

Curriculum vitae of Alessandro Dal Palù

Addresses:

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Date of Birth: 24 January 1979.

Place of Birth: Verona (VR).

Degrees: Computer Science degree (Laurea = BS + MS), University of Verona, Italy, on 10th Jul 2002.

Ph.D.: Ph.D. in Computer Science, at University of Udine on 31th March 2006.

Current position : researcher (assistant professor) at Parma University, Dept. of Mathematics.

Research Interests:

- Programming methodologies to solve complex problems: Constraint (Logic) Programming, Answer Set Programming.
- Bioinformatics: Tertiary structure prediction for proteins, Rna Alignment.
- Parallelism and GPU computing.
- Analysis of multi-dimensional medical images.
- Computational complexity and data structure optimization.

Curriculum Vitae et Studiorum

Jul 1997 I pursued High School Degree at Liceo Scientifico Statale G.Fracastoro in Verona with 60/60.

Sep 1997 I enrolled at University of Verona, for a Computer Science degree.

Sep 1997 – Jul 2002 Scholarship from the Municipality of Verona during my 5 years of University studies.

Aug 2000 Scholarship from Esu Verona, for a month of intensive English course at Hull University, UK.

Aug 2001 – Dec 2001 I begun a MS in Computer Science at New Mexico State University, Las Cruces, NM, Usa and collaborated for research on algorithms and data structures optimizations.

May and Jun 2002 Collaboration with Verona University for a project of remote robotic surgery.

10th Jul 2002 I received my Computer Science degree from the Faculty of Scienze Matematiche Fisiche e Naturali, University of Verona, thesis title: *New optimal algorithms on pointer machines*, relators: Prof. Roberto Giacobazzi, Prof. Agostino Dovier, Prof. Enrico Pontelli e Prof. Desh Ranjan. I received the mark 110/110 cum laude and a special mention from the committee for my outstanding curriculum.

Sep – Nov 2002 Research period at University of Parma, for integrating Constraint Logic Programming solvers over sets.

Jul – Nov 2002 Collaboration with University of Verona for a project to study the disposition of alarms to alert population in case of high tide in the town of Venice.

Nov 2002 I enrolled and received a scholarship for a Computer Science Ph.D. at University of Udine.

Apr 2003 – Sep 2004 I was granted a scholarship from the European Social Fund: Misura D4 Miglioramento delle risorse umane nel settore della ricerca e sviluppo tecnologico.

Feb – Mar 2004 Research period in Jena, Germany, on bioinformatics and Constraint Logic Programming. During this period, I designed and implemented a new protein simulator in the framework of CLP over Finite Domains.

Aug – Dec 2004 Research at New Mexico State University, Las Cruces, NM, Usa, focusing on bioinformatics, parallelism and Constraint Logic Programming, e.g. I applied parallel constraint programming to solve protein structure prediction problems.

Oct 2005 End of scholarship for Ph.D. studies (3 years).

16th Dec 2005 Start researcher position (assistant professor with tenure track) at University of Parma, Dept. of Mathematics.

31th March 2006 Final dissertation for Ph.D.

Spring semester 2011 Visiting Professor and research collaborator at New Mexico State University

Currently Assistant professor with tenure track at University of Parma, Math. Dept, Italy.

International Scientific collaborations:

- New Mexico State University (Dept. Computer Science), since 2001
- EPFL, Switzerland (Signal Processing Lab 5), since 2010

Awards:

- 9th March 2007: Marco Cadoli Award given by GULP (Gruppo Ricercatori e Utenti Logic Programming) for best Ph.D. thesis on computational logics
- Best paper award at International Conference of Logic Programming 2010, *CLP-based protein fragment assembly*
- Prolog programming contest winner at International Conference on Logic Programming 2012 (Budapest).

Editor:

- Book chapter. Constraint Based Methods for Bioinformatics in Trends in Constraint Programming, Frederic Benhamou, Narendra Jussien and Barry O'Sullivan eds. (co-editor). ISBN: 9781905209972, 2007
- Constraints Journal, Special Issue on Constraint based methods for Bioinformatics (co-editor) Volume 13, Issue 1 (2008).
- Thematic series on Constraints and Bioinformatics, Algorithms for Molecular Biology (co-editor), 2012.

