

Electronic Imaging & the Visual Arts

EVA 2019 Florence

PROCEEDINGS
Editor: Vito Cappellini



Proceedings e report

123

Electronic Imaging & the Visual Arts

EVA 2019 Florence

8-9 May 2019

edited by

Vito Cappellini

Firenze University Press

2019

Electronic Imaging & the Visual Arts : EVA 2019
Florence : 8 – 9 May 2019 / edited by Vito Cappellini.
– Firenze : Firenze University Press, 2019.
(Proceedings e report ; 123)

<http://digital.casalini.it/9788864538693>


ISBN 978-88-6453-868-6 (print)
ISBN 978-88-6453-869-3 (online)

Peer Review Process

All publications are submitted to an external refereeing process under the responsibility of the FUP Editorial Board and the Scientific Committees of the individual series. The works published in the FUP catalogue are evaluated and approved by the Editorial Board of the publishing house. For a more detailed description of the refereeing process we refer to the official documents published on the website and in the online catalogue (www.fupress.com).

Firenze University Press Editorial Board

M. Garzaniti (Editor-in-Chief), M. Boddi, A. Bucelli, R. Casalbuoni, A. Dolfi, R. Ferrise, M.C. Grisolia, P. Guarnieri, R. Lanfredini, P. Lo Nostro, G. Mari, A. Mariani, P.M. Mariano, S. Marinai, R. Minuti, P. Nanni, G. Nigro, A. Perulli.

 The on-line digital edition is published in Open Access on www.fupress.com.

The present work is released under Creative Commons Attribution 4.0 International license (CC BY 4.0: <http://creativecommons.org/licenses/by/4.0/legalcode>). This license allows you to share any part of the work by any means and format, modify it for any purpose, including commercial, as long as appropriate credit is given to the author, any changes made to the work are indicated and a URL link is provided to the license.

© 2019 Firenze University Press

Published by Firenze University Press

Firenze University Press
Università degli Studi di Firenze
via Cittadella, 7, 50144 Firenze, Italy
www.fupress.com

*This book is printed on acid-free paper
Printed in Italy*

PROGRAM

For CELEBRATIONS of LEONARDO DA VINCI

Electronic Imaging & the Visual Arts

‘The Foremost European Electronic Imaging Events in the Visual Arts’

The key aim of this Event is to provide a Forum for the user, supplier and scientific research communities to meet and exchange experiences, ideas and plans in the wide area of Culture & Technology. Participants receive up to date news on new EC and international arts computing & telecommunications Initiatives as well as on Projects in the Visual Arts field, in archaeology, history and other Culture Activities. Working Groups and new Projects are promoted. Scientific and technical demonstrations are presented. Technology and Art Exhibitions are promoted.

Main Topics

- ❖ European Commission Projects and Plans regarding Cultural Heritage
- ❖ Mediterranean Initiatives in Technology for Cultural Heritage: Synergy with European & International Programmes
- ❖ 2D – 3D Digital Image Acquisition
- ❖ Leading Edge Applications: Galleries, Libraries, Archaeological Sites, Museums & Historical Tours
- ❖ Integrated Digital Archives for Cultural Heritage and Contemporary Art
- ❖ Management of Museums by using ICT Technology: Documentation, Access, Guides & Other Services
- ❖ The Impact of New Mobile Communications on Cultural Heritage and Modern Arts Area
- ❖ Cloud Networks
- ❖ Semantic Webs
- ❖ Ontology Systems
- ❖ Human - Computer Interaction for Cultural Heritage Applications
- ❖ Copyright Protection
- ❖ Secure Electronic Commerce (Anticounterfeiting)
- ❖ Cybersecurity
- ❖ Culture and *e-government*
- ❖ Activities and Programmes for *e-learning*
- ❖ Digital TV and films
- ❖ 3D Developments and Applications in the Cultural Heritage Area
- ❖ Virtual Galleries and Exhibitions
- ❖ Digital Art
- ❖ Music - Digital Music
- ❖ Theatre - Digital Theatre
- ❖ Cultural Tourism & Travel Applications
- ❖ Impact of Culture in the Smart City
- ❖ Art and Medicine

WHO SHOULD ATTEND

THE CULTURAL SECTOR: The Visual Arts Community including Museums, Libraries, Archaeological Sites, Educational Institutions, Commercial Galleries and Dealers, Auction Houses, Artists & Collectors

THE HI-TECH INDUSTRY SECTOR: Multimedia Systems, Image Acquisition & Analysis, Databases, Display & Printing, ICT Industry, Telematics & Systems Manufacturing, On-line Information Services

MEDIA & RELATED SECTORS: Publishing, Press, Film, Television, Photography, Printing, Advertising, Graphics Design, Consumer Media

IMAGING SYSTEMS RESEARCHERS: Imaging Systems, 3-D Acquisition, Reconstruction & Representation Systems, Information Sciences

TOURISM & TRAVEL SECTOR: Tourism Agencies & Operators, Travel Agencies

THE GOVERNMENT SECTOR: Ministries of Culture and other Institutions involved in Cultural Heritage, Ministries of Industry, Education, Research and Science, Regional Governments

SPONSORS & SUPPORTERS AND PARTNERS

EUROPEAN COMMISSION, THE UNIVERSITY OF FLORENCE,
REGIONE TOSCANA, COMUNE DI FIRENZE,
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE - UNIVERSITA' DI FIRENZE,
CENTRO PER LA COMUNICAZIONE E L'INTEGRAZIONE DEI MEDIA,
ISTITUTO DI FISICA APPLICATA "NELLO CARRARA" – C.N.R.
CONFINDUSTRIA FIRENZE,
GTTI – GRUPPO ITALIANO TELECOMUNICAZIONI
E TEORIA DELL'INFORMAZIONE,
CNIT – CONSORZIO NAZIONALE
INTERUNIVERSITARIO PER LE TELECOMUNICAZIONI,
GRUPPO SESA,
T.T. TECNOSISTEMI,
POWERSOFT,
FRATELLI ALINARI IDEA,
CENTRICA,
NEUMUS,
VIDITRUST,
VIRTUITALY,
INN-3D,
CONSERVATORIO DI MUSICA LUIGI CHERUBINI,
ICESP – INTERNATIONAL CENTER FOR SIGNAL AND IMAGE PROCESSING,
FONDAZIONE CR FIRENZE,
ASSOCIAZIONE BENI ITALIANI PATRIMONIO MONDIALE

