

Francisco Costela

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Education

- 2011-2014 **Doctor of Philosophy in Neuroscience**, *Arizona State university*, Tempe, AZ, USA, Dissertation: The Significance of Microsaccades for Perception and Oculomotor Control.
- 2010 **Master of Science in Neuroscience and Behavior**, *Pablo de Olavide University*, Seville, Spain. Grade: A, MSc Thesis: Fiber tract modeling.
- 2009 **Master of Science in Biomedical Engineering**, *Oxford University*, UK. Grade 2:1, MSc Thesis: Identification of the Stria of Gennari in high resolution MRI.
- 2006 **Undergraduate thesis**, *Heriot-Watt University*, Edinburgh, UK. Grade: A, Design and construction of an autonomous underwater vehicle.
- 2005 **BSc Computer Engineering**, *University of Granada*, Granada, Spain.

Academic Employments

- 2019-present **Research Programmer at Schepens Eye Research Institute**, *Harvard Medical School*, Boston, MA, Python, Matlab (Neural network toolbox/Psychtoolbox), Stata, Rasch analysis.
- 2015-present **Postdoctoral Fellow at Schepens Eye Research Institute**, *Harvard Medical School*, Boston, MA. Advisor: Russell Woods, Gaze contingency display analysis - Video image processing - Rasch analysis - Amazon Mechanical Turk - Eye tracking with humans - Saccade prediction - Mixed-model analysis - Stata, Matlab (Neural network toolbox/Psychtoolbox) - Grant proposal writing.
- 2011-2014 **Researcher at Barrow Neurological Institute**, *Laboratory: Visual Neuroscience*, Phoenix, USA. Advisor: Susana Martinez-Conde, Analysis of fixational eye movements - Psychophysics - Electrophysiology - Eye tracking with humans - Eye coil with primates - Matlab (standalone/Psychtoolbox) - Human physiology (Biopac) - IRB management - Assistance in grant proposals.
- 2009-2010 **Research Assistant at the Functional Neuroscience Laboratory**, *Pablo de Olavide University*, Seville, Spain, Advisor: Jose Luis Cantero, Tasks: Analysis of fiber tract - Diffusion tensor imaging from patients with Alzheimer's disease - FSL, Freesurfer, DTI-Studio, Matlab, and Paraview.
- 2009 **Master Student at the Functional MRI Building**, *Oxford University*, UK, Advisor: Vicente Grau, 3T High resolution MRI acquisition. Segmentation and Registration to develop intensity profile delineation algorithms - FSL, Freesurfer, Matlab.

Teaching Experience

- 2019 **“Vision as a system- Eye Movements”**, *Lecturer*, Harvard University/Schepens Eye Research Institute, 1 semester.
- 2017 **“HBTM 303qc. Vision: A System and its Assessment - Eye Movements”**, *Lecturer*, Harvard University/Schepens Eye Research Institute, 1 semester.
- 2016-present **“IMFAHE Fellowship”**, *Advisor*, Spain-USA, 3 graduate students.
- 2015-present **“International Mentor Program”**, *Coordinator/Mentor*, Spain-USA, 10 graduate students.
- 2013-2014 **“BIO 201 Anatomy and Physiology”**, *Graduate Teaching Associate*, School of Life Sciences, Arizona State University, 3 semesters.
- 2012-present **“Mentorship Program in Neuroscience”**, *Mentor*, Arizona State University, 3 graduate students and 4 undergraduate students.
- 2011-2012 **“Ask a biologist”**, *GPSA Volunteer*, Arizona State University.
- 2009-2010 **“Spanish”**, *Spanish Official Helper*, Oxford Language Centre.

