Daniela Pamplona

Computational and data neuroscientist

Curriculum Vitae

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Curriculum vitae

Personal details

Daniela Pamplona
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https://danielapamplona.github.io/
Birth date: July 20, 1984
Birthplace: Lisbon, Portugal
Citizenship: Portuguese

Education

2015, Workshop on C++ for intermediate level, INRIA, France

2009 - 2014, PhD. Computational Neuroscience, Johann Goethe Universität - Frankfurt, Germany

2009, IURS Summer school on Visuomotor Interaction, Benicàssim, Spain

2007, Erasmus student, Informatics department of Technische Universität Darmstadt, Germany

2006 - 2008, MSc. Applied Mathematics and Computation Theory, Instituto Superior Tecnico, Portugal

2002 - 2006, BSc. Applied Mathematics and Computation Theory, Instituto Superior Tecnico, Portugal

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Working experience

2022 - 2023 ATER (equivalent to lecturer), LASSI, UPEC, France in collaboration with Prof. Corinne Lagorre

2022, Teaching assistant at Neuro-match academy in computational neuroscience

2019, Career break for maternity leave

2017 - 2022, Postdoc, U2IS, ENSTA-PARIS, IPParis in collaboration with Prof. Antoine Manzanera

➢ *Proposed and tested an extension for the algorithm Expectation Maximization to improve its performance on an incremental learning setup.*

➢ *Developed and tested a new curiosity principle for a domestic robot based the Fisher information gain*

➢ *Supervised 4 Master internship, co-supervised 1 Master internships.*

2017 - 2021, Lecturer, U2IS, ENSTA-PARIS, IPParis.

➢ 2019 - 2021, Main professor of "Neural-computational models of vision"

> *Responsible for the syllabus, theoretical and exercise classes, and evaluation*
>
> ➢ 2019, Teaching assistant of "Probabilistic and statistics models"
>   *Contributed to syllabus, exercises and evaluation*
> ➢ 2018, Main professor of "Introduction to Matlab"
>   *Responsible for the syllabus, exercises and evaluation*
> ➢ 2017 - 2018, Invited professor of "Neural-computational models of vision"
>   *Contributed to theoretical and exercise classes, and evaluation*
> ➢ 2017, Teaching assistant of "Vision for autonomous robots"
>   *Contributed to exercise classes, and evaluation*

2015, Career break for maternity leave

2014 - 2016, Postdoc, BioVision Team, in collaboration with Dr. Bruno Cessac and Dr. Pierre Kornprobst, INRIA Sophia Antipolis, France

> ➢ *Developed new techniques for the analysis and modeling of retinal spiking data*
> ➢ *Developed freeware for analysis and simulation of spiking data.*
> ➢ *Contributed to the deliverables and review reports of the European Commission project Renvision.*

2009 - 2014, PhD Candidate, group of Prof. Constantin A. Rothkopf and Prof. Jochen Triesch, Frankfurt, Institute for Advanced Studies, Johann Goethe Frankfurt University, Germany

> ➢ *Developed models of the natural stimulus' spatial properties and the ecological consequences on optimal encoders of such stimulus. Contributed to one journal article and several conference abstracts.*
> ➢ *Participated in the "night of science", a science workshop for university students.*
> ➢ *Organized group meetings, journal clubs, and seminar classes.*
> ➢ *Co-supervised 2 Master internships*

2008, Visiting researcher, working with Prof. Zoran Ognjanović, Institute of Mathematics of the Serbian Academy of Arts and Science, Serbia

> ➢ *Explored and exploited the properties of Probabilistic Logic. Contributed to a research report.*

2007 - 2008, Research Assistant, under supervision of Prof. Alexandre Bernardino, Vislab, Institute for Systems and Robotics, Portugal

> ➢ *Developed and tested new bio-inspired method for image acquisition. Contributed to one conference article*

2007 - 2008, Tutorial teacher for secondary and high school students.

> ➢ *Contributed to the success of several students of different ages, by helping with their homework and new exercises in mathematics and physics*

2007 - 2008, Home school teacher of high school level

> ➢ *Responsible of the class, including: theory, exercises and evaluation in mathematics*

2007, Research Assistant, group of Prof. Bern Schiele, Technical University of Darmstadt, Germany

> ➢ *Contributed with tools for testing segmentation algorithms*

Grants and funding

> ➢ Name: 2A2C
> Funding Organization: Direction générale de l'armement, Ministère des armées,

FRANCE
Period of Grant Award: 01/01/2019 - 31/12/2021
Title of Project: Apprentissage Actif, Consolidation et Curiosité dans les   systèmes de vision duale
Role on Project: Leader/Postdoc

