

Miguel Ruiz García

Post-doctoral Researcher
Department of Physics and Astronomy
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- EDUCATION** *PhD* 2017
Sobresaliente *Cum Laude*, Mention of International Doctor,
Modeling and Numerical Simulation Group,
Department of Materials Science,
Universidad Carlos III de Madrid, Madrid, Spain.
- Research Master's Degree in Materials Science and Engineering* 2013
Universidad Carlos III de Madrid, Madrid, Spain.
- Degree in Physics* 2012
Universidad de Sevilla, Sevilla, Spain,
"Premio al mejor expediente" (Valedictorian).
- EXPERIENCE** *Post-doctoral Researcher* 2017-Present
Advisors: Profs. Andrea J Liu and Eleni Katifori,
Soft Matter Group,
Department of Physics and Astronomy,
University of Pennsylvania,
Philadelphia, PA, USA.
- FPU Doctoral Fellow* 2014-2017
Advisors: Profs. Luis L Bonilla and Antonio Prados,
Modeling and Numerical Simulation Group,
Department of Materials Science,
Universidad Carlos III de Madrid, Madrid, Spain,
Supported by Ministerio de Educación.
- Research assistant* 2012-2014
Modeling and Numerical Simulation Group,
Department of Materials Science,
Universidad Carlos III de Madrid, Madrid, Spain,
Supported by a research grant of the Autonomous Region of Madrid and the Spanish Government.
- PUBLICATIONS** **Ruiz-Garcia, M**, Bonilla, L L, and Prados, A, *Bifurcation analysis and phase diagram of a spin-string model with buckled states*, Physical Review E, (under review). ArXiv:1708.07990
- Essen, J, **Ruiz-Garcia, M**, Jenkins, I, Carretero, M, Bonilla, L L and Birnir, B, *Parameter dependence of high-frequency nonlinear oscillations and intrinsic chaos in short GaAs/(Al, Ga) As superlattices*, Chaos (under review). ArXiv:1706.09488.
- Ruiz-Garcia, M**, Essen, J, Carretero, M, Bonilla, L L, and Birnir, B, *Enhancing chaotic behavior at room temperature in GaAs/(Al,Ga)As superlattices*, Physical

Review B, **95**, 085204 (2017)

Yin, Z, Song, H, Zhang, Y, **Ruiz-Garcia, M**, Carretero, M, Bonilla, L L, Biermann, K and Grahn, H T, *Noise-enhanced chaos in a weakly coupled GaAs/(Al,Ga)As superlattice*, Physical Review E, **95**, 012218 (2017).

Ruiz-Garcia, M, Bonilla, L L, and Prados, A, *STM-driven transition from rippled to buckled graphene in a spin-membrane model*, Physical Review B, **94**, 205404 (2016).

Bonilla, L L, **Ruiz-Garcia, M**, *Critical radius and temperature for buckling in graphene*, Physical Review B, **93**, 115407 (2016).

Ruiz-Garcia, M, Bonilla, L L, and Prados, A, *Ripples in hexagonal lattices of atoms coupled to Glauber spins*, J. Stat. Mech.: Theor. Exp., P05015 (2015)

Highlighted in Revista Española de Física, 29 (3), 26 (2015).

Ruiz-Garcia, M and Prados, A, *Kovacs effect in the one-dimensional Ising model: A linear response analysis*, Physical Review E, **89**, 012140 (2014).

HONORS AND AWARDS

Visiting Student Research Collaborator, April-May, 2017
 Financed by Prof. Andrej Košmrlj
 Mechanical and Aerospace Engineering, Princeton University

MINECO Fellow in Residencia de Estudiantes 2016-2017
 Awarded and financed by Ministerio Economía y Competitividad.

FPU Doctoral Fellowship 2014-2018
 Materials Science Department, Universidad Carlos III de Madrid,
 Awarded and financed by Ministerio de Educación.

The 24th Annual PCMI Summer Session, Mathematics and Materials 2014
 Attendance scholarship awarded and financed by
 Institute for Advanced Study (IAS).

PIF Doctoral Fellowship 2014
 Materials Science Department, Universidad Carlos III de Madrid,
 Awarded and financed by Universidad Carlos III de Madrid.

Undergraduate Research Fellowship 2012
 Department of Statistical Mechanics, Universidad de Sevilla,
 Awarded and financed by Ministerio de Educación.

RESEARCH STAYS

Princeton University April-May, 2017
 Princeton, NJ, USA
 Advisor: Prof. Andrej Košmrlj.

École Normale Supérieure June-July, 2016
 Paris, France
 Advisor: Prof. Pierre Le Doussal.

University of California, Santa Barbara September-December, 2015
 Santa Barbara, California, USA
 Advisor: Prof. Bjorn Birnir.

University of Iceland
Reikiavik, Iceland
Advisor: Prof. Bjorn Birnir.

July, 2015

**CONFERENCES
AND
SEMINARS**

Invited Seminar

Talk: Rippling and buckling of graphene monolayers
Department of Physics and Astronomy
The University of Pennsylvania, PA, USA, October 30, 2017.

Invited Seminar

Talk: Nonlinear effects in low dimensional systems: graphene membrane
and electron dynamics in semiconductor superlattices
Instituto Álvaro Alonso Barba
Universidad Carlos III de Madrid, Junio, 2017.

Invited Seminar

Talk: Buckling of thermalized sheets
Department of Mechanical and Aerospace Engineering
Princeton University, NJ, USA, May 2017.

The 18th Mid-Atlantic Soft Matter Workshop

Talk: Buckling of thermalized sheets
The University of Pennsylvania, PA, USA, May 19, 2017.

The 7th Northeast Complex Fluids and Soft Matter Workshop

Talk: Buckling of thermalized sheets
Princeton University, NJ, USA, May 26 2017.