EVA 2019 Florence Organizer: Vito Cappellini
Co-Chairmen: Vito Cappellini, Enrico del Re – Florence University
vito.cappellini@unifi.it enrico.delre@unifi.it

ADVISORY BOARD

President: James Hemsley, EVA Conferences International
jrhemsley6@gmail.com

Cristina Acidini, Accademia delle Arti del Disegno, Florence, Italy
Dirk Petrat, Ministry of Culture, Hamburg, Germany
Gianpiero Alfarano, Laboratory Design Model, Design Campus, University of Florence, Italy
Andreas Bienert, Staatliche Museen zu Berlin, Germany
Paolo Blasi, University of Florence, Florence, Italy
Enrico Bocci, Confindustria Firenze, Florence, Italy
Nikolay Borisov, ITMO University, Saint Petersburg, Russia
Edoardo Calia, Fondazione LINKS, Turin, Italy
Andrea De Polo, Fratelli Alinari IDEA, Florence, Italy
Carlo Francini, Comune di Firenze, Florence, Italy
Virginio Cantoni, Computer Vision and Multimedia Laboratory, Pavia University
Massimo Lonardi, Istituto Superiore di Studi Musicali “Franco Vittadini”, Pavia, Italy

EVA 2019 Florence Technical Organizing Committee includes:

Antonella Castaldi, Roberto Caldelli, Alessandro Piva, Francesca Uccheddu,
Alessandro Nozzoli, Giuseppina Maria Celeste, Riccardo Saldarelli,
Silvia Capecchi, Paola Imposimato, Claudia Riva di Sanseverino

For general information:

Dipartimento di Ingegneria dell'Informazione (DINFO)
Università di Firenze
Via di Santa Marta, 3 – 50139 Firenze, Italy
Tel.: (+39) 055 2758548 – Fax: (+39) 055 2758570
E-mail: vito.cappellini@unifi.it
Web Site ~ <https://lesc.dinfo.unifi.it/sites/default/files/Documenti/EVA-2019.pdf>

For information on the Exhibitions:

CENTRICA Srl
Piazza della Madonna della Neve, 5 - 50122 Florence - Italy
Tel.: (+39) 055 24 66 802 – Fax: (+39) 055 20 09 785
E-mail: info@centrica.it Web pages ~ <http://www.evaflorence.it>



**FONDAZIONE
CR FIRENZE**



UNIVERSITÀ
DEGLI STUDI
FIRENZE
DINFO
DIPARTIMENTO DI
INGEGNERIA
DELL'INFORMAZIONE



PROGRAM - PLANNING

Wednesday, 8 May

9,30 – 13,00	WORKSHOP	p. 11
14,15 – 15,30	OPENING OF CONFERENCE	p. 12
15,45 – 17,25	SESSION 1	p. 12
17,25 – 18,40	SESSION 2	p. 13
10,00 – 13,00	TECHNICAL EXHIBITION	p. 18
19,00 – 21,30	SPECIAL EVENT	p. 18

Thursday, 9 May

9,30 – 11,45	INTERNATIONAL FORUM ON "CULTURE & TECHNOLOGY"	p. 15
12,00 – 13,15	SESSION 3	p. 16
14,50 – 16,05	SESSION 4	p. 16
16,20 – 17,35	SESSION 5	p. 17
10,30 – 13,00	ART EXHIBITION	p. 19

Venue:

Hotel Pierre

Via De' Lamberti, 5 - 50123 Firenze

Tel. +39 055 216218 Fax +39 055 2396573

E-mail: pierre@remarhotel.com

<http://www.hotel-pierre-florence.com/>

Special reservations for rooms are provided (please use code EVA19)

WORKSHOP

ROOM A

WORKSHOP INNOVATION AND ENTERPRISE – INNOVAZIONE E IMPRESA (Italian Language)

9,30 – 13,00

Chairman: *Enrico Bocci, Vice-Presidente Confindustria Firenze, Firenze*

Technological requirements in the Cultural Heritage field are outlined and opportunities for Italian Enterprises and SME's working in the field, using new technologies, are presented.

Regional and National Applied Research Programs in Italy are described.

Activities by National Organizations and Firms working in the area of Telecommunications, Informatics, Environment and Infomobility are presented.

Funding by European Commission is considered, with particular reference to multimedia and telematics for Cultural Heritage. Special consideration is given to the EC Plan HORIZON 2020 and the following ones.

Initiatives regarding the "know-how" transfer from Research Organizations to the Industrial Sector are described, in particular to create Start-Ups and new Enterprises.

Invited Speakers:

- *Andrea Arnone, Pro-Rettore al Trasferimento Tecnologico e Presidente di CsaVRI, Università degli Studi di Firenze, Firenze*
- *Laura Castellani, Responsabile del Settore Infrastrutture e Tecnologie per lo Sviluppo della Società dell'Informazione, Regione Toscana*
- *Paola Castellacci, VAR GROUP*

Speakers include:

- *Stefano Cinquini and Luigi Carfagnini, TELECOM ITALIA*
- *Renzo Zampini, INFOCAMERE*
- *Andrea Calistri, SAPAF Srl, Firenze*
- *Claudio Tasselli, Qu.In. Srl, Calenzano, Firenze*
- *Riccardo Bruschi and Luca Bencini, T.T. TECNOSISTEM Spa, Prato*
- *Carlo Lastrucci and Luca Lastrucci, Powersoft Spa, Firenze*
- *Gianluca Vannuccini, Servizio Sviluppo Infrastrutture Tecnologiche, Comune di Firenze, Firenze*
- *Giacomo Bucci, Università degli Studi di Firenze, Firenze*
- *Francesco Mati, Pianta MATI, Pistoia*
- *Giuliano Benelli, Università degli Studi di Siena, Siena*
- *Franco Guidi, NEUMUS Srl, Firenze*
- *and Roberto Piermarini, ICT Consulting Expert*
- *Paola Imposimato, Studio Creazioni di Design e Arti Grafiche e Pittoriche, Firenze*

