Mar 10th, 2015

Silvio-Paolo Sabatini, PhD

Curriculum vitae et studiorum

PERSONAL INFORMATION

Place / date of birth: Genoa, May 22nd, 1968

Work address: Department of Informatics, Bioengineering, Robotics, & System Engineering (DIBRIS)
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CURRENT POSITION

Associate Professor of Bioengineering, at the Faculty of Engineering of the University of Genoa.
Coordinator of the **B.Sc. and M.Sc. programs** in Biomedical Engineering and Bioengineering.

ACADEMIC DEGRESS AND APPOINTMENTS

1992	Laurea in Electronic Engineering (summa cum laude) from the University of Genoa
1992-1993	Winner of a post-laurea research grant at ST, SGS-Thompson Microelectronics S.p.A., within the Italian National Research Program on Technologies for Bioelectronics, on the track "Silicon neural circuits and architectures for sensors and learning systems".
1996	Ph.D. in Electronic Engineering and Computer Science from the University of Genoa
1996-1999	Post-doc fellowship at the Department of Biophysical and Electronic Engineering (DIBE), University of Genoa.
1999-2010	Assistant professor of Computer Science at the Faculty of Engineering, Genoa.
2011-today	Associate Professor in Bioengineering at the Faculty of Engineering, Genoa.
1999-2011	Head of the laboratory "The Physical Structure of Perception and Computation" (PSPC-lab), at the Department of Biophysical and Electronic Engineering of the University of Genoa.
2001-2011	Member of the Scientific Board of Interdepartmental Research Center on Neuroscience and Neuroengineering.
2003-today	Head of the PSPC Research Group at DIBRIS.
2005-2013	Member of the Board of Directors of the Doctoral Course in Bioengineering.
2013-today	Member of the Board of Directors of the Doctoral Course in Bioengineering and Robotics.

Member of IEEE (since 1989).
Reviewer for several international scientific journals (Biological Cybernetics, IEEE Transaction on Neural Networks, IEEE Trans. on System, Man and Cybernetics B, Spatial Vision, International Journal of Neural Systems, IEEE Computer, Int. Journal of Computer Vision, EURASIP Journal on Advances in Signal Processing, Adaptive Behavior, Robotics and Computer Integrated Manufacturing, Sensors, IEEE Sensors Journal, Robotics and Computer Integrated Manufacturing, Journal of Circuits, Systems, and Computers, Frontiers in Computational Neuroscience).
Reviewer of research projects for "The Israel Science Foundation", "The Wellcome Trust (UK)", "The Leverhulme Trust (UK)", "Research Foundation - Flanders (FWO, BE)", and for EU-FP7 "Future and Emerging Technologies".

He is author of more than 100 papers in peer-reviewed journals, book chapters and international conference proceedings.

Mar 10th, 2015

RESEARCH ACTIVITY

The general research framework relates, in the long run, to the individuation of the structural principles underlying visual perception (1) to foster modeling studies on visual perception and cortical functional architecture; (2) to steer new experimental research; (3) to conceive innovative hardware and software artificial systems. The approach, strongly interdisciplinary, links bidirectionally with the Brain Sciences. From one side, it fosters the transfer towards artificial systems of the knowledge gained from the study of biological systems (i.e., models specified in hardware, software or wetware that embody in an essential form their principles, architectures and functionalities), and, from the other side, it demonstrates the usefulness of the "artificial" approach as a method for the investigation of the nervous systems. In this line three complementary research themes are addressed:

1) Functional modeling of visual cortical processing
- *Visual coding and multidimensional signal representation;*
- *Visuospatial perception and visuomotor control.*

2) Neuromorphic algorithms for visual perception;

3) Realization of "perceptual machines", robotic vision and interaction systems.

Thence, in 1995, the contribution to the foundation of the "Physical Structure of Perception and Computation" (PSPC) Research Group at DIBE (http://pspc.unige.it/), as an organized structure to promote such multidisciplinary activities.
Presently, the PSPC-lab comprises, beside the undersigned, an Assistant Professor, 2 post-doc fellows, 1 Ph.D. student, and, on average, a temporary-hired collaborator.