Program committee:

- PC member of ICLP 2008/11/12 and publicity chair of ICLP 08.
- Doctoral Consortium, ICLP10/11 (co-chair).
- PC member of IJCAI11.
- Workshop on Constraint Based Methods for Bioinformatics (2005-2014), co-chair in 2006/07/09/10/11/13.
- PC member of CILC 08-14.
- PC member of RCRA 13.
- Bio-Logical: Logic-based Approaches in Bioinformatics 2009, Reggio Emilia, Italy, Dec 2009.

Project member:

- GNCS 2005 Sviluppo di risolutori di vincoli e loro applicazioni in teoria dei codici e bioinformatica
- FIRB 2003: Il riconoscimento molecolare nelle interazioni proteina-ligando, proteina-proteina e proteina superficie: sviluppo di approcci sperimentali e computazionali integrati per lo studio di sistemi di interesse farmaceutico (Approved March 31st 2005) — RBNE03B8KK
- PRIN 2005 (as Ph.D. student): Vincoli per la programmazione con insiemi, l'analisi di sistemi con automi, il ragionamento su intervalli e la bioinformatica. — 2005015491

- PRIN 2008 Innovative and multi-disciplinary approaches for constraint and preference reasoning. — 20089M932N
- GNCS 2010 Tecniche innovative per la programmazione con vincoli in applicazioni strategiche
- (Project coordinator) GNCS 2011 Nuova architettura parallela per l'esecuzione di Programmi Logici mediante General Purpose Graphic Processing Unit (GPGPU)
- GNCS 2014: CUD@ASP: sfruttare la potenza di calcolo delle GPU per il ragionamento automatico

Associations:

- GNCS Gruppo Nazionale per l'Informatica Matematica.
- GULP Gruppo programmatori e Utenti Logic Programming.
- ALP: Association for Logic Programming.
- AI*IA Associazione Italiana per l'Intelligenza Artificiale.
- Agentlink

Teaching:

- A.Y. 2002/03. T.A. for the class: C/C++ Programming for Mathematics and Computer Science at University of Parma.
- A.Y. 03/04, 04/05, 05/06. T.A. for the class: Operating Systems for Biotechnology at University of Udine.
- A.Y. 05/06, 06/07, 07/08, 08/09 . Computer Science, Biotechnology degree, University of Parma.
- A.Y. 05/06, 06/07, 07/08, 08/09, 09/10, 11/12, 12/13, 13/14. Operating Systems, CS degree, University of Parma.
- A.Y. 10/11. Programming Lab, CS degree, University of Parma.

Invited Seminars:

- An Optimal Data Structure to Handle Dynamic Environments in Non-deterministic Computations (27/11/02, Università di Parma).
- Protein Folding Complexity (05/05/03, Università di Udine).
- Protein Folding in Constraint Logic Programming over Finite Domains (27/05/04, Lipari Summer School).
- Protein Folding with CLP (13/09/04, New Mexico State University, NM, USA).
- A Constraint Logic Programming Approach to 3D Structure Determination of Large Protein Complexes (16/09/05, Dobbiaco Summer School).
- Global constraints for discrete lattices (25/01/07, Freiburg Germany).
- Constraint based protein fragment assembly (19/11/09, Freiburg Germany).
- Protein structure prediction methods (Doctoral school) (4-6/07/11, Sissa, TS).
- A constraint-based framework to model protein structure: applications and examples (Workshop on Structural Bioinformatics and Computational Biophysics) (7/07/11, Sissa, TS).
- Constraint-based Assembling of Protein Fragments (Coprod, El Paso, TX (17/03/11)).