Closing:

- *Cecilia Del Re, Assessore Sviluppo Economico e Turismo, Comune di Firenze, Firenze*

13,00

Lunch Break

ROOM A

CONFERENCE

Wednesday, 8 May

Chairmen: Vito Cappellini, University of Florence
Enrico Del Re, University of Florence

14,15 Opening: Eugenio Giani,
President of Consiglio Regionale della Toscana
Enrico Vicario,
Director of Dipartimento di Ingegneria dell'Informazione
Università di Firenze
Gabriele Gori,
General Director of FONDAZIONE CR FIRENZE
Paolo Castellacci,
President of GRUPPO SESA

15,30 Coffee Break

ROOM A

15,45 **SESSION 1 – STRATEGIC ISSUES**

Chairman: Paolo Blasi, University of Florence, Florence, Italy

"The DAFNE Project: Human
and Machine Involvement"

V. Cantoni¹, L. Lombardi¹,
G. Mastrotisi², A. Setti¹
¹Dept. Electrical, Computer and Biomedical
Engineering, University of Pavia,
Pavia, Italy
²Novaria Restauri Srl,
Novara, Italy

"Restored Paintings and Visual Perception: A
Proposed Protocol to Study Emotional and
Cognitive Involvement in Art"

V.A. Sironi¹, A. Banzi², R. Folgieri^{2,3}
¹Centre on the History of Biomedical Thought,
University of Milano Bicocca, and Cespeb
Neuroaesthetic Laboratory,
Milano, Italy
²Cespeb Neuroaesthetic Laboratory,
Milano, Italy
³Department of Philosophy "Piero Martinetti",
Università degli Studi di Milano,
Milano, Italy

“Technology and the Art Market: Access, Protection, and Transparency”

Frances Oglesby
Artive Inc.,
Atlanta, GA, U.S.A.

“Evolutionary Dynamics and Computational Aesthetics: Experiments in Minimalist Blends”

Stefano Kalonaris
RIKEN Center for Advanced Intelligence Project (AIP),
Tokyo, Japan

“Electrical Networks as Media: Post - Humanist Media Archaeological Analysis of the Digitalization of Electric Networks”

Mika Laakkonen, Ville Kivivirta
Faculty of Social Science,
University of Lapland,
Rovaniemi, Finland

ROOM A

17,25 **SESSION 2 – NEW SCIENCE AND CULTURE DEVELOPMENTS & APPLICATIONS**

Chairman: Edoardo Calia, FONDAZIONE LINKS, Turin, Italy

“It’s Time to Give Back” (O3 LAB)”

Massimiliano Zanoni¹, Jean Paul Carradori²,
Qing Li³
¹O3 Lab,
Milan, Italy
²Shanghai International Interior Design Festival
O3 Lab
³Art Projects O3 Lab,
Beijing, China

“A Blockchain-Based Support to Safeguarding the Cultural Heritage”

Mariano Basile¹, Gianluca Dini¹, Andrea Marchetti², Clara Bacciu², Angelica Lo Duca²
¹Dept.of Ingegneria dell’Informazione,
University of Pisa,
Pisa, Italy
²Institute of Informatics and Telematics,
National Research Council,
Pisa, Italy

“Educate to Wellness by the Emotion of Light”

G. Alfarano¹, A. Spennato²
¹Department of Architecture - Design Campus,
Laboratory Design Model and Laboratory Smart Lighting Design,
University of Florence,
Florence, Italy
²Department of Architecture - Design Campus,
Laboratory Design Model,
University of Florence,
Florence, Italy

“Robot Surgery for Total Knee Arthroplasty”

Michele D’Arienzo¹
Lawrence Camarda¹,
Antonio D’Arienzo²,

¹Department of Orthopaedic Surgery,
University of Palermo,
Palermo, Italy

²Department of Orthopaedic Surgery,
University of Pisa,
Pisa, Italy

Thursday, 9 May

ROOM A

9,30

INTERNATIONAL FORUM ON “CULTURE & TECHNOLOGY

Chairman: Vito Cappellini, University of Florence, Florence, Italy

The structure of the FORUM is presented.

Actual developments and perspectives are outlined, regarding *Culture* and *Technology*.

- Cooperation Groups
- Proposed Projects
- Funding Opportunities
- European Commission Plans

Opening:

- Eugenio Giani, President of Consiglio Regionale della Toscana

Speakers Include:

- *Cristina Acidini, President Accademia delle Arti del Disegno, Florence, Italy*
- *Edoardo Calia, Deputy Director, FONDAZIONE LINKS, Turin, Italy*
- *Alberto Del Bimbo, Centro per la Comunicazione e l'Integrazione dei Media, University of Florence, Florence, Italy*
- *Luigi Rucher, Technical Director THALES ITALIA, Italy*
- *David Feldman, Vice President THE MONA LISA FOUNDATION, Zurich, Switzerland*
- *Monica Carfagni, Full Professor of Industrial Engineering, University of Florence, Florence, Italy*
- *Carlo Francini, Florence Municipality, Florence, Italy*
- *Paolo Zampini, Director of Conservatorio di Musica Luigi Cherubini, Florence, Italy*
- *Francesco Bellini, University of Rome “La Sapienza” and Research Director of EUROKLEIS, Rome, Italy*
- *Giovanni Gasbarrone, Innovation Advisor, Rome, Italy*

11,45

Coffee Break

12,00

SESSION 3 – NEW TECHNICAL DEVELOPMENTS & APPLICATIONS

Chairman: Andrea De Polo Saibanti, Fratelli Alinari IDEA Spa, Florence, Italy

“NEMOSINE: Innovative packaging solutions for storage and conservation of 20th century Cultural Heritage of artefacts based on cellulose derivate”

Andrea De Polo Saibanti
Fratelli Alinari IDEA Spa,
Florence, Italy

“Living in the Present: Using 3D Mixed Reality Technology to Enhance Guest Experiences with Museum Objects and Collections”

D. Marshall¹, R. Hite², J. Hoffman¹
¹Museum of Texas Tech University,
Texas Tech University,
Lubbock, Texas, U.S.A.
²Department of Curriculum & Instruction,
Texas Tech University,
Lubbock, Texas, U.S.A.