In the international scenario such an approach imposed itself through the (1) definition of specific Research Programs aimed to overcome the formal framework of artificial neural networks and to relate more decisively to models derived from neuroscience research, and through (2) the consolidation of Labs, research Groups and Network of Excellence active on these topics [e.g., see the recent EU programs "Neuroinformatics for living artefacts (FP5, 2000)", "Life-like Perception Systems (FP5, 2001)", "Beyond Robotics (FP6, 2003)", "Bio-inspired Intelligent Information Systems" (FP6, 2004), "Bio-ICT convergence" (FP7, 2007), "Brain-inspired ICT" (FP7, 2009), e "Neuro-Bio-Inspired Systems" (FP7, 2012), and the Thematic Networks "European Research Network for Cognitive AI-enabled Computer Vision Systems 'ECVision'" (FP5, 2002-05) , "Neuro-IT-Net Thematic network" (FP5, 2002-06) e "EUCog - European Network for the Advancement of Artificial Cognitive Systems, Interaction and robotics" (FP6, FP7, 2006-2014)].
In this scenario, Silvio P. Sabatini has participated as promoter or research partner to several multisciplinary research projects with the specific goal of valuing multisciplinary collaborations that gather contributions from Engineering, Cybernetics and Neuroscience. Among them, we cite the "ECoVision" consortium, established in Genoa in December 1999 after his initiative ("Optic Flow Analysis in Animals and Machines: Cortical Computational Paradigms and Artificial Vision Systems", Genoa 9-10.12.99) with the objective of exploring the cortical mechanisms on the basis of adaptive processing in visual perception. These mechanisms could indeed be embedded with high efficiency in novel hardware-software artificial systems for a vision-based analysis of complex dynamic scenes in navigation tasks and visuo-motor control. The consortium activity led to the EC projects ECoVision - "Artificial vision systems based on early-cognitive cortical processing" [FP5 IST-FET, 2002-04] - and DrivSco - "Learning to emulate perception-action cycles in a driving school scenario" [FP6 ICT-FET, 2006-09].

LAST FIVE YEAR RECORD

In particular, in the last five years, his research activity mainly focused on the analysis of the structural mechanisms of visuospatial cognition, responsible for orienting and interacting in the 3D space, by promoting, coordinating and participating as a partner to the following EC FP6 and FP7 projects :

FP7-217077 "EYESHOTS", Heterogeneous 3-D Perception Across Visual Fragments (FP7-ICT-217077), 2008-2011, **project conception**, **scientific and administrative coordinator**, **principal investigator**, (www.eyeshots.it).

FP7-215866 "SEARISE", Smart Eyes: Attending and Recognizing Instances of Salient Events (FP7-ICT-215866), 2008-2011, **principal investigator**.

FP6-16276 "DRIVSCO", Learning to act: Emulation of Perception-Action Cycles in Human-Machine Systems, (FP6–IST-FET-2002-16276), 2006-2009, **principal investigator**, (www.pspc.unige.it/drivsco).

FP6-12963 "MCCOOP", Multi-channel cooperativity in visual processing, (FP6-NEST-2003-1 ADVENTURE 12963), 2005-2008, **principal investigator**.

The first two projects, both funded under the Call Unit of "Cognitive Systems and Robotics", at the junction of the cognitive, ICT and natural sciences, represent a confirmation and a maturation of the research topics, opening novel interesting directions of research both for the experimental aspects related to neuroscience, experimental psychology and visuomotor rehabilitation (collaborations with the laboratory of prof. Claudio Galletti and prof. Patrizia Fattori at the Department of Human and General Physiology of the University of Bologna, with the laboratory of prof. Markus Lappe of the Department of General and Applied Psychology of the Westfälische Wilhelms-Universität Münster, and with the Computational Sensomotorics Section, led by prof. Martin Giese at the Department of Cognitive Neurology of the University of Tuebingen), and for the technological issues related to the implementation of bio-inspired software modules to enable perceptual and sensorimotor processes in humanoid robotics (collaborations with the Department of Communication, Computer and System Science of the University of Genoa, with the Departamento de Arquitectura y Tenología de Computadores of the University of Granada, and with the Department of Robotics, Brain and Cognitive Sciences of the Italian Institute of Technology).

