

<b>Part A. Personal Information</b>		<b>DATE</b>	03/03/2020
Surname(s)	MORENO HERRERO		
Forename	FERNANDO		
Social Security, Passport, ID number			
Sex	MALE		
Age	43		
Researcher codes	WoS Researcher ID (*)	N-2967-2013	
	SCOPUS Author ID(*)	6603474573	
	Open Researcher and Contributor ID (ORCID)	0000-0003-4083-1709	

(\*) At least one of these is mandatory

**A.1. Current position**

Post/ Professional Category	INVESTIGADOR CIENTIFICO CSIC		
UNESCO Code	2406.99. Biophysics, Others. Nanobiotechnology		
Key Words	Atomic Force Microscopy, Magnetic Tweezers, Optical Tweezers, Single-molecule techniques, DNA repair, molecular motors		
Name of the University/Institution	CENTRO NACIONAL DE BIOTECNOLOGÍA CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS		
	Department/Centre	Macromolecular Structures Dep. / National Center of Biotechnology	
	Full Address	Darwin 3, 28049, Madrid	
	Email Address	fernando.moreno@cnb.csic.es	
	Phone Number	+34 91 585 5305	
Start date	Tenured since 18/09/2009 (Científico Titular) Since 21/12/2017 (Investigador Científico)		

**A.2. Education (title, institution, date)**

Year	University	Degree	Title
1998	Univ. of Oviedo	First degree	Licenciado (equivalent Bachelor+Master) in Physics
2003	Autonomous University at Madrid	PhD	PhD in Physical Science. (Condensed Matter Physics) "cum laude". PhD extraordinary Prize.

**A.3. Indicators of Quality in Scientific Production (See the instructions)**

Research "Sexenios": 3, 1999-2004, 2005-2010, 2011-2016.  
 Research "Quinquenios": 3, 2000-2004, 2005-2009, y 2010-2014.  
 PhD Thesis supervision: 6, M.E. Fuentes Pérez (Nov. 2014), Benjamin Gollnick (Jan. 2015), and César L. Pastrana (Nov. 2017), Julene Madariaga-Marcos (Feb. 2019), Alejandro Martín (Nov. 2019), Alberto Marín (March 2020).  
 Ongoing PhD thesis: 3, Mikel Marín (since 2019), Sara de Braganca (since 2019), Ania dobiezynska (since 2020).  
 Master thesis supervision: 5  
 Internships supervision: 12  
 Total number of citations: > 2300. (03/2020)  
 Average citations/article: ~ 39. (04/2019)  
 Average citations/year over the last 5 years: 157. (2015-2019)  
 H index: 25. (03/2020)  
 Total publications: 92  
 Publications in scientific journals indexed in the JCR: 55. First quartile (Q1): 47. First decile (D1): 27.  
 Book Chapters: 3. Reviews: 1; Conference proceedings: 29; Others, Outreach: 4.

1 publication in Nature (IF-42), 1 in Nature Nanotechnology (IF-33), 1 in Molecular Cell (IF-15), 3 in Nano Letters (IF-13), 2 in ACS nano (IF-12), 1 in JACS (IF-11), 3 in PNAS (IF-9.7), 7 in Nucleic Acids Research (IF-9.8), 1 in Small (IF-8.8), 3 in eLife (IF-8.0), 2 in Nanoscale (IF-7.7), and 2 in Phys. Rev. Lett. (IF-7.7).

*Invited talks at scientific conferences:* 25, including 4 plenary talks.

*Invited seminars at Research Centers and scientific groups:* 21

*Contributions to scientific conferences and congresses:* 125 (59 oral contributions).