➢ Name: RENVISION
Funding Organization: European Comission, IP project FP7-ICT-2011-9
Period of Grant Award: 2014 - 2016
Title of Project: Retina-inspired ENcoding for advanced VISION tasks
Role on Project: Postdoc

➢ Name: Frankfurt Vision Initiative
Funding Organization: Nationales Bernstein Netzwerk Computational   Neuroscience, Förderinitiative des Bundesministeriums für Bildung und   Forschung
Period of Grant Award: 2009 - 2014
Title of Project: Bernstein Focus: Neurotechnology
Role on Project: PhD candidate

Research interests

➢ Computational neuroscience: retina, vision, efficient coding, receptive fields, spiking data analysis, maximum entropy methods, population coding
➢ Machine learning: unsupervised, probabilistic, reinforcement, active, continual learning
➢ Robotics: curiosity, active sensing, dual vision, embodiment, decision making

I.T. and programming skills

➢ Programming languages: Matlab (advanced), Python (advanced), C++ (intermediate), C (elementary), Java (elementary), C#(elementary)
➢ Operative systems: Ubuntu, Fedora, Windows

Publicly available software and source code

SWN: https://github.com/DanielaPamplona/SWN
PRANAS: https://team.inria.fr/biovision/pranas-software/
Power Spectrum of natural input: https://danielapamplona.github.io/

Service

2012- Reviewer for: PLOS One, CLVISION workshop, Women in Machine Learning workshop, IEEE Artificial Intelligence & Knowledge Engineering, Brain-PIL workshop

2018, Mentor: Women in Machine Learning workshop, young french mathematiciens workshop

2012-2014, Student's representant deputy in FIAS board meetings

2013, Organizer of "science night" of Frankfurt University

2008, Interview to the national radio of Serbia on robotics and machine learning

Language skills

- ➢ Portuguese (native)
- ➢ English (advanced)
- ➢ French (intermediate)
- ➢ German (elementary)
- ➢ Turkish (beginner)

Research experience

Theses

PhD Thesis: Ecological Perspectives on Local Statistics of Images, 2014
MSc Thesis: Gaussian Foveation, 2008

Peer reviewe articles

Pamplona, D.; Manzanera A.; Uncertainty driven attention while learning while learning visual representations (under preparation)

Pamplona, D.; Hilgen, G.; Hennig, M.; Cessac, B.; Sernagor, E.; Kornprobst P.; Large visual neuron assemblies receptive fields estimation using a super-resolution approach, Journal of Neurophysiology, 2022

Pamplona, D.; Manzanera A.; Naturally Constrained Online Expectation Maximization, International Conference on Pattern Recognition, 2021

Cessac, B*; Kornprobst, P.*; Kraria, S.*; Nasser, H.*; **Pamplona, D.***; Portelli, G.*; Vieville T.* PRANAS: A New Platform for Retinal Analysis and Simulation, Frontiers NeuroInformatics, 2017 *Authors in alphabetic order

Hilgen, G.; Pirmoradian, S.; **Pamplona, D.**; Kornprobst, P.; Cessac, B.; Hennig, M.H.; Sernagor E.; Pan-retinal characterisation of Light Responses from Ganglion Cells in the Developing Mouse Retina, Scientific Reports, 2017

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; Power spectra of the natural input to the visual system, Vision Research, 2013

Sato, Y.D.; Jitsev, J.; Bornschein, J.; **Pamplona, D.**; Keck C.; von der Malsburg, C.; A Gabor Wavelet Pyramid-Based Object Detection Algorithm, International Symposium on Neural Networks, 2011

Pamplona, D.; Bernardino, A.; Smooth Foveal Vision with Gaussian Receptive Fields, 9th IEEE - RAS International Conference on Humanoids Robots, 2009

Conference abstracts

Pamplona, D. ; Manzanera A. ; Should I stay or should I go? Addressing the curiosity / boredom dilemma of a domestic robot, international workshop on Intrinsically Motivated Open-ended Learning, 2023

Pamplona, D.; Manzanera A.; Uncertainty driven gaze selection, European Conference on Eye Movements (oral presentation), 2022

Pamplona, D.; Manzanera A.; Naturally Constrained Online Expectation Maximization, Conférence sur l'Apprentissage automatique, 2021

Cessac, B.*; Kornprobst, P.*; Kraria, S.*; Nasser, H.*; **Pamplona, D.***; Portelli, G.*; Vieville

T.*; ENAS: A new software for spike train analysis and simulation, Bernstein Conference 2016, *Authors in alphabetic order

Hilgen, G.; Softley, S.; **Pamplona, D.**; Kornprobst, P.; Cessac, B.; Sernagor, E.; The effect of retinal GABA Depletion by Allylglycine on mouse retinal ganglion cell responses to light, European Retina Meeting, 2015