Recent invited talks and assignments in international institutions

- November 2014, seminar at the Mærsk Mc-Kinney Møller Instituttet della Syddansk Universitet di Odense, Denmark: "Deep representation hierarchies for 3D active vision".
- June 2011, seminar at the University of Ulm, Ulm, Germany: "Heterogeneous 3-D Perception Across Visual Fragments: Case Studies on Enabling Interactive Stereopsis in Humanoid Robots".
- May 2010, seminar at the Centre de Recherche Cerveau et Cognition, CNRS-Université Paul Sabatier Toulouse 3: "Early perception-action cycles in binocular vision: Cortical architectures for 3D dynamic measurements in the peripersonal space".
- September 2010, invited talk at the 11th European Confeence on Computer Vision, Workshop on "Vision for Cognitive Tasks", 10th September, 2010, Hersonissos, Heraklion, Crete, Grece: "Early Perception-Action Cycles in Binocular Robot Vision: Visuomotor Paradigms and Cortical-like Architectures".
- Member of the Examining Committee of the following international PhD theses:
  - "Specific-Purpose Processing Architectures for Dynamic Artificial Vision Systems", Dr. Francisco Barranco Expòsito, University of Granada, PhD Program in Electronics and Computer Science, October 2012.
  - "Visual neuroscience of robotic grasping", Dr. Eris Chinellato, Universitat Jaume I, PhD Programme in Computer Science, June 2008.
  - "Computational modeling of visual attention: neuronal response modulation in the thalamocortical complex and saliency-based detection of independent motion", Dr. Karl Pauwels, K.U.Leuven, PhD Programme in Medical Sciences, April 2008.
  - "Multimodal bio-inspired vision system- High performance motion and stereo processing architecture", Dr. Javier Diaz, University of Granada, PhD Program in Electronics and Computer Science, July 2006.

PUBLICATIONS

Journal papers (J)

[J. 1] A. Gibaldi, A. Canessa, F. Solari, S.P. Sabatini. *Autonomous learning of disparity–vergence behavior through distributed coding and population reward: Basic mechanisms and real-world conditioning on a robot stereo head*. Robotics and Autonomous Systems, in press doi:10.1016/j.robot.2015.01.002. Special Issue on "Emerging spatial competences: From machine perception to sensorimotor intelligence" (Editorial by Agostino Gibaldi, Silvio P. Sabatini, Sylvain Argentieri, and Zhengping Ji).

[J. 2] S.P. Sabatini *Deep Representation Hierarchies for 3D Active Vision: Designing Specializations in Perception-Action Loops.* Künstliche Intelligenz, 29(1), pp. 31-40, 2015.

[J. 3] M. Antonelli, A. Gibaldi, F. Beuth, A. Duran, A. Canessa, M. Chessa, F. Solari, A. del Pobil, F. Hamker, E. Chinellato, S.P. Sabatini *A hierarchical system for a distributed representation of the peripersonal space of a humanoid robot.* IEEE Transactions on Autonomous Mental Development, 6(4) pp. 259-273, 2014.

[J. 4] F. Solari, M. Chessa, S.P. Sabatini. *An integrated neuromimetic architecture for direct motion interpretation in the log-polar domain*. Computer Vision and Image Understanding, 125, pp. 37-54, 2014.

[J. 5] E. Martinez-Martin, A.P. Del Pobil, M. Chessa, F. Solari, S.P. Sabatini *An active system for visually-guided reaching in 3D across binocular fixations*. The Scientific World Journal, 2014, art. no. 179391.

[J. 6] A. Canessa, M. Chessa, A. Gibaldi, S.P. Sabatini, F. Solari. *Calibrated depth and color cameras for accurate 3D interaction in a stereoscopic augmented reality environment*. Journal of Visual Communication and Image Representation, 25(1), pp. 227–237, 2014.

[J. 7] M. Chessa, F. Solari, S.P. Sabatini *Adjustable Linear Models for Optic Flow based Obstacle Avoidance*, Computer Vision and Image Understanding, 117(6), pp. 603-619, 2013.

[J. 8] F. Solari, M. Chessa, M. Garibotti, S.P. Sabatini. *Natural perception in dynamic stereoscopic augmented reality environments*. Displays, 34(2):142-152, 2013.

[J. 9] M. Chessa, V. Bianchi, M. Zampetti, S. P. Sabatini, F. Solari *Real-time simulation of large-scale neural architectures for visual features computation based on GPU*. Network: Computation in Neural Systems 23(4):272-291, 2012.

[J. 10] F. Barranco, J. Diaz, A. Gibaldi, S.P. Sabatini, E. Ros. *Vector Disparity Sensor with Vergence Control for Active Vision Systems.* Sensors, Vol. 12(2):1771-1779, 2012.

