

Milano, Italy 11-14 April 2024

# Design & Health

13TH WORLD CONGRESS & EXHIBITION

# REVITALIZING HEALTH BY SALUTOGENIC DESIGN

Healthy environment | Healthy people

*Final program*

Media partner



Sponsors



# Gerflor®



**DEMENTIA IS A JOURNEY,  
NOT A DESTINATION**

Gerflor is committed to  
enhancing comfort and  
safety for Dementia care



More than 200 designs are accredited by the DSDC

---

# CONTENTS

<b>People</b>	pag 4
<b>Program Overview</b>	pag 5
<b>Welcome to Milano</b>	pag 6
<b>Conference program</b>	pag 8
<b>Conference venue</b>	pag 16
<b>Keynote speakers &amp; chairs</b>	pag 18
<b>Keynote Abstracts</b>	pag 20
<b>Oral Presenters</b>	pag 22
<b>Abstracts Oral Presentations</b>	pag 26
<b>Poster Presenters</b>	pag 38
<b>Abstracts Posters</b>	pag 40
<b>International Academy Awards</b>	pag 48
<b>Dinner Venue</b>	pag 56
<b>Study tours</b>	pag 58
<b>Partners &amp; Advocacy</b>	pag 62
<b>Registrations</b>	pag 63

# PEOPLE

## Chair of Scientific Committee

*Alan Dilani / President IADH*  
International Academy for Design & Health

## Scientific Secretariat

*Stefano Capolongo / Vicepresident IADH*  
Politecnico di Milano, Department of Architecture, Built environment and Construction engineering, Design & Health Lab

## Scientific Committee

*Abbasi Sahand*  
Ph.D. South Dakota State University, USA

*Capolongo Stefano*  
Ph.D. Politecnico di Milano, Italy

*Dilani Alan*  
Ph.D. Academy for Design & Health, Sweden

*Farrow Tye*  
M.Sc. Farrow Partner Architects, Canada

*Ghamari Hessam*  
Ph.D California State University, USA

*Lee Angela M.*  
AiA, Regional Managing Director, Asia Pacific HKS

*Luk Calvin W.*  
Ph.D. The Hong Kong Polytechnic University

*Nazarian Massey*  
Ph.D. Nottingham Trent University, UK

*Okpanum Innocent*  
Ph.D. N. Okpanum Associates, South Africa

*Rebecchi Andrea*  
Ph.D. Politecnico di Milano, Italy

*Surkamp Sandra*  
Arch. Destravis Group, Australia

## Organizing Committee

*Stefano Capolongo*  
European Chapter Director, IADH, Italy

*Andrea Rebecchi*  
Design&Health Lab. DABC Politecnico di Milano, Italy

*Andrea Brambilla*  
Design&Health Lab. DABC Politecnico di Milano, Italy

*Marco Gola*  
Design&Health Lab. DABC Politecnico di Milano, Italy

*Silvia Mangili*  
Design&Health Lab. DABC Politecnico di Milano, Italy

*Hessam Ghamari*  
California State University, USA

*Alan Dilani*  
Founder, IADH, Sweden

*Sandra Surkamp*  
Destravis Group, Australia

## International Advisory Board

*Nicola Bertrand*  
Head of Architecture and Construction Division, Hamburg, Germany

*John Zeisel*  
President, Hearthstone Alzheimer Care, USA

*Fabio Bitencourt*  
Past President, ABDEH, Brazil

*Mardelle McCuskey Shepley*  
Professor, Cornell University, USA

*Tye Farrow*  
Senior Partner, FARROW Partners Architects, Canada

*Ihab Elzeyadi*  
Professor, University of Oregon, USA

*Anthony Capon*  
Professor, Director, United Nations University – International Institute for Global Health, Australia

*Abd Rahim Mohamad*  
Cyberjaya University College of Medical Sciences (CUCMS), Malaysia

*Rosalia Saimon*  
Senior Lecturer Department of Community Medicine and Public Health, Malaysia

*Mungo Smith*  
MAAP Architects, Australia

*Paul Barach*  
MD. MPH, Thomas Jefferson Medical University, USA

# PROGRAM OVERVIEW

## Thursday 11<sup>th</sup> April 2024

The first day of the World Congress of the International Academy of Design & Health aims to networking and gathering of distinguished experts, lecturers, professors, and designers, with Ph.D. candidate representing a preeminent global, interdisciplinary community committed to advancing research on the intersection of design, health, science, and culture. This day is dedicated to fostering connections and networking among attendees and connecting Mentors to Mentees.

- 15:00-18:00** IADH PhD students mentor, mentees & networking
- 18:00-19:00** WCDH registration
- 19:00-21:00** official welcome reception: opening remarks & cocktail

## Friday 12<sup>th</sup> April 2024

On the second day of the Congress, introducing the scientific program the focusing on the application of Salutogenic design on healthcare practices, encompassing hospitals, regional healthcare facilities, and spaces tailored for the elderly and healthy aging. These spaces serve as architectures of care, facilitating preventive management and emergency response while also fulfilling crucial urban public functions and promoting public health.

- 9:00-10:30** **Session 1: Scientific introduction of the congress**
- 10:30-11:00 coffee break
- 11:00-12:30** **Session 2: SALUTOGENIC HEALTHCARE DESIGN**
- 12:30-14:00 lunch break, sponsors showcase and networking
- 14:30-16:00** **Session 3: Case Study Projects, Elderly Care and Healthcare Facilities**
- 16:00-16:30 coffee break
- 16:30-18:00** **Session 4: 1st panel discussion**
- 20:00-23:00 IADH Global Leadership Committee meeting & Speakers Networking Dinner  
(by invitation only)

## Saturday 13<sup>th</sup> April 2024

The third day of the Congress delves into themes such as Urban Public Health, Urban Mental Health, and Healthy Buildings, exploring both theoretical frameworks and practical applications for health promotion and prevention within the built environment, both indoors and outdoors. Urban planning and architecture are recognized as strategic assets in promoting public health and overall well-being. The day will be finalized with Gala Dinner Academy Awards with several prestigious categories among them Life Time leadership Awards to be given to most distinguish scientist within Design and Health community.

- 9:00-10:30** **Session 5: URBAN PUBLIC HEALTH**
- 10:30-11:00 coffee break
- 11:00-12:30** **Session 6: URBAN MENTAL HEALTH**
- 12:30-14:00 lunch break, sponsors showcase and networking
- 14:00-16:00** **Session 7: HEALTHY BUILDINGS**
- 16:00-16:30 coffee break
- 16:30-18:00** **Session 8: 2nd panel discussion**
- 20:00-23:00 Academy Award Gala Dinner  
(open event, registration required)

## Sunday 14<sup>th</sup> April 2024

On the fourth and final day of the World Congress on Design & Health, participants will have the opportunity to engage in three distinct study visits, each aligned with the main themes of the Congress. These visits include an Urban Health walking tour, a Hospital Design case study visit, and a Healthy Building case study visit. For the convenience of attendees, each guided visit experience will be offered twice daily. Participants can select their preferred time slot from either the early morning session running from 9:30 to 11:00 or the late morning session from 11:30 to 13:00. This scheduling allows flexibility for attendees to tailor their experience and delve deeper into the specific areas of interest within the realms of urban health, hospital design, and healthy buildings.

- 9:30-11:00 or 11:30-13:00 Urban Health walking tour, into the city of Milan
- 9:30-11:00 Hospital Design case study visit, close to the city of Milan
- 9:30-11:00 or 11:30-13:00 Healthy Building case study visit, into the city of Milan

**WELCOME  
TO MILAN!**



# Design & Health

## Introducing the 13th World Congress 11-14 April 2024

### Revitalizing Health by Salutogenic Design - Healthy Environment / Healthy People

*The scientific programme for the 13th Design & Health World Congress & Exhibition in Milano will explore the global application of salutogenic architecture.*

*Dear Esteemed Colleagues and Friends,*

Welcome to the vibrant city of Milan for the 13th World Congress on Design & Health (WCDH 2024), in partnership with Politecnico di Milano and with the collaboration of esteemed academic institutions and healthcare industries worldwide.

Over the next few days, you will witness an exciting scientific program. Prepare to engage with some of the world's most distinguished interdisciplinary scientists, embracing a transdisciplinary approach where architecture, psychology, and medicine converge. Research underscores the profound impact of architectural aesthetics on our mood, cognitive faculties, behavior, and overall well-being. Thus, the concept of salutogenic design emerges, addressing these critical needs. In this era of ecological sensitivity, architecture must embrace a new philosophy focusing on interconnectivity, community, and comprehensibility, shaping cities that optimize spatial experiences for societal growth and serenity.

Now, more than ever, the designed physical environment plays a critical role in population health and wellness. Recent studies underscore the significance of investing in spaces that promote psychological well-being and economic sustainability. At WCDH 2024, we'll explore into cutting-edge research utilizing neuroimaging tools to explore how beauty experiences impact various brain areas.

Our society faces pressing challenges, notably the cognitive struggles encountered by a significant portion of the elderly population. Yet, public-space design guidelines often overlook their needs, reflecting broader gaps in addressing dementia health and promoting healthy communities. Transitioning from a disease-centric healthcare model to one grounded in salutogenic science requires a paradigm shift, one that prioritizes the bio-psycho-social needs of individuals and communities within dynamic environments.

Inspired by the principles of Salutogenesis, members of the IADH network have integrated this approach into their work and lives. Recognizing the profound impact of lifestyle on health, we echo WHO's emphasis on

health promotion as a means to empower individuals and improve public health through strategic environmental interventions.

Our scientific program kicks off with keynote presentations showcasing innovative research and practical insights into the intersection of design and health, emphasizing the role of health infrastructure in fostering well-being. WCDH 2024 offers a unique opportunity to engage with a global network of professionals spanning architecture, design, healthcare, public health, and more.

Prior to the congress, our pre-congress program introduces Academy M2, a groundbreaking initiative fostering mentor-mentee relationships to fostering emerging talent under the guidance of experienced professionals. Following the congress, our post-congress study tour offers insights into Milan's leading healthcare facilities and innovative built environments.

Join us for the Academy Awards Gala Dinner, where we celebrate groundbreaking projects in Design and Health, showcasing the ingenuity of our colleagues in advancing health promotion and shaping the future of European healthcare design.

We eagerly anticipate welcoming you to Milan, reconnecting with old friends, and making new connections. Let us come together at the welcome reception to celebrate the 13th World Congress and Exhibition on Design and Health, from April 11th to 14th, 2024, in the design city of Milan.



*Prof Alan Dilani PhD Founder, International Academy for Design & Health, Sweden*



*Prof Stefano Capolongo PhD Director of the Department ABC Design & Health Lab, Politecnico di Milano, Italy*



# CONFERENCE PROGRAM

# THURSDAY 11<sup>th</sup>

15.00  
18.00

## Introducing Academy M2: Connecting Experienced Mentors with Promising Mentees

*@ Politecnico di Milano, Aula De Donato, Building 3, ground floor*

Academy M2 presents a pioneering initiative aimed at establish enduring mentor-mentee relationships by bridging experienced professionals with aspiring talents. This dynamic program serves as a robust platform where mentors extend their expertise to nurture the growth of mentees.

Mentors are afforded the privilege to impart their wealth of experience and wisdom to the next generation of leaders. They play a pivotal role in guiding mentees through their professional journey, offering invaluable insights, fostering career development, cultivating new connections, and unlocking fresh opportunities across the vast landscape of science.

For mentees, Academy M2 presents an unparalleled opportunity to establish connections with veteran professionals who serve as committed leaders. These mentors offer ongoing support in navigating career courses, tackling unforeseen challenges, improving skills, and expanding professional networks. Academy M2 is not merely a networking initiative; it's a collaborative endeavor self-assured to shape the future of the scientific community by fostering meaningful relationships and facilitating knowledge transfer between generations. Join us in this transformative journey of mentorship and empowerment.

18.00  
19.00

## WCDH registration

19.00  
21.00

## OFFICIAL WELCOME RECEPTION Opening remarks & cocktail

REVITALIZING HEALTH BY SALUTOGENIC DESIGN - Healthy environment | Healthy people



# FRIDAY 12<sup>th</sup>

09.00  
10.30

## SESSION 1

### SCIENTIFIC INTRODUCTION OF THE CONGRESS

**Emilio Faroldi** Ph.D. Vice Rector Politecnico di Milano

**Alan Dilani (Sweden)**, The Science of the Salutogenesis, Theory and Application

**Stefano Capolongo (Italy)**, Architecture and Health

**Keynote**

**Stefano Boeri** (Italy), The Bosco Verticale (Vertical Forest) Green Residential

10:30  
11.00

### Coffe Break Exhibition, Posters

## SESSION 2

### HEALTHCARE DESIGN

11:00  
12.30

**Chair**

**Okpanum Innocent** Ph.D. I. Okpanum Associates, South Africa

**Keynote**

**David Raket** (USA), The Science of the Salutogenesis and Healthcare Delivery

**Oral presenters**

**Andrea Brambilla** (Italy), Sustainability in the Next Generation Hospital

**Tye Farrow** (Canada), Embreathment, embodiment, environmental enrichment, and improved oncology outcomes

**Margreet C. Vos** (The Netherlands), Design a Safe Hospital for Patients and Healthcare Staff

12:30  
14.00

### Lunch Exhibition, Posters

## SESSION 3

### CASE STUDIES HEALTHCARE DESIGN

14.00  
16.00

**Chair**

**Nazarian Massey** Ph.D. Nottingham Trent University, UK

**Oral presenters**

**Sonika Rawal** (USA), Impact of Urban Park Design on Recovery from Stress

**Eduard Boonstra** (The Netherlands), Why a “Blue Hospital” Design? How to Achieve?

**Maddalena Buffoli** (Italy), Urban Green Space Design and Impacts

**Erica Brusamolin** (Italy), Designing community health centers to improve well-being

**Marco Gola** (Italy), Rethinking the Territorial Medicine in Italy

**Erica Isa Mosca** (Italy), Advanced Design Strategies for Community Health Center in Italy

16:00  
16.30

### Coffee Break Exhibition, Posters

# FRIDAY 12<sup>th</sup>

## SESSION 4

16.30  
18.00

### PANEL DISCUSSION

Chair

**Alan Dilani (Sweden)**  
**Stefano Capolongo (Italy)**  
**John Zeisel (USA)**  
**David Rakel (USA)**

Representative

**Stefano Capolongo**, Centro Nazionale Edilizia e Tecnica Ospedaliera (CNETO)  
**Carlo Signorelli**, The Association of Schools of Public Health in the European Region (ASPHER)  
& Accademia Lombarda di Sanità Pubblica (Italy)