Scientific Publications - Pubblicazioni scientifiche

International Journals - Riviste Internazionali

1. R. Vacondio, A. Dal Palù, P. Mignosa GPU-enhanced Finite Volume Shallow Water solver for fast flood simulations. *Environmental Modeling and Software*. In press.
2. A. Dal Palù, A. Dovier, A. Formisano, and E. Pontelli. CUD@SAT: SAT Solving on GPUs. To appear in *JETAI (Journal of Experimental & Theoretical Artificial Intelligence)*
3. F. Campeotto, A. Dal Palù, A. Dovier, F. Fioretto and E. Pontelli. A Constraint Solver for Flexible Protein Model. *JAIR (Journal of Artificial Intelligence Research)* Volume 48, pages 953-1000, 2013. Doi:10.1613/jair.4193
4. A. Dal Palù, F. Spyraakis and P. Cozzini A new approach for investigating protein flexibility based on Constraint Logic Programming. The first application in the case of the Estrogen Receptor. *European Journal of Medicinal Chemistry*, 2012. DOI: dx.doi.org/10.1016/j.ejmech.2012.01.003
5. A. Dal Palù, A. Dovier, F. Fogolari, and E. Pontelli CLP-based protein fragment assembly. *Theory and Practice of Logic Programming*, special issue dedicated to ICLP 2010. 10(4-6): pp 709-724, July 2010, doi:10.1017/S1471068410000372
6. A. Dal Palù, A. Dovier, E. Pontelli. Computing Approximate Solutions of the Protein Structure Determination Problem using Global Constraints on Discrete Crystal Lattices (preprint). In *International Journal of Data Mining and Bioinformatics*. 4(1), 1-20, 2010, DOI: 10.1504/IJDMB.2010.030964
7. A. Dal Palù, A. Dovier, E. Pontelli, G. Rossi. GASP: Answer Set Programming with Lazy Grounding. *Fundamenta Informaticae*, 96 (2009) DOI 10.3233/FI-2009-180, 297-322, IOS Press.
8. F. Bergenti, A. Dal Palù, G. Rossi. Integrating Finite Domain and Set Constraints into a Set-based Constraint Language. *Fundamenta Informaticae* 96 (2009) DOI 10.3233/FI-2009-177, 227-252, IOS Press
9. A. Dal Palù, J. He, E. Pontelli, Y. Lu. A Constraint Logic Programming approach to associate 1D and 3D structural components for large protein complexes. In *International Journal of Data Mining and Bioinformatics*, 1(4), 352-371, 2007.
10. A. Dal Palù, A. Dovier and E. Pontelli. A constraint solver for discrete lattices, its parallelization, and application to protein structure prediction. In *Software: Practice and Experience* DOI 10.1002/spe.810 2007 Volume 37, Issue 13 , Pages 1405 - 1449. Accepted: 23 December 2006.
11. A. Dal Palù, E. Pontelli and D. Ranjan Sequential And Parallel Algorithms For The Nca Problem On Pure Pointer Machines. In *Theoretical Computer Science*, 1-3(352):108-135, March 2006, ISSN: 0304-3975.
12. A. Dal Palù, A. Dovier and F. Fogolari. Constraint Logic Programming approach to protein structure prediction. *BMC Bioinformatics* 5(186), November 2004. (Impact factor 5.42)
13. F. Avanzini, D. Rocchesso, A. Belussi, A. Dal Palù, and A. Dovier. A urban-scale auditory warning system for high tides in Venice. *IEEE Computers* 37(9):55-61, September 2004.
14. D. Ranjan, E. Pontelli, A. Dal Palù. An Optimal Data Structure to Handle Dynamic Environment in Non-deterministic Computations. In *Computer Languages*, 28(2):181-201, Pergamon Press 2002.

National Journals - Riviste Nazionali

15. L. Bortolussi, A. Dal Palù, A. Dovier, and F. Fogolari. Simulazione del processo di ripiegamento di una proteina utilizzando un sistema ad agenti Agent-based Protein Folding Simulation. In *Intelligenza Artificiale*, 1:56-61, 2005, ISSN 1724-8035.