Peer Reviewed Articles

- accepted **Narrative video scene description task discriminates between levels of cognitive impairment in Alzheimer’s Disease**, *Reeves S, Williams V, Costela FM, Palumbo R, Umoren O, Mikaila C, Blacker D, Woods RL*, Neuropsychology.
- 2019 **People with central vision loss have difficulty when watching videos**, *Costela FM, Saunders DR, Rose DJ, Katjezovic S, Reeves S, Woods RL*, Investigative ophthalmology and visual science 60 (1), 358-364.
- 2019 **A free database of eye movements watching "Hollywood" videoclips**, *Costela FM, Woods RL*, Data in Brief, 103991.
- 2019 **Microsaccades reflect the dynamics of misdirected attention in magic**, *Barnhart AS, Costela FM, Martinez-Conde S, Macknik SL, Goldinger SD*, Journal of Eye Movement Research, 12 (6) Special issue.
- 2018 **When watching video, many saccades are curved and deviate from a velocity profile model.**, *Costela FM, Woods LR*, Frontiers in Neuroscience. 2018; 12: 960.
- 2018 **Saccade Landing Point Prediction: A Novel Approach based on Recurrent Neural Networks.**, *Morales A, Costela FM, Tolosana R, Woods RL*, Proceedings of the 2018 International Conference on Machine Learning. 2018. displays, 3, 9..
- 2018 **Measuring the difficulty watching video with hemianopia and an initial test of a rehabilitation approach**, *Costela FM, Saunders D, Rose D, Woods RL*, Translational Vision Science and Technology. 2018; 7(4): 13-18.
- 2018 **Survey of TV, Computer and Cinema Use and Photography by People with Hemianopia**, *Costela FM, Sheldon S, Woods RL*, Optometry and Vision Science 95 (5), 428-434.

- 2017 **The preferred retinal locus used to watch videos**, *Costela FM, Kajtezovic S, Woods RL*, Investigative ophthalmology and visual science 58 (14), 6073-6081.
- 2017 **Dynamic gaze-position prediction of saccadic eye movements using a Taylor series**, *Wang S, Woods RL, Costela FM, Luo G*, Journal of vision 2017, 14(3-3).
- 2017 **Changes in visibility as a function of spatial frequency and microsaccade occurrence**, *Costela FM, McCamy MB, Coffelt M, Otero-Millan J, Macknik SL, Martinez-Conde S*, European Journal of Neuroscience 2017, 45(433-439).
- 2015 **V1 neurons differentiate between motion in the world and self-generated motion due to eye movements**, *Troncoso XG, McCamy MB, Najafian A, Cui J, Costela FM, Otero-Millan J, Macknik SL, Martinez-Conde S*, Nature Communications 2015; 6:8114.
- 2015 **Characteristics of spontaneous square-wave jerks in the healthy macaque monkey during visual fixation**, *Costela FM, Otero-Millan J, McCamy MB, Macknik SL, Di Stasi LL, Rieiro H, Leigh JR, Troncoso XG, Najafian A, Martinez-Conde S*, PLoS ONE 2015, 10(6): e0128428.
- 2014 **Fixational eye movement correction of blink-induced gaze position errors**, *Costela FM, Otero-Millan J, McCamy MB, Troncoso XG, Najafian A, Macknik SL, Martinez-Conde S*, PLoS ONE 2014, 9(10) e110889.
- 2014 **Task difficulty in mental arithmetic affects microsaccadic rates and magnitudes**, *Siegenthaler E, Costela FM, McCamy MB, Di Stasi LL, Otero-Millan J, Sonderegger A, Groner R, Macknik SL, Martinez-Conde S*, European Journal of Neuroscience 2014, 39 1.
- 2013 **Microsaccades restore the visibility of foveal minute targets**, *Costela FM, McCamy MB, Macknik SL, Otero-Millan J, Martinez-Conde S.*, PeerJ 2013 1, E119.
- in review **Characteristics of fixational eye movements under restriction of visual field**, *Otero-Millan J, Costela FM, Macknik SL, Martinez-Conde S.*
- in review **Orientation of the preferred retinal locus is maintained following changes in simulated scotoma size**, *Costela FM, Reeves SM, Woods RL.*
- in review **Validation of a Vision-related Activity Scale for Patients with Retinitis Pigmentosa**, *Costela FM, Pesudovs K, Sandberg M, Weigel-DiFranco C, Woods RL.*
- in review **Refractive error and visual dysfunctions of students (15-18 years old) of the Northwest of Mexico**, *Teheran E, Costela FM.*
- in review **Risk prediction framework using eye movements during simulated driving**, *Costela FM, Castro-Torres J.*
- submitted **Monocular visual field patterns in retinitis pigmentosa found using unsupervised machine learning**, *Costela FM, Reeves S, Elze T, Weigel-DiFranco C, Woods RL.*