20.00  
23.00

### IADH Global Leadership Meeting & Speakers Networking Dinner

Foodspot di Tommaso Fara  
Via F. Argelati 47/A - MM2 Romolo  
by invitation only

REVITALIZING HEALTH BY SALUTOGENIC DESIGN - Healthy environment | Healthy people



# SATURDAY 13<sup>th</sup>

09.00  
10.30

## SESSION 5

### URBAN MENTAL HEALTH/SUPPORTIVE ENVIRONMENT

Chair

**Andrea Rebecchi** Ph.D. Politecnico di Milano, Italy

Keynote

**John Zeisel** (USA), Healthy Aging Includes Aging Well with Dementia

Oral presenters

**Tianzhi Sun** (Italy), Supporting Healthy Aging Community by Design and Health Impact

**Calvin WH Luk** (Hong Kong), Salutogenic design for therapeutic garden in a vertical city of Hong Kong

**Silvia Mangili** (Italy), Assessing the Quality of Built Environment for People with Dementia

10:30  
11.00

### Coffee Break Exhibition, Posters

## SESSION 6

### URBAN PUBLIC HEALTH

11.00  
12.30

Chair

**Sandra Surkamp** Arch. Destravis Group, Australia

Oral presenters

**Antonio Gomez-Palacio** (Canada), The community well-being framework

**Julia Nerantzia Tzortzi** (Italy), Urban Health - Interdisciplinary Resilience Assessment

**Ruzica Bozovic Stamenovic** (Singapore), Singapore: shaping the salutogenic city for Resilient Future

**Fei Lian** (China), Effects of Neighborhood Environment on People with Cognitive Impairments

**Mauricio Rosso** (Colombia), The Critical Role of Urban Environment on Health of People

12:30  
14.00

### Lunch Exhibition, Posters

## SESSION 7

### HEALTHY BUILDINGS

14.00  
16.00

Chair

**Ghamari Hessam** Ph.D California State University, USA

Keynote speaker

**Enzo Grossi** (Italy) Neurobiological Salutogenic Mechanisms of Architectural Beauty

Oral presenters

**Francesca Jimenez** (USA), New Workplace Design with Positive Effects on Employee Physical Activity

**Andrea Möhn** (The Netherlands), Healing Architecture: six case studies of room renovations

**Argiro Dimoudi** (Greece), Zero Energy Building Strategies for Hospitals

**Mohana Das** (Hong Kong), Salutogenic Design and its Role in Enhancing the Sense of Belonging

**Eleonora Zioni** (Brasil), Neuro-urbanism and Mental Health: designing the salutogenic city

16:00  
16.30

### Coffee Break Exhibition, Posters

# SATURDAY 13<sup>th</sup>

## SESSION 8

16.30  
17.30

### PANEL DISCUSSION

Chair

**Alan Dilani (Sweden)**  
**Stefano Capolongo (ITALY)**  
**David Rakel (USA)**  
**Enzo Grossi (Italy)**

Representative

**Iveta Nagyova**, European Public Health Association (EUPHA)

17.30  
18.00

### Announcement for the Next World Congress 28 Oct-1st Nov. 2025

20.00  
23.00

### Academy Gala Dinner

@Politecnico di Milano - Building 13 Trifoglio - Ground level  
Piazza Leonardo da Vinci 32, Milano  
Registration required



# SUNDAY 14<sup>th</sup>

09.30  
11.00  
or  
11.30  
13.00

## URBAN HEALTH WALKING TOUR

@ New linear park MM4 Viale Argonne, Milano  
By walk

09.30  
11.00

## HOSPITAL DESIGN CASE STUDY VISIT

@ Humanitas Research Center Rozzano (MI)  
By bus

09.45  
11.00  
or  
11.45  
13.00

## HEALTHY BUILDING CASE STUDY VISIT

@ Fondazione Luigi Rovati Corso Venezia 52 – 20121 Milano  
By metro





# CONFERENCE VENUE

**De Donato Classroom**  
**Milano Città Studi - Piazza Leonardo da Vinci 32**  
**Building Edificio 3 - Gino Cassinis - Ground floor**

*How to reach De Donato classroom*

**Milano Centrale Station**

Take Line 2 of the underground railway (MM2 green line), towards Cologno Nord-Gessate. Get off the train at the Piola station (third stop). Take the left-hand exit from Piola station; walk along Via D'Ovidio, keeping to the left and cross Via Bonardi: at this point you will have arrived in Piazza Leonardo da Vinci. Politecnico di Milano is the main building facing you.

**Piola Station**

Take the left-hand exit from Piola station; walk along Via D'Ovidio, keeping to the left and cross Via Bonardi: at this point you will have arrived in Piazza Leonardo da Vinci. Politecnico di Milano is the main building facing you.

**Milano Cadorna Station**

Take Line 2 of the underground railway (MM2 green line), towards Cologno Nord-Gessate, as far as PIOLA station (eighth stop). Take the left-hand exit from Piola station; walk along Via D'Ovidio, keeping to the left and cross Via Bonardi: at this point you will have arrived in Piazza Leonardo da Vinci. Politecnico di Milano is the main building facing you.

**Milano Lambrate Station**

Take Line 2 of the underground railway (MM2 green line) towards Abbiategrasso as far as PIOLA station (first stop). Take the left-hand exit from Piola station; walk along Via D'Ovidio, keeping to the left and cross Via Bonardi: at this point you will have arrived in Piazza Leonardo da Vinci. Politecnico di Milano is the main building facing you.





# KEYNOTE SPEAKERS

Listed in appearance order



**Alan Dilani Prof, PhD Arch/Public Health**  
Director Academy for Design and Health

Founder of the International Academy for Design & Health and World Health Design journal, author of many books, articles and research papers on salutogenic design. Dr Dilani has been engaged worldwide in several universities in the field of design and health developing “Salutogenic design program”, both in medical and design institutions. Awarded by American Institute of Architects for his high quality research in the built environment.



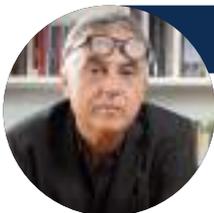
**Stefano Capolongo, Prof. PhD Arch**  
Head Department ABC, Design & Health lab, Politecnico di Milano

Architect, Full Professor Politecnico di Milano. Head of the Department in Architecture, Built environment and Construction engineering (DABC) and Scientific Coordinator of the Design & Health Lab. President of the Urban Public Health Section for the European Public Health Association (EUPHA). Coordinator Cluster Design of Health Facilities, European Symposium Scientific Director.



**John Zeisel PhD, Hon D.Sc.**  
Founder, I'm Still Here Foundation / Hopeful Aging

Author I'm Still Here and Inquiry by Design. Founder I'm Still Here Foundation – Mission: to change the public narrative of dementia from Despair to Hope; supports innovative engagement programs that change the way people living with cognitive challenge feel and act. Contributes to engaging designed environments that employ salutogenic approaches and natural mapping to encourage self-awareness, wayfinding, and sense of self – alleviating the need to spend energy navigating today's physically and spiritually draining environments. Developer and research leader of technologies and environments that support social connection and health among older persons, including those living with cognitive challenges – who represent almost half of those in the world over the age of 75 years old.



**Stefano Boeri, Prof. Arch**  
Stefano Boeri Architetti

Stefano Boeri, born in Milan in 1956, is a renowned Italian architect celebrated for his pioneering work in sustainable and green architecture. He is best known for the innovative Bosco Verticale (Vertical Forest) in Milan, a pair of residential towers adorned with thousands of trees and plants. Boeri's designs prioritize ecological integration, blending urban environments with nature. Apart from his architectural achievements, he is a prominent urban planner and has held positions such as editor-in-chief of Domus magazine. His work embodies a vision of cities that harmoniously coexist with greenery, aiming for a more sustainable and livable future.



**Enzo Grossi, Prof. MD**  
Bracco Foundation, Milano, Italy

Medical doctor, scientist, and researcher in different fields (Pharmaceutical medicine, Artificial intelligence, Art culture and health). Over the past 15 years has worked intensively in the field of art, culture and health with numerous scientific publications, seminars, and university courses in Milano, Turin, Bologna and Lugano Universities. Since 2012, Scientific Director of the child neuropsychiatric institute “Villa Santa Maria” in Tavernerio (Como). Scientific Advisor of Italy Pavillon at Expo 2015. Author of more than 500 publications (full papers, conference proceedings, patents) indexed on Google Scholar including more than 250 full papers indexed on PubMed. H index = 61



**David Rakel, Prof. MD**  
Department of Family Medicine and Community Health, University of Wisconsin (US)

Dave Rakel is Professor & Chair of the Department of Family Medicine and Community Health at the University of Wisconsin. He founded the UW Integrative Medicine Program and received the Gold Foundation's Leonard Tow Humanism in Medicine Award, the school's highest honor for excellence and compassion in care. His team worked with more than 50 clinical systems within the Veterans Health Administration to implement the “Whole Health” model to make care more personalized, proactive, and patient driven. He is exploring how to shift health care from a reactive pathogenic model to one that focuses on the outcomes we want to achieve through salutogenic science. He has published 11 books, including the Textbook of Family Medicine, Current Therapy, and Integrative Medicine, as well as peer-reviewed research on the impact of measures such as mindfulness meditation and the power of the therapeutic encounter.

# CHAIRS

Listed in appearance order



## Innocent Okpanum

Architect, researcher, urban designer, healthcare design specialist, and the managing director and owner of the architectural firm, Ngonyama Okpanum & Associates, which has offices in eight cities in South Africa; Abuja, Nigeria; Accra, Ghana; and in Ho Chi Minh City, Vietnam. He studied in Genova, Italy, where he obtained a doctorate degree in architecture. He also holds a Ph.D. in architecture for health care facilities design from the University of Newcastle in the United Kingdom. He has gained extensive professional experiences planning over 35 years of practice; and has designed a wide range of buildings.



## Nazarian Massey

Architect PhD at Loughborough University. Her thesis dealt with “Nursing Staff Productivity: The Role of Layout and People Circulation”. It has had a significant impact on research into/professional approaches of hospital designs by optimising productivity-oriented circulation system of medical staff. Her first academic appointments were as University Teacher and Associate Researcher at Loughborough. She joined Nottingham Trent University in 2019 and been working as Senior Lecturer.



## Andrea Rebecchi

Architect, PhD in Architecture, Built environment and Construction engineering (ABC) at the Politecnico di Milano (2017). He achieved the II level Master in Planning, programming and design of hospital and social-health systems (2013), since May 2021 he's Senior Researcher at the ABC Department Design&Health Lab. Professor in Technologies for Construction and Environmental Hygiene.



## Sandra Surkamp

Architect, with almost 20 years of experience. She has specialised in healthcare facilities, earning recognition as one of Australia's leading health facility planners. Her pragmatic approach to the development and implementation of health infrastructure projects creates efficient facilities that support the model of care and contribute to a sustainable health system. Sandra is a Director of the Destravis Group, an organisation focused on health system, health service and health facility design.”



## Hessam Ghamari

Associate Professor of Interior Design for the Department of Family & Consumer Sciences at California State University, Northridge (CSUN). He received his Ph.D. in Environmental Interior Design in 2014 from Texas Tech University. He has published articles in peer-reviewed journals and presented at international conferences on environmental psychology, and healthcare design.

# SCIENTIFIC INTRODUCTION

Professor **Alan Dilani**, Ph.D. Architect / Public Health  
International Academy for Design and Health

## The Science of the Salutogenesis, Theory and Application

Health research can be approached from two main perspectives: pathogenic and salutogenic. Pathogenic research explores to understand the causes and development of diseases within the physiological organism, aiming primarily to identify medical treatments. On the other hand, salutogenic research focuses on identifying factors that maintain and promote health, rather than just investigating disease-causing factors. Together, these approaches provide a comprehensive understanding of health and disease, aiming to answer the salutogenic question: what factors contribute to both creating and sustaining health? The principles of salutogenic design extend beyond mere support for the healing process; they aim to actively promote health and well-being across various types of buildings. Salutogenesis forms the foundation of a healthy society, seeking to efficiently reduce the burden of lifestyle diseases. This necessitates significant investments in health promotion and the prevention of non-communicable diseases. Our society faces significant challenges, particularly concerning the cognitive struggles experienced by a substantial portion of the elderly population. Unfortunately, public-space design guidelines often neglect their needs, highlighting broader shortcomings in addressing dementia and fostering healthy communities. Transitioning towards a salutogenic healthcare model requires a fundamental shift, prioritizing the bio-psycho-social needs of individuals and communities within dynamic environments. Adopting salutogenic approaches in the built environment, infrastructure investment, and development embeds preventative care at the core, shifting focus from treating diseases to understanding and enhancing wellness factors. Incorporating abundant greenery not only promotes physical activity, reducing the risk of cardiovascular diseases, stroke, diabetes, and falls in the elderly, but also contributes to mental well-being by reducing stress and mental fatigue. Creating attractive and supportive environments ultimately improves the burden of disease, potentially reducing healthcare costs and reinforcing societal resilience. By shaping the salutogenic built environment, we can proactively promote health and prevent stress, fostering a healthier and more sustainable society.

Professor **Stefano Capolongo**, Ph.D. Architect / Public Health  
International Academy for Design and Health

## The Next Generation Hospital

The awareness of the role that the built environment plays in ensuring the highest possible standard for healthcare provision has emerged forcefully after the pandemic experience. Therefore, the evidence-based design application to the next-generation hospital is necessarily linked to the application of typological, functional, and performance determinants resulting from scientific research. For this reason, the World Health Organization (WHO) decided to address the topic of future healthcare infrastructure through a technical-brief document. This technical report “Hospitals of the future: a technical brief on re-thinking the architecture of hospitals” has been published in 2023 and was developed based on the scientific paper “COVID-19 and healthcare facilities: a decalogue of design strategies for resilient hospitals (Capolongo et al., 2020). The document, carried out with the scientific support of the Design & Health Lab of the Politecnico di Milano, aims to guide planners, designers, and health infrastructure managers to improve standards of comfort, safety, and efficiency.

The key elements of the hospital of the future in the European region have been defined by identifying planning and architectural elements of two types: outside the hospital elements and inside the hospital elements. These have been identified based on the analysis of existing scientific literature and sector technical documents. For each criterion of the hospital of the future, the document defines a list of concrete actions and functional characteristics.