## Part B. Free Summary of CV (Max. of 3.500 characters, including spaces)

Dr. Moreno-Herrero (Oviedo, Spain), graduated in Physics by the University of Oviedo in 1998. Intrigued by the physical mechanisms of proteins and their interactions with nucleic acids, Fernando moved to Madrid to undertake a D. Phil. in Biophysics using the Atomic Force Microscope under the supervision of Prof. A. M. Baró. During his D. Phil., Fernando enjoyed three research internships for a total of eight months at the University of California at Berkeley under the supervision of Prof. C. Bustamante. Fernando's PhD work (*Cum laude*, 1998-2003) was also awarded the *Ph.D. Extraordinary Prize* by the Universidad Autónoma de Madrid. On September 2003, Dr. Moreno-Herrero moved to The Netherlands to carry on postdoctoral research in single molecule biophysics at the Delft University of Technology under the supervision of Prof. C. Dekker. During his postdoctoral period with Prof. Dekker, Fernando focused his research on liquid AFM imaging and Magnetic Tweezers to study DNA-repair proteins interactions and the mechanical properties of nucleic acids. In December 2006, the PI started his own independent research line supported by the Spanish *Ramón y Cajal* program at the Fundació Privada Institut Català de Nanotecnologia (ICN) in Bellaterra, Barcelona. In september 2009, the PI secured a permanent position (Científico Titular) at the National Centre of Biotechnology, Madrid (CNB); a research institute of the Spanish National Research Council (CSIC), and since May 2017 he is Investigador Científico. Fernando leads the group of Single-Molecule Biophysics of DNA-repair Nanomachines at the CNB. Current research combines development of novel fast AFM technologies and Optical and Magnetic Tweezers machines with the aim to characterize and monitor the real-time dynamics of DNA repair processes at the single-molecule level.

Fernando has participated in 22 Research Projects, being the Principal Investigator in 13 of them, including a ERC Starting Grant 2007, a ERC Proof of Concept Grant 2014, and an ERC Consolidator Grant 2015. He has been also PI of three projects from MINECO. FMH has more than 92 publications, including 55 in ISI WoS Scientific journals, 28 conference proceedings and 3 book chapters. To date he has over 22 papers in journals with impact factor 9 or higher. His scientific papers accumulate over 2300 citations (WOS) and his H-index is 25. The average impact factor of his publications is around 8. Moreover, he has delivered 25 invited talks in national and international scientific conferences, including four plenary talks. He has been invited to present his work at Research Institutes or Scientific groups 21 times. Fernando has published his work in top multidisciplinary journals such as Nature, Nature Nanotechnology, Molecular Cell, The Proceedings of the National Academy of Sciences of USA, Physical Review Letters, The Journal of the American Chemical Society, Nano Letters, ACS nano, and Nucleic Acids Research among others. The impact of his research was recognized in 2012 by the Izasa-Werfen Prize of the Spanish Society for Biochemistry and Molecular Biology, in 2014 by the "Perez-Paya" Prize of the Spanish Biophysical Society, and more recently in 2015 by the "Miguel Catalán" Prize of the Autonomous Community of Madrid for researchers under 40.

## Part C. Relevant accomplishments

### C.1. Recent Publications as PI

1. C. Carrasco\*, C. L. Pastrana, C. Aicart-Ramos, S. H. Leuba, S. A. Khan and **F. Moreno-Herrero\*** *Force and twist dependence of RepC nicking activity on torsionally-constrained DNA molecules* **Nucleic Acids Research** **2020**. DOI: 10.1093/nar/gkz1200. Índice de Impacto (JCR 2018): **11.2**.
2. A. Marín-González, J.G. Vilhena, **F. Moreno-Herrero\*** and R. Perez\*. *Sequence-dependent mechanical properties of double-stranded RNA* **Nanoscale** **2019**, Vol 11(44) 21471-21478. DOI: 10.1039/c9nr07516j
3. J. Madariaga-Marcos, C. Pastrana, G. L. Fisher, M.S. Dillingham, and **F. Moreno-Herrero\***, M. A. Oliva\*. *The structural basis for dynamic DNA binding and bridging interactions which condense the bacterial centromere*. **eLife** **2019** vol 8, e43812, doi: 10.7554/eLife.43812