Contribution to Meetings

- Aug 2019 **Fixation dynamics as a function of PRL eccentricity with a simulated-scotoma**, *Costela FM, Martinez-Conde S, Woods RL*, European Conference of Eye Movements, Alicante, Spain.

- May 2019 **Orientation of the preferred retinal locus is maintained following changes in simulated scotoma size** , *Costela FM, Reeves SM, Woods RL*, The Association for Research in Vision and Ophthalmology, Vancouver, Canada.
- Jun 2018 **Saccade Landing Point Prediction: A Novel Approach based on Recurrent Neural Networks**, *Morales A, Costela FM, Tolosana R, Woods RL*, International Conference on Machine Learning Techniques, ICMLT, Jinan, China.
- May 2018 **Vision-related Activity Limitations of a Large Sample of People with Retinitis Pigmentosa**, *Costela FM, Pesudovs K, Sandberg M, Weigel-DiFranco C, Woods RL*, The Association for Research in Vision and Ophthalmology, Honolulu, USA.
- Oct 2017 **Measuring the difficulty experienced by people with central vision loss when watching videos**, *Costela FM, Saunders DR, Rose D, Woods RL*, American Academy of Optometry meeting, Chicago, IL.
- Oct 2017 **Measuring the difficulty experienced by people with central vision loss when watching videos**, *Costela FM, Saunders DR, Rose D, Woods RL*, American Academy of Optometry meeting, Chicago, IL.
- Aug 2017 **Information acquisition as a biomarker for vision inpairment**, *Costela FM, Woods RL*, European Conference of Visual Perception, Berlin, Germany.
- May 2017 **Viewing video with hemianopia** , *Costela FM, Woods RL*, Speaker - The Association for Research in Vision and Ophthalmology, Baltimore, MD, **Talk**.
- Aug 2016 **Perceptual fading and visibility restoration as a function of spatial frequency and microsaccade production**, *Costela FM, McCamy MB, Macknik SL, Martinez-Conde S* , European Conference of Visual Perception, Barcelona, Spain.
- Aug 2016 **Is there a crucial portion of the scene for viewing movies?** , *Costela FM, Woods RL*, European Conference of Visual Perception, Barcelona, Spain.
- May 2016 **Preferred retinal locus used to watch videos** , *Costela FM, Woods RL*, Speaker - The Association for Research in Vision and Ophthalmology, Seattle, WA, **Talk**.
- Nov 2015 **Square wave jerks characteristics in primates**, *Costela FM, Otero-Millan J, McCamy MB, Macknik SL, Troncoso XG, Najafian A, Macknik SL, Martinez-Conde S* , Society for Neuroscience Meeting, Chicago, IL.
- Jul 2015 **How much of a movie scene do you need to see?** , *Costela FM, Woods RL*, Gordon Research Conference on Eye Movements, Waltham, MA.
- May 2014 **Square wave jerks characteristics in primates**, *Costela FM, Otero-Millan J, McCamy MB, Macknik SL, Troncoso XG, Najafian A, Macknik SL, Martinez-Conde S* , Visual Sciences Society Meeting, San Petersburg, FL.
- Apr 2014 **The significance of Microsaccades for perception and oculomotor control**, *Costela FM*, Speaker - Neuroscience Research Seminar, Arizona State University, Tempe, AZ.
- Nov 2013 **Microsaccades restore the visibility of foveal minute targets**, *Costela FM, McCamy MB, Macknik SL, Otero-Millan J, Martinez-Conde S.*, Society for Neuroscience Meeting, San Diego, CA.
- May 2013 **Microsaccades correct fixation errors due to blinks**, *Costela FM, Otero-Millan J, McCamy MB, Macknik SL, Troncoso XG, Najafian A, Macknik SL, Martinez-Conde S* , Visual Sciences Society Meeting, Naples, FL.