Regarding the external elements of healthcare infrastructure, the document addresses four key elements: strategic hospital localization, the synergy with the territorial health and social care network, landscape and healing outdoor environments, and universal design and inclusion strategies. For the inside elements of healthcare infrastructure, criteria and design indications have been defined in the following areas: functional design and innovative layouts, environmental sustainability, flexibility and resilience, healthy workspaces, prevention and health, infection control and air quality.

The set of criteria and design guidelines for hospitals of the future presented in the document constitutes a crucial foundation for ensuring a minimum level of standardization in the quality of healthcare infrastructure throughout the European region. This approach allows for scalability of the elements included, which can be achieved through the definition of performance monitoring and measurement models, which can be applicable even in diversified contexts.

The technical and scientific nature of the document does not exclude the importance of design experience for healthcare spaces of medical directors and healthcare designers. Rather, the document purpose is to standardize and outline all the drivers that will guide the design of hospital projects in the future. For this reason, in early 2024, the first implementations were made in real-case projects carried out in the European region territory, such as in the case of the renovation of the Oncology National Institute the Republic of Moldova.

# ABSTRACTS

## Keynote speakers

### **Healthy Aging Includes Aging Well with Dementia**

*John Zeisel PhD, Hon D.Sc.*

Public health and design professionals have difficulty perceiving what “living well with dementia” means. The stigma surrounding “cognitive challenges” – dementia and MCI (Mild Cognitive Impairment) – leads to discussions of “healthy aging” excluding large numbers of older people. The implication – from a salutogenic point of view – is devastating to individuals and most present societies whose populations are aging. Nearly half of all elders over 75 years face some cognitive challenges, yet few public-space design guidelines accommodate this group of users. Few social-connecting technologies for this population have been developed, and few if any agreed-upon measures of dementia health have been developed. This presentation uses examples to demonstrate how salutogenic design that authentically reflect the positive health and well-being of all elders reflects and supports design for dementia.

### **Salutogenic Design in Health Care Delivery**

*David Raket, MD*

How do we shift a disease-centric, reactive health care system to one that first focuses on what humans and communities need to be healthy? This requires a different process of care that is grounded in salutogenic science. Science is often linear traveling from A to B. Salutogenesis needs to adapt to the context of living beings that live within a dynamic environment. It requires that we bend the science into unique patterns based on bio-psycho-social needs. Antonovsky used the concept of entropy to describe the chaos that can lead to disease. The force that organizes the chaos into its salutogenic focus requires meaning and service. This is the glue that bonds the entropy towards Antonovsky’s sense of coherence. How do we do this in health care delivery systems? How do we motivate healthy behaviors? This session will bring the wisdom of cognitively diverse professionals across design and health care to empower self-healing and thriving mechanisms. We will highlight a successful experiment with the Veteran’s Administration Health Care in America and discuss how to design salutogenic health clinics and community health centers. We will discuss the importance of a financial model that rewards the salutogenic outcomes we want. And we will ask one another, what do we want our health for?

### **Neurobiological salutogenic mechanisms of architectural beauty.**

*Enzo Grossi, Bracco Foundation, Milano, Italy*

Today, many people spend more than 90 per cent of their lives in buildings. Studies indicate that the aesthetic qualities of architecture have an impact on our mood, cognitive functioning, behavior and even health. The salutogenic design seeks to address these needs with a transdisciplinary approach, where architecture, psychology and medicine are intertwined. In recent years thanks to neuroimaging tools such as electroencephalography, functional magnetic resonance imaging and near infrared spectroscopy, and thanks to an extensive scientific research, it has been possible to document the impact of beauty experience on brain areas. In general, whenever one has an aesthetic experience involving any stimulus that gives a sense of pleasantness, the stress hormone cortisol ‘drops’ as does anxiety. The beauty of natural environments and of buildings designed in a proper way paying attention to contours, colors, harmony of forms act on a specialized brain center located in orbito-frontal cortex, which evolved with the human species and probably did not exist at the time of Homo Heidelbergensis, a hominid who lived hundreds of thousands of years ago, before Neanderthal man and Homo sapiens. This center has been called the center of beauty by Samir Zeki, as it integrates sensations of various kinds that our species judges to be beautiful, be they visual, olfactory, gustatory and even auditory. The stimulation of this center, which is located in the orbitofrontal cortex, reverberates in other centers of the brain, and in particular in the basal nuclei, ancestral centers (therefore ancient at an evolutionary level) that, when activated, bring into play neuromediators, i.e. chemical substances to which we owe the various sensations of peace, contentment, and pleasantness that we experience when we appreciate beauty. Recently, studies have been conducted on the cerebral response to architecture by investigating the effect of spaces with different geometries. It has been seen, for example, that curvilinear spaces are able to activate brain centers of the beauty circuit, with reverberations on the basal nuclei and increase of salutogenic neuromediators. In the brain first, and then throughout the body, molecules such as dopamine, oxytocin, serotonin and endorphins are in fact put into circulation, each of which can interfere in various ways with anxiety, stress, depression. These are precisely the mediators to which the salutogenic effects of architectural beauty are attributed.

# ORAL PRESENTERS

Listed in appearance order



## Andrea Brambilla

Architect, PhD and Researcher at Politecnico di Milano, Department of Architecture, Construction Engineering and the Built Environment (DABC), Design & Health Lab. Assistant Professor in “Health and Sustainability for the Built Environment” at the School of Architecture Urban planning Construction engineering (AUIC), Politecnico di Milano. Scientific Secretariat of the Joint Research Partnership Healthcare Infrastructure (JRP HI) promoted by Politecnico di Milano, Fondazione Politecnico di Milano, private companies and institutions in the healthcare sector.



## Tye Farrow

Tye Farrow is a world-recognized pioneer tackling how what we create either gives or cause health. With award-winning projects around the globe that enact salutogenic design, he is the first Canadian architect to have earned a Master of Neuroscience Applied to Architecture (University of Venice IUAV), and has a Master of Architecture in Urban Design (Harvard University), and a Bachelor of Architecture degree (University of Toronto). Tye is a sought-after speaker who has presented to respected organizations and universities in over forty-five cities on six continents.



## Margreet C. Vos

Prof Dr Margreet C. Vos (1961) is a Clinical Microbiologist and a professor of Healthcare related Infections at the ErasmusMC, Rotterdam, the Netherlands. She received > 200 invited lectures and has about 235 peer-reviewed publications on e.g. outbreaks, transmission, hospital environment and hospital design. Main topics are the impact of hospital design on microbial safety. Currently, she is promotor of about 10 PhD students. She is a member of many (inter)national guidelines/working-groups and took initiative to a guideline on sampling hospital environment.



## Sonika Rawal

Dr. Sonika Rawal, Research & Design Associate at Alliance Architecture, brings 17 years of expertise in workplace design. Driven by passion for design’s impact on health & well-being, her research focuses on psychological intricacies of salutogenic design. In her architectural pursuits, she uses the transformative potential of experiential design for crafting innovative solutions for workplace and hospitality design, creating emotive environments that evoke memories and offer unique experiences.



## Eduard Boonstra

Founder of the International Academy for Design & Health and World Health Design journal, author of many books, articles and research papers on salutogenic design. Dr Dilani has been engaged worldwide in several universities in the field of design and health developing “Salutogenic design program”, both in medical and design institutions. Awarded by American Institute of Architects for his high quality research in the built environment.



## Maddalena Buffoli

Associate Professor in the field of Hygiene and Public Health in Politecnico di Milano. Architect and PhD in “Planning, Maintenance, Redevelopment of building and urban systems. Member of the Design&Health Lab. of Dept. ABC of Politecnico di Milano, the strategic research working group “Complex Construction” of Politecnico di Milano, as well as Lombard Academy of Public Health, the “Building Hygiene” research group of the Italian Society of Hygiene (SItI) and the “Urban Health” working group of European Public Health Association (EUPHA).



## Erica Brusamolin

Erica Brusamolin is an Interior and Spatial Designer, PhD student at Politecnico di Milano, ABC Department, Design & Health Lab. Her doctoral research aims to explore how local socio-health facilities, particularly Community Health Centers (CHCs), can become central reference points for comprehensive community well-being. To address this issue, she delves into the design of CHCs focusing on integrating socio-health, social, and community aspects also through interior, spatial, and communication design elements.



## Marco Gola

Marco Gola is an Assistant professor at Politecnico di Milano. He is an architect for public health. Among his research activity he studies the healthcare design and building hygiene issues. In particular he focuses his attention on the topic of indoor air quality in indoor environments, on hospital layouts and their correlations to the healthcare processes. Working in synergy with the Design & Health Lab, we had the opportunity to collaborate for the technical brief for the World Health Organization of the hospital of the future and for the metaprojects of the new healthcare community centers and community hospitals for the Italian Ministry of Health.

# ORAL PRESENTERS

Listed in appearance order



## Erica Isa Mosca

Architect and Ph.D. in Architecture, Built Environment, and Construction Engineering (ABC) of Politecnico di Milano, on research concerning Design for All quality assessment. Research fellow at Politecnico di Milano's Department of ABC from April 2021 and Universal Design expert in the "Design & Health Lab". Engaged in teaching support activities since 2018. Speaker at national and international seminars, author of publications on accessibility, Design for All, and Urban Health. Co-director of the "Design for All strategy" post-graduate training course.



## Tianzhi Sun

Tianzhi Sun is an architect and a PhD student of Design & Health Lab from ABC Department, Politecnico di Milano. Her research interests are built environment and health impacts, the health and well-being of the elderly group. Currently, She's focus on the research about how the design of community centers can support healthy aging in community.



## Calvin WH Luk

Dr. Calvin W. Luk is Acting Director and Project Manager-Spatial Team Leader of Jockey Club Design Institute for Social Innovation, The Hong Kong Polytechnic University. He develops and leads community participatory action research on topics spanning Universal Accessibility, Inclusive Design for people with disabilities, Therapeutic landscape for Dementia, and Environmental assessment of care facilities for older persons. He engages extensively in community and urban infrastructure projects, including the government Rehabilitation Policy Plan and Occupational safety & health study for aged workers.



## Silvia Mangili

Silvia Mangili is an Architect, research fellow and PhD Candidate in Politecnico di Milano, ABC Department, Design & Health Lab. She is currently exploring the topic of dementia and Healthcare Facilities through her PhD, researching Experienced-based design strategies for patients with the disease, aiming to investigate the relationship between the built environment and clinical outcomes on patients' lives in those structures like nursing homes and long-term care facilities.



## Antonio Gomez-Palacio

Antonio Gomez - Palacio is frequently called upon to lead conversations on how the design of the built environment can contribute to community wellbeing. He has acted as chair of the Toronto Society of Architects and Vaughan's Design Review Panel. Antonio is active on several research and advocacy groups, including the Rethinking Rental Roundtable and Planning Research Advisory Committee with CMHC-SCHL and the Advisory Committee for Healthy Design city. He became a Fellow of the Royal Architectural Institute of Canada College in 2018.



## Julia Nerantzia Tzortzi

Associate Professor at the Department of Architecture, Built Environment and Construction Engineering of Politecnico di Milano while previously she was professor in Universities in Cyprus (Head of the Department of Architecture, Land and Environmental Sciences at Neapolis University of Cyprus) and in Greece and visiting professor in several Universities. In the last 25 years she has been leading more than 40 European and other Programmes with an emphasis on Natural Based Solutions, Climate Change, Cultural Landscapes, through: HORIZON 2020, RISE, JPI, INTERREG IVC, FP7, LIFE+.



## Ruzica Bozovic Stamenovic

Dr Ruzica Bozovic Stamenovic is Associate Professor and Leader of Urbanism Research Cluster at the Department of Architecture, National University of Singapore. Her research interest is in human ecology, health-restoring design processes, and design for wellness in contemporary urban settings and megamature societies. She is Faculty Fellow of The Centre for Health Systems and Design, Texas A&M University, Executive Board Member of the UIA Public Health Group and GUPHA (Global University Programs in Healthcare Architecture).



## Fei Lian

Dr. Fei Lian, has been an Associate Professor at School of Architecture of Harbin Institute of Technology (HIT) in China. Lian's research interests follow three main themes: inclusive physical environment, evidence-based design, and architectural programming. She is in charge of 2 research programs funded by National Natural Science Foundation of China (NSFC), and 1 Ministry of Education funded program. She has authored more than 50 papers in peer reviewed journals and international conferences. As an advisor, Lian has instructed students to win the 1st prize of 2023 UIA International Student Competition and other prizes.

# ORAL PRESENTERS

Listed in appearance order



## Mauricio Rosso

Professor of the Department of Environmental Engineering at the University of Córdoba, Colombia. Director of the research group on Environmental Resilience and Sustainability. Environmental engineer with master and PhD in environmental sciences, with research emphasis in watershed planning, environmental impact assessment, environmental health and ecological restoration.



## Francesqca Jimenez

Francesqca Jimenez investigates the ways environments impact human health, happiness, and well-being. Francesqca holds a Master of Science in Applied Research in Human-Environment Relations from Cornell University's Department of Design and Environmental Analysis with a minor in Organizational Behavior, and a Bachelor of Arts in Psychology, English and Women's Studies from the University of California-Los Angeles. Her primary research interests are environmental psychology, linking environments to healthy behaviors.



## Andrea Möhn

Andrea Möhn attended the Technical University of Berlin, the University of Stuttgart, and the Technical University of Delft, the latter on an Erasmus scholarship. Her main interests lie in the influence of the social, cultural and economic spheres upon architecture today. Her research in this field, as well as her extensive interaction throughout the design process with both clients and users of the buildings, have had a significant impact on her work and approach.



## Argiro Dimoudi

Professor at 'Science & Technology of Structures with Emphasis on Environmental and Energy Design'. Director of the Laboratory 'Environmental & Energy Design of Buildings and Settlements', Department of Environmental Engineering, Democritus University of Thrace, Greece. Extensive experience on aspects of energy conservation/RES & sustainability in buildings and settlements, microclimate, outdoor spaces bioclimatic design.



## Mohana Das

Mohana Das is a PhD researcher in Healthcare Architecture at the School of Design, PolyU (HKSAR). Her research focuses on developing a set of evaluative physical design guidelines, strategies, and policy recommendations for achieving improved standards of living for the elderly-care homes in Hong Kong that are prepared for the future post-pandemic world.



## Eleonora Zioni

Eleonora Zioni is an architect with B.A. and master from University of Sao Paulo, Executive specialized in culture of health and healthy buildings at Harvard T.H. Chan School of Public Health; MBA from Michigan University certified; LEED certified WELL faculty; Planetree fellow in 2022; DGNB consultant, Green Building Council Brazil consultant. Director of Brazilian Association to Develop Hospital Buildings (ABDEH).