[J. 11] R. Breveglieri, K. Hadjidimitrakis, A. Bosco, S.P. Sabatini, C. Galletti, P. Fattori. *Eye-position encoding in 3D space: integration of version and vergence signals in the medial posterior parietal cortex.* The Journal of Neuroscience, Vol. 32(1): 159-169, 2012.

[J. 12] F. Solari, M. Chessa, S.P. Sabatini. *Design strategies for direct multi-scale and multi-orientation feature extraction in the log-polar domain*. Pattern Recognition Letters, 33(1), pp. 41-51, 2012.

[J. 13] K. Hadjidimitrakis, R. Breveglieri, G. Placenti, A. Bosco, S.P. Sabatini, P. *Fattori Fix Your Eyes in the Space You Could Reach: Neurons in the Macaque Medial Parietal Cortex Prefer Gaze Positions in Peripersonal Space*. PLoS ONE 6(8): e23335.

[J. 14] N. Chumerin, A. Gibaldi, S.P. Sabatini and M.M. Van Hulle *Learning Eye Vergence Control from a Distributed Disparity Representation*. International Journal of Neural Systems, Vol. 20(4):267-278, 2010.

[J. 15] S.P. Sabatini, G. Gastaldi, F. Solari, K. Pauwels, M.M. Van Hulle, J. Diaz, E. Ros, N. Pugeault and N. Krueger *A Compact Harmonic Code for Early Vision based on Anisotropic Frequency Channels*, Computer Vision and Image Understanding, Vol. 114:681-699, 2010.

[J. 16] A. Gibaldi, M. Chessa, A. Canessa, S.P. Sabatini, F. Solari. *A cortical model for binocular vergence control without explicit calculation of disparity,* Neurocomputing, Vol. 73:1065-1073, 2010.

[J. 17] J. Díaz , E. Ros, S.P. Sabatini, F. Solari and S. Mota *A phase-based stereo vision system-on-a-chip*. Biosystems, Vol. 87, p 314-321, 2007.

[J. 18] S.P. Sabatini, F. Solari and L. Secchi *Emergence of Oscillations and Spatio-Temporal Coherence States in a Continuum-Model of Excitatory and Inhibitory Neurons*. BioSystems, Vol. 79: 101-108, 2005

[J. 19] S.P. Sabatini, F. Solari and L. Secchi, *A Continuum-field Model of Visual Cortex Stimulus-driven Behaviour: Emergent Oscillations and Coherence Fields*. Neurocomputing, Vol 57C: 411-433, 2004.

[J. 20] S.P. Sabatini and F. Solari *Emergence of Motion-in-depth Selectivity in the Visual Cortex through Linear Combination of Binocular Energy Complex Cells with Different Ocular*

Dominance. Neurocomputing special issue on Computational Neuroscience: Trends in Research 2004, Vol 58-60C: 865-872, 2004.

[J. 21] S.P. Sabatini, F. Solari, P. Cavalleri, and G.M. Bisio, *Phase-based Binocular Perception of Motion-in-depth: Cortical-like Operators and aVLSI Architectures*, EURASIP Journal on Applied Signal Processing, special issue on "Neuromorphic Signal Processing and Implementations", Vol. 7: 690-702, 2003.

[J. 22] P. Cavalleri, S.P. Sabatini, F. Solari, G.M. Bisio *Centric-minded Templates for Self-motion Perception*, Vision Research, Vol. 43(13): 1473-1493, 2003.

[J. 23] F. Solari, S.P. Sabatini, and G.M. Bisio *Fast technique for phase-based disparity estimation with no explicit calculation of phase*. Electronic Letters, 37(23): 1382-1383, November 2001.

[J. 24] S.P. Sabatini, and F. Solari *An architectural hypothesis for direction selectivity in the visual cortex: The role of spatially asymmetric intracortical inhibition*. Biological Cybernetics, 80(3):171-183, 1999.

[J. 25] L. Raffo, S.P. Sabatini, G.M. Bo and G.M. Bisio *Analog VLSI circuits as physical structures for perception in early visual tasks*. IEEE Trans. Neural Networks, 9(6):1483-1494, 1998.

[J. 26] G.M. Bisio, L. Raffo, and S.P. Sabatini *Analog VLSI primitives for perceptual tasks in machine vision* (invited paper). Neural Computing Applications, special issue on Machine Vision, 7:216-228, 1998.

