Bernat Guillen Pegueroles

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Born: December 31, 1989—Barcelona, Spain
Languages: Spanish (native), Catalan (native), English (fluent), German (working)

Areas of specialization

Interpolation and approximation theory • Numerical Analysis • Algorithms • Data analysis

Education

2014-now **Ph.D. student**, Applied Mathematics (GPA:4.0). Advisor: Charles Fefferman
Princeton University, Princeton, NJ
First two years partially supported by Fulbright-Telefonica Scholarship
Relevant coursework:

- Software Engineering for Scientific Computing
- Numerical Algorithms for Scientific Computing
- Systems for Data-centric Computing
- Introduction to PDE
- Topics in Analysis (Interpolation and Approximation)
- Topics in Analysis (Metric Embeddings and Geometric Analysis)

2007-2012 **Licentiate degree (BSc+MSc)**, Applied Mathematics
UPC[2], Barcelona, Spain

2007-2013 **Engineer's degree (BSc+MSc)**, Telecommunication Engineering
UPC, Barcelona, Spain
Both degrees as a dual degree managed by CFIS[3]*, an excellence program in UPC which requires an entry exam. I was awarded a scholarship (tuition) for being one of the TOP5 in that exam.*

Summer 2011 MBA Summer School
IESE, Barcelona, Spain
Scholarship awarded by CFIS

Summer 2008 Summer Institute for Outstanding European Students
Bentley College, Waltham, MA
Scholarship awarded by the Fulbright Comission in Spain

[1] Program in Applied and Computational Mathematics
[2] Universitat Politecnica de Catalunya
[3] Center for Interdisciplinary Superior Education

Research Experience

2015-now Advisors: Charles L. Fefferman, Simon Levin.
***Princeton University**, PACM*
Smooth Selection Problem and Applications: Improvement of algorithms for the Smooth Selection Problem (interpolation with restrictions); applications to shape space analysis of influenza genome strands.

2015 Advisor: Sergiu Klainerman.
***Princeton University**, PACM*
Study of Einstein's equations in vacuum and viability of numerical methods to simulate the formation of trapped surfaces in vacuum.

2014-2015 Advisor: Phillip Holmes.
***Princeton University**, PACM*
Mathematical Neuroscience; study of dynamical systems reproducing the behavior of neurons and synapses in insects.

2013-2014 **Research Assistant**, advisors: Modesto Orozco, Oscar Flores.
***IRB**, Molecular Modeling and Bioinformatics*
Applied biostatistics and computational genomics techniques to study physical properties of DNA and nucleosome positioning. Assisted in developing `nucleR`.

2012-2013 Advisors: Xavier Hesselbach, Xavier Munoz, Sonja Klingert.
***Universitat Politecnica de Catalunya (UPC)**, Networks Engineering Department, Mathematics Department*
***Mannheim Universität**, Chair of Software Engineering*
Energy and Carbon emissions aware service allocation for Data Centers based on the Dynamic Bin Packing Problem
10/10 with Honors. Stay in Mannheim Universität supported by Erasmus and CFIS scholarships. Project in the field of All4Green FP7 EU project.

2011-2012 Advisors: Jordi Forne, David Rebollo-Monedero.
***Universitat Politecnica de Catalunya**, Networks Engineering Department*
Research on data privacy and k-anonimity: "π-likely k-anonimity".

Summer 2011 Advisor: Antonio Acin.
***Photonic Sciences Institute**, Quantum Information Theory group*, Castelldefels, Spain.
Study of SDP techniques for the problem of Mutually Unbiased Bases in $\mathbf{C}^6$.

Coding Projects & Experience

Most used: C, C++, Python, Java, MATLAB, Perl, R, Julia, MPI, openMP. Github, Bitbucket

2015 MPImap, MapReduce implementation on C/MPI for analyzing fault tolerance and performance. Final project (group project) for the course "Systems for Data-Centric computing".

2015 dG_project, implementation of nodal discontinuous Galerkin methods for solving PDE. Final project for the course "Numerical Algorithms for Scientific Computing". Advisor: James Stone

2014 ADMM-4-block, conic programming solver with 4 blocks of restrictions. Final project for the course "Software Engineering for Scientific Computing".

2013 Assisted in developing `nucleR`, a bioconductor package used for nucleosome coverage analysis in DNA sequences.

Research consulting experience

2016-now Working with GlassFrog on developing a methodology for the study of impact of education programs when the data is clustered/hierarchical. Applying Propensity Score Matching models to multilevel/clustered data.

Grants, honors & awards

2014-2016 Fulbright-Telefonica Scholarship for Advanced Studies.
2007-2013 CFIS grant for double degree in Mathematics and Telecommunication Engineering studies.
2011 ETSETB-Everis prize for best academic transcript in the double degree program (first cycle).
2008 ETSETB-Everis prize for best academic transcript in the double degree program (first year).

Teaching Experience

Fall 2016 **Assistant Instructor, Princeton University**. Software Engineering for Scientific Computing. Instructor: James Stone.

Spring 2016 **Assistant Instructor, Princeton University**. Math Alive. Instructors: Ian Griffiths (Oxford Uni.), Adam Marcus.
Grading assignments and holding office hours for the course Math Alive, an introduction to the different applications of mathematics to real-world problems.

Fall 2015 **Assistant Instructor, Princeton University**. Numerical Analysis. Instructor: Javier Gomez-Serrano.
Grading assignments, projects and exams as well as holding office hours for the course Numerical Analysis.

2010-2011 **Tutor, UPC** Tutoring seniors in high school, helping with their research projects in Applied Security and Wi-fi auditories.

2011-2012 **Mentor CFIS, UPC** Mentoring freshmen in CFIS.

2005-2013 Private tutoring.

Publications & talks

MSc Thesis

2013 Energy and Carbon emissions aware service allocation for Data Centers based on the Dynamic Bin Packing Problem

Conference Articles

2013 Energy and Carbon Emissions Aware Services Allocation with Delay for Data Centers,*JITEL 2013*

Activities & Interests

Classical and jazz clarinet. Taekwondo.
EUCOOP, IEEE student branch. Participated in several IETF projects.
Organized several education outreach programs for underprivileged children in my hometown.

Last updated: December 3, 2016
Typeset in XeLaTeX
Up to date CV.Up to date resume