# PANEL DISCUSSION



## Carlo Signorelli

He is the director of the School of Specialization in Hygiene and Preventive Medicine and president of the Center for Training and Research on Health Systems at the University of Parma. With over 1200 publications, including 200 in PubMed and 40 university textbooks, he is a prolific author. His qualifications include degrees in Medicine and Surgery, Law, Political Science, and a Doctorate in Public Health. He holds a Master's and PhD in Epidemiology from the University of London. A member of key committees such as the Scientific Technical Committee of the Ministry of Health and the National Vaccine Commission-NITAG, he contributes to research in hygiene, epidemiology, public health, and environmental policies.



## Iveta Nagyova

Dr. Iveta Nagyova is a Senior Research Leader and Head of the Department of Social and Behavioural Medicine at Pavol Jozef Safarik University in Kosice, Slovakia (UPJS; www.sbm.upjs.sk). She is also a President of the Section on Chronic Diseases at the European Public Health Association (www.eupha.org) and a member of the Platform for Healthcare Innovations at the Institute of Health Policies, Ministry of Health of the Slovak Republic. She graduated in Psychology at UPJS and obtained her PhD in Medical Sciences from the University of Groningen, the Netherlands. Her research interests are in psychological and social adaptive processes in patients with chronic disease.

CNETO, well-known as Centro Nazionale per l'Edilizia e la Tecnica Ospedaliera (the Italian National Center for Hospital Building and Technology), similar to Architects for Health association, is a leader association, founded in 1954, in Italy which merges several expertise related to healthcare design. It is a forum for sharing best practice, knowledge, innovation and thought leadership relating across the healing environments.

Although it is small size association (around 130 members), it merges all the hospital designers on the entire Italian territory and its added value is defined by the presence of medical directors who allow us to broaden the point of view and the organization of the processes.

#### Goals:

- To promote and encourage studies and documentation related to the field of health care and hospital reconstruction
- To impart the latest knowledge of hospital design and management and encourage its development
- Promote analysis, study trips, international comparisons, and provide documentation on advanced projects and experiences
- Involve the university world and in particular that of young people
- Organize meetings with industry and companies in the field
- Organize technical refresher courses and on new industry regulations and legislation
- Promote meetings and initiatives with political-administrative authorities and with all those working in the sector



**Would you like to become a member?**

mail: [segreteria@cneto.it](mailto:segreteria@cneto.it)

follow us on



More info on the website [www.cneto.it](http://www.cneto.it)



# ABSTRACTS

## Friday 12<sup>th</sup>

### HEALTHCARE DESIGN

#### **Sustainability in the Next Generation Hospital®. Needs and requirements collection in industrial companies and hospital strategic management for healthcare infrastructures supply chain.**

*Andrea Brambilla, Silvia Mangili, Michele Dolcini, Stefano Capolongo (Italy)*

Introduction. Technological, demographic, epidemiological, environmental and social changes require investment in new sustainable hospital infrastructure; there is a lack of guidelines and interaction between stakeholders. Methods. In February 2022, a Joint Research Platform Healthcare Infrastructures (JRP HI) was established consisting of Hospital.Strategic Directions and Industrial Partners. A national survey was carried out via web-survey and semi-structured interviews with a sample of 30 stakeholders to collect the main drivers and constraints for innovation, the requirements framework from a One Health perspective and in terms of Sustainability (Sustainable Development Goals - SDGs). Results. The main needs to be addressed through the guidelines refer to Digitalisation (27%), Flexibility (32%), Environmental (36%) and Economic Sustainability (27%) as well as Flow Management (18%) and Hospital Infection (14%). The participants consider SDG No. 3 “Good Health and Wellbeing” to be the most relevant for development activities (32%; 41% respectively). The hospital partners prioritise SDG No. 8 “Decent Work and Economic Growth” (23%); on the contrary, the industrial partners suggest SDG No. 11 “Sustainable Cities and Communities” and No. 13 “Climate Actions” (32%) as topics to be addressed in the near future. Furthermore, 57% of the respondents state that they lack adequate training, budget and/or leadership to apply innovative strategies in the day-to-day management of the healthcare organisation. Conclusions. The results have been collected in an Annual Report distributed to the Health Directorates of the Italian Regions; they will be the operational tool for the planning of the next hospital building and technology interventions.

#### **Embreatment, embodiment, environmental enrichment, and improved oncology outcomes.**

*Tye Farrow (Canada)*

Introduction. The Hemsley Cancer Center, Israel’s newest center located in Jerusalem, leveraged scientifically grounded, salutogenic, multi-sensory, neuro-wellness interventions, to improve the full range of clinical, and human outcomes, based on: Embreatment, a new concept in embodied cognition, advanced by neuroscientist Amedi, where the representation of one’s physiological breath and body, in immersive experiences, is used to enhance presence, interception, and sense of control, reducing negative cognitions of claustrophobia, occurring in areas such as CT suites, which is a significant psychological challenge in cancer treatment. Embodiment, proposed by cognitive philosophers Clark and Chalmers, whereby the mind extends throughout the body, to the surrounding environment, contrary to the belief that the mind stops at the skull. Environmental Enrichment (EE), advanced by Diamond and Rosenzweig, shows that immersive environments can positively impact mental and physical wellbeing, including synapse and cortex growth, thereby altering the biochemical milieu and neuroanatomical brain structure. Current neuroscientific breakthroughs have uncovered insights into the senses, and the bidirectional effect of the mind on the body (top-down) and viceversa (bottom-up), including one’s perception of pain. Different people can experience the same physical nociceptive stimulus, yet report differing levels of pain. Moreover, it is known that the senses influence our pain perception. EE sensory substitution reprograms the brain to bring about desired top-down influences. For example, the use of external visual and auditory multisensory feedback immersive systems, that reacts to one’s body in real time, through a process known as embreatment, have been shown to induces mind-body sensory substitution which modify one’s internal awareness. The overlap between body representations, and areas related to high-order mental and emotional functions, whereby sensory information, such as pain, can be conveyed by alternative sensory modalities through sensory substitution, meaning that immersive building experiences can reprogram the brain to bring about desired top-down influences. Methodology. The new cancer center’s building design, from once you enter, through to the CT simulator rooms, includes interactive, multisensory, auditory, visual, and tactile programming capabilities, personalized to one’s physiological signals, using materiality; curved LED display; ambisonic audio speakers; haptic bed surface interfaces; among other design interventions. Results. Preliminary results show: reduced anxiety, enhanced sense of control, calmer breathing patterns, and improved clinical outcomes.

## **Design a microbial safe hospital for patients and health care workers; lessons from hospital acquired infections, outbreaks and the COVID-19 pandemic.**

*Margreet C. Vos (The Netherlands)*

Objective: The COVID-19 pandemic underscored the critical role of hospital design. Hospitals have always faced challenges in preventing hospital-acquired infections in patients and the transmission of pathogens to staff and the hospital environment. The COVID-19 pandemic has put this important issue again on the agenda to ensure safety of both patients and staff. How ward design can support and improve infection prevention and control, and thus microbial safety, is a value of good facility design that should be revisited. Single-occupancy rooms is considered as a key prerequisite in reducing the transmission of pathogens between patients and staff, compared to ward configurations with multi-occupancy rooms. Methods: In 2018, the Erasmus University Medical Center, Rotterdam, the Netherlands, moved from an old hospital with multi-occupancy rooms (2-4) to a new facility with 100% single-occupancy rooms. The IPC-impact of this change was subjected to three separate studies: (1) bacterial contamination of the innate environment of patient rooms and the transmission of resistant microorganisms (“hospital bugs”); (2) occurrence of hospital-acquired COVID-19 infections among patients and staff in the new hospital; and (3) comparison of number and size of outbreaks defined as transmission of pathogens. The 3 studies combined will give insight and evidence on the effect of single-occupancy rooms on microbial safety. Some results are already published, others are to be analyzed yet. Results: The study on bacterial contamination showed that the single rooms were less contaminated. 4993 sites were sampled, 724 in the old hospital, 4269 in the new hospital. Contamination of “hospital bugs” was seen less frequently. Transmission of “hospital bugs” was indirectly lowered as single-occupancy rooms reduced the need for transfers to other rooms, for example due to changes in patients conditions, hereby reducing patient’s exposure to the environment. Hospital-acquired infections of COVID-19 among staff and patients were seen, but less frequent compared to reports by others. The number of outbreaks in the old hospital compared to the new one has yet to be analyzed. The impression is that the new hospital design has led to fewer and more manageable outbreaks, thanks to the ease of separating patients in single-occupancy rooms. Conclusions: These three studies altogether give insight into the effect of single-occupancy rooms on microbial safety. As we can conclude now, single-occupancy rooms offer a microbial safer environment for both patients and staff. These results should be considered while revisiting the single- versus multi-occupancy patient room discussions for future health facilities.

## **CASE STUDIES HEALTHCARE DESIGN**

### **Impact of urban park design on recovery from stress: an experimental approach using physiological biomarkers**

*Sonika Rawal, Celen Pasalar (USA)*

The unprecedented challenges posed by the COVID-19 pandemic spurred a renewed interest in addressing the pathological aspects of the crisis, while emphasizing the environmental design factors contributing to overall well-being. This has underscored the multifaceted salutogenic benefits that well-designed urban green spaces offer to individuals. Nature (designed or natural) offered a refuge for individuals seeking respite from the challenges posed by the pandemic. However, less is known about the amount of green exposure and the specific attributes of outdoor spaces that produce the greatest restorative potential. Most pertinent evidence uses self-reported health indicators as primary measures of well-being with limited consideration of design elements. Hence, this study investigates the design attributes of urban parks that are associated with recovery from acute stress using physiological biomarkers as pragmatic measures of stress, as well as Immersive Virtual Reality Environments (IVE) to measure unambiguous characteristics of urban parks and their impact on acute stress in people. The study particularly looked at the amount of vegetation within an urban park exploring if the recovery from acute stress was directly proportional to the amount of vegetation cover, and if the two shared a linear relationship. Using a multi-method approach, data were collected from 103 healthy participants who engaged in a quasi-experiment. Psychological stress was first induced in the participants using Trier Social Stress Test (TSST) and then they were randomly assigned to experience one of four, 360-degree panoramic images of an urban park using IVE. Participants provided saliva samples for alpha-amylase and cortisol measures, as they also completed a State-Trait Anxiety Inventory (STAI) questionnaire during the experiment. Additionally, structured interviews were conducted at the end of the experiment. Results indicate that as the percentage of vegetation cover increases from barren to greener scenes, there is a rapid decrease in stress levels until the density of vegetation reaches about 50% of the visible space; higher densities predict higher stress. Content analysis of interviews also revealed a similar but stronger association between vegetation density and perceived stress. An urban park with moderate amount of vegetation, along with presence of water features, visual connection to built form, subtle play of levels and landform with points of interest and potential for affordance, was considered to create maximum recovery from daily urban stress. These insights hold practical implications for designers and policy makers in creating healthier urban spaces for greatest restorative potential, influencing future policies and design guidelines.

## Why a “Blue Hospital” Design? How can you achieve a “Blue Hospital” Design?

*Eduard Boonstra (The Netherlands)*

Objectives; Why a “Blue Hospital” Design? How does one build a future-ready hospital when the future is unpredictable? One thing is sure, there is an urgent need to build hospitals that are smarter, more flexible, more sustainable, and more cost-effective. It requires an innovative and more integrated design process. We call this, the Blue Hospitals design, which aims to optimize the hospital’s performance in terms of health outcomes, patient centrality, lower cost, and employee well-being and sustainability. Results and Solutions; How can you achieve a “Blue Hospital Design”. Quadruple Aim has often been the guiding principle for healthcare projects with patient centrality, better health outcomes, lower cost, and employee well-being as the key performance indicators. There are several ways design interventions can contribute to these goals, such as: Give patients more control of their environment for a better patient experience and faster recovery. Ensuring better health outcomes by improving patient safety through better indoor air quality can reduce the risk of infections. Lowering the total CAPEX & OPEX costs through compact and flexible designs, energy savings, etc. Providing a pleasant working environment that stimulates productivity and fosters employee well-being. From a design standpoint, there are two other KPIs that enable the objectives of the Quadruple aim; Sustainability & Digitalization of Hospital. A future-proof designed hospital takes into account the strong interdependencies between these indicators and integrates them in the design process to enhance the building performance. Deerns solution to meet these challenges is a new innovative approach: The Blue Hospital design that aims to optimize hospital design across the six performance indicators: Patient centrality - Better Health outcomes - Well-being - Lower cost - Sustainability - Smart Building. The dependencies between these major healthcare themes and technical possibilities can best be compared with a Rubik’s cube. Since every hospital is different, and other priorities are set, some of the six themes will be higher ranked than others, but still they are linked. As it is with a Rubik’s cube, in order to solve the puzzle, you need to understand how the dependencies work. To comprehend these dependencies, it is crucial to first understand how a hospital works, the current challenges and ways to improve its performance. Exploring user journeys within the hospital, by mapping their steps, helps to spot challenges and find effective solutions related to sustainability, cost, efficiency and wellbeing. Conclusions. Blue Hospitals design is an innovative method developed by Deerns to meet 6 key performance indicators of a future-proof hospital and optimize the overall hospital design performance. The integrated approach does not only include the design, but also integrates the technical-, spatial-, ICT-, well-being, and sustainability program of requirements into one overall program of requirements which meets the project budget. Deerns, as one of the leading hospital engineering consultants, believes that it is time to fully utilize the opportunities that new technologies, innovations and real integration of design creates. All with the aim to build better hospitals.

