
BIOGRAPHICAL SKETCH

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NAME Carazo, Jose Maria		POSITION TITLE Full Professor	
eRA COMMONS USER NAME (credential, e.g., agency login) josemariacarazo			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Granada, Spain	Ms.C	1981	Physics
University Autonoma, Madrid, Spain	Ph.D	1984	Structural Biology

A. Personal statement.

I have a sustained experience in the field of Three-dimensional Electron Microscopy (3DEM), especially in the methods development area. I have also been very active in exploring new instrumentation possibilities to observe biological structures, and it was as part of this endeavor that I became involved in the construction of a new beam line for Soft X-ray Tomography of cells at the Spanish Synchrotron ALBA, complementing approaches initiated at the Berlin and Berkely synchrotrons. This beam line will be operational by the end of 2011, offering us access to an instrument unique of its kind. Irrespective of the photon source and of the beam line design, there are fundamental issues regarding the image-forming interaction of photons at these wave lengths with biological matter, issues that clearly demand specific image processing developments.

I believe in multidisciplinary approaches to science as a way of finding truly new discoveries at the interface of different disciplines, I also believe in "team work" and focused multidisciplinary collaborations

I would like to add that as a recognition to both my contributions to the EM field and also to my way of forming successful teams around me, we have been selected as the European Instruct Center for Image Processing in Structural Biology as part of the European research infrastructure INSTRUMENT, starting 2011. This central role certainly will help us in assuring the dissemination of our "fresh" developments in a global manner.

B. Positions and Honors.

Positions and Employment

1981-1984	Pre-doctoral fellow, IBM Research Center, Madrid, Spain
1985-1986	Post-doctoral fellow, Centro de Biología Molecular Severo Ochoa, Madrid, Spain
1987-1988	Research Affiliate II, New York State Department of Health
1989-	Head of the Biocomputing Unit, National Center of Biotechnology, Madrid, Spain
1990-2000	Tenure Scientist, National, Center of Biotechnology, Madrid, Spain
2001-2002	Senior Research Scientist, National Center of Biotechnology, Madrid, Spain
1998-2001	Deputy Director for Research, National Center of Biotechnology, Madrid,
2002-2003	Deputy Director for Research Planning and Monitoring, Science and Technology Ministry
1995-2003	Adj. Professor of Computer Science, Autonoma University, Madrid, Spain
2003-2004	Senior Research Scientist National Center of Biotechnology, Madrid, Spain
2005 -	Full Professor, National Center of Biotechnology, Madrid, Spain

Other Experience and Professional Memberships

1997-2001	President of the Spanish Microscopy Society.
2005-	Senior member of the IEEE Computer Society

Honors

1984	PhD Excellence Award by the Spanish Academy of Science.
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1986 Okazato Research Award, by JEOL.
1998 Rhone-Poulenc Excellence Award by the French Academy of Science

C. Selected recent peer-reviewed publications

1. C.O.S.Sorzano, R.Marabini, N.Boisset, E.Rietzel, R.Schroeder, G.T.Herman and J.M.Carazo. The effect of overabundant projection directions on 3D reconstruction algorithms. *Journal of Structural Biology*, 2001: 133:108-118.
2. M.G. Gomez-Lorenzo, M. Valle, J. Frank, C. Gruss, C.O.S. Sorzano, X.S. Chen, L.E. Donate and J.M. Carazo. Large T antigen on the simian virus 40 origin of replication: a 3D snapshot prior to DNA replication. *The EMBO Journal*, 2003: 22:6205-6213. PMID: PMC291853.
3. C.O.S. Sorzano, R.Marabini, G.T.Herman, Y.Censor and J.M.Carazo. Transfer function restoration in 3D electron microscopy via iterative data refinement. *Physics in Medicine and Biology*, 2004: 49:509-522.
4. R. Marabini, C.O.S. Sorzano, S. Matej, J.J. Fernández, J.M. Carazo and G.T. Herman. 3D reconstruction of 2D crystals in real space, *IEEE Transactions on Image Processing*, 2004: 13:549-561.
5. C.O.S.Sorzano, R.Marabini, G.T.Herman and J.M.Carazo. Multiobjective algorithm optimization using multivariate statistics in three-dimensional electron microscopy reconstructions. *Pattern Recognition*, 2005: 38:2587-2601.
6. Y. Gómez-Llorente, R.J. Fletcher, X.S. Chen, J.M. Carazo and C. San Martín. Polymorphism and double hexamer structure in the archaeal minichromosome maintenance (MCM) helicase from *Methanobacterium thermoautotrophicum*. *Journal of Biological Chemistry*, 2005: 280:40909-40915.
7. S.H.W. Scheres, M. Valle, R. Nuñez, C.O.S. Sorzano, R. Marabini, G.T. Herman and J.M. Carazo. Maximum-likelihood multi-reference refinement for electron microscopy images, *Journal of Molecular Biology*, 2005: 348:139-149.
8. M. Valle, X.S. Chen, L.E. Donate, E. Fanning and J.M. Carazo. Structural basis for the cooperative assembly of large T antigen on the origin of replication. *Journal of Molecular Biology*, 2006: 357:1295-1305.
9. R. Núñez-Ramírez, M. Velten, G. Rivas, P. Polard, J.M. Carazo and L.E. Donate. Loading a ring: structure of the *Bacillus subtilis* DnaB protein, a co-loader of the replicative helicase. *Journal of Molecular Biology*, 2007: 367:764-769. .
10. H. Tidow, R. Melero, E. Mylonas, S.M. Freund, J.G. Grossmann, J.M. Carazo, D.I. Svergun, M. Valle and A.R. Fersht. Quaternary structures of tumor suppressor p53 and a specific p53 DNA complex. *Proceedings of the National Academy of Sciences*, 2007: 104:12324-12329. PMID: PMC1941468.
11. S.H.W. Scheres, H. Gao, M. Valle, G.T. Herman, P.P.B. Eggermont, J. Frank and J.M. Carazo. Disentangling conformational states of macromolecules in 3D-EM through likelihood optimization, *Nature Methods*, 2007: 4:27-29.
12. S.H. Scheres, R. Núñez-Ramírez, C.O.S. Sorzano, J.M. Carazo and R. Marabini. Image processing for electron microscopy single-particle analysis using XMIPP. *Nature Protocols*, 2008: 3:977-990. PMID: PMC2778070.
13. C.O.S.Sorzano, J.A. Velázquez-Muriel, R.Marabini, G.T.Herman and J.M.Carazo. Volumetric restrictions in single particle 3DEM reconstructions. *Pattern Recognition*, 2008: 41: 616-626. PMID: PMC2812911
14. S. Nickell, F. Beck, S.H.W. Scheres, A. Korinek, F. Förster, K. Lasker, O. Mihalache, N. Sun, I. Nagy, A. Sali, J.M. Plitzko, J.M. Carazo, M. Mann and W. Baumeister. Insights into the molecular architecture of the 26S proteasome. *Proceedings of the National Academy of Sciences*, 2009: 106:11943-11947. PMID: PMC2715492.
15. Cuesta I, Núñez-Ramírez R, Scheres SH, Gai D, Chen XS, Fanning E, Carazo JM. Conformational rearrangements of SV40 large T antigen during early replication events. *J Mol Biol*. 2010: 397:1276-86.. PMID: PMC2862297
16. Melero R, Rajagopalan S, Lázaro M, Joerger AC, Brandt T, Veprintsev DB, Lasso G, Gil D, Scheres SH, Carazo JM, Fersht AR, Valle M Electron microscopy studies on the quaternary structure of p53 reveal different binding modes for p53 tetramers in complex with DNA. *Proc Natl Acad Sci U S A*. 2011: 108(2):557-62. PMID: 21178074