Invited Seminar

Talk: Rippling and buckling of graphene monolayers
Department of Mechanical and Aerospace Engineering
Princeton University, NJ, USA, April 2017.

Gregorio Millán Barbany Institute: 2017 Workshop

Talk: Characterizing and enhancing chaotic oscillations in semiconductor superlat-
tices
Madrid, Spain, January, 2017.

Gregorio Millán Barbany Institute: Junior Seminar

Talk: Poquito a poco me voy cuantizando
Madrid, Spain, October, 2016.

*Coupled Mathematical Models for Physical and Biological Nanoscale Systems and
Their Applications*

Talk: Spontaneous chaotic oscillations at room temperature in a semiconductor su-
perlattice model.
Poster: STM Driven Transition from Rippled to Buckled Graphene in a Spin-Membrane
Model.
Banff International Research Station for Mathematical Innovation and Discovery,
Banff, Canada. September 2016.

Gregorio Millán Barbany Institute: Junior Seminar

Talk: ¡Se oyen, se sienten, las ondas gravitatorias están presentes!
Madrid, Spain, March, 2016.

Nonequilibrium Statistical Physics Network and its Multidisciplinary Applications: Nonequilibrium condensed matter and biological systems

Talk: Spontaneous chaotic oscillations and noise in a semiconductor superlattice model

Madrid, Spain, March, 2016.

Gregorio Millán Barbany Institute: Junior Seminar

Talk: Grafeno, una hamaca de cristal

Madrid, Spain, February, 2016.

Nonequilibrium Statistical Physics Network and its Multidisciplinary Applications

Talk: Spin-oscillator models of ripples in suspended graphene

Barcelona, Spain, April, 2015.

19th International Conference on Electron Dynamics on Semiconductors, Optoelectronics and Nanostructures

Poster: Enhanced Spontaneous Chaos in Semiconductor Superlattices at Room Temperature

Salamanca, Spain, June, 2015.

ADMINISTRATION EXPERIENCE

Gregorio Millán Barbany Institute: 2017 Workshop

Organizer

January the 19th and 20th, 2017.

Gregorio Millán Barbany Institute: Junior Seminar

Organizer

2015-2016 and 2016-2017.

Nonequilibrium Statistical Physics Network and its Multidisciplinary Applications: Nonequilibrium condensed matter and biological systems

Member of the local organizer committee

Madrid, Spain, March, 2016.

VI Conference of the Spanish Network of Nonequilibrium Statistical Physics

Member of the local organizer committee

Madrid, Spain, November, 2012.

TEACHING

Attendance to "Curso de desarrollo docente" (teaching development) 2016

10 hours

Universidad Carlos III de Madrid.

Advisor of a senior undergraduate's research project 2016-2017

Grade: 10/10

Bachelor's Degree in Computer Science

Universidad Carlos III de Madrid.

Calculus 2016-2017

Bachelor's Degree in Computer Science

Universidad Carlos III de Madrid.

Congratulated for outstanding performance by Universidad Carlos III de Madrid.

Multivariable Calculus 2015-2016

Bachelor's Degree in Aerospace Engineering

Universidad Carlos III de Madrid,
 Congratulated for outstanding performance by Universidad Carlos III de Madrid.

**PARTICIPATION
 IN RESEARCH
 PROJECTS** *National Research Project: MTM2014-56948-C2-2-P*
 Financed by Ministerio de Economía y Competitividad (Spain).

National Research Project: FIS2011- 28838-C02-01
 Financed by Ministerio de Ciencia e Innovación (Spain).

Research Project: HYSYCOMB, (S2009/ENE-1597)
 Financed by Comunidad de Madrid (Spain).

**OTHER
 MERITS**

Referee for scientific journals:
 Superlattices and Microstructures
 Applied Physics A.

Language certificates

- English level: First Certificate in English, certificate of Cambridge. Jun 2013.
- English level: B2.2, certificate of School of Modern Languages at the University of Barcelona. Apr 2013.

Other Scholarships

- Master's Degree Scholarship. Universidad Carlos III de Madrid. (1000 euros).
- Master's Degree Scholarship. Comité Olímpico Español. (1000 euros).

Computer Skills

FORTRAN, MATLAB, Mathematica.

**EXTRA-
 CURRICULAR
 ACTIVITIES**

Music, rowing and physics have influenced a great deal of my life. As my relation with physics is extensively discussed along this CV, I felt that these other aspects of my life should be also gathered here.

I played clarinet for nine years until I was 17 years old. I performed some solo recitals and was a member of a young orchestra (*Joven Orquesta Provincial de Málaga*) for five years. We performed every month in Málaga and carried out one concert tour around Morocco. We also participated in Eurorchestries 2003, a meetings of young orchestras from all over the world in Charente-Maritime, France. Simultaneously, when I was fourteen I started to practice rowing, and soon, I got hooked by it. From 2006 to 2011 I was a member of the Spanish National Team, participating in diverse international competitions. Since 2011, I have continued going to some international competitions for clubs, including two World Rowing Coastal Championships. A brief track record:

- 5th, World Rowing Coastal Championships, 4x+. Montecarlo (Monaco), 2016.
- 7th, World Rowing Coastal Championships, 2x. Helsingborg (Sweden), 2013.
- Spanish u23 Record, Indoor Rowing, 2000m (5' 59"). 2011.
- 11st, World Rowing u23 Championships, 4x. Amsterdam (Netherlands), 2011.
- 11st, European Rowing Championships, 4x. Brest (Belarus), 2009.
- 3rd, Coupe de la Jeunesse, 8+. Groningen (Netherlands), 2006.
- As well as eight times 1st in the Spanish Rowing Championships.

The initials (2x, 4x, 8+...) correspond with different rowing boats.