- Oct 2012 **Microsaccades correct fixation errors due to blinks**, *Costela FM, Otero-Millan J, McCamy MB, Macknik SL, Troncoso XG, Najafian A, Macknik SL, Martinez-Conde S*, Society for Neuroscience Meeting, New Orleans, LA.

Guest speaker

- Apr 2019 **Effects of real and simulated preferred retinal loci on functional tasks**, *Costela FM*, Midwestern University, Chicago, IL.
- Sep 2018 **Visual rehabilitation aids for people with hemianopia**, *Costela FM*, University of Granada, Granada, Spain.
- Dec 2017 **Viewing video with central visual loss**, *Costela FM*, Polytechnic University of Hong Kong, HK, China.
- Sep 2017 **Viewing video with low vision**, *Costela FM*, Civil Hospital of Culiacan and University Autonoma of Sinaloa, Mexico.
- Mar 2017 **Watching video with hemianopia**, *Costela FM*, 6th Military Vision Symposium on Ocular and Vision injury, Boston, MA.
- Nov 2014 **The significance of Microsaccades for perception, cognition, and oculomotor control**, *Costela FM*, Schepens Eye Research Institute, Boston, MA.
- Aug 2014 **The significance of Microsaccades for perception, cognition, and oculomotor control**, *Costela FM*, Neuroscience Datablitz, Barrow Neurological Institute, Phoenix, AZ.
- Sep 2012 **Microsaccades correct fixation errors due to blinks**, *Costela FM*, 4th ASU-BNI Neuroscience Research Symposium, Phoenix, AZ.

Grants and Awards

- 2017-present **NIH Grant R21 EY027882 - Contributor**, *Impact of Peripheral Islands in the Visual Field on Functional Ability in Patients with Retinitis Pigmentosa*, Schepens Eye Research Institute, MA, USA.
- 2017 **Envision Atwell Honorable Mention by the Low Vision Research group**, *The Association for Research in Vision and Ophthalmology*, Baltimore, MD, USA.
- 2015-present **NIH Grant RO1 EY019100 - Contributor**, *Watching Television with Low Vision*, Schepens Eye Research Institute, MA, USA.
- 2015-2016 **NIH Grant R21 EY023724 - Contributor**, *Improving gaze contingent display systems*, Schepens Eye Research Institute, MA, USA.
- 2011-2015 **NSF Grant #1153786 - Contributor**, *Towards a unified theory of microsaccadic and saccadic function: determining the significance of microsaccades for perception, cognition, and oculomotor control*, BNI, Phoenix, AZ, USA.
- 2013 **NIH Grant proposal - Contributor**, *Affective Modulation of Attentional Control in Relation to Autism*, Not awarded, BNI, Phoenix, AZ, USA.
- 2014 **School of Life Sciences Completion Award**, Tempe, AZ, USA.
- 2012-2013 **Barrow Neurological Institute Interinstitutional Collaborative Fellowship Recipient**, Phoenix, AZ, USA.
- 2011-2013 **School of Life Sciences Travel Grant**, Tempe, AZ, USA.
- 2011-2012 **Graduate and Professional Student Association Research Award**, Tempe, AZ, USA.