“Combining RTI & SFM
A Multi-Faceted Approach to Inscription Analysis”

Moshe Caine¹, Michael Maggen²,
Doron Altaratz¹,
¹Hadassah Academic College,
Jerusalem, Israel
²Israel Museum,
Jerusalem, Israel

“Chateau de Chambord, a Perfect Order”

Jeanette Zwingenberger¹, Bertrand Triboulot²
¹Université Paris 1 Panthéon-Sorbonne,
Paris, France
²Direction régionale des affaires culturelles d'Île-de-France, Service régional de l'archéologie,
Paris, France

13,15

Lunch Break

ROOM A

14,50

SESSION 4 – CULTURAL ACTIVITIES – REAL AND VIRTUAL GALLERIES AND RELATED INITIATIVES

Chairman: Jeanette Zwingenberger, Université Paris 1 Panthéon-Sorbonne, Paris, France

“Architectonic design for mediating Cultural Heritage ”

Dominik Lengyel¹, Catherine Toulouse²
¹BTU University of Technology Cottbus-Senftenberg,
Cottbus, Germany
²Lengyel Toulouse Architects,
Berlin, Germany

“Innovative methodologies and technologies. Civil liability and "genetic code" of a work of art”

Sara Penco
Restorer and creator of Smarticon Project,
Rome, Italy

"Information Technology in Conservation and Restoration of Art Works: Perspectives of Ukrainian Universities Project"

Roman Mykolaichuk¹, Tetiana Tymchenko²,
Alisa Mykolaichuk³,
Iryna Somyk-Ponomarenko², Vira Mykolaichuk³,
Antonina Mykolaichuk²

¹Taras Shevchenko National University of Kyiv,
Kyiv, Ukraine

²The National Academy of Fine Arts and
Architecture,
Kyiv, Ukraine

³State University of Telecommunications,
Kyiv, Ukraine

"Museum Collections Using Information and Digital 3D Technologies"

Tinatin Mshvidobadze, Sopio Mshvidobadze
Gori State University,
Georgia

16,05 Coffee Break

ROOM A

16,20 **SESSION 5 – ACCESS TO THE CULTURE INFORMATION**

Chairman: James Hemsley, EVA Conferences International, U.K .

"Contemporary Methods of Functional
Harmony Teaching in a High School Context"

Anna Shvets
Institute of Cultural Studies,
Maria Curie-Skłodowska University in Lublin,
Lublin, Poland

"The Aesthetics of Volumetric Photography for
Virtual Reality"

Daniel Buzzo
University of the West of England,
Bristol, UK

"Optimising 3D cultural environments with
large amount of texts for 3D Web. The Santo
Stefano Lapidarium to the dead soldiers of the
Great War, a case study"

Beatrice Chiavarini, Daniele De Luca, Antonella
Guidazzoli, Maria Chiara Liguori,
Silvano Imboden, Luigi Verri
VisitLab Cineca,
Bologna, Italy

"A techno social collaborative platform to
optimize Cultural Heritage funding: final
results from the validation phase"

F. Spadoni¹, F. Tariffi², R. Rossi¹, S. Lusso²,
¹Rigel Engineering Srl,
Livorno, Italy
²Space Spa,
Prato, Italy

SPECIAL EVENT

Wednesday, 8 May: 19,00 - 21,30

Visit to ACCADEMIA DELLE ARTI DEL DISEGNO

President Cristina Acidini

with Concert by Paolo Zampini, Director
of CONSERVATORIO DI MUSICA “LUIGI CHERUBINI”
of Florence

in Cooperation with ANTICA COMPAGNIA DEL PAIOLO
President Anna Bini

and

“Wellcome Drink”

EXHIBITION

ROOM B

Wednesday 8 May: 10,00 - 13,00

TECHNICAL EXHIBITION

Coordinator: Marco Cappellini, CENTRICA Srl

Advanced Technologies will be presented, with Technical Demonstrations,
regarding in particular:

- Augmented Virtual Reality Immersive Systems
- 3D Digital Models Protection
- Uffizi Touch® Cloud Edu for Schools

by some Enterprises, Leaders in the above Areas.

Thursday 9 May: 10,30 – 13,00

ART EXHIBITION

Coordinator: Vito Cappellini, EVA 2019 FLORENCE Organizer

Digital Presentations of Museums, Art Institutions, Virtual Galleries and Art-Works will be performed.
In particular Digital Art-Works of LEONARDO DA VINCI will be presented.

*in Cooperation with ANTICA COMPAGNIA DEL PAIOLO,
President Anna Bini*

Events Organization: INN-3D Srl, Empoli (FI)

Official Television TVL Spa Pistoia

NEXT EVA EVENT

8-11 July 2019

EVA 2019 London

Website: <http://www.eva-london.org/eva-london-2019/>

PROCEEDINGS

STRATEGIC ISSUES

EDUCATE TO WELLNESS BY THE EMOTION OF LIGHT

G. Alfarano

Department of Architecture - Design Campus
Scientific Director Laboratory Design Model and Laboratory Smart Lighting Design
University of Florence
Florence, Italy
gianpiero.alfarano@unifi.it

A. Spennato

Department of Architecture - Design Campus
Scientific Manager Laboratory Design Model
University of Florence
Florence, Italy
alessandro.spennato@unifi.it

The light in addition to being the factor that most influences the human perception, makes a leading wellbeing role in everyday life. Learning about relationships, influenced by the light, amongst emotions and behaviors, is a relevant investigation to stimulate applications and projects that can help us to improve the health and emotional status. Through mental processes related to our individual experiences, we attribute to light the ability to make more familiar the environment that hosts us. Feeling at ease in a place, it depends much of our relationship with light. The perception of the visible that enables us to understand and interact comfortably with everything that surrounds us, taking, even unconsciously, the well-being from the pleasure to be a part of *that* place and to appreciate its characteristics without efforts: the niceness of enjoying and be enjoyed.

