphs. *Applicable Analysis and Discrete Mathematics*, 3(2):386–394, 2009.
- [20] Celina M. H. de Figueiredo, Guilherme D. da Fonseca, Vinicius G. P. de Sá, and Jeremy Spinrad. Algorithms for the homogeneous set sandwich problem. *Algorithmica*, 46(2):149–180, 2006.
- [21] Guilherme D. da Fonseca, Celina M. H. de Figueiredo, and Paulo C. P. Carvalho. Kinetic hanger. *Information Processing Letters*, 89(3):151–157, 2004.
- [22] Vânia M. F. Dias, Guilherme D. da Fonseca, Celina M. H. de Figueiredo, and Jayme L. Szwarcfiter. The stable marriage problem with restricted pairs. *Theoretical Computer Science*, 306(1-3):391–405, 2003.
- [23] Guilherme D. da Fonseca and Celina M. H. de Figueiredo. Kinetic heap-ordered trees: Tight analysis and improved algorithms. *Information Processing Letters*, 85(3):165–169, 2003.

Conférences internationales

- [24] Guilherme D. da Fonseca and Yan Gerard. Shadoks approach to knapsack polygonal packing. In *40th International Symposium on Computational Geometry (SoCG 2024)*, volume 293 of *LIPICs*, pages 84:1–84:9, 2024.
- [25] Guilherme D. da Fonseca, Yan Gerard, and Bastien Rivier. Short flip sequences to untangle segments in the plane. In *International Conference and Workshops on Algorithms and Computation (WALCOM 2024)*, volume 14549 of *Lecture Notes in Computer Science*, pages 163–178, 2024.
- [26] Guilherme D. da Fonseca. Shadoks approach to convex covering. In *39th International Symposium on Computational Geometry (SoCG 2023)*, volume 258 of *LIPICs*, pages 67:1–67:9, 2023.
- [27] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Economical convex coverings and applications. In *ACM-SIAM Symposium on Discrete Algorithms (SODA 2023)*, pages 1834–1861, 2023.
- [28] Guilherme D. da Fonseca, Yan Gerard, and Bastien Rivier. On the longest flip sequence to untangle segments in the plane. In *International Conference and Workshops on Algorithms and Computation (WALCOM 2023)*, *Lecture Notes in Computer Science*, pages 102–112, 2023.

- [29] Arun Kumar Das, Sandip Das, Guilherme D. da Fonseca, Yan Gerard, and Bastien Rivier. Complexity results on untangling red-blue matchings. In *15th Latin American Theoretical Informatics Symposium (LATIN 2022)*, Lecture Notes in Computer Science, pages 730–745, 2022.
- [30] Loïc Crombez, Guilherme D. da Fonseca, Yan Gerard, and Aldo Gonzalez-Lorenzo. Shadoks approach to minimum partition into plane subgraphs. In *38th International Symposium on Computational Geometry (SoCG 2022)*, LIPIcs, pages 71:1–71:8, 2022.
- [31] Loïc Crombez, Guilherme D. da Fonseca, Yan Gerard, Aldo Gonzalez-Lorenzo, Pascal Lafourcade, and Luc Libralesso. Shadoks approach to low-makespan coordinated motion planning. In *37th International Symposium on Computational Geometry (SoCG 2021)*, volume 189 of *LIPIcs*, pages 63:1–63:9, 2021.
- [32] Rahul Arya, Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Optimal bound on the combinatorial complexity of approximating polytopes. In *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 786–805, 2020.
- [33] Loïc Crombez, Guilherme D. da Fonseca, and Yan Gerard. Efficient algorithms for Battleship. In *International Conference on Fun with Algorithms (FUN 2020)*, pages 11:1–15, 2020.
- [34] Loïc Crombez, Guilherme D. da Fonseca, and Yan Gérard. Peeling digital potatoes. In *Canadian Conference in Computational Geometry (CCCG)*, pages 124–132, 2019.
- [35] Ahmed Abdelkader, Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Approximate nearest neighbor searching with non-euclidean and weighted distances. In *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 355–372, 2019.
- [36] Loïc Crombez, Guilherme D. da Fonseca, and Yan Gérard. Efficient algorithms to test digital convexity. In *International Conference on Discrete Geometry for Computer Imagery (DGCI)*, pages 409–419, 2019.
- [37] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Approximate convex intersection detection with applications to width and Minkowski sums. In *European Symposium on Algorithms (ESA)*, pages 3:1–14, 2018.
- [38] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Near-optimal ε -kernel construction and related problems. In *International Symposium on Computational Geometry (SoCG)*, pages 10:1–15, 2017.
- [39] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Optimal approximate polytope membership. In *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 270–288, 2017.
- [40] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. On the combinatorial complexity of approximating polytopes. In *International Symposium on Computational Geometry (SoCG)*, pages 11:1–15, 2016.
- [41] Guilherme D. da Fonseca, Vinícius G. P. de Sá, and Celina M. H. de Figueiredo. Linear-time approximation algorithms for unit disk graphs. In *Approximation and Online Algorithms (WAOA)*, volume 8952 of *Lecture Notes in Computer Science*, pages 132–143, 2015.
- [42] Guilherme D. da Fonseca, Vinícius G. P. de Sá, Celina M. H. de Figueiredo, and Raphael Machado. Linear time approximation for dominating sets and independent dominating sets in unit disk graphs. In *Approximation and Online Algorithms (WAOA)*, volume 7846 of *Lecture Notes in Computer Science*, pages 82–92, 2013.
- [43] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Optimal area-sensitive bounds for polytope approximation. In *ACM Symposium on Computational Geometry (SoCG)*, pages 363–372, 2012.

- [44] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Polytope approximation and the Mahler volume. In *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 29–42, 2012.
- [45] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Approximate polytope membership queries. In *ACM Symposium on Theory of Computing (STOC)*, pages 579–586, 2011.
- [46] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. A unified approach to approximate proximity searching. In *European Symposium on Algorithms (ESA)*, volume 6346 of *Lecture Notes in Computer Science*, pages 374–385, 2010.
- [47] Vinícius G. P. de Sá, Celina M. H. de Figueiredo, Guilherme D. da Fonseca, and Raphael Machado. Complexity dichotomy on degree-constrained vlsi layouts with unit-length edges. In *International Symposium on Combinatorial Optimization (ISCO)*, volume 36 of *Electronic Notes in Discrete Mathematics*, pages 391–398, 2010.
- [48] Sunil Arya, Guilherme D. da Fonseca, and David M. Mount. Tradeoffs in approximate range searching made simpler. In *Symposium on Computer Graphics and Image Processing (SIBGRAPI)*, IEEE, pages 237–244, 2008.
- [49] Guilherme D. da Fonseca. Approximate range searching: The absolute model. In *Algorithms and Data Structures (WADS)*, volume 4619 of *Lecture Notes in Computer Science*, pages 2–14, 2007.
- [50] Celina M. de Figueiredo, Guilherme D. da Fonseca, Vinícius G. de Sá, and Jeremy Spinrad. Faster deterministic and randomized algorithms on the homogeneous set sandwich problem. In *Experimental and Efficient Algorithms (WEA)*, pages 243–252, 2004.