4. A. Marin-Gonzalez, JG Vilhena, **F. Moreno-Herrero\*** and R. Perez\*. *DNA Crookedness Regulates DNA Mechanical Properties at Short Length Scales*. **Physical Review Letters** **2019** vol 122 (4), 048102, doi: 10.1103/PhysRevLett.122.048102
5. B. Martín-García\*, A. Martín-González\*, C. Carrasco, A. M Hernández-Arriaga, R. Ruíz-Quero, R. Díaz-Orejas, C. Aicart-Ramos, **F. Moreno-Herrero\***, M. A. Oliva\*. *The TubR-centromere complex adopts a double-ring segrosome structure in Type III partition systems*. **Nucleic Acids Research** **2018** gky370, doi:10.1093/nar/gky370
6. J. Madariaga-Marcos, S. Hormeño, C. L. Pastrana, G. L. M. Fisher, M. S. Dillingham, and **F. Moreno-Herrero\***. *Force determination in Lateral Magnetic Tweezers combined with TIRF microscopy*. **Nanoscale** **2018** 10(9):4579-4590. doi: 10.1039/C7NR07344E I.F.: 7.76.
7. Fisher GL\*, **Pastrana CL\***, Higman VA\*, Koh A, Taylor JA, Butterer A, Craggs T, Sobott F, Murray H, Crump MP, **Moreno-Herrero F**, Dillingham MS. *The structural basis for dynamic DNA binding and bridging interactions which condense the bacterial centromere*. **Elife** **2017**;6:e28086 doi: 10.7554/eLife.28086. I.F.: 7.7.
8. A. Marin-Gonzalez, J.G. Vilhena, R. Perez\* and **F. Moreno-Herrero\***. *Understanding the mechanical response of double-stranded DNA and RNA under constant stretching forces using all-atom molecular dynamics*. **Proceedings of the National Academy of Sciences USA** **2017** 114(27) 7049-7054. I.F. (JCR-2016): 9.6.
9. C. L. Pastrana, C. Carrasco, P. Akhtar, S. H. Leuba, S. A. Khan, and **F. Moreno-Herrero\***. *Force and twist dependence of RepC nicking activity on torsionally-constrained DNA molecules*. **Nucleic Acids Research** **2016**. 44(18):8885-8896. I.F. (JCR-2016): 10.2.
10. P. Ares, M.E. Fuentes-Perez, E. Herrero-Galán, J. M. Valpuesta, A. Gil, J. Gómez-Herrero, and **F. Moreno-Herrero\***. *High resolution atomic force microscopy of double-stranded RNA* (Cover Article). **Nanoscale** **2016** 8(23):11818-26. I.F. (JCR-2013): 7.7.
11. J. A. Taylor, C.L Pastrana, A. Butterer, C. Pernstich, E. J. Gwynn, F. Sobott, **F. Moreno-Herrero\***, and M.S. Dillingham\*. *Specific and non-specific interactions of ParB with DNA: implications for chromosome segregation*. **Nucleic Acids Research** **2015** 43(2):719-731. I.F. (JCR-2015): 9.2.
12. B. Gollnick, C. Carrasco, F. Zuttion, N. S. Gilhooly, M. S. Dillingham and **F. Moreno-Herrero\***. *Probing DNA Helicase Kinetics with Temperature-Controlled Magnetic Tweezers* (Cover Article). **Small** **2015** 11(11), 1273-1284. I.F. (JCR-2015): 8.3.
13. K. Wegrzyn, M.E. Fuentes-Perez, K. Bury, M. Rajewska, **F. Moreno-Herrero\***, and I. Konieczny\*. *Sequence specific interactions of Rep proteins with ssDNA in the AT-rich region of the plasmid replication origin*. **Nucleic Acids Res** **2014**. 42(12): 7807-7818. I.F. (JCR-2014): 9.1.
14. C. Carrasco, N. Gilhooly, M.S. Dillingham\*, and **F. Moreno-Herrero\***. *On the mechanism of recombination hotspot scanning during double-stranded DNA break resection*. **Proceedings of the National Academy of Sciences USA** **2013** 110(28), E2562-E2571. I.F. (JCR-2013):9.8 .
15. E. Herrero-Galán, M. E. Fuentes-Perez, C. Carrasco, J. M. Valpuesta, J. L. Carrascosa, **F. Moreno-Herrero\***, J. R. Arias-Gonzalez\*. *Mechanical identities of RNA and DNA double helices unveiled at the single-molecule level*. **Journal of the American Chemical Society** **2013** 135(1), 122-31. I.F. (JCR-2011): 11.44.
16. M.E. Fuentes-Perez, E.J. Gwynn, M.S. Dillingham and **F. Moreno-Herrero\***. *Using DNA as a fiducial marker to study SMC complex interactions with the Atomic Force Microscope*. **Biophysical Journal** **2012** 102, 839-48. I.F. (JCR-2012): 3.7.
17. J.T.P. Yeeles, K. van Aelst, M.S. Dillingham\* and **F. Moreno-Herrero\***. *Recombination hotspots and single-stranded DNA binding proteins couple DNA translocation to DNA unwinding by the AddAB helicase-nuclease*. **Molecular Cell** **2011** 42, 806-16. I.F. (JCR-2011):14.2.