Light, besides being the factor that most influences human perception, contributes in a pre-eminent way to the psychophysical well-being of the individual in everyday life. Knowing relationships, influenced by light, between emotions and behaviors, is a relevant investigation to stimulate applications and projects that improve health and emotional state in an environment.

In perceiving one's relationship with space, each of us needs to make sense of the surrounding environment.

Through mental processes related to individual experience we recognize the ability to make us appropriately familiar with the environment that hosts us. Feeling comfortable in one place depends a lot on our relationship with light. Our perception of the visible allows us to understand and interact easily with what surrounds us by taking, even unknowingly, well-being through the pleasure of being part of that place and to appreciate its features without effort: the pleasure of pleasing and be welcome.

If the objects had the possibility to speak and the rooms had the possibility to be walked, this would be certainly due to light. If this is accepted spontaneously, less spontaneously we accept that objects and environments have their own independent experience with respect to those who use them. Yet phenomena occur in them which do not depend on the will of the user, but rather, express conditions that suggest moods, purely emotional perceptions.

The logic that the isometry of the form is to determine the functions or destinations of use is often a logic of perceptual suggestions, of relational relationships between light and shadow.

Light not only illuminates, but characterizes shapes and spaces.

Not only it allows perception, but it is precisely through it that emotional relationships are born. The objects, the spaces through the modulation of light, chromatic declination, tonal intensity, offer varied fruition dimensions.

Namely that if the physical space always remains the same in time, the luminous space can change and transform the perceptive conditions (by) changing the psychological relationship of things' fruition in a cognitive or even suggestive way.

Designing by light

Designing light today also means refurbishing methodologies of approach to the discipline by adopting training paths that are able to interact in close partnership both to the design of physical parameters and to the project of intangible contents.

To all this we add education to perception as a cultural structure. As Arnheim (1974) has already amply advocated, perception requires time, and in this it is necessary to educate oneself to be aware of it.

According to Arnheim our perception, in a general sense, does not differ from what is necessary. That means that the concepts remain as generic as it is allowed by their application in understanding what one is observing.

To perceive an object as immutable means to abstract it at the highest possible level of generality. In the physical world, modifications do exist. The control and design of this variability condition contributes greatly to the well-being of fruition to be more corresponding to what we actually see; otherwise everything would be immobile enough to make us argue that the variations either do not exist or do not matter, renouncing the emotional sensoriality.

On this heightened awareness, accelerated by the evolution of technological possibilities, today new aspects of the project of light are developing. By now skilled in scientific mastery, the lighting designer needs to tap into the sweet sensuality of light as a research tool for visual well-being and subsequently as a method of rationalizing perceptual cognition.

Emotional Intelligence

How the perceptual cognition of light has changed and how the need arose to relate it to emotional sensoriality can be highlighted by the development that the studies had on the influence that emotions exert on our perceptive abilities.

According to the most recent studies, emotions contain information capable of enabling some sensorial capacities in order to read phenomena and influence our perceptions of well-being in a qualifying way. It is now clear that emotions characterize a very discriminating part of what it means to think, to make decisions and to solve problems.

Yet until not long ago, emotions were still understood as an element of disturbance and fragility in cognitive processes. Only as from the end of the eighties in psychology there is a strong interest in emotions.

The first signs of the interest of neuroscience to emotional phenomena were already triggered in the twenties by Edward Lee Thorndike, who proposed the concept of "Social Intelligence".

To arrive at this codification, he paid attention to define the concept of halo effect.

Indeed, he argues that a single positive or negative aspect of an individual can generate a positive or negative halo on other individuals.

At the same time the studies of Robert Sternberg and Howard Gardner were in turn orientating themselves on other perspectives. Overcoming the classic "IQ", they began some researches based on models of Multiple Intelligences, which included the concept of "Personal Intelligence"

In 1990, J. J. Mayer and P. Salovey finally brought order to the complex constellation of studies on the subject by definitively launching a real new branch of research.

The contribution of Emotional Intelligence, however, did not have a big echo in the public right from the start and much less was influential on the culture of the project, which was still strongly linked to functionalist principles, despite the gain of the Post Modern.

Instead, who contributed to its popularization and popularization was Daniel Goleman, who studied the works of Mayer and Salovey and attended their seminars: in 1995 he published the

famous best-selling book *"Emotional Intelligence: what it is and why it counts more of the IQ"*.

Goleman, moreover, has led the research beyond the theorization of Mayer and Salovey, by adding many other connotations within his definition of emotional intelligence and often going beyond the scientific evidence of research on the topic.

If, on one side, the volume of Goleman has had the merit of making Emotional Intelligence known to millions of people, on the other side it has generated lots of confusion in this field of studies. In fact, today there is no single definition of Emotional Intelligence.

However, the studies on neurosciences conducted so far bring to our attention the evidence that the emotional centers of our brain are not hierarchically in a secondary position compared to the centers of what we could define reasoned cognition. But, on the contrary, these two dimensions communicate in a complex, harmonic & systemic manner which are strictly interconnected.

From now on, the culture of the project cannot separate itself from this consideration and start from the emotional reactions in order to shape the spaces and define the shapes by using the new technological possibilities of lighting.

The bright climate

To design light, we are now in an advanced phase where we can easily understand that the choice of lighting instruments and their positioning is no longer enough, even if determined by the characteristics of the type of light. We are able to pay attention and reason on which bright climate we want and we can get. The thing we want is nourished by the regeneration of the culture of vision in reference to the new cultural skills of perceiving space. The way to get it is based on the capillary and experimental knowledge of the new technical skills to produce light.

The Bright Climate is a component that those who practice the design of the environments consider taken for granted: One of the obvious events in which the project stumbles. In fact what is taken for granted is also inefficient.