## Urban Green Spaces (UGS) design and impacts

*Maddalena Buffoli, Danilo Lo Turco, Andrea Rebecchi (Italy)*

Objectives. The presence of Urban Green Spaces (UGS) provides many well-documented benefits, inducing a positive effect on physical and mental health, on socialization, on the environment and resilience to climate changes. It has also been demonstrated that the design and the presence of services and equipment (play areas, sports areas, cycle paths) play an important role in the frequency and use of the Green Spaces. For this reason, public administrations have been promoting redevelopment actions of existing green ar-eas, like in Milan, when in 2020 the construction of the new MM4 metro line, given the opportunity to redesign an important green linear infrastructure between the Tricolore and Argonne (1,7 km). The research aims to quantify the impact of this project on the habits and lifestyles of the people. Methods. A specific questionnaire was prepared and administered to users for a period of 3 months. The questionnaire consists of 20 questions divided into four macro-categories: General and Health data, Daily physical activity levels (IPAQ), Frequency and use of the park and Suggestions. The administration of the questionnaire took place digitally, through a specific platform. Various methods were used to distribute and publicize the survey: social pages and mail list of neighborhood associations and recreation centers; in-person distribution of a QR Code connected with the survey; posters and flyer. Results and conclusions. The processed results confirmed that this infrastructure, after its inauguration on 26 November 2022, has contributed to changing the habits of the area’s residents. In fact, 72.4% of the respondents stated that they had increased their time spent in public outdoor spaces. The activities that increased the most were resting or recreation for adults and children, with a percentage of 39.7%. The percentage relating to sporting activity was also very significant, with 39.1% of users stating that they had increased their levels of physical activity after the opening of the park. The increase in the use of the area as a link to other parts of the city was also significant (37.4%). All in all, the park is very popular with respondents, with only 9.3% using the park less than once a week.

## Designing community health centers for comprehensive well-being: a systematic literature review

Erica Brusamolin, Maddalena Buffoli (Italy)

Introduction: This study aligns with the context of a global paradigm shift in healthcare, moving towards a holistic approach, in line with the One Health approach. This perspective translates into an attempt to conceive community-based socio-health structures (Community Health Centers; CHCs) as alternatives to the traditional hospital model, invoking the concept of “la ville du quart d’heure” to bring them closer to communities, focusing on proximity and territorial ubiquity. However, despite their fundamental role in promoting holistic well-being, many CHCs, especially in Europe, are currently designed as outpatient centers lacking services and strategies for the integration of socio-health, social, and community aspects, compromising their effectiveness. In Italy, the implementation of territorial socio-health structures similar to the model of CHCs, becomes crucial considering the funds allocated to territorial health through the National Recovery and Resilience Plan (PNRR) and the importance attributed by the regulatory Decree Ministerial 77/2022 to the design of “Case della Comunità” (CdC). Therefore, the aim of this work is to review existing CHC design strategies oriented towards the community’s holistic well-being emerging from current scientific knowledge. Methods: Conducting a systematic review across scientific databases such as Scopus, Web of Science, and Google Scholar, a comprehensive exploration of studies focusing on community-centered design was undertaken. The design indications collected were analyzed, clustered, and represented in a matrix to highlight their frequency. Results: 36 studies related to architecture and design, urban planning, health management, health technologies, environmental psychology, and organizational sociology were identified. Design indications, grouped into categories such as Community Spaces, Social Engagement, Environmental Harmony and Greenery, Recreational Appeal, Safety and Cleanliness, Identity and Visibility, Accessibility and Connectivity, Flexibility, and Technological Integration, emerge as crucial factors in the overall effectiveness of CHCs. Three specific frameworks on Placemaking, Community-Centered Design, and strategic objectives of CHCs in Italy also emerge from the selected papers. Conclusions: The analysis of existing design strategies and frameworks serves as a starting point for formulating design indications to enhance the key role of CHCs as hybrid, multiservice, and central institutions in promoting holistic well-being, health promotion, improving patient experience, and participation in predictive medicine services.

## Rethinking the territorial medicine in Italy: the meta-projects of the new Community Health Centers, Community Hospitals and Local Operative Centers

Marco Gola, Maddalena Buffoli, Stefano Capolongo (Italy)

Introduction. COVID-19 highlighted significant criticalities of the Italian National Healthcare System (NHS) and recently the Italian Government approved the National Recovery and Resilience Plan (NRRP) to relaunch its economy and at the same time to promote health, sustainability and digital innovation. Specifically, Mission 6 Component 1 wants to introduce Community Health Centers (CHCs), Community Hospitals (CHs) and Local Operative Centers (LOCs) to strength territorial healthcare services. Starting from the Italian Ministerial Decree n. 77 (2022), AGENAS (National Agency for Regional Healthcare System) and POLIMI (Politecnico di Milano) working group developed the meta-design guidelines for CHCs, CHs and LOCs facilities with the aim of supporting decision-makers to define spatial features and building performances in order to be responsive to functional issues. Methods. The spatial strategies of these facilities have been elicited through three different steps: a) a survey about the current national and international scenario regarding the territorial healthcare; b) a review of all national and regional regulations; c) the development of the meta-design guidelines have been elaborated from the analysis of the a) and b) steps. Discussion. The regulatory instructions and scientific indications collected through the literature have been translated into spatial and functional layouts. The services have been organized by homogeneous macro-areas and defined in a synoptic framework which shows the performance approach and their features. Each macro-area, sorted by type of functions, has been subdivided into a list of all its specific spatial units. Conclusions. The study conducted aims at supporting the planning of these facilities in relation to the catchment area and their sizing. It will be necessary to define the location by evaluating the possibility of setting them up within existing hospitals, as well as to guarantee a sustainable approach in the realization of these infrastructures

## Advanced design strategies for Community Health Centers in Italy. Exploring spatial and functional aspects

Erica Isa Mosca, Maddalena Buffoli, Marco Gola, Stefano Capolongo (Italy)

**Introduction.** The Italian Government approved Mission 6 Component 1 of the National Recovery and Resilience Plan (NRRP), calling for the implementation of Community Health Centers (CHCs) to improve local healthcare services post-COVID-19. Within the research project “Coltivare\_Salute.Com - Città e Case della Salute per Comunità resilienti” which won the 2020 Polisocial Award from Politecnico di Milano, a study was conducted to examine the spatial and functional characteristics of CHCs. The objective was to ensure their effectiveness and efficiency addressing aspects such as location, accessibility, organizational strategies, and functional design within the CHCs. **Methods.** the methodology for the best practices development was structured in three phases by a multidisciplinary team: 1) State of the Art analysis through a literature review and analysis of national and international (England, France, Spain, Portugal) case studies of CHCs or similar that provided quantitative and qualitative data; 2) focus groups and targeted interviews in the territorial context of a project partner (AUSL Piacenza) and comprehensive analysis of the 8 CHCs in the region; 3) definition of meta-design strategies. **Results.** the best practices emerged to ensure efficient and effective healthcare environments, have been distributed across 8 macro areas: 4 related to location and accessibility and 4 related to functional and spatial design. The first related to the outdoor spaces are: relationship with the context (e.g. location in existing structures and presence of services for the community); accessibility to the facility (e.g. parking and public transport presence, absence of barriers for people with disabilities and without); recognizability of the facility (e.g. signs, sensorial aids); outdoor spaces quality (e.g. space for gathering and for emergency situations). The latter which considers the design of the indoor spaces are: separation of accesses, flows, and paths (e.g. public and personnel paths; waiting areas, vertical circulation); flexibility of the CHCs and environmental factors (e.g. light, acoustics, materials); functional distribution (e.g. areas and connections between spaces); spaces for community activities and health promotion (e.g. inclusive space for associations and the psychophysical wellbeing). For each of them, a user-friendly data sheet was produced that includes: general description; design strategies; sample scheme; best practices of the national scenario. **Conclusions.** These strategies represent a guidance for designers and local health entities in implementing CHCs as outlined in PNRR, which envisions the establishment of 1288 CHCs. Emphasizing a sustainable approach, these strategies aim to ensure the harmonious integration of these infrastructures with the existing healthcare facilities.

## SATURDAY 13<sup>th</sup>

### URBAN MENTAL HEALTH/ SUPPORTIVE ENVIRONMENT

#### Supporting healthy aging in community: the health impact related to physical environment from a holistic perspective

Tianzhi Sun, Stefano Capolongo (Italy)

**Objectives.** Recently, aging in community has been widely discussed by scholars and experts. Besides, many studies have found clear evidence between the built environment and the quality of life and well-being of older people in healthcare buildings. As the physical environment supports, how to design community care facilities to reach the aim of healthy aging in community should be further explored. In order to link the built environment factors of the aged-care settings in the community and the health impacts to provide the knowledge for the design, a Systematic Literature Review is taken in this study to gather evidence. **Methods.** The systematic search using two databases (Web of Science; SCOPUS) was undertaken from June 2021 to October 2023. Four-tiered keywords (Healthcare facilities, Built environment, Health, Community) were employed to examine the primary research field. The inclusion criteria for selection were: (1) written in the English language; (2) reporting quantitative or qualitative associations between the built environment and older adults in aged care buildings; (3) research focus on the health impact of the older adults. Articles that exclusively pertained to medical or biological matters were among the exclusion criteria. Nine main pieces of information were extracted from these studies, including descriptive data (authors, title, year, source title), categories of research objectives (type of research, type of building, design variables, health-related outcomes, groups), **Results.** 23 studies were selected and analyzed. The study summarizes and discusses the health outcomes related to the physical environment from the pathogenic and salutogenic aspects. From a pathogenic perspective, with the aim of curing and healing illness and therefore reducing the impact of diseases, it is related to mobility, sensory support, cognitive support, restorative benefits, infection control, and safety. From the salutogenic perspective, it aims to promote health and lead to the extension of healthy living time, including physical activity, maintenance of activity of daily life, social activities, comfort and satisfaction, spiritual flourishing, emotional wellness, community link, and staff support. **Conclusion.** After the literature discussion, a healthy aging model about the design of community care facilities is put forward in this study. This model summarizes the evidence that community care facilities affect the health of the elderly and provides a theoretical reference for the design. There is also the limitation, the case studies and opinions of the stakeholders should also be considered in the next step to modify the healthy aging model.

## Salutogenic design for intergenerational therapeutic garden in a vertical city of Hong Kong

Calvin WH Luk (Hong Kong)

In the vertical city of Hong Kong, an idling podium space of an old public housing estate was revitalized to accommodate a care home for older persons with a co-living roof terrace, to integrate all estate occupants through vigorous and rewarding social interactions across all age groups. The novel strategy of space utilization/integration aims to bring the young back to a once stagnant community. Objectives. The intergeneration therapeutic garden was designed to promote physical health and social well-being of local residents, through fostering meaningful interactions across all ages including older persons in the care home, caregivers, family members and other estate occupants. Method used. The additional garden space located at the roof terrace immediately above the care home acted as a catalyst of change. It was designed with salutogenic approach in reference to Chinese culture (which is deep-rooted in these early immigrants from Canton China), to improve their sense of cohesion through physical, social and culturally meaningful intergeneration interactions. Results and conclusions. Comprehensibility – In Taoism, the ability of “knowing one-self” is essential to enable a person to look out and perceive the world. The well-defined pathway provides clear orientation and guides the flow of activities with familiar destinations in various zones - loop path, sensory wall, music cocoon, and story corners to share life stories across generations. It reinforces the experience of “making sense of one’s own context, cultural background/life story and current circumstances”. Manageability – In Chinese culture, the ability of manage oneself “able” refers to the strength of bear and agility of deer’s legs. Unobtrusive safety features with secured perimeter requires minimum supervision, allows free movement and choice of activities in the fitness trail, lawn space, alone or with family/companions or even engage in sporting games. The positive experience of managing day-to-day physical realities with own strength and agility reinforces their mind that life is manageable and realized.

Meaningfulness – Ancient Chinese dictionary interprets that “meanings” is manifested in the “will of mind” or “way of life”. For cognitively deficient persons, self-identity remains as the central pillar of their “vision” of way of life. Activities offered at the inclusive planting stations, fitness zone, lawn area and story corners support to generate a formative “vision” or way of life for them, forming a “foundation of desire to live”, and enable them to embrace the challenging reality which they often feel alienated from.

## Assessing the quality of built environment for people with dementia. Evidence from literature and stakeholders’ involvement

Silvia Mangili, Stefano Capolongo (Italy)

Objective. Worldwide there are about 55 million people have dementia and the number is expected to grow exponentially in the coming years. Because of the comorbidities and symptoms of the disease, these often live within residential care facilities. The impact that the built environment can have on people’s health is now well known, although many aspects are still under-investigated. This research aims to analyze the relationships between the built environment and health and well-being outcomes in people with dementia (PwD) by comparing data from the systematic literature review with the direct experiences of experts. Methods. The methodology consists of two parts: a systematic literature review and the involvement of stakeholders with expertise in dementia. The first analysis was conducted on scientific databases (Scopus, Pubmed, and Web of Science), using significant keywords, outlining a comparison matrix that correlates architectural aspects and the health of people with dementia. The second analysis was conducted through the compilation of the matrix, between architectural-spatial and health and well-being outcomes which emerged from the literature and was expanded by the study authors, between architectural-spatial aspects (such as location, size, indoor environmental qualities, signage) and health and wellness outcomes of patients with dementia (such as Delirium, wandering, ADL, BPSD, falls). This matrix was shared with experts, including physicians, occupational therapists, and technicians (architects and engineers). Experts were asked to put a number from -1 to 2 to indicate the degree of impact of architectural aspects on various outcomes (-1 represents negative impact, 0 neuro impact, 1 positive impact, and 2 very positive impacts). Results. The literature review identified how some studies relate health outcomes and the built environment. Many aspects seem to be widely explored, for example, quality of life (QOL), BPSD (Behavioral and Psychological Symptoms of Dementia), the number of rooms per household, light, or the creation of a home-like environment. Many of the studies do not analyze the impact that specific features of the built environment can have on people with dementia, including concerning health outcomes. To fill this gap, the stakeholder study was conducted to assess the extent of relationships between environment and health. The study confirmed the evidence from the literature by expanding it with additional significant aspects such as wandering, control of acoustics, the possibility of space customization, and the presence of adequate areas for carrying out occupational activities. Conclusions. The research outlines the main characteristics the environment must possess to be prosthetic and defines which aspects may impact PwD. These aspects should be prioritized in the design and renovation of healthcare and residential facilities.

# URBAN PUBLIC HEALTH

## The community well-being framework

*Antonio Gomez-Palacio (Canada)*

DIALOG, in partnership with the Conference Board of Canada, collaborated on a multi-year research study to define community wellbeing and how it can inform the design of the built environment. The Community Wellbeing Framework sets out to understand, measure, and guide the creation of built environments that serves in the interest of the wellbeing of the community. The resulting Framework is an open-source methodology for designing the built environment within the interests of the wellbeing of a community, or occupants of a place. Conceptualized based on the definition of community wellbeing, the social, environmental, economic, cultural, and political domains help guide design professionals, project stakeholders, and community members to make design decisions that positively contribute to wellbeing. The Framework is a guide for understanding the relationship of the physical environment and the wellbeing of people and natural systems.