[J. 27] B. Crespi, A.G. Cozzi, L. Raffo, and S.P. Sabatini *Analog computation for phase-based disparity estimation: continuous and discrete models*. Machine Vision and Applications, 11:83-95, 1998.

[J. 28] S.P. Sabatini, L. Raffo, and G.M. Bisio *Functional periodic intracortical couplings induced by structured lateral inhibition in a linear cortical network*. Neural Computation, 9(3):525-531, 1997.

[J. 29] L. Raffo, S.P. Sabatini, M. Mantelli, A. De Gloria, and G.M. Bisio *Design of an ASIP architecture for low-level visual elaborations*. IEEE Trans. on VLSI Systems, 5(1):145-153, 1997.

[J. 30] S.P. Sabatini *Recurrent inhibition and clustered connectivity as a basis for Gabor-like receptive fields in the visual cortex*. Biological Cybernetics, Vol. 74(3), 189-202, 1996.

[J. 31] L. Raffo, S.P. Sabatini, and G.M. Bisio *A programmable VLSI architecture based on multilayer CNN paradigms for real-time visual processing*. Int. J. Circ. Th. and Appl., Special Issue on Cellular Neural Networks, Vol. 24, 357-367, 1996.

[J. 32] G. Indiveri, L. Raffo, S.P. Sabatini, and G.M. Bisio *A recurrent neural architecture mimicking cortical preattentive vision systems*. Neurocomputing, Vol. 11, 155-170, 1996.

[J. 33] G. Indiveri, L. Raffo, S.P. Sabatini, and G.M. Bisio *A neuromorphic architecture for cortical multi-layer integration of early visual tasks*. Machine Vision and Applications, Vol. 8, 305-314, 1995.

[J. 34] L. Raffo, S.P. Sabatini, G. Indiveri, G. Nateri, and G.M. Bisio *A memory-based recurrent neural architecture for chips emulating cortical visual processing*. IEICE Trans. Electron., E77-C(7), 1994.

[J. 35] L. Raffo, S.P. Sabatini, D.D. Caviglia, and G.M. Bisio *Anisotropic active resistor meshes for implementing image processing operators*. Electronics Letters, 29(11):960-961, May 1993.

[J. 36] L. Raffo, S.P. Sabatini, D.D. Caviglia, and G.M. Bisio *Artificial visual orientation map implemented as inhomogeneous active resistor mesh*. Electronics Letters, 29(11):963-964, May 1993.

Edited Works: Chapters (M)

[M. 1] S.P. Sabatini, F. Solari, A. Canessa, M. Chessa, A. Gibaldi. *Early Perception-Action Cycles in Binocular Vision: Visuomotor Paradigms and Cortical-like Architectures*. In:

Developing and Applying Biologically-Inspired Vision Systems: Interdisciplinary Concepts. Marc Pomplun and Jun Suzuki Eds., IGI Global, pp. 154-182, 2013.

[M. 2] S.P. Sabatini, F. Solari, M. Chessa. *Context-sensitive recurrent filters for visual motion analysis*. In Neurocomputing: Learning, Architectures and Modeling, Elizabeth T. Mueller (Ed.), Novapublisher, ISBN/ISSN: 978-1-61324-699-3, 2012.

[M. 3] M. Vanegas, M. Chessa, F. Solari, S.P. Sabatini. Bio-Inspired Active Vision Paradigms in Surveillance Applications. In Machine Vision - Applications and Systems, Fabio Solari, Manuela Chessa and Silvio P. Sabatini (Eds.), InTech, ISBN/ISSN: 978-953-51-0373-8, 2012.

[M. 4] A. Canessa, A. Gibaldi, M. Chessa, S.P. Sabatini and F. Solari. *The Perspective Geometry of the Eye: Toward Image-Based Eye-Tracking*. In Human-Centric Machine Vision, M. Chessa, F. Solari and S.P. Sabatini (Eds.), InTech, ISBN: 978-953-51-0563-3, 2012.

[M. 5] M. Chessa, F. Solari, S.P. Sabatini. *Virtual Reality to Simulate Visual Tasks for Robotic Systems*. In Virtual Reality, Ed. Jae-Jin Kim, InTech, ISBN/ISSN: 978-953-307-518-1, 2010.