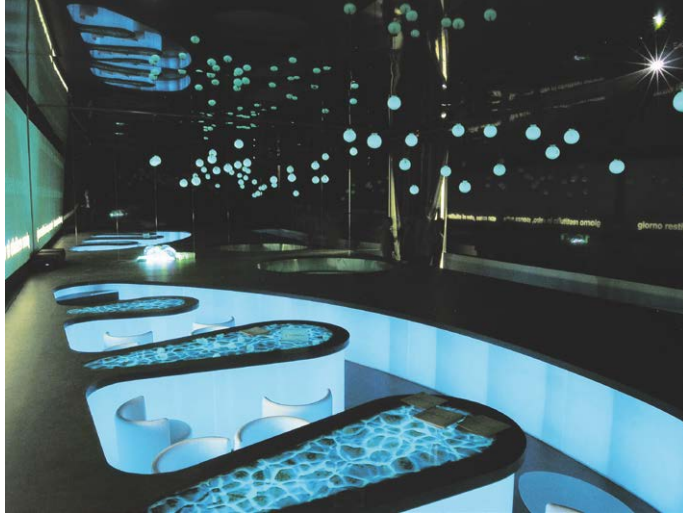
Having tools to understand what mood and state of mind can be suggested or take care of is not easy, considering the innumerable incident variables. Meanwhile, the subjectivity of the user changes anthropologically from one person to another, just like the induced variables of the time factor. Our knowledge of light is based on variability. Natural light is never equal to itself and independent from our will. This is our reference experience in perception. In the light that we design everything is instead fixed, determined, but above all voluntary. It depends on a choice of who designed it or who uses it. This may seem to be an advantage and until now in the culture of the project it has been like this; an excellent and ample benefit to shed light on request. But the potential offered by new technologies opens up completely different scenarios and conditions. More knowledge of both technical culture and perception culture is needed to focus on new choices and new formulations of lighting requirements.

The bright climate today has many possibilities to be built, but needs to understand what kind of space to define based not only on the needs, but also the way to live it, to interpret it in a variable and transformable way.

The simple act of "highlighting" is a design fact, based on choices, on responsibility and however spontaneous, rarely completely conscious. The act of shedding light today more than in the past needs information, knowledge, skills to give not only light, but the possibility to perceive our actions with agreeableness and acceptability.

Photoluminescence

The tools that the culture of light design has already refined converge largely towards the acquisition of the founding principle that "light can be declined as an emotional value". The light passes from a necessary condition to see to a perceptive element that arouses moods.



"Kulana Nalu" by Pierandrei Associati
Experimental set up realized for Lucedentro srl

The light used as an expressive language can be translated into symbolic value. The cultural direction of perception greatly orients the suggestible capacities of communication. The hotter is the light the more it works as an attractor. It becomes "fire" to collect people around. Emotionally it generates a symbolic perception, an imaginary that supplies security and comfort.

The fact that light is a symbolic emotion tells us that it is not possible to find the same path in the attribution of symbolic value both for "warm" and "cold" light.

If the warm light associates an emotional imagery that welcomes and warms, for the cold light we are in a cultural evolutionary stage in which it becomes commonplace to associate the colors that go towards the blue at low temperatures.

Today the symbolic value of this graduality of light is associated with new technologies. It combines with the most advanced performance of innovative materials.

In this new perceptive perspective, photoluminescence is included.

The signs of change can be appreciated, with various perceptive fluctuations, precisely in the ability of the new generations of photoluminescent pigments to be a vector of cultural orientation.

To appreciate the considerable shift in the cognitive parameter we are subjecting to, we must first reaffirm a basic theoretical concept that has accelerated this ongoing process. There is no light but there is light in all its forms. It seems an axiomatic, purely conceptual postulate, but it has been the most significant stimulus that in recent decades has given awareness to the use of light as an emotional component.

Says Vittorio Storaro: "We must continue to learn the art of seeing. The eye must seize ... the whispers of the visible".

The availability that today gives us the photoluminescence is to educate us to an emotional perception of the whisper of light. Doing little with the very imagination we need. The photoluminescence reinterprets the shadow light dichotomy, on/off, overcoming it by proposing a faint light, but useful to illuminate small spaces.

In front of it the eye is purified from the overload to which artificial light has accustomed it and, as in a moonless night of stars, slowly rediscovers the complexity of the world and new

magical dimensions. Luminescence thus becomes a friendly, comfortable form useful for regenerating psychological and environmental energies.

The chromatic pleasantness of light

The common experience leads to understand that the objects are presented mostly with a very specific color. This leads us to believe that color is an exclusive and constant property of objects and surfaces of environments. Less spontaneous is the evaluation of what really happens to the color. It depends fundamentally on enlightenment and it is known through knowledge acquired by culture and certainly not by direct perception.

Rather than understanding what color objects, surfaces, volumes & spaces are, we are urged to learn the information that color leads to acquiring.

The new lighting technologies, the new lighting possibilities, considerably shift the interest from visual perception to visual comfort.

It is a passage that is increasingly needed for awareness.

The passage is almost epochal: the shift from the interest in the color of objects to the project of the color of light can be explained as a cognitive paradigm that is fundamental for the well-being of perception beyond perception itself.

The growing awareness of how and how much certain aggregations of colors influence the mood and cognitive perception of a space can not sustain itself on the spontaneous notions of differentiation between warm colors and cold colors.

Giving consequently the artificially cultural and simplistic meaning of excitement, aggressiveness, positivity to the so-called warm colors and instead calmness, privacy, relaxation, tranquility, negativity to the so-called cold colors the project methodologies are categorized rather than favoring their application in terms of benefits the potential that innovations allow.

"I tried to express the terrible human passions through red and green". Vincent Van Gogh was already aware of this categorization.

If we want to understand the perception of color today, we must ask ourselves not only how it works, but also what are the ideas that men have made of it and how we intend to use it today. Surely among the most motivated applications there are processes that imply it to be effective in giving wellbeing.