## C.2. Active Research Projects and Grants

1. Reference: **BFU2017-83794-P**  
 Title: Biofísica de molécula única para el estudio de máquinas proteicas de reparación de ADN.  
 Funding body and call for proposals: MEIC. Plan Estatal 2017  
 Principal Investigator and affiliation: Fernando Moreno Herrero (CNB-CSIC)  
 Starting and ending date: from 1-01-2018 to 31-12-2020 (36 months)  
 Amount: 234.740€ + 1 PhD Fellowship (FPI)      Type of participation: Principal Investigator  
 Project status: Ongoing
2. Reference: **ERC-CoG-2015-681299**

*Title:* Unfolding the Mechanisms of Chromosome Cohesion and Condensation using Single-Molecule Biophysical Approaches

*Funding body and call for proposals:* European Research Council. Consolidator Grant 2015.

*Principal Investigator and affiliation:* Fernando Moreno Herrero (CNB-CSIC)

*Starting and ending date:* from 1-6-2016 to 31-05-2021 (60 months)

*Amount:* 1.894.999€ *Type of participation:* Principal Investigator

*Project status:* Ongoing

3. *Reference:* **P2018/NMT-4443**

*Title:* Nuevas Tecnologías Aplicadas al Estudio de Nanomáquinas Biológicas

*Funding body and call for proposals:* Comunidad de Madrid. **Programa de I+D en Tecnología 2018.**

*Principal Investigator and affiliation:* Fernando Moreno Herrero (CNB-CSIC)

*Starting and ending date:* from 1-1-2019 to 31-12-2022 (48 months)

*Amount:* 809,600€ (149,631€ Coord) *Type of participation:* Coordinator

*Project status:* Ongoing

4. *Reference:* **Y2018/BIO-4747**

*Title:* Nanobiología Estructural y Molecular de Procesos de Reparación de ADN relacionados con Cáncer

*Funding body and call for proposals:* Comunidad de Madrid. **Proyectos Sinérgicos 2018.**

*Principal Investigator and affiliation:* Fernando Moreno Herrero (CNB-CSIC)

*Starting and ending date:* from 1-1-2019 to 31-12-2021 (36 months)

*Amount:* 812,900€ (431,200€ Coord) *Type of participation:* Coordinator

*Project status:* Ongoing

### C.3. Prizes and honours

1. **2015 Miguel Catalán Prize** of the Autonomous Community of Madrid for researchers under 40.
2. **Consolidator Grant** for Frontier Research 2015. European Research Council.
3. **Proof of Concept Grant** for Frontier Research 2014. European Research Council.
4. **2014 SBE-40 "Perez-Payá" Prize** of the Spanish Biophysical Society.
5. **2012 IZASA-WERFEN Prize** of the Spanish Society for Biochemistry and Molecular Biology.
6. **Starting Grant** for Frontier Research 2007. European Research Council.
7. **2004 Extraordinary PhD Prize** of the Autonomous University of Madrid
8. PhD Thesis "cum laude" by Autonomous University of Madrid, March 3, 2003 (26 years-old).
9. Ramón y Cajal Awardee 2006 (Ranked 1<sup>st</sup>).
10. Ramón Areces Foundation Postdoctoral Fellow, 2003-2005.
11. PhD Fellowship from the Autonomous Community of Madrid, 1999-2003.
12. Graduated in Physics as second of 1998 promotion (22 years-old). University of Oviedo.
13. Graduated with honors from High School. 1994.

### C.4. Other distinctions and achievements

1. Editorial Member of Scientific Reports Journal in the Biological Physics Area since 2016.
2. Reviewer for Nature, Nat. Struct. Mol. Biol, Molecular Cell, Nucleic Acids Research, and Biophysical J., among others.
3. Member of the Evaluation Committee of National Projects (Physics Area, 2016) and "Ramon y Cajal" proposals (Fundamental Biology area, 2017). Ministry of Economy, Industry and Competitiveness.
4. Elected member of the Executive Board of the Spanish Society for Biochemistry and Molecular Biology. 2014-2018
5. Reviewer of Ikerbasque Research Fellow and BERC, since 2014.
6. Reviewer of Scientific Projects for MINECO, since 2012.
7. Reviewer of A\*MIDEX Foundation at Aix-Marseille University, since 2017