[M. 6] G.M. Bisio, S.P. Sabatini and F. Solari *How to organize analog VLSI operators to perform perceptual tasks in machine vision*. In Smart Adaptive Systems on Silicon, Ed. M. Valle, Kluwer, pages 119-136, 2004.

[M. 7] S.P. Sabatini *Recurrent inhibition and clustered connectivity as a basis for Gabor-like receptive fields in the visual cortex* (extended HTML version). In Miikkulainen, R., Sirosh, J., and Choe, Y., Eds., Lateral Interactions in the Cortex: Structure and Function . UTCS Neural Networks Research Group. Austin, TX, 1996. Electronic book, ISBN 0-9647060-0-8.

Invited Contributions (IC)

[IC. 1] S.P. Sabatini *Deep representation hierarchies for 3D active vision* (invited talk). International Workshop on “Active Visual Learning and Hierarchical Visual Representations for General-Purpose Robot Vision” at the IEEE International Conference on Robotics and Automation (ICRA’14), 31st May 2014. Hong Kong, China.

[IC. 2] S.P. Sabatini *Early Perception-Action Cycles in Binocular Robot Vision: Visuomotor Paradigms and Cortical-like Architectures* (invited talk). 11th European Conference on Computer Vision, Workshop on "Vision for Cognitive Tasks", 10th September, 2010, Hersonissos, Heraklion, Crete, Grece.

[IC. 3] S.P. Sabatini *Early perception-action cycles in binocular robot vision* (invited talk). Symposium on "Neuronal processes of attention and action, and their use in artificial intelligent systems", 3rd Mediterranean Conference of Neuroscience, 13-16 December, 2009, Alexandria, Egypt.

Edited Books (EB)

[EB. 1] M. Chessa F. Solari, S.P. Sabatini. *Human-Centric Machine Vision*. InTech, ISBN: 978-953-51-0563-3, 180 pages, 2012.

[EB. 2] F. Solari, M. Chessa, S.P. Sabatini. *Machine Vision – Applications and Systems*. InTech, ISBN: 978-953-51-0373-8, 272 pages, 2012.

Refereed Conference and International Workshop Papers (CI)

[CI. 1] A. Gibaldi, A. Canessa, S.P. Sabatini. *Vergence Control Learning through Real V1 Disparity Tuning Curves.* 7th Int. IEEE EMBS Conference on Neural Engineering, The Corum, Montpellier, France, April 22-24, 2015.

[CI. 2] M. Chessa, S. Murgia, L. Nardelli, S.P. Sabatini, F. Solari *Bio-inspired Active Vision for Obstacle Avoidance*. International Conference on Computer Vision Theory and Applications, VISAPP 2014, 5th-8th January 2014, Lisbon.

[CI. 3] M. Garibotti, M. Chessa, S.P. Sabatini, F. Solari. *An affordable stereoscopic 3D augmented reality system for life-like interaction*. CVMP 2013 : 10th European Conference on Visual Media Production, London, UK, 6-7 November, 2013.

[CI. 4] A. Gibaldi, A. Canessa, M. Chessa, F. Solari, S.P. Sabatini. *Population coding for a reward-modulated Hebbian learning of vergence control.* Int. Joint Conference on Neural Networks (IJCNN 2013), Dallas, TX, August 4-9, 2013.

[CI. 5] M. Chessa, M. Garibotti, A. Canessa, A. Gibaldi, S.P. Sabatini, F. Solari. *Veridical Perception of 3D Objects in a Dynamic Stereoscopic Augmented Reality System*. In Computer Vision, Imaging and Computer Graphics. Theory and Application, G. Csurka et al. (Eds.): VISIGRAPP 2012 Revised Selected Papers, CCIS 359, pp. 274-285, 2013.

[CI. 6] A. Gibaldi, A. Canessa, M. Chessa, F. Solari, S.P. Sabatini. *A neural model for coordinated control of horizontal and vertical alignment of the eyes in three-dimensional space*. BioRob'12, The Fourth IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics, 24th-27th June 2012, Rome.

[CI. 7] A. Gibaldi, A. Canessa, M. Chessa, F. Solari, S.P. Sabatini. *How a Population-based Representation of Binocular Visual Signal Can Intrinsically Mediate Autonomous Learning of Vergence Control*. Procedia Computer Science, Volume 13, 2012, Pages 125-134, ISSN 1877-0509.