And it is the wellbeing that is subjected to a new exploration because not only is it not easy to define it, but it is amply demonstrated that its effectiveness depends strictly on the variants of its perception.

The well-being as a guarantee of continuity of a certain state of health, of comfort, gives way to the increasingly variegated progress of the perception of the pleasantness of the phenomenon. Character completely subjective and closely linked to the social and cultural environment in which the observer lives and moves. Rather than being interested in wellness, perhaps it is necessary to consider the motive that leads us to perceive it: pleasure.

It is through the pleasure we perceive well-being.

Pleasure comes from emotions, it arouses emotions and variable effects.

It allows to participate in a personal way to the mutability of things, of life. It allows us to escape from the compactness of certainties and the fixity of the perception of the world. It benefits the variety, the variability, the vastness of interpretation of what we see, perceive and which by nature is elusive.

The pleasure of appreciating a color takes place before such a perception can manifest itself as well-being.

The pleasantness thus becomes an attitude that is still little explored and enormously interesting, especially if considered in relation to the growing sophistication of visual languages and cultural complexity we live today the awareness that light is not only a perceptive feature, but a category we think about light with.

To give importance to pleasure, as a discriminating element of our perceptions, we need to start from the consideration that in our contemporaneity enlightenment takes on the value of a complex code of communication.

To better understand it, we must distinguish our perception of color with respect to the source of illumination.

At the root of our concepts of perception there is a misunderstanding that must be debunked and exists in the true color of things.

But even his substitute must be debunked that is that to distinguish a true color you need to put it under the right light.

And here is the first of the conventions to be overcome. Considering the sunlight more reliable than that of a light bulb is a conventional guarantee certificate and commonly used for instrumental acceptance for productivity purposes.

We have already widely acquired by convention, not only in the practice of human narration, but especially in evaluations of industrial products, that the colors are estimated by placing them under the standard light of 6500 Kelvin degrees and it resemble the temperature of the sunlight of a generic noon.

The light, therefore, takes on the role of leading architect in giving ways to describe and furnish the space.

Today we are creating a global approach to color space. A perspective set to be considered together as a complex play of lights and reflecting surfaces that can be regulated by the infinite possibilities of light modulation.

The experience of the new immaterial dimension of light

We are now widely used to see environments that change color only with the temporary effect of artificial light. So, we are culturally predisposed to accept and perceive, as a value, intangible light effects that can change the visual perception of the place.

Since the 1960s, pop art has been able to accept advertising light as the most advanced expression of the lighting technology that modernity could have.

Las Vegas and Times Square have spread the culture of diffused light.

The sixties were the years of fluorescent neon inaugurating "the era of the naked bulb", or the luminaire in sight.

The jump happened because there was no need to hide the light source anymore. Everything is left to the eye. The lamp becomes no longer just a source, but a legitimate medium in itself that characterizes the colors of the spaces.

The result is the diffusion of a fluid, magical, undulating weightless perception.

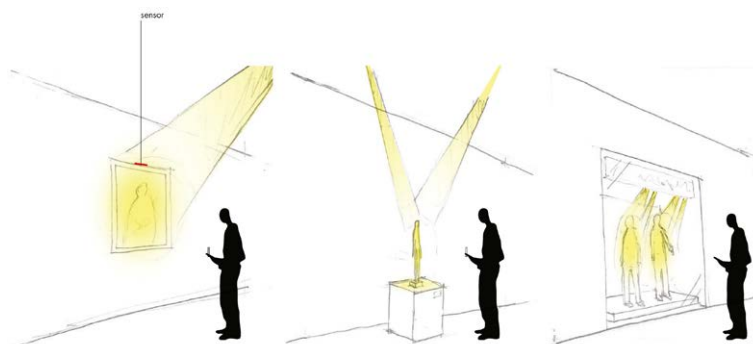
F. Wright writes in the "Testament" - "Glass pipes superimposed like bricks of a wall make up the luminous surfaces" - we are in the age of "diaphanous" light: light that envelops, light as much as possible.

With the advent of digital control of artificial light, we can define a new immaterial dimension. To the conventional dimensions is added the emotion produced by the varied applications of lighting technologies. The point control of each lighting effect can be reactively managed with the environment, in direct correspondence to the needs of the moment and to vary according to the perceptive conditions of the users.

Light from an immaterial dimension becomes a participatory immaterial dimension: it produces sensations and stimulates immersive perception. A new dimension that needs more awareness in the organized scandery of the fruition of space. The immaterial interconnectivity of objects, which is now expanding, has the concreteness of existing if it finds in the lighting apparatus the dimension in which to express the usefulness of its own abilities.

The light is totally involved in creating both the technical functionality of the connectivity between the objects, and the LI-FI is already a physiological reality, both in creating the environmental conditions. By doing this, the new invisible prodigies of technology can be

perceived by humans.



Project by Viabizzuno srl

In this, now an advanced performance scenario, the lighting project overcomes, with ever more sophisticated implementation tools, the commitment of providing a correct contribution in lumens to the environments in order to quickly move to a new methodological application phase. Moving the lighting design towards a strongly cultural trajectory: educating to wellbeing by educating to the perception of light.

