

Giacomo Benvenuti

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contacts

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personal info

Italian

37 years old

techniques

VSD imaging

Calcium imaging

Single electrode

Utah Array

Optogenetic stim.

Electric stim.

Imaging+electrode

Viral Transfection

Eyelink

Plexon spk sorting

languages

Italian mother tongue

English fluency

French fluency

programming

Matlab

Python

Psychtoolbox

Chronux

Elphy

Rex

Tempo

L^AT_EX

Html, css, JavaScript

productivity tools

Git

Mendeley

Illustrator

Trello

Dropbox paper

Atom

experience

2015–Now

Postdoc in Neuroscience

PI: Eyal Seidemann

Linking neural population representations in monkey primary visual cortex to perception.

University of Texas, Austin, TX, USA

- Published a peer reviewed article in an international high impact journal (as first author)
- Designed electrophysiological, psychophysical and computational experiments & analysis.
- Developed computational methods to decode and model neural population responses and analyze monkeys and humans behavior.
- Run Wide-field voltage-sensitive-dyes and calcium imaging in behaving monkeys.
- Performed viral transfections of monkeys cortex with genetic tools.
- Trained monkeys to perform demanding behavioral tasks.
- Programmed and run psycho-physics experiments in humans.
- Performed opto-genetic and electrical stimulation in the cortex of the behaving monkey.
- Developed a new technique to perform close-loop brain stimulation in the behaving monkey.
- Performed surgical procedures to implant and maintain chronic cranial windows in monkeys to perform imaging of the cortex.
- Supervised four graduate and undergraduate students

Teaching

University of Texas, Austin, TX, USA

Guest lecture on Vision for the graduate course "Principles of Neuroscience II"

2009–2015

Graduate Research Assistant in Neuroscience

CNRS, Marseille, France

PI: Frederic Chavane

Lateral computation in the primary visual cortex

- Published a peer review article in an international high impact journal
- Programmed and run electrophysiological experiments in the awake monkey using single- and multi-electrodes (Utah array)
- Developed computational methods to decode neural population responses
- Programmed advanced spectral analyses of local field potential (LFP)
- Performed surgical procedures to implant and maintain chronic cranial windows in monkeys to perform electrophysiology
- Trained monkeys to perform behavioral tasks.

2007–2009

Undergraduate Research Assistant in Neuroscience

University of Turin, Italy

PI: B. Sacchetti & P. Strata

Study the role of secondaries sensory cortexes in emotional memories storage

- Run electrophysiological recordings using whole-cell patch clamp in slices of mice hippo-campus
- Recorded and analyzed mice behavior
- Performed histological analysis in the mouse brain

2005 – 2006

Undergraduate Research Assistant in Neuropharmacology

University of Florence, Italy

PI: A. Chiarugi & F. Moroni

- Run experiments in-vitro on single neurons with a wide range of pharmacological and molecular techniques

2004 – 2004

Undergraduate Research Assistant in Genomics

University of Florence, Italy

Apprenticeship as laboratory technician in genomic analysis

education

- 2009–2015 **PhD** in Neuroscience CNRS, Marseille, France
top marks and honors
thesis "Anticipation of a moving bar by neuronal populations in awake monkey V1"
- 2006–2009 **Master** of Neurobiology University of Turin, Italy
top marks and honors
thesis "The role of secondaries sensory cortexes in emotional memories storage"
- 2002–2006 **Bachelor** of Biotechnology University of Florence, Italy
top marks and honors
thesis "Biomolecular mechanisms induced by Poly(ADP-ribose) polymerase-1 (PARP-1) hyperactivation" (Neuropharmacology)

training

- 2011 **European summer School** Univ. of Magdeburg, Germany
Visual Neuroscience - from Spikes to Awareness
- 2010 – 2013 **FACETS-ITN PhD training courses:**
- Intellectual property course by european patent academy, 2011, UPF, Barcelona, Spain
 - Ethics course, 2011, EPFL, Lausanne, Switzerland
 - Theoretical Neuroscience course, 2011, EPFL, Lausanne, Switzerland
 - Scientific grant writing, 2012, Heidelberg, Germany
 - Neuromorphic hardware course, 2012, Heidelberg, Germany
 - Software course: From Biomodel simulators to hardware, 2012, Heidelberg
 - Theoretical approaches to new computation concepts, 2012, Leysin, Switzerland
 - Experiments with large scale hardware systems, 2012, Forschungszentrum Julich, Germany
 - Bioelectronic interface, March 2012, IMS Bordeaux, France
 - Scientific writing, March 2012, IMS Bordeaux, France

awards

- 2009-2012 **PhD fellowship from Marie Curie Initial Training Network "FACETS-ITN".**
European project aimed to transfer concepts from brain dynamic to brain-inspired machines (<https://facets.kip.uni-heidelberg.de/ITN/>).