Book Chapters - Capitoli di libri

16. A. Dal Palù, A. Dovier, F. Fogolari and E. Pontelli. Protein Structure Analysis with Constraint Programming. Book chapter in *Computational Approaches to Nuclear Receptors*, RSC Drug Discovery Series. 40-59, 2012. ISBN: 978-1-84973-535-3. DOI: 10.1039/9781849735353-00040
17. A. Dal Palù, and P. Torroni. 25 Years of Applications of Logic Programming in Italy . Book chapter in *25 Years of Logic Programming in Italy*, LNCS 6125, 300-328, 2010 .
18. A. Dal Palù, A. Dovier, S. Will. Introduction to the Special Issue. *Constraints*, 13(1):1-2, 2008.
19. A. Dal Palù, A. Dovier, F. Fages, S. Will. Constraint Based Methods for Bioinformatics. In *Trends in Constraint Programming*. Frederic Benhamou, Narendra Jussien and Barry O'Sullivan eds. ISBN: 9781905209972, 2007

International Conferences - Convegni internazionali

20. Federico Campeotto, Alessandro Dal Palù, Agostino Dovier, Ferdinando Fioretto, and Enrico Pontelli Exploring the Use of GPUs in Constraint Solving. Proc of PADL 2014, LNCS 8324, pp. 152-167.
21. A. Daducci A. Dal Palù A. Lemkaddem; J. Thiran. A Convex Optimization Framework For Global Tractography. International Symposium on Biomedical Imaging, San Francisco, CA, USA, April 8-11, 2013.
22. F. Campeotto, A. Dal Palù, A. Dovier, F. Fioretto, and E. Pontelli. A Filtering Technique for Fragment Assembly-based Proteins Loop Modeling with Constraints. In M. Milano ed., Proc of 18th International Conference on Principles and Practice of Constraint Programming, Quebec City, Canada, 8-12 October 2012. LNCS 7514
23. A. Dal Palù, A. Dovier, F. Fogolari, and E. Pontelli CLP-based protein fragment assembly . In: Toby Walsh, NICTA and University of NSW . Proceedings of the Twenty-Second International Joint Conference on Artificial Intelligence. Barcelona, Spain, July 16-22, vol. 3, p. 2590-2596, Suite 100 Menlo Park CA:AAAI Press/International Joint Conferences on Artificial Intelligence, ISBN: 9781577355151, doi: 10.5591/978-1-57735-516-8/IJCAI11-431
24. A. Dal Palù, M. Moehl, and S. Will. A Propagator for Maximum Weight String Matching with Arbitrary Pairwise Dependencies . In proceedings of CP 2010, LNCS 6308, 167-175, DOI: 10.1007/978-3-642-15396-9_16
25. A. Dal Palù, A. Dovier, E. Pontelli, G. Rossi. Answer Set Programming with Constraints using Lazy Grounding. In ICLP 09 International Conference of Logic Programming.
26. A. Dal Palù, A. Dovier, E. Pontelli. Logic Programming Techniques in Protein Structure Determination: Methodologies and Results. In LPNMR 09 International Conference on Logic Programming and Nonmonotonic Reasoning, 560-566 LNCS 5753 Springer 2009
27. A. Dal Palù, A. Dovier, E. Pontelli. Enhancing the Computation of Approximate Solutions of the Protein Structure Determination Problem Through Global Constraints for Discrete Crystal Lattices. In proceedings of Computational Structural Bioinformatics Workshop (BIBM 07) November 4, 2007, San Jose, CA.
28. A.Dal Palù, E.Pontelli, D.Ranjan. An Optimal Algorithm for Finding NCA on Pure Pointer Machines. In *Algorithm Theory - SWAT 2002*, Lecture Notes In Computer Science, 428-438, Springer-Verlag 2002 ISBN: 3-540-43866-1.
29. A.Dal Palù, E.Pontelli, D.Ranjan. An Efficient Parallel Pointer Machine Algorithm for Nearest-Common Ancestor Problem. In *IFIP International Conference on Theoretical Computer Science*, Information Processing Letters, 85(5):275-283, Elsevier North-Holland 2003, ISSN: 0020-0190.
30. F. Avanzini, D. Rocchesso, A. Belussi, A. Dal Palù, and A. Dovier. Acqua alta a Venezia: design of a urban scale auditory warning system ICAD 2003, Proc. Int. Conf. on Auditory Display, ICAD 2003, pp. 184-187, Boston, 2003.
31. A. Dal Palù, A. Dovier, F. Fogolari. Protein Folding in CLP(FD) with Empirical Contact Energies. In Joint Annual Workshop of the ERCIM Working Group on Constraints and the CoLogNET area on Constraint and Logic Programming, MTA SZTAKI, Budapest, Hungary 30 June - 2 July, 2003. In K.R. Apt, F. Fages, F. Rossi, P. Szeredi and J. Vancza, eds, Recent Advances in Constraints, 2003, LNAI 3010, May 2004.
32. A. Dal Palù, A. Dovier, E. Pontelli and G. Rossi Integrating Finite Domain Constraints and CLP with Sets. In D. Miller, ed., Proc. of Fifth ACM-SIGPLAN International Conference on Principles and Practice of Declarative Programming Uppsala, Sweden, pp. 219-229, 27-29 August 2003.
33. L. Bortolussi, A. Dal Palù, A. Dovier, and F. Fogolari. Protein Folding Simulation in CCP. BioConcur 2004, Workshop on Concurrent Models in Molecular Biology, London, 30 August 2004.
34. A.Dal Palù, A.Dovier and E. Pontelli. Heuristics, Optimizations, and Parallelism for Protein Structure Prediction in CLP(FD). In proceedings of PPDP 2005, Lisboa, 11-13 July 2005.
35. A.Dal Palù, A.Dovier and E. Pontelli. A New Constraint Solver for 3-D Lattices and its Application to the Protein Folding Problem. In G. Sutcliffe, A. Voronkov eds., Proc. of Logic for Programming, Artificial Intelligence, and Reasoning. LNAI 3835, ISSN 0302-9743, December 2005, Montego Bay, Jamaica.
36. A.Dal Palù, Enrico Pontelli, Jing He, Yonggang Lu. A Constraint Logic Programming Approach to 3D Structure Determination of Large Protein Complexes. In proceedings of Symposium on Applied Computing (SAC) 2006, April 23-27 Dijon, France.