- 2008–2009 **Talentia Excellence Scholarship from Junta de Andalucia, Oxford, UK.**
- 2007–2008 **Integrants Scholarship Award for Engineers, Chicago, USA.**
- 2006 **2nd position in the Student Autonomous Underwater Competition, Pinewood Studios, London, Organized by UK Ministry of Defense.**
- 2005–2006 **Erasmus Grant for European Students, Edinburgh, UK.**

Courses and Merits

- 2019-present **IEEE Transactions on Image Processing, Reviewer.**
- 2019-present **Translational Vision Science and Technology, Reviewer.**
- 2019-present **Data in Brief, Reviewer.**
- 2019-present **PeerJ, Reviewer.**
- 2019-present **Journal of Neuropsychology, Reviewer.**
- 2019-present **Journal of Eye Movement Research, Reviewer.**
- 2018-present **Experimental Eye Research, Reviewer.**
- 2018-present **PLoS ONE, Reviewer.**
- 2018-present **European Journal of Neuroscience, Reviewer.**
- 2018 **Successful grant writing, Harvard Catalyst.**
- 2017-present **International Journal of Neural Systems, Reviewer.**
- 2017-present **Ophthalmic and Physiological Optics, Reviewer.**
- 2017 **Effectively communicating research, Harvard Catalyst.**
- 2016-present **Frontiers Neuroscience, Reviewer.**
- 2015-present **Information Science, Reviewer.**
- 2015-present **Frontiers Psychology, Reviewer.**
- 2015 **Polytechnic University of Madrid, PhD thesis External Reviewer.**
- 2012-present **ARVO, Society for Neuroscience, and Vision Sciences Society, Member.**
- 2015-2016 **Certificate in Applied Biostatistics, Harvard Catalyst.**
- 2015 **Fundamentals of Clinical and Translational Research, Harvard Catalyst.**
- 2013 **ASU Graduate Association of Interdisciplinary Neuroscience Students, Founder.**
- 2013 **Machine learning course, Coursera Stanford University.**
- 2011–2014 **Head of the volunteer committee - Best Illusion of the Year Contest, Visual Sciences Society, Naples, St Petersburg, FL.**
- 2009 **MRI Physics course, FMRI Centre, Oxford.**
- 2009 **Oxford Biomedical Engineering Society, IT officer and web manager, Oxford.**

Languages

Spanish **Mother tongue**

English **Reading Fluent**
Writing Fluent
Oral Fluent

*TOEFL IBT 102/120 (2010),
 Graduate Record Examination (GRE) (2010)*

French	Reading	Inter-	<i>Passed French Basic 60-hours course in Offizzia Academy, Madrid, Spain (2007)</i>
	mediate		
	Writing	Basic	
	Oral	Basic	
Mandarin	Reading	Basic	<i>Beginner level at Pablo de Olavide University Language Center, Seville, Spain (2010)</i>

Other Work Experience

- 2007–2008 **Senior Programmer for Ebrisa (Encyclopaedia Britannica - Salvat Online)**, *Chicago, USA*, Webpage Administration - MyEclipse, J2EE, Struts, Hibernate, MySQL, Css, Taglibs, XML.
- 2006–2007 **Junior Programmer for Telefonica I+D**, *Madrid, Spain*, ADSL Provision management for Telefonica Germany and O2, JAVA Technology, J2EE, JABX, SOAP, XML, Javascript, Beanshells, PL/SQL, PJTools, Oracle Database.
- 2005–2006 **Junior Programmer in Ocean Lab**, *Edinburgh, UK*, Design of the intelligence of an autonomous underwater vehicle, Sonar management, C++, Image processing with OpenCV, mapping, web design.
- 2005 **Training program in MADOC (Mando de adiestramiento y doctrina para el combate)**, *Granada, Spain*, Maintenance and development of applications involving database access to Oracle and Access from Delphi and Jbuilder.