publications

- 2020 **An Open Resource for Non-Human Primate Optogenetics**
S. Tremblay, ..., G. Benvenuti, ..., M.L. Platt
Neuron 108 (6) 1075-1090. e6
- 2018 **Scale-Invariant Visual Capabilities Explained by Topographic Representations of Luminance and Texture in Primate V1**
G Benvenuti, Y Chen, C Ramakrishnan, K Deisseroth, WS Geisler, E Seidemann
Neuron 100 (6), 1504-1512. e4
- 2017 **Spontaneous cortical activity is transiently poised close to criticality**
G Hahn, A Ponce-Alvarez, C Monier, G Benvenuti, A Kumar, F Chavane, G Deco, Y Frégnac
PLoS computational biology 13 (5), e1005543
- 2015 **Testing the odds of inherent vs. observed overdispersion in neural spike counts**
W Taouali, G Benvenuti, P Wallisch, F Chavane, LU Perrinet
Journal of neurophysiology 115 (1), 434-444

- 2015 **Anticipation of an approaching bar by neuronal populations in awake monkey V1**
G Benvenuti, S Chemla, A Boonman, G Masson, F Chavane Journal of vision 15 (12), 479-479
- 2015 **A dynamic model for decoding direction and orientation in macaque primary visual cortex.**
W Taouali, G Benvenuti, F Chavane, L Perrinet Journal of vision 15 (12), 484-484
- 2014 **Measurement of propagating waves from local field potentials and unit activity in the cortex of human and monkey**
LE Muller, G Benvenuti, F Chavane, A Destexhe
 BMC neuroscience 15 (1), P174
- 2013 **Motion based prediction and development of response to an "on the way" stimulus**
MA Khoei, G Benvenuti, F Chavane, LU Perrinet
 BMC neuroscience 14 (S1), P314
- Under revision
Anticipatory responses along motion trajectories in awake monkey area V1
G. Benvenuti, S. Chemla, A. Boonman, L. Perrinet, G.S. Masson, F. Chavane
 Elife
- In preparation
Two complementary population coding schemes in primate V1 contribute to scale-invariant pattern discrimination.
G. Benvenuti, Y. Chen, W.S. Geisler, E. Seidemann
- A bi-directional optical-genetic toolkit for reading and writing topographic neural population codes in behaving macaque cortex.**
G. Benvenuti, Y. Chen, D. Miller, C.T. Sullender, F Radaei, A.K. Dunn, C. Ramakrishnan, K Deisseroth, W.S. Geisler, E. Seidemann
- Bi-directional optical-genetic interrogation of primate V1 reveals neural and perceptual masking effects of low-power optogenetic stimulation.**
S.C. Chen, G. Benvenuti, Y. Chen, W.S. Geisler, E. Seidemann
 (Submitted)

presentations

2021	Seminar	Dept. of Psychology, Univ. of Texas at Austin
	What is the role of cortical maps in integrating and encoding visual information?	
2018	Poster	Society for Neuroscience Annual Meeting
	Two complementary population coding schemes in primate V1 contribute to scale-invariant pattern discrimination.	
	Benvenuti G, Chen Y, Geisler WS and Seidemann E.	
2017	Poster	Society for Neuroscience Annual Meeting
	Possible Contribution of Retinotopic-scale Luminance Signals in Primate V1 to Visual Pattern Discrimination.	
	G. Benvenuti, Y. Chen, W.S. Geisler and E. Seidemann	
2014	Seminar	CNS Annual Meeting
	Measurement of propagating waves from local field potentials and unit activity in the cortex of human and monkey	
	L. Muller, G. Benvenuti, F. Chavane, A. Destexhe	
2014	Poster	Society for Neuroscience Annual Meeting
	A model relating temporal processing across spatial and temporal scales using electrophysiological and optical imaging data in primate V1	
	J.L. R. Stevens, S. Chemla, G. Benvenuti, F. Chavane, J. A. Bednar	
2013	Poster	Society for Neuroscience Annual Meeting
	Motion integration along a trajectory by neuronal population in alert monkey V1	
	G. Benvenuti, GS. Masson, F. Chavane	
2013	Poster	CNS Annual Meeting
	Motion-based prediction and development of response to an "on the way stimulus"	
	M. A. Khoei, G. Benvenuti, F. Chavane, L. Perrinet,	
2012	Seminar	BrainScales Workshop - Jülich Forschungszentrum
	Building a directional anticipatory response along the motion trajectory in monkey area V1	
	G. Benvenuti, A. Boonman, GS. Masson, F. Chavane	
2012	Poster	GDR multi-électrodes Meeting
	Building a directional anticipatory response along the motion trajectory in monkey area V1	
	G. Benvenuti, A. Boonman, GS. Masson, F. Chavane	
2011	Poster	Society for Neuroscience Annual Meeting
	Building a directional anticipatory response along the motion trajectory in monkey area V1	
	G. Benvenuti, A. Boonman, GS. Masson, F. Chavane	
2011	Seminar	FACET-ITN Workshop - KTH Stockholm - Sweden
	How neural population activity can affect single neuron's computation: insights from motion trajectory integration in the primary visual cortex (V1)	
	G. Benvenuti, A. Boonman, GS. Masson, F. Chavane	

references

- **Eyal Seidemann**, Full Professor of Psychology and Neuroscience, Institute for Neuroscience and Center for Perceptual Systems, The University of Texas at Austin. USA.
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Phone: +1 5122326052,
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