The Framework helps to move forward the shift humanity is undergoing currently: the way health is prioritized today is unprecedented and the physical built environment is increasingly seen as a mechanism for improving public health and wellbeing. By figuring out how to define and evaluate ambiguous concepts like happiness, play, or resilience, designers of the physical environment can lead communities toward actionable plans. Since its publication, the Framework has been successfully employed in a variety of projects. Heron Gate in Ottawa is a master planned, 6000-unit, mixed-use development, that employing the Community Wellbeing Framework was able to introduce and reconcile a variety of environmental, social, and cultural objectives. The final plans include over 1000 units of affordable housing – the largest affordable housing development in Ottawa’s history. GEF Seniors Housing is a registered charity and the largest provider of subsidized seniors’ housing in Alberta, and provide affordable and secure housing and services to almost 4,000 seniors. For areas where significant investment is required, the Framework set out a plan for GEF for improvement through strategic thinking and alignment with funding sources, with clear principles, key performance indicators (KPIs), and strategies to improve sustainability through a holistic, yet pragmatic lens embedded in the operations and culture of the organization. The Framework outlined a path to advance sustainability goals over the next five years including clear principles, performance indicators. The presentation will outline tangible and practical opportunities for a proactive improving wellbeing, by creating the right conditions in the built environment for healthy lifestyles/choices to take place, in a manner that can be readily implemented by design professionals and community builders.

## Urban Health in interdisciplinary resilience assessment: the H2020-HARMONIA project

*P.Morandini, M.Bicchieri, A. Voza, M.S. Lux, J.N. Tzortzi (Italy)*

In recent decades large urban settlements are becoming more and more aware about the issues and risks that urban conditions can pose to human well-being. Adverse health outcomes are, for instance, the increased frequency of cardiovascular events (CVEs) and respiratory diseases. In the past two years, COVID-19 pandemic made the discussion about urban health even more urgent. The Horizon 2020 project HARMONIA represents an innovative example of inclusion of Urban Health as key topic in the development of an Integrated Resilience Assessment Platform (IRAP), together with multi-hazards assessment concerning meteorological, geotechnical and urban risks. Within the IRAP, the HARMONIA Decision Support System (DSS) will be a tool for a better assessment of the correlation between the probability of occurrence of respiratory related diseases occurring in the urban population, as registered at the hospital’s Emergency Departments (ED), and environmental factors. These factors include meteorological conditions and pollution factors and the assessment will be conducted in the pilot cities of Milan (Italy) and Piraeus (Greece). A prediction model has been developed, using meteorological and air quality data obtained from ground stations and health data consisting of the daily number of encounters related to respiratory diseases at the hospital’s Emergency Department of the pilot cities. Different aggregation levels have been tested in order to examine varying temporal granularities, including daily, weekly, and bi-weekly levels. These data were used in a regression framework, in which the environmental data were used as features to predict the number of hospital encounters. The hyperparameter tuning was performed using a Random Sample approach to optimize mainly the regularization parameters like learning rate, the maximum number of leaves, the L2 regularization, and the maximum depth allowed to the trees.

Acknowledging the non-independent and non-identically distributed nature of the dataset due to its time series structure, we adopted a stratified splitting approach. The years spanning from 2015 to 2017 were designated as the training set, 2018 served as the validation set, and 2019 was allocated as the test set. The model trained on Milan data shows a good fit obtaining an Explained Variance score of 0.952 in validation set and 0.828 in test set. For Piraeus a lot of missing data conditioned the performance and further studies are needed to validate these findings. Here the Explained Variance score is 0.485 in validation and 0.146 in test. In conclusion, environment data have been used to investigate their correlation with health data in two European cities, and allowed to demonstrate that it is possible to forecast the number of hospital encounters caused by respiratory related diseases.

## Singapore: shaping the salutogenic city for resilient future

*Ruzica Bozovic Stamenovic (Singapore)*

The 2020 pandemic brought health to the limelight of the entire humanity. However, the consensus on the paramount importance of wellbeing for the future of resilient cities seldom pinpoints new paths to achieving this goal. Singapore, a city state known for its unprecedented development and forward-looking practises, has the resilience gene in its very core. City's progress in recent years has demonstrated ability to reuse scarce resources and reinterpret the well-known urban paradigms in order to reinvent itself as a salutogenic and resilient city able to face the challenging future. This phenomenon was in the core of a three years long design research cycle set to theoretically and practically dissect the naissance of new hybrid design paradigms, and related urban processes, and to understand and test their potential to shape the new salutogenic city for the more resilient future. Theoretic analyses implied literature reviews and on-site forensics of existing architecture, spaces and communities while the new hybrid principles were tested in design studios led according to a specifically set design research methodology. In this presentation we situate the issues of wellness and resilience in the frames of know models of planning and design and explicate signs and origins of the emerging paradigmatic changes. While pointing to the intricacies of specific examples, we portray a nascent urban phenomenon- the coexistence of diverse urban realities sharing the same space-time realm albeit providing plethora of alternatives to hassled urbanites and stretched urban systems. Although descending from the era of multiple crises, this tendency is already recognized as game-changing in both architectural practices and strategic planning for the future. Topics like typology, zoning, biocentrism, rural and urban, farming, user centric and smart, to cite just a few, become obsolete in their original sense, yet once recomposed they become powerful intersectional design tools for future city of wellness. Though interesting, such tendencies also compel speculations that changes are temporal reactions on the spur of the moment. Therefore, this presentation is a reorientation point and move from our confinement in professional routine rather than a question of singular ontology. Experiences presented here, consequentially might inspire new diverse readings and creative design interpretations, and practices beyond Singapore.

## Effects of neighborhood environment on people with cognitive impairments: a qualitative study of their experiences and perceptions in China

*Fei Lian, Zhexin Shi, Hui Li (China)*

**Background and Purpose:** Maintaining the independence, autonomy and continuity for people with cognitive impairment living in community is of paramount importance. While neighborhood environment directly affects the content and scope of the daily activities of cognitively impaired adults, which in turn affects the status of their independent living. At present, the environmental factors affecting the daily life of people with cognitive impairment in China are not clearly defined. Moreover, due to the differences in people living habits and environmental features, there are some special characteristics of environmental experience and perception in China. This study aims to investigate how people with cognitive impairment in China participate in and use the outdoor environments, as well as the characteristics of human-environment interactions. **Design and Methods:** In-depth semi-structured interviews were conducted with 22 mild to moderate cognitively impaired people and 25 older adults without cognitive impairment as a control group in Shanghai. It captures the characteristics of cognitively impaired people's experiences and perceptions of their neighborhood environments as well as the impacts of environmental features. The results of the interviews were analyzed using the thematic analysis approach. **Results and Conclusion:** Three themes were identified: use of outdoor environment, limitations and barriers of outdoor environment, and preferences of outdoor environment. The results show that people with mild to moderate cognitive impairments still maintain a certain degree of ability to go out and move around. While almost all of their activities are arranged in familiar areas, and architectural features, signage and landmarks, and plants are used as orientation cues. The outdoor environment quality influences the content and scope of their daily activities. The lack of public spaces or far-distance problems, invisible dangers, negative stimuli, and the lack of environmental identity restrict the willingness of them to go out. However, they have a higher demand for green space and have more emphasis on the safety and comfort of environment. This study contributes to the empirical evidence of the interaction between people with cognitive impairment and neighborhood environments in China. **Keywords.** cognitive impairment, neighborhood, outdoor environment

## The critical role of urban environment in the health of its inhabitants, a “non-place” analogy. Case study “El Recuerdo” residential complex, Montería, Colombia

*Mauricio Rosso (Colombia)*

Non-places are transient spaces without cultural sense or significance for their users, lacking variables such as comprehension of habits, emotions and wellness, that separate the authentic salutogenic design from the generic conception of architecture. The residential complex (RC) presents a unique situation, transforming into a realm of “transient sojourn” within a structure that lacks the essence of a home. It functions akin to a building constructed for the building itself, resembling a vast waiting room: uncomfortable, unsafe, and evoking a sense of unease. Objective: Analyse the RC with a salutogenic lens, exploring its impact on residents’ mental, physical and environmental health, through a parallel with Marc Augé’s concept of ‘non-place’, to propose specific urban and architectural design enhancements that foster a more anthropocentric and conscious environment. We conducted targeted inquiries aimed at comprehending and analysing the emotions evoked by the inhabitant’s respective environments, and to identify impediments to the free development of their lives, such as the provision of secure spaces for children’s recreation, proper sewage systems, sanitary security, arborization, and adequate spaces. We worked with children from the local school, aiming to tap into their imagination and innocence to identify what they envisioned as their dream living space. Expressing their thoughts through drawings, they represented the good and the bad things they saw in their neighbourhood. We conducted a physical analysis of the space, considering design and bioclimatic aspects. This involved evaluating factors such as temperature readings, materiality, spatial configuration, and sanitary conditions. Results: The activities yielded a product in the form of a table with recommendations about the primary issues identified. These are aimed at creating a more user-friendly urban environment, and mitigate the discomfort reported by inhabitants in their own homes. Among them, we emphasize the establishment of urban gardens as public spaces, fostering employment for the community, while transforming and structuring extensive green areas currently contributing to insecurity and sanitary issues. These suggestions serve as design criteria for urban spaces trying to introduce changes to the RC while steering it towards a more salutogenic conception. Conclusion: Architecture should emotionally connect with users. As architects craft spaces for people’s well-being, it’s challenging to admit these spaces may be the cause of discomfort due to unconscious design. Given that we need spaces for activities supporting emotional and physical health, meticulous design is crucial. Social housing architecture should go beyond standardized structures, creating culture, life, and health, avoiding the pitfalls of non-places.

## HEALTHY BUILDINGS

### A new office workplace design has positive effects on employee physical activity: credible evidence from a natural experiment

*Francesca Jimenez (USA)*

**Objectives** A global professional services firm recently moved its corporate headquarters (HQ) to a new building in a mixed-use neighborhood development in a mid-sized city. The design and location of the new facility intended to support workplace wellbeing, and the facility received Fitwel® 3-star certification. The study measured effects of holistic workplace and neighborhood design on employee work-time sedentary behavior (SB) and physical activity (PA). The new a ten story, 228,000 square foot office building included open-concept workstation layouts, ample daylight access, staircase design features and decision-point signage to encourage stair use, a café with patio seating and healthy food options, bicycle storage, and shower facilities. The building intentionally integrates into the surrounding mixed-use neighborhood context to support active living. Within a short walking distance, employees can access transit, retail, gyms, a park, nature trail, and bike paths. A natural experiment research design compared outcomes at the old and new HQ sites to 2 control sites in other U.S. cities. We hypothesized intervention effects of reduced employee work-time SB and increased PA, behaviors with established connections to critical population health outcomes. **Methods** A random selection of employees received an invitation to participate voluntarily. 217 participants across 3 sites wore ActiGraph accelerometers throughout the workday for 3 to 5 days within a week at two points in time before and after the HQ move and completed daily activity logs. Results Average BMI at all locations in both time periods was in the overweight range ( $\mu=26.5$ ,  $SD=5.0$ ). Difference-in-difference analyses showed that the intervention positively influenced employee SB and PA, reducing average daily work time in SB by 10.0 minutes ( $p<0.001$ ), increasing time in light PA by 4.5 minutes ( $p=0.006$ ), increasing time in moderate-to-vigorous (MV) PA by 5.5 minutes ( $p<0.001$ ), and increasing steps by 696 ( $p<0.001$ ), compared to the control groups. Incremental effects of a corporate wellness “step challenge” program in the post-period incrementally reduced daily work-time SB by 8.5 minutes ( $p<0.001$ ), increased time in light PA by 4.5 minutes ( $p=0.005$ ) and in MVPA by 4.0 minutes ( $p=0.023$ ), and increased steps by 496 ( $p=0.001$ ). **Conclusions** This study is one of the first to credibly demonstrate a connection between holistic corporate office design/siting strategies and employee health behaviors, independent of programmatic intervention effects. Findings indicate that the holistic physical workplace environment can measurably improve health behaviors, and that programmatic interventions can provide synergistic desirable effects.

## Healing Architecture: six case studies of room renovations of clients with intellectual disabilities and challenging behavior in long-term care facilities

Andrea Möhn (*The Netherlands*)

Objective: Due to their vulnerable and mental state, people with intellectual disabilities in long-term care facilities are particularly sensitive to their physical environment. Their personal space can create a sense of emotional insecurity, which in turn can lead to restlessness, aggression and misunderstood behaviour. This seemed to occur particularly among users who did not identify with their personal space. A positive change in behaviour was observed 12 years ago in the first case: “Dolf’s room”. Methodology: Five further rooms were redesigned with the aim of finding common ground. Close observation of the clients’ behaviour, biographical work and an intensive participatory process with carers, therapists and family members helped to define the residents’ needs. This formed the basis for the definition of design tools and a specific approach centred on the individual design of an environment tailored to each client’s identity. Results: The six best practice examples show a positive change in client behaviour, less agitation and aggressive behaviour, in many cases a reduction in costs and a decrease in the sickness rate of the care staff after the redesign of the rooms. Conclusions: Atmosphere, colour, light, materials and acoustics all play an important role. However, the simple addition of these factors is insufficient. It is important to first recognise the real needs of the user in order to achieve a spatiality that is subtle and really “touches users”. It is not only the physical needs that play an important role here, but above all the psychological ones. Keywords: mental health, behavioural design, environmental design.

## Towards Sustainable Healthcare: Zero Energy Building Strategies for Hospitals

Argiro Dimoudi (*Greece*)

Among buildings in the tertiary sector, hospitals are the most energy-intensive, as they host several high and continuous demands for electricity, heating, and cooling energy (including HVAC systems operating under strict comfort conditions, high hot water demand, kitchen facilities, etc). Identifying the energy behavior of hospitals is a crucial task for determining potential energy savings and developing benchmarks and design guidelines for Nearly Zero Energy Hospitals (ZenH). To study the energy efficiency of hospital buildings and propose models for their transition to Zero Energy Buildings (ZEB), six hospital representative typologies, based on the building’s floor plan, were tested. In this study, two energy upgrade scenarios, for each typology, were studied. The primary criterion for distinguishing between these scenarios was the thermal insulation of the building. The first scenario assumed that the hospitals were constructed before the implementation of the Thermal Insulation Regulation for Buildings in Greece, while the second scenario considered hospitals built after the Regulation. Each typology and scenario was examined for the different climatic zones in Greece, using the energy efficiency simulation model DesignBuilder. Additionally, energy-saving and upgrading scenarios to assess the potential for converting hospitals into almost Zero Energy Buildings were examined. The findings strongly affirm the feasibility of transforming hospitals into structures with nearly zero energy consumption, irrespective of their architectural design. This paradigm shift towards achieving near-zero energy performance in healthcare facilities carries profound implications for the tertiary sector. The substantial energy savings achieved by transitioning hospitals into Nearly Zero Energy Buildings (NZEBS) underscore the pivotal role they can play in setting a benchmark for energy efficiency across diverse commercial building types. This groundbreaking progress paves the way for a broader transformation in the realm of sustainable construction and energy conservation. This research was conducted as part of the ZenH Project, supported by INTERREG Balkan-Mediterranean and funded by the European Union.