References

1. Alfaro, G., "L'abitare tra luce e buio", in: Follesa, S. (Eds.), *sull'ABITARE*, Franco Angeli Editore, Milano, pp. 134-143, 2016.
2. Alfaro, G., "La rapidità del design", in: Spennato, A., *Design e Prototipazione*, Editoriale Delfino, Milano, pp. 26-33, 2016.
3. Alfaro, G., "La luce che si fa vedere", Pietro Macchione Editore, Milano, 2015.
4. Alfaro, G., "Forme di percezione della forma", in: Filieri, J., *Il prodotto da solo non basta*, Altralinea Edizioni srl, Firenze, pp. 78-85, 2015.
5. Arielli, E., "Pensiero e progettazione", Bruno Mondadori, Milano, 2003.
6. Arogers, C., "Materiali intelligenti", in *Le Scienze*, Quaderni n. 115, 2000.
7. Arnheim, R., "Il pensiero visivo", Einaudi, Torino, 1974.
8. Branzi, A., Bojorati, G., Mibelli, E., Pierantoni, R., "La percezione e il progetto. Luce come luogo, Luce e Comfort", in *Interni Annual-Luce* n°4, 1992.
9. Celine, L., "Viaggio al termine della notte", Corbaccio, Milano, 1992.
10. Cremonini, L., "Luce: luce naturale, luce artificiale", Alinea Editrice, Firenze, 1992.
11. Giannini, A. M., Marzi, T., Viggiano, M. P., "Design. Percezione visiva e cognizione, psicologia dell'arte, la scelta del prodotto: emozioni, decisioni e neuroestetica", Giunti Editore, 2011.
12. Goldman, D., "Intelligenza emotiva", Rizzoli, Milano, 1999.
13. Goldman, D., "Intelligenza sociale", Rizzoli, Milano, 2006.
14. Mayer, J. D., "Personality: A Systems Approach", Rowman & Littlefield, Maryland, 2017.
15. Pierantoni, R., "Verità a bassissima definizione", Einaudi, Torino, 1998.
16. Rossi, M., "Design della luce", Maggioli Editore, Santarcangelo di Romagna (RN), 2008.
17. Semprini, A., "Il senso delle cose", Franco Angeli, Milano, 1999.
18. Tanizaki, J., "Libro D'ombra", Bompiani, Milano, 1992.

19. Thorndike, E., L., "The Evolution of the Human intellect", University of Minnesota, 1924.
20. Thorndike, E., L., "The psychology of wants, interests and attitudes", D. Appleton-Century Co., New York, London, 2013.
21. Van Hinte, E., Bakker, C., "Trespassers: Inspiration for Eco-efficient design", Netherlands design institute/010 pubblischera, Rotterdam, 2000.

Note

The authors have shared the theoretical approach and the articulation of the contents of the paragraphs, however, the contributions are attributed as follows:

Introduction (page 72) was written by Gianpiero Alfarano, Alessandro Spennato;

"Designing by light" - "Emotional Intelligence" - "The bright climate" (pages 73-74), it was written by Gianpiero Alfarano;

"Photoluminescence" (pages 74-75) was written by Gianpiero Alfarano, Alessandro Spennato;

"The chromatic pleasantness of light" - "The experience of the new immaterial dimension of light" (pages 76-78), it was written by Alessandro Spennato.

INDEX

STRATEGIC ISSUES

“The DAFNE Project: Human and Machine Involvement”	V. Cantoni L. Lombardi G. Mastrotisi A. Setti	p. 24
“Restored Paintings and Visual Perception: A Proposed Protocol to Study Emotional and Cognitive Involvement in Art”	A. Banzi V.A. Sironi R. Folgieri	p. 32
“Technology and the Art Market: Access, Protection, and Transparency”	Frances Oglesby	p. 37
“Evolutionary Dynamics and Computational Aesthetics: Experiments in Minimalist Blends”	Stefano Kalonaris	p. 43
“Electrical Networks as Media: Post - Humanist Media Archaeological Analysis of the Digitalization of Electric Networks”	Mika Laakkonen Ville Kivivirta	p. 49

NEW SCIENCE AND CULTURE DEVELOPMENTS & APPLICATIONS

“It’s Time to Give Back” (03 LAB)”	Massimiliano Zanoni Jean Paul Carradori Qing Li	p. 58
“A Blockchain-Based Support to Safeguarding the Cultural Heritage”	Mariano Basile Gianluca Dini Andrea Marchetti Clara Bacciu Angelica Lo Duca	p. 64
“Educate to Wellness by the Emotion of Light”	G. Alfarano A. Spennato	p. 72
“Robot Surgery for Total Knee Arthroplasty”	Michele D’Arienzo Lawrence Camarda Antonio D’Arienzo	p. 80

NEW TECHNICAL DEVELOPMENTS & APPLICATIONS

“NEMOSINE: Innovative packaging solutions for storage and conservation of 20th century Cultural Heritage of artefacts based on cellulose derivate”	Andrea De Polo Saibanti	p. 84
“Living in the Present: Using 3D Mixed Reality Technology to Enhance Guest Experiences with Museum Objects and Collections”	D. Marshall R. Hite J. Hoffman	p. 89

“Combining RTI & SFM A Multi-Faceted Approach to Inscription Analysis”	Moshe Caine Michael Maggen Doron Altaratz	p. 97
“Chateau de Chambord, a Perfect Order”	Jeanette Zwingenberger Bertrand Triboulot	p. 105

CULTURAL ACTIVITIES – REAL AND VIRTUAL GALLERIES AND RELATED INITIATIVES

“Architectonic design for mediating cultural heritage ”	Dominik Lengyel Catherine Toulouse	p. 108
“Innovative methodologies and technologies. Civil liability and "genetic code" of a work of art”	Sara Penco	p. 116
“Information Technology in Conservation and Restoration of Art Works: Perspectives of Ukrainian Universities Project”	Roman Mykolaichuk Tetiana Tymchenko Alisa Mykolaichuk Iryna Somyk-Ponomarenko Vira Mykolaichuk Antonina Mykolaichuk	p. 124
“Museum Collections Using information and Digital 3D Technologies”	Tinatin Mshvidobadze Sopio Mshvidobadze	p. 132

ACCESS TO THE CULTURE INFORMATION

"Contemporary methods of Functional Harmony Teaching in a High School Context"	Anna Shvets	p. 142
--	-------------	--------

"Aesthetics of Volumetric Photography for Virtual Reality"	Daniel Buzzo	p. 150
--	--------------	--------

"Optimising 3D cultural environments with large amount of texts for 3D Web. The Santo Stefano Lapidarium to the dead soldiers of the Great War, a case study"	Beatrice Chiavarini Daniele De Luca Antonella Guidazzoli Maria Chiara Liguori Silvano Imboden Luigi Verri	p. 158
---	--	--------

"A techno social collaborative platform to optimize Cultural Heritage funding: final results from the validation phase"	F. Spadoni F. Tariffi R. Rossi S. Lusso	p. 166
---	--	--------