Pamplona, D.; Hilgen, G.; Cessac, B.; Sernagor, E.; Kornprobst, P.; A super-resolution approach for receptive fields estimation of neuronal ensembles, 24th Annual Computational Neuroscience Meeting (CNS), 2015

Pamplona, D.; Cessac, B.; Kornprobst, P.; Shifting stimulus for faster receptive fields estimation of ensembles of neurons, Computational and Systems Neuroscience (Cosyne), 2015

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; Can the eye's imaging process explain ganglion cells anisotropies?, European Conference in Visual Perception, 2013,

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; Eye's imaging process explains ganglion cells anisotropies, Computational and Systems Neuroscience (Cosyne), 2013

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; The statistics of looking: Deriving properties of retinal ganglion cells across the visual field, 12th Annual meeting of the Vision Sciences Society (oral presentation), 2012

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; Predicting Ganglion Cells Variability, Computational and Systems Neuroscience (Cosyne), 2011

Pamplona, D.; Triesch, J.; Rothkopf, C. A.; Edge and image statistics across the visual field, Bernstein Conference, 2011

Pamplona, D.; Weber, C.; Triesch J.; Foveation with optimized receptive fields, Bernstein Conference, 2009

Tushev G.; Liu, M.; **Pamplona, D.**; Bornschein, J.; Weber, C.; Triesch J.; Foveated Vision with FPGA Camera, Bernstein Conference (demo), 2009

FPGA Camera, Bernstein Conference (demo), 2009

Invited talks

➢ 2023, From stimulus to spikes,and back, ISBS - Research and inovation seminar, Université Paris Est-Creteil, France
➢ 2022, Active but costly - Modeling eye movements for uncertainty reduction of embodied systems, ETIS, CY Cergy Paris Université, France
➢ 2020, On the bio inspired modeling of vision, IUT de CY Cergy Paris Université, France
➢ 2018, Neurosciences computationnelles et applications à la robotique, Rendez-Vous des Jeunes Mathématiciennes (RJM), association Animath, Palaiseau, France
➢ 2018, PRANAS: a tool for retinal data analysis, Annual Students Symposium of the Institut du Cerveau et de la Moelle épinière (ICM) Paris, France
➢ 2017, Embodied action perception loops, ENSTA-Paris, France
➢ 2016, Retinal data analysis: from single to population level, Renvision Workshop, Genova, Italy
➢ 2014, Space variant vision for scene classification, Group of Prof. Dr. Visvanathan Ramesh - University of Frankfurt, Frankfurt
➢ 2010, Space variant vision for robot applications, Vislab, ISR, IST, Portugal

Teaching experience

Supervised MSc thesis/ research internships

- ➢ 2021, Lam, J.P., Apprentissage incrémental de segmentation sémantique d'un robot domestique (Incremental learning of semantic segmentation using a domestic robot)
- ➢ 2020 Li, X., A Deep Convolutional Neural Network For Semantic Segmentation: Adaptability of the network
- ➢ 2018, Hmila, D., Learning the Principal Components of Images: Studying Catastrophic Forgetting and Solutions
- ➢ 2018, Hasni, A., Learning eye movements to maximize information
- ➢ 2017, Daoud, B., Les Statistiques d'ordre supérieur des images naturelles (High order statistics of natural images)
- ➢ 2010, Tushev, G., Designing a foveation system for an FPGA camera
- ➢ 2010, Xiu, L. Integration of an FPGA camera with a linux system

Teaching details

Class	Magistral / Exercises	Level	Length (hour)	N. Students	Lang.	Exercises
Mathematics and Physics tutorial	M E	Sec.+ High	300	6	🇵🇹	Hand-written
Visual perception and learning	M E	2 Eng 1 MSc	18	40	🇬🇧	Hand-written python
Vision for autonomous systems	E	3 Eng 2 MSc	6	20	🇫🇷	C++
Introduction to Matlab	E	1 Eng 3 BSc	21	20	🇫🇷🇬🇧	Matlab
Probabilistic and Statistical models	E	2 Eng 1 MSc	9	20	🇫🇷🇬🇧	Hand-written python

Class	Magistral / Exercises	Level	Length (hour)	N. Students	Lang.	Exercises
Neuro-computational models of vision	M E	2 Eng 1 MSc	63	20	🇬🇧	Hand-written python
Computational Neuroscience	E	PhD	100	7	🇫🇷🇬🇧	python
Digital data analysis and processing I	M E	1 MSc	50	30	🇫🇷	python
Digital data analysis and processing II	M E	1 MSc	52	30	🇫🇷	python
Methods, data and algorithms	M E	2 MSc	40	18	🇫🇷	python
Object-Oriented programming	E	1 BSc	42	30	🇫🇷	python