D. Research Support

Ongoing Research Support

CSD2006-00023 Serrano (Coordinator of 9 research groups) 11/01/2006 - 11/01/2011
Spanish Ministry of Education and Sciences (MEC)
Centrosome – 3D
Large collaborative project on the structural-functional relationships of the centrosome.
Role: PI

ACI2009-10220: 1/01/2010 - 12/15/2012
MICINN
Associated center for image processing in microscopy for structural biology.
Role: Coordinator

ACI2010-1088: 01/01/2011 - 12/31/2011
MICINN
Puesta en marcha del Centro Asociado INSTRUMENT en procesamiento de imágenes en Microscopía
Role: Coordinator

BIO2010-16566: 01/01/2011 - 12/31/2013
MICINN
Hacia una Microscopía electrónica tridimensional de alto rendimiento.
Role: PI

PIF08-020-2: Carazo (Coordinator of three research groups) 09/01/2008 - 08/31/2011
Spanish High Research Council (CSIC)
Tomografía de Rayos X: Una herramienta de integración entre biología molecular y celular.
Multidisciplinary project around the Spanish X-ray Tomography synchrotron beam line
Role: Coordinator

UE (CE: FP7-202047) Rolf Ziesche (Coordinator of 12 groups) 04/01/2000 - 03/31/2013
European Union
Resolve chronic inflammation and achieve healthy ageing by understanding non-regenerative repair.
Our work in this large consortium is on data management and data analysis of proteomics data
Role: PI

Completed Research Support

New electron microscopy approaches for studying protein complexes and cellular supramolecular architecture”.

Funding entity: (EU-FP6-502828) UE

Timing of the project: 05/01/04 – 05/07/09

Research leader: Jose M. Carazo (co-PI)

Description: European Union Network of Excellence in Large collaborative project among leading European 3DEM research groups

Enabling Grids for E-science - II (EGEE - II)

Funding entity: (UE - 031688)

Timing of the project: from 1 April 2006 to 31 March 2008

Research leader: Jose M. Carazo (co-PI)

Description: Development of a Computational Grid in Europe with an emphasis on Structural Biology.

Towards understanding the structural richness of molecular nanomachines

Funding entity: Cicyt (BFU2004)

Timing of the project: from 13 December 2004 to 12 December 2007

Research leader: J.M.Carazo (PI)

Description: This is a project centered in EM methods development and applications on helicases.

Hacia la proteomica funcional: una aproximación conjunta desde la proteomica, la bioinformática y la biología estructural

Funding entity S-GEN-0166-2006 Community of Madrid

Timing of the project: 01/01/07 – 12/31/11

Research leader: J.M.Carazo (PI) (Coordinator of six research groups)

Description: Large interdisciplinary project on the centrosome differential and structural proteomics.

Análisis de grandes cantidades de imágenes de microscopia electrónica tridimensional: Desarrollo de métodos y aplicación al análisis del replisoma.

Funding entity : BIO2007 - 67150 Spanish Ministry of Education and Sciences (MEC)

Timing of the project: 10/01/07 – 10/01/10

Research leader: J.M.Carazo (PI)

Description: A structural biology project focused on the large scale processing of 3DEM images, and its application to the characterization of the replisome

2R01 HL070472-05 Herman (PI)

09/01/2005 - 08/31/2010

NIH

Image Processing in Biological 3D Electron Microscopy

A multidisciplinary approach is proposed to apply image-processing techniques to problem areas of 3D electron microscopy of complex biological macromolecules.

Role: Co-Investigator