[CI. 8] A. Canessa, M. Chessa, A. Gibaldi, F. Solari, S.P. Sabatini. *Binocular Vision Statistics in the Peripersonal Space: The Active Observer Perspective*. Sensory Coding & Natural Environment 2012, 9-12 September 2012, Klosterneuburg, Austria.

[CI. 9] M. Chessa, M. Garibotti, A. Canessa, A. Gibaldi, S.P. Sabatini, F. Solari. *A stereoscopic augmented reality system for the veridical perception of the 3D scene layout*. Accepted for oral presentation at the International Conference on Computer Vision Theory and Applications (VISAPP 2012), Rome, Italy, 24-26 February, 2012

[CI. 10] A. Gibaldi, A. Canessa, M. Chessa, S.P. Sabatini, F. Solari. *A neuromorphic control module for real-time vergence eye movements on the iCub robot head*. IEEE-RAS International Conference on Humanoid Robots, 26-28 October, 2011, Bled, Slovenia.

[CI. 11] M. Chessa, S.P. Sabatini, F. Solari, F. Tatti. *A fast and reliable technique for the log-polar mapping: a quantitative comparison*. International Conference on Computer Vision Systems, 20-22 September, 2011, Sophia Antipolis, France.

[CI. 12] G. Maiello, C. Silvestro, A. Canessa, M. Chessa, A. Gibaldi, S.P. Sabatini, F. Solari. *Assessment of stereoscopic depth perception in augmented reality environments based on low-cost technologies*. Applied perception in graphics and visualization, 27-28 August, 2011, Toulouse, France.

[CI. 13] M. Chessa, G. Maiello, C. Silvestro, A. Canessa, A. Gibaldi, S.P. Sabatini, F. Solari. *Assessment of the visuo-motor coordination in the peripersonal space through augmented reality environments*. European Conference on Visual Perception, 28 August - 1 September, 2011, Toulouse, France.

[CI. 14] A. Canessa, M. Chessa, A. Gibaldi, F. Solari, S.P. Sabatini. *Empirical horopter explained by the statistics of disparity patterns in natural space*. European Conference on Visual Perception, 28 August - 1 September, 2011, Toulouse, France.

[CI. 15] A. Gibaldi, M. Chessa, A. Canessa, F. Solari, S.P. Sabatini. *A cortical model for vergence control: advantages of space-variant geometry of the cortical domain*. Computational and Systems Neuroscience, 24-27 February, 2011, Salt Lake City, Utah.

[CI. 16] E. Martinez-Martin, A.P. del Pobil, M. Chessa, F. Solari, S.P. Sabatini. *An Integrated Virtual Environment for Visual-based Reaching*. International Conference on Ubiquitous Information Management and Communication, 21-23 February, 2011, Seoul, Korea.

[CI. 17] A. Gibaldi, A. Canessa, M. Chessa, S.P.Sabatini, F. Solari *Read-out rules for short-latency disparity-vergence responses from populations of binocular energy units: the effect of vertical disparities*. 33rd European Conference on Visual Perception, 22-26 August, 2010, Lausanne, Switzerland.

[CI. 18] N. Chumerin, A. Gibaldi, S.P. Sabatini and M. Van Hulle *Convolutional Network for Vergence Control* 2nd International Symposium on Applied Sciences in Biomedical and Communication Technologies 24-27 November, 2009, Bratislava, Slovak Republic.

[CI. 19] M. Chessa, S.P. Sabatini and F. Solari *A fast joint bioinspired algorithm for optic flow and two-dimensional disparity estimation*. 7th Int. Conference on Computer Vision Systems (ICVS'09), 13-15 October 2009, Liege, Belgium.

[CI. 20] S.P. Sabatini, M. Chessa and F. Solari *How embedding prior constraints improves coding and decoding strategies in a neural distributed architecture for depth perception*. 32nd European Conference on Visual Perception, 24-28 August 2009, Regensburg, Germany.

[CI. 21] M. Chessa, S.P. Sabatini and F. Solari *A virtual reality tool for disparity statistics in the peripersonal space*. 32nd European Conference on Visual Perception, 24-28 August 2009, Regensburg, Germany.

[CI. 22] F. Solari, S.P. Sabatini and A. Canessa *Do eyes move as a tilt-pan like system? Physical plausibility of the coplanarity of the fixation planes*. 32nd European Conference on Visual Perception, 24-28 August 2009, Regensburg, Germany.

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