

CURRICULUM VITAE

ABEL MOLINA

PUBLICATIONS

Abel Molina, Thomas Vidick, John Watrous. Optimal counterfeiting attacks and generalizations for Wiesner quantum money. *arXiv: 1202.4010*. Presented at *TQC 2012*.

Abel Molina, John Watrous. Hedging bets with correlated quantum strategies. *arXiv:1104.1140*. Presented at *QIP 2012*. Published in *Proceedings of the Royal Society A*.

Enrique Alvarez Guerra, Abel Molina, Javier R. Vigiuri, Manuel Alvarez Guerra. A SOM-based methodology for classifying air quality monitoring stations. Published in *Environmental Progress & Sustainable Energy*.

EDUCATION

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| 09/2010-12/2011 | Master degree in Computer Science (Quantum Information), University of Waterloo. Cumulative GPA 94.00. |
| 01/2009-08/2010 | Bachelor degree with a double major in Computer Science and Combinatorics and Optimization, and a minor in Physics. University of Waterloo. Cumulative average 96.21/100.0 (97.63 for CS major and 97.64 for C&O major). |
| 08/2007-09/2007 | Three physics courses. University of California, Los Angeles (UCLA). Cumulative average 3.83/4.00. |
| 09/2005-06/2008 | Thirty-three courses towards the completion of a 5-year degree in Computer Science before transferring to the University of Waterloo. Universidad Politecnica de Madrid (UPM). Cumulative average 95.74/100.0. |
| 09/2003-06/2005 | High School, Science and Engineering Concentration. IES "Aguilar y Eslava", Cabra(Cordoba), Spain. |

COMMUNICATIONS

Juan Bermejo, Jesus Gomez, Francisca Martinez, Abel Molina, Almudena Navarro. Treatment of premature infants. A natural approach. ("Tratamiento de niños prematuros. Un Enfoque Natural."). *Actas del Certamen Jovenes Investigadores 2007*.

Antonio Giraldo, Abel Molina. Topological classification of planar minimal graphs according to their embeddings into the plane and into the sphere ("Clasificación topologica de los grafos planos minimales en relacion a su inmersión en el plano y en la esfera"). *Actas del Certamen Jovenes Investigadores 2006*.

ACADEMIC ACTIVITIES

2012	Member of the contest committee, Canadian Computing Competition.
11-2011	Problemsetter and judge, The 2011 ACM Southwestern Europe Programming Contest
07-2011	Problem Tester, International Olympiad in Informatics 2011
2011	Problemsetter, home parent, and member of the contest committee, Canadian Computing Competition
01-2011/04-2011	Teaching Assistant for "CO 481/CS 467/ PHYS 467: Introduction to Quantum Information Processing"
11/2010	Problemsetter and judge, The 2010 ACM Southwestern Europe Programming Contest
08/2010	Member of the Scientific Committee, International Olympiad in Informatics 2010
2010	Problemsetter, Canadian Computing Competition
11/2009	Problemsetter, The 2009 ACM Southwestern Europe Programming Contest.
08/2006	Volunteer at the ICM(International Congress of Mathematicians) 2006

ACHIEVEMENTS

01/2012	115th place (out of 7605), Facebook Hacker Cup 2012.
09/2010-12/2011	Mike and Ophelia Lazaridis Graduate Scholarship, valued at \$20,000 + tuition fees per year.
09/2010-12/2011	David R. Cheriton Graduate Scholarship, valued at \$10,000 per year.
08/2010	Dean Honours List for the Spring Term and graduation with distinction - Dean Honours list.
08/2010	176th position (out of at least 1439), Topcoder Open 2010.
04/2010	Dean Honours List for the Winter Term, University of Waterloo.
12/2009	Tied for position 98-107 out of 3632, 2009 William Lowell Putnam Mathematical Competition
12/2009	Dean Honours List for the Fall Term, University of Waterloo.
11/2009	6th place (out of 115), the 2009 ACM East Central North America Programming Contest.
10/2009	240th position(out of 8289), advancing to the last round before the World Final, Google Code Jam 2009.
04/2009	Dean Honours List for the Winter Term, University of Waterloo.
11/2008	IBM Special Award in the Arquimedes Research Competition, organized by the Spanish Ministry of Science and Innovation.
06/2008	Award to the best academic results in the Computer Science Faculty at the Universidad Politecnica de Madrid, year 07-08.
04/2008	The Autonomous Community of Madrid Excellence Scholarship, year 07-08, valued at 4,500 euros.
11/2007	13th place (out of 64), The 2007 ACM Southwestern Europe Programming Contest.
09/2007	First Prize, Young Researchers Contest, organized by the Youth Institute of the Spanish Government.