37. A. Dal Palù, J. He, E. Pontelli, Y. Lu. Identification of alpha-Helices from Low Resolution Protein Density Maps. In proceedings of Computational Systems Bioinformatics Conference (CSB) 2006, August 14-18, Stanford CA.

Conferences with non official proceedings - Convegni con atti non ufficiali

38. F. Vella, A. Dal Palù, A. Dovier, A. Formisano, E. Pontelli. CUDASP: Experimenting with GPGPUs in ASP solving. Proceedings of Cilec 2013. CEUR Vol-1068, 163-177
39. A. Dal Palù, A. Dovier, A. Formisano, and E. Pontelli. CUD@SAT: GPU parallelism for SAT Solving. In T. Mancini and A. Oddi eds, Proc of RCRA 2012: 19th RCRA International Workshop on Experimental Evaluation of Algorithms for solving problems with combinatorial explosion. Roma, 14-15 June 2012. CEUR-WS Vol
40. A. Dal Palù, A. Dovier, A. Formisano and E. Pontelli. Exploiting Unexploited Computing Resources for Computational Logics. 27th Italian Conference on Computational Logic, Roma, June 6-7, 2012. CEUR Vol 857
41. F. Avanzini, A. Belussi, A. Dal Palù, A. Dovier, and D. Rocchesso. Optimal Placement of Acoustic Sources in a Built-up Area using $CLP(\mathcal{FD})$ In J. J. Moreno-Navarro and J. M. Carballo eds., APPIA-GULP-PRODE 2002, Joint Conference on Declarative Programming, Madrid, Spain, 16–18 September 2002, pp. 139–154.
42. A. Dal Palù, S. Will, R. Backofen, and A. Dovier. Constraint Based Protein Structure Prediction Exploiting Secondary Structure Information. In G. Rossi, E. Panegai (eds.), Proc. of CILC'04, *Italian Conference on Computational Logic* 16-17 giugno 2004, Parma, Research Report Quaderno del Dipartimento di Matematica, Università' di Parma, n. 390, Novembre 2004.
43. L. Bortolussi, A. Dal Palù, and A. Dovier. Constraint-based tools for protein folding. Demo at CILC'04, *Convegno Italiano di Logica Computazionale* 16-17 giugno 2004, Parma.
44. L. Bortolussi, A. Dal Palù, A. Dovier and F. Fogolari. Protein Folding Simulation in CCP. In proceedings of IX *Convegno della Associazione Italiana Intelligenza Artificiale*, 15–17 Settembre 2004, Perugia.
45. A. Dal Palù, A. Dovier and E. Pontelli. Heuristics, Optimizations, and Parallelism for Protein Structure Prediction in CLP(FD). In proceedings of CILC 2005, Rome 21-22 June 2005.
46. A. Dal Palù, A. Dovier, E. Pontelli, G. Rossi. GASP: Answer Set Programming with Lazy Grounding. In CILC 08 *Convegno Italiano di Logica Computazionale*.
47. F. Bergenti, A. Dal Palù, G. Rossi. Generalizing Finite Domain Constraint Solving. In CILC 08 *Convegno Italiano di Logica Computazionale*.

Workshops with non official proceedings

48. A. Dal Palù, A. Dovier, E. Pontelli and G. Rossi. Integrating Finite Domain Constraints and CLP with Sets. In 12th International Workshop on Functional and (constraint) Logic Programming. Valencia, June 2003.
49. A. Dal Palù, A. Dovier, and E. Pontelli. Global Constraints for Discrete Lattices. In 2nd International Workshop on Constraint Based Methods for Bioinformatics (CP2006). Nantes, France, Sept 2006.
50. A. Dal Palù, A. Dovier, E. Pontelli, G. Rossi. GASP: Answer Set Programming with Lazy Grounding. In Lash 08 International Workshop on Logic and Search.
51. A. Dal Palù, A. Dovier, F. Fogolari, and E. Pontelli. CLP-based protein fragment assembly. Bio-Logical Workshop, AI*IA, 12th Dec 2009, Reggio Emilia.
52. A. Dal Palù, M. Moehl, and S. Will. Alignment of RNA with Structures of Unlimited Complexity. WCB 2010
53. Martin Mann and A. Dal Palù. Lattice model refinement of protein structures. WCB 2010
54. F. Campeotto, A. Dal Palù, A. Dovier, F. Fioretto, and E. Pontelli. Protein Loop Modeling via Constraints and Fragment Assembly. Proceedings of Workshop on Constraint Based Methods for Bioinformatics at ICLP 2012, Budapest, Hungary.

Technical Reports - Rapporti di ricerca

- E. Pontelli, D. Ranjan, and A. Dal Palù: Ancestor Problems on Pure Pointer Machines. NMSU-CS-2001-005, Dept. of Computer Science, New Mexico State University, USA, Nov 2001.
- A. Dal Palù, E. Pontelli, and D. Ranjan: An Optimal Algorithm for Finding NCA on Pure Pointer Machines. NMSU-CS-2001-007, Dept. of Computer Science, New Mexico State University, USA, Nov 2001.
- A. Dal Palù, E. Pontelli, and D. Ranjan: An Efficient Parallel Pointer Machine Algorithm for Nearest-Common Ancestor Problem. NMSU-CS-2001-009, Dept. of Computer Science, New Mexico State University, USA, Nov 2001.
- A. Dal Palù, A. Dovier, E. Pontelli, G. Rossi. A Constraint Logic Programming Framework for Effective Programming with Sets and Finite Domains. Quaderno del Dipartimento di Matematica, n. 437, Università di Parma, March 2006.

Posters

- A. Dal Palù, A. Dovier and F. Fogolari. Protein Folding in CLP(FD) with Empirical Contact Energies. Poster at European Conference in Computational Biology ECCB'2003, Paris 26–30 Sept.
- A. Dal Palù, A. Dovier, F. Fogolari. Protein Folding Simulation in CCP. Poster in Proc. of International Conference of Logic Programming 2004, LNCS 3132 pp. 452-453, Saint Malo, France.
- L. Bortolussi, A. Dal Palù, A. Dovier. Two constraint-based tools for protein folding. Poster at CILC 2004, Parma, 16-17 giugno 2004.
- A. Dal Palù, A. Dovier, F. Fogolari, R. Backofen, S. Will. Protein Folding with Constraint Logic Programming. Poster at BioInformatics Summer School, Lipari 2004.
- A. Dal Palù, M. Moehl, S. Will and B. Berger. CARNA: Alignment of RNA with Structures of Unlimited Complexity . RECOMB 2010