## **Salutogenic design and its role in enhancing the sense of belonging among the elderly in long-term residential communities in an eastern context: case of Hong Kong**

*Mohana Das (Hong Kong)*

This research aims to explore the role of Salutogenic Design in enhancing the sense of belonging among the elderly in long-term residential communities, specifically within the unique context of Hong Kong. The objectives of this study are to understand the physical and psychological impacts of Salutogenic Design on the elderly, to explore how these design principles can be integrated into existing residential buildings and community spaces, and to assess the applicability of these principles in an Asian context. The research employs a mixed-methods approach, combining quantitative data from surveys and health assessments with qualitative data from interviews and focus groups. This approach is designed to capture the unique characteristics of the Asian aging population, which are often overlooked in studies conducted in Western settings. The study also incorporates cultural and social factors that are specific to Hong Kong, such as the city's high population density and traditional living arrangements. The results of the study indicate that Salutogenic Design can have a positive impact on the sense of belonging and overall well-being of the elderly in Hong Kong. The design principles were found to have high potential in improving accessibility, safety, comfort, and opportunities for social interaction. However, the dense urban environment often leads to a compromised connection to nature for older residents. The study thus highly recommends incorporating indoor plants and other elements of nature within their living spaces to help reestablish this vital connection and improve their overall well-being. Furthermore, the study revealed that these principles can be successfully integrated into existing residential buildings and community spaces, despite the challenges posed by Hong Kong's urban environment. The study concludes that Salutogenic Design holds significant potential for enhancing the health and well-being of the elderly in Asian urban settings. It highlights the need for more research in this area, particularly in light of Asia's rapidly aging population. The findings also underscore the importance of considering cultural and social factors in the application of Salutogenic Design, to ensure its effectiveness and relevance in different contexts. This research contributes to the growing body of knowledge on Salutogenic Design and its applicability in an Asian context. It underscores the importance of a culturally sensitive approach in the design of age-friendly and health-promoting environments.

## **Neuro-urbanism and Mental Health: designing the salutogenic city for healthy and quality aging**

*Eleonora Zioni (Brasil)*

This article seeks to integrate advances in neuroscience and gerontology in the design of residential architecture, aiming to promote healthy aging in the community context. By combining the neuroscientific concept of Enriched Environments with the architectural model of cohousing, a systemic project is proposed, adaptable not only to spatial configurations, but also to internal human dynamics. Cohousing, an intentionally communal residential model, fosters social interactions, mutual support and a sense of belonging. Considering that the population aged 65 and over is expected to double by 2050, the world's population faces complex challenges, including the rising cost of living in urban complexes and the need for social connection and a more active, quality lifestyle. The United Nations World Social Report 2023 highlights the centrality of the rights and well-being of older people for a sustainable future. Aging, a global trend, redefines socioeconomic aspects and ways of living. Furthermore, chronic issues of mental health, isolation and sedentary lifestyle emerge along with the growing increase in urban life, as predicted by 68% of the population by 2050, according to UN-Habitat in 2022. With the aim of mitigating such emerging biopsychosocial problems, the exploratory research of this study includes a bibliographical review, qualitative analysis of case studies and design guidelines for Cohousing, scientifically based in favor of the quality of life of current and future elderly people. The case study to be analyzed was "New Ground Cohousing", a shared housing for women in London. This project is the first senior cohousing community in the UK and its members have been planning this development for many years. In addition to representing female resilience in relation to the difficulties and prejudices that still exist in contemporary society, this cohousing provides social, cognitive, sensory and motor stimuli based on the composition, planning and dynamics of the built environment contemplated by it. Thus, based on this dialogue between the cohousing model and the concept of Environmental Enrichment, founded in 1947 by Donald Hebb, we intend to foster a framework with the main guidelines and propositions for "environmentally enriched cohousing". Other research has pointed out that Enriched Environments could also result in physically measurable changes in the brain throughout life. These guidelines aim to guide scientists and architects in the practical application of the concept of Enriched Environments, aiming to create spaces that support brain plasticity, benefiting memory, learning and well-being in a constantly aging population. Keywords: neuroscience; architecture; cohousing; aging; enriched environment. Topic chosen: Promoting healthy lifestyles and active aging through environments.

**REair has developed and patented the eCoating system: a transparent, environmentally friendly solution providing coatings that are 100% green**

**The eCoating by REair is an innovative solution aimed at purifying indoor air and enhancing people's well-being.**

**Specifically tailored for the healthcare sector, REair's eCoating Medical Indoor products are designed to meet the unique needs of medical environments.**



## ORIGINAL PLUS

**The latest generation of photocatalytic eCoating is designed for masonry walls, curtains, and various porous surfaces, delivering long-lasting effects.**



Patent n. 102018000003836  
International patent appl. No. PCT/IB2019/057988

## ORIGINAL GOLD

**Introducing a hard surface disinfectant with bactericidal, mildicidal, and virucidal properties. It stands as the first environmentally friendly disinfectant product, meticulously crafted for professional use, boasting high effectiveness and long-lasting action.**



**MEDICAL SURGICAL DEVICE**  
Registration n. 21168 - Italian Ministry of Health

### BACTERIOSTATIC AND VIRUCIDAL

They deactivate and eliminate microorganisms, including viruses and bacteria associated with lung and respiratory diseases. Certified for the reduction of SARS-related viruses, ensuring enhanced safety and protection.

### DEPOLLUTING AND DEODORIZING

They effectively diminish both inorganic and organic pollutants within indoor environments, thereby enhancing Indoor Air Quality (IAQ).

### SELF-CLEANING AND SUSTAINABLE

Environmentally safe and non-toxic, these solutions operate on a purely physical basis and are completely solvent-free. This ensures their sustained effectiveness over time.

# POSTER PRESENTERS

Listed in appearance order



## Helena Pombares

Helena Pombares is an architect and criminologist with 18 years' experience in justice architecture, and a lecturer at two universities in the UK. Helena also possesses a masters' degree in Prisons Architecture and is on the final steps of her journey of a Professional Doctorate degree at University of West London (UWL), researching "Salutogenic Architecture - Reshaping Prison Design for the 21st Century", where she is a lecturer for the Criminology degree (and paths). She joined Pick Everard, to connect research evidence and practice base as a prison architect specialist and a researcher.



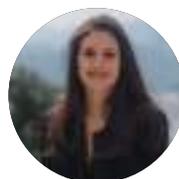
## Francesca Dinelli

Medical Doctor, graduated in 2003 at University of Pisa, specialist in Public Health. Has prevalent experience in Hospital medical management in different Tuscan Hospitals. Dealed mainly with Hospitals Organization and production (Diagnosis Related Groups sector) carried out the Agenas audits on the quality of the Italian Piano Nazionale Esiti data, coordinated the verifying of the production appropriateness and quality checks of the clinical documentation of accredited private structures and Tuscan AOU. She was Medical Director of the Auxilium Vitae Volterra (rehabilitation hospital).



## Luca Ciaffoni

I gained my work's experience in research and development of architecture design along twenty year of professional activity. The main part was dedicated to the architecture for care (healthcare, daycare, elderlycare, nursery and kindergarten) inside my team named ccdstudio.eu. My works are not only in Italy. I have had some experience for residential building in Switzerland and for the Istruotional school complex in Moscow. I always joint the practice of design and the research deeping about specific fields of architecture as my PhD in 2007 and the recent Master in Politecnico for healthcare planner.



## Erica Lazzeri

Digital remote rep with two years of experience in pharmaceutical sales, during which time I was also involved in a new drug launch. I have achieved a high level of expertise on multi-channel communication dynamics. I am proactive, results-oriented and eager to learn and improve day by day. I have been working in sanofi for four years, after doing a PhD at LENS - European Laboratory for Non-Linear Spectroscopy.



## Eleonora Zioni

Eleonora Zioni is an architect with B.A. and master from University of Sao Paulo, Executive specialized in culture of health and healthy buildings at Harvard T.H. Chan School of Public Health; MBA from Michigan University certified; LEED certified WELL faculty; Planetree fellow in 2022; DGNB consultant, Green Building Council Brazil consultant. Director of Brazilian Association to Develop Hospital Buildings (ABDEH).



## Michele Dolcini

Michele Dolcini is a PhD Candidate at Design & Health Lab, ABC Department, Politecnico di Milano. He is studying sustainability in healthcare facilities, with an integrated approach, taking into account economic, social, and environmental aspects. Michele is a component of the scientific secretariat of the Joint Research Partnership Healthcare Infrastructures, the research platform at Politecnico di Milano which is developing research and policy reports on healthcare infrastructure innovation.



## Gian Luca Guerrini

Chemical engineer, specialist in industrial innovation. He currently works on indoor/outdoor air purification and surface protection technologies through photocatalysis. For over 30 years he has worked in the field of research and innovation of construction products (concrete), approximately 25 years of which in the field of photocatalysis and environmentally sustainable technologies, participating in the construction of prestigious buildings. He is Coordinator of the UNI / CT033 / GL01 "Photocatalysis" working group, Member of CEN / TC386 and ISO TC206 / WG9 "Photocatalysis", he is also a professional and academic trainer.



## Yong Yu

Yong Yu is an Architect, focusing on architectural sustainability. From 2013 to 2018, he studied Architecture at Wuhan University, in Wuhan, China. In Sep. 2018, he started his Master Degree in the program of Sustainable Environmental Design at the Architectural Association School of Architecture, in London, UK, and got the Master of Architecture Degree in Mar. 2020. From Nov. 2021, he came to Politecnico di Milano and officially started working as a 37 ° PhD candidate in the Department of Architecture, Built environment and Construction engineering, in the Health and Design Lab.

# POSTER PRESENTERS

Listed in appearance order



## **Daniel Hany Ibrahim**

A Canadian professional, who completed his bachelors in Architectural Science at the Toronto Metropolitan University (formerly known as Ryerson University), graduating with honors in 2018. He then proceeded to work in the architectural field for a few years in which he designed a number of built projects ranging from residential to commercial projects. afterwards he decided to continue his studies proceeding to do his masters at the Politecnico di Milano in Architecture and Urban Design, graduating in 2023 with Cum Laude.



## **Stefano Arruzzoli**

Stefano Arruzzoli is a licensed professional architect who graduated with honors in “Technological and Sustainable Architecture” at Politecnico di Milano. During his University career he has always been very interested in themes which were referred to social e public utility. Actually, he is PhD candidate at Department of Architecture, Built environment and Construction Engineering of Politecnico di Milano, and recently graduated in the II Level Master “Planning, Programming and Designing of the Healthcare Systems”. He worked for several architecture firms, and his tasks were mainly related to preliminary and detailed designs, especially with BIM technology.

# SCIENTIFIC POSTERS GALLERY

P01

## Salutogenic Architecture in Custodial Facilities to Promote Health, Wellbeing and Rehabilitation

*Helena Pombares (UK)*

Architecture carries great social responsibility and that is just exacerbated when talking about prison projects. Researchers have emphasised for years the importance of the built environment on the rehabilitation and consequent reintegration of inmates into society. Objectives This paper objective is to show how the use of research-based design could guide and inform designers on how the use of salutogenic architecture in custodial facilities can facilitate inmates' rehabilitation and help the reintegration process. It will use data collected and case studies to show how an architecture practice in the UK have welcomed research-based design to integrate the principles of Salutogenic design into their prison projects. Methodology Salutogenic architecture and ecologic design arguably improve health and wellbeing and combined, they deliver a psychosocially supportive approach to prison design. Salutogenic architecture takes an intrinsically human-centric approach, considering how touch, sight, hearing, and smell is important to the reception and use of a space. It extends to the materials used in construction, the shape of the buildings, the colours and textures used, the relationship between the spaces, as well as the use of apertures within the surrounding environment. It involves creating a sense of coherence, making the environment as readable and as understandable as possible, something particularly important for people who suffer from acute mental health issues. Summary/Conclusion Given that prisons have the highest concentration of mental health conditions besides hospitals, this must play a role in any prison design to ultimately feed into rehabilitation. Moreover, the use of salutogenesis approach in the architecture of prisons for vulnerable groups such as women and mental ill people, shows to be effective to address their criminogenic needs. Ultimately, to achieve a salutogenic supportive prison design all stakeholders, from the government and prison management organisations through to operational staff, the community - and indeed prisoners themselves - must be unified in the ambition to deliver modern centres of true rehabilitation.

P02

## The building of New Santa Chiara Hospital in Cisanello (NSC)

*Francesca Dinelli (Italy)*

Objectives In Pisa, Tuscany, the building of New Santa Chiara Hospital in Cisanello (NSC) is in progress. (<https://www.e-chiaracresce.it/>). Executive Project of the new Hospital is dated 2016, layer of the first stone was in 2019 and construction began in July 2021. We are a second level Hospital according to Italian Law and hub, including for Neonatal Intensive Care Unit (NICU) for spoke Hospitals of North West Tuscany with about 1.5 million Inhabitants. At the moment we offer 23 ICU/SUB NICU beds in Santa Chiara Hospital, located in the Historical Center of Pisa. The beds are for newborns delivered in the hospital (about 1600 delivery per year) and accommodate the demand for all spoke Hospitals. In NSC we want offer a different, innovative, human and safe layout for the NICU. Method used In time between project and beginning of construction Covid outbreak occurred worldwide and facing new Standards in Hospitals became an urgency. Moreover, nursing care delivery models too changed fastly in recent years thanks to new skills and technologies available and medical professional responsibility managing the NICU setting changed. A multiprofessional working group was constituted including hospital management, medical and nurse professionals and architect that explored the opportunities of the new hospital and focused on innovative organization of newborns assistance, new technologies available. New layouts of different virtuous NICUs we could visit and compare helped and inspired our work. Results and Conclusions New NICU in located at first floor of the new Hospital adjoining the new delivery block (2 operating rooms and 4 delivery room), NINA center - the Hospital training Center for newborns - and the Obstetrics Ward. At the groundfloor the Obstetrics Emergency service is present. The new design of NICU we decided to promote is family centered and designed to support safety and healing through unrestricted parental presence, promoting close collaboration between families and staff, breastfeeding promotion. The executive project was delivered in collaboration between hospital management, medical and nurse professionals and architect. Beds will be increased at 32 and the layout will provide the opportunity of 5 single family rooms and, a comfortable space for parents. Moreover, covid outbreak and new Standards gave us the possibility of projecting 3 isolated rooms with switching pressure positive to negative to manage respiratory infectious diseases reducing the risk of ICA.

## Future Architecture For Long Term Care In Dementia

*Luca Ciaffoni, Silvia Mangili, Stefano Capolongo (Italy)*

Italy is a country where the percentage of the elderly population is very high (23% over 65). The investigation aims to bring out which aspects of the spaces intended to accommodate elderly People with Dementia pathologies should be most present and potentially interested in becoming cornerstones of a new model of Long-Term Care facilities (LTC). Methods: This research uses a case studies analysis followed by a web-based survey as a methodological tool. The questions were identified after exploring an analysis of recent European case studies. The survey has been submitted to a panel of stakeholders (users, practitioners, designers, and managers in the healthcare sector). It is articulated in eight items touching on functional, configurational, and perceptual aspects of the LTC. Results: The 210 responses provided a basis for comparison with the trend lines detected by the case study analysis, establishing continuity on some configuration aspects and providing divergent views for others. The research found a strong need to introduce new service activities and technologies targeted at caring for and assisting guests with dementia. These specific requirements commonly require the development of new spaces and environments or the redefinition of the same, where already present. Conclusions: The results highlight that a new model of residence must incorporate new technological applications, and outdoor spaces, that are perceived significantly by both patients and practitioners and therefore improve the well-being of all users.

## Webtool for predicting risk score of T1 diabetes (TOSCA): an innovative approach to early detection.

*G. Tironea, D. Gaudesib, A. Coluccia, E. Lazzeri, M. Beccariab, A. Rizzia (Italy)*

Introduction: T1D is a chronic autoimmune disease characterized by the destruction of insulin-producing pancreatic beta cells<sup>1</sup>. Early detection of individuals at risk for developing T1D is crucial for implementing preventive measures and decrease the risk of long-term complications, including brain damage associated with ketoacidosis, hyper glycaemia and hypo glycaemia, as well as vascular complications<sup>2</sup>. To date, the most common way to predict T1D is antibody screening that has been used extensively in first degree relatives of patients with T1D (siblings, children, parents)<sup>2</sup>. However, it is known that the onset of T1D is also influenced by genetic markers and demographic factors<sup>3</sup>. Moreover, nearly 90% of individuals with newly diagnosed T1D have no family history of T1D<sup>2</sup>. Therefore, it is essential to implement screening strategies considering all risk factors and extending this clinical investigation to the general population. Objective: Here, we developed a cutting-edge integrated web platform (hereinafter "TOSCA"), for a large-scale screening strategy, designed to predict the risk of developing T1D. TOSCA processes a comprehensive set of parameters, including genetic markers, demographic factors, and autoantibodies, employing advanced algorithm.

Methods: The algorithm analyzes the following parameters to provide the risk score to develop T1D: age, familiarity with first-degree relatives, autoantibodies positivity (anti-insulin, anti-glutamic acid decarboxylase, anti-zinc transporter 8, anti-protein tyrosine phosphatase-like protein), and genetic markers. In detail, the algorithm works on the genetic risk score (GRS2) analyzing 14 human leukocyte antigen (HLA) region single nucleotide polymorphisms (SNPs) representing DQ, 21 HLA region SNPs not representing DR-DQ and 32 non-HLA SNPs<sup>1</sup>. Results: At the best of our knowledge, TOSCA is the first web platform that can predict the risk of developing T1D at 1, 3 and 5 years after the initial profiling, that combines three macro-factors: genetic predispositions, immune system markers, and demographic factors; providing a holistic approach to risk assessment. Moreover, TOSCA is able to provide a single risk score and standardized result, monitor risk and disease progression during years. Conclusion: TOSCA represents a significant advancement in the field of screening for T1D risk prediction, offering a user-friendly and scientifically robust platform for early identification of individuals at risk. TOSCA contributes to proactive health management by empowering individuals with personalized risk assessments. The combination of accuracy, accessibility, and continuous improvement of TOSCA, positions it as a valuable asset in the ongoing efforts to advance the field of T1D risk prediction. However, further analyses will be necessary for the use of TOSCA in clinical practice.

P05

## Gecko Gaze art and built environment workshop: “re- humanizing” healthy people.

Fanny Feigenson, Eleonora Zilioni (São Paulo, Brazil)

**Objective:** The objective is to present the importance of remembering people that human beings need to be humanized to promote health and to prevent more mental health issues. This workshop aims to open their minds and reflect about the process of consciousness. Humanization is considered to be the process of recognizing, valuing, and promoting the full worth, dignity, and inherent humanity of individuals or groups in a healthy balance. The benefits of bringing an art practice to incentive humanization are various. An individual who encounters any kind of art at life, becomes a freer person to perceive what is happening to the person and, at the same time, can be more aware of your environment, your needs and in relation to other human beings, plants and animals. According to Joseph Beuys (1906-1986) ‘to make people free is the aim of art, therefore art for me is the science of freedom’. Freedom is not doing anything, on the contrary, it is about dividing your time to put your knowledge and experiences into practice and evolve. Doing nothing is also part of the whole, but it is a slice.

**Methods:** Art comes with the Gecko Gaze workshop applied through a method known by ‘Visual Poetics’, which is in terms of the perceptual and cognitive resources at their disposal, in particular spatiality as a body-based semantics. It investigates the expanding role of 3-D space, and of embodied visual ‘reading’. Combines methodologies from literary theory, art history, aesthetics, semiotics, psychology of perception, and cognitive linguistics. Art comes as a creativity stimulator. ‘Gecko Gaze art and built environment workshop’ has already been applied to more than 180 persons at two universities in Brazil using Visual Poetics method. The purpose is to stimulate the gaze. Stimulate the body with a foreign look, unusual look, innovative, to be able to reach more oxygenated perspectives. Practicing art become less toxic to all levels people, spaces, and planet. People who consented to be part of the workshop are asked to respond to a questionnaire before and after the Gecko Gaze workshop. Questions are related to mental health and how they are feeling. After a brief explanation of art and built environment influence, participants are asked to take photos with their cell phones metaphorically with the gaze of a lizard perspective, and not with a human gaze. Gecko walks on the floor, walls and ceilings. Perception of the world from several different perspectives are stimulated to observe the space with unusual curiosity and using imagination. Results: All qualitative and quantitative data were classified and analyzed as evidences based on scientific neuroscience literature. Workshop results shows unusual images composed by at least ten pictures taken by participants. There are a lot of shapes contrast, textures, colors, abstract stains that representes people’s unconsciousness, since the expression come from the unconciousness also. More than 87% of total participants were satisfied with workshop results. Conclusions: IADH presentation will explain the Gecko Gaze workshop can be a useful tool to ‘re-humanize’ people. Art compositions pictures will be exposed. Creation leads to expansion of thought and contact with the subtle and sensible brain. The workshop exercise can open doors for debate and expansion of thoughts, considering neuroscience based evaluations.

P06

## RESPIRA, a cloud-based system with AI algorithms

Raffaella Scorziello (Italy)

RESPIRA, a cloud-based system with AI algorithms developed by Sener, is a pioneering solution to address the specific challenges of hospital air conditioning, among other sectors. This system is presented as a “virtual operator”, capable of managing the complexity of hospital air conditioning autonomously. Its ability to predict future behaviors and make decisions in real-time puts it at the forefront of intelligent hospital facility t The implementation of RESPIRA not only promises energy efficiency, but also guarantees thermal comfort and air quality. The use of artificial intelligence to predict behavior allows us to obtain patterns, as well as being able to infer the best possible operation from an objective function, which can be a balance between the three vectors, or limit consumption to a certain value, choosing the best possible operation under that consumption restriction. Among the advantages provided by a system with these characteristics:

- Automatic and efficient control of air conditioning systems.
- Reduction in energy consumption thanks to AI algorithms and predictive capabilities, around 20-30% of air conditioning consumption depending on the existing installation.
- Improvement of thermal comfort and air quality within the hospital.
- Comprehensive information management through dashboards that allow the building’s behavior to be continually evaluated.
- Centralization of different areas or zones with different software (BMS).
- Continuous training of the algorithms, continuously adapting to reality.
- Improvement of the equipment life cycle thanks to better operation and maintenance.
- Agnostic to the existing installation. The system can manage any type of installation.

The estimated savings of 20 to 30% in energy consumption are testament to its ability to transform HVAC management in hospitals. This proactive approach not only responds to current demands, but also lays the foundation for more efficient and sustainable healthcare in the future. In conclusion, the optimization of air conditioning in the hospital sector goes beyond comfort, being an essential pillar for effective medical care. Artificial intelligence, exemplified by RESPIRA, is the key to addressing the complexity of hospital facilities, improving efficiency and ensuring healthy environments. In a constantly evolving world, investing in technologies like RESPIRA is not only an operational improvement, but a strategic decision that paves the way to a healthier and more sustainable future in healthcare.

## Innovative photocatalytic coatings for the healthcare sector

*Gian Luca Guerrini (Italy)*

Healthcare associated infections are a leading cause of illness and death across the world. Strategies to diminish the environmental burden of microorganisms can be classified and found as a function of the position where they can be located: non-touch or touch surfaces (vertical walls, objects, curtains) or air. In the past, environmental surfaces were considered non-critical, although recent evidence suggests that the built environment may contribute to the transmission of pathogens. Now, the situation is changing also as a result of what happened with the emergency of COVID 19. Ineffective cleaning and disinfecting of environmental non-critical surfaces may increase risk of transmitting nosocomial pathogens leading to hospital acquired infections among patients, workers (doctors, nurses) or other entering peoples (caregivers, visitors). Cleaning and disinfection of hospitals, including non-critical environmental surfaces, is now a crucial function for infection prevention. Chemical disinfection is the commonest solution adopted for obtaining a strong reduction of bacteria and virus which are deposited on the surfaces, but this implies a high consumption of chemicals, expenses of labour, sometimes even toxicity and allergenicity and its effect is instantaneous, not durable (and for this reason must be repeated very often, as a function of the protocols adopted). A solution here proposed is to use transparent photocatalytic coatings capable of protecting surfaces for a long time, with an antibacterial and antiviral effect, as well as having depolluting and deodorizing properties: they represent a solution capable of intervening both on surfaces and in the air. For several years it has been proven that photocatalysis is a versatile and effective process that can be adapted for use in many applications for disinfection in air and on surfaces. Studies on the photocatalytic technique for disinfection demonstrate this process to have potential for widespread applications in indoor air and environmental health, biological, and medical applications, laboratory and hospital applications, nursing homes and retirement homes. In this paper, an innovative family of unique photocatalytic coatings will be presented, with certified properties and high efficacy, durable and easy to apply with protocols that also allow to verify the maintenance of performance over time. These products are attractive from the interior designer's point of view because they are colourless and transparent, so that they can be applied to surfaces without altering their appearance. The great importance of using these coatings in hospitals as an alternative to traditional chemical disinfection techniques and related sectors will be illustrated, presenting some case studies where they have already been successfully applied.

## Measuring and Enhancing Long-term Sustainability in Healthcare Facilities Key Performance Indicators (KPIs) elicitation process toward an ESG evaluation framework

*Michele Dolcini, Stefano Capolongo (Italy)*

Background: Healthcare facilities, as complex infrastructures, exert considerable environmental, social, and economic impacts on societies and communities to which they belong. Outdated or poorly managed healthcare facilities contribute to suboptimal performance, emphasizing the urgency for strategic interventions. Evidence-based design studies underline the profound impact of improved health infrastructure on patient outcomes and staff performance. However, significant capital investments required for healthcare facility upgrades and improvements pose challenges for decision-makers. The evaluation framework that will be developed aims at offering a border decision-making tool for healthcare managers and public institutions to understand the impacts of existing facilities and the expected results that can be achieved throughout the renovation or the construction of a new healthcare facility. Objectives: The study presented aims to represent the first step toward the definition of an evaluation framework for the sustainability of healthcare facilities. The research addresses the process that has been conducted to select environmental, social, and economic indicators that will be included in the evaluation framework. Methods: In order to collect indicators to be included, reviews have been carried out at two levels: - Literature Review: A comprehensive review of existing peer-to-peer scientific literature related to sustainable healthcare infrastructure and ESG evaluation frameworks for healthcare organizations. - Sustainability evaluation frameworks and sustainability protocols for the built environment: this investigation was aimed at investigating existing protocols for sustainability in healthcare facilities and for other infrastructure typologies. Results: The literature survey and the review of existing evaluation systems enabled the identification of a set of over 120 sustainability key performance indicators for healthcare facilities, divided into three main areas (environmental, social, and economic), further categorized into a total of 17 impact criteria and categories (n=8,5,4) Conclusions: The indicators collected constitute the basis for monitoring and measuring the sustainability of healthcare infrastructure, through an extensive mapping of fundamental impacts of environmental, social, and economic impacts of these facilities. The indicators collection and elicitation constitute the first step towards the definition of the evaluation framework, which will integrate a multi-criteria analysis (MCA) methodology to weigh the indicators.

## **A systematic review on low-cost sensors with the Internet of Things application in indoor air quality monitoring in residential buildings.**

*Yong Yu, Marco Gola, Stefano Capolongo (Italy)*

**Introduction.** Good indoor air quality (IAQ) is the basic requirement for guaranteeing well-being and a healthy lifestyle. In residential buildings that are private, autonomous and occupied spaces for most of the time, keeping a good IAQ level is necessary, especially when there are children, elderly or other vulnerable users. Within the development of gas sensors, its low-cost feature and Internet of Things (IoT) application make it affordable, flexible and feasible even for ordinary occupants to do IAQ monitoring in their homes. **Method.** This systematic review searched papers (n=66) from 2 databases, Scopus and Web of Science, about the low-cost sensors (LCS) and IoT applications in residential buildings, with “open access” as the only 1 filter used during the search. After the 2 rounds of screening on their titles, abstracts and full texts, a total number of 23 papers are included in this review. The exclusion eliminated the research that: 1) introducing or advertising some products; 2) not applied in residential buildings; 3) more related to thermal comfort and energy consumption rather than IAQ; 4) more about outdoor air quality but not indoor; and 