04/2007	The Autonomous Community of Madrid Excellence Scholarship, year 06-07, valued at 4,500 euros.
11/2006	29th place (out of 63), The 2006 ACM Southwestern Europe Programming Contest.
09/2006	Second Prize, Young Researchers Contest, organized by the Youth Institute of the Spanish Government.
06/2006	National High School Award 2005 (fifteen awards for all of Spain, determined by an exam covering the material studied at high school).
04/2006	The Autonomous Community of Madrid Excellence Scholarship, year 05-06, valued at 4,500 euros.
11/2005	Extraordinary High School Award 2005 (one award per 1000 students finishing high school in the same region of the country, determined by an exam covering the material studied at high school).
09/2005	Entered college at age 15
08/2005	Grant of attendance to "Aula de Verano Ortega y Gasset. Iniciacion a la Universidad", UIMP (International University Menendez Pelayo), to which the fifty applicants with the best GPA at High School in Spain attended.
06/2005	Graduated with honors from High School
04/2005	Bronze Medal (41st place), Spanish Physics Olympiad.
03/2005	Silver Medal (10th place), Spanish Mathematics Olympiad.

UNDERGRADUATE PROJECTS

Design, analysis and implementation of an error correction scheme based on Low Density Parity Check codes for a Quantum Key Distribution system, for a project between the Technical University of Madrid ("Universidad Politecnica de Madrid") and Telefonica R&D. The objective was to reduce the time spent in the error correction step, which was at the time the bottleneck of the system due to the use of the Cascade protocol.

Design and implementation of a system based on neural networks for classification of geographical areas according to their air contaminant emission rates, for the Arquimedes Research Competition 2008 (organized by the Spanish Ministry of Science and Innovation), in collaboration with a group of Chemical

Engineering students from the University of Cantabria. Using a Kohonen neural network to classify the data from the different stations, we generate a set of maps that represent the location of the stations in the different clusters, and also some of their characteristics. We consider different choices for the parameters in our algorithm, and select the ones that lead us to better results.

Design of an incubator in a interdisciplinary team of 5 people, for the Young Researchers Contest 2007. The preborn is placed into a womb-like cavity, and it receives natural stimulus through its senses. My work is mainly in the part of the sound interface, and designing and implementing an example of the monitoring interface

OOP Design and implementation of a vector graphics editor in GtkAda in a group of 2 people, as part of the course Data Structures II. Among other features, the editor supports layers, grouping of forms, aligning and zooming. The supported forms are rectangles, ellipses, text, lines, polylines and polygons of any number of sides representable using 32-bit integers.

Study of the number of isomorphism classes for Hamiltonian planar graphs under different isomorphisms. As part of this, I implemented a series of routines that find all the Hamiltonian graphs for a succession of degrees, and calculate the classes of equivalence between them according to different topological isomorphisms.

PROGRAMMING EXPERIENCE

08/2012-	Highlight app. Focus on growth, data analysis, and backend data processing.
01/2012-04/2012	imo.im. Developing for the imo network, with a focus on content recommendation.
Upper Intermediate	C++, Ada (with GtkAda).
Intermediate	C (with Unix API), LaTeX, Maple, Matlab, MC68000 and MC68110, Visual C++, VHDL.
Basic	Bash, Haskell, Javascript, SQL, Nyquist, Python, R, Ruby on Rails.

LANGUAGES

Fluent	English, Spanish.
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Basic French, Korean.

OTHER ACADEMIC ACTIVITIES

	Reviewer for the Theory of Computing journal
09/2011-12/2011	Science writer and proofreader for Imprint, the official student newspaper of the University of Waterloo.
09/2011-12/2011	Volunteer for UW Circle K, an university chapter of Kiwanis International.
05/2011-08/2011	Introduction to Combinatorics tutor for the University of Waterloo chapter of Students Offering Support, a charity that raises funds by organizing review sessions for exams.
01/2011-04/2011	Teaching Assistant for "CO 481/CS 467/ PHYS 467: Introduction to Quantum Information Processing".
05/2009-12/2010	Librarian of the Pure Math, Applied Math and Combinatorics & Optimization Club.
08/2006	Volunteer at the ICM(International Congress of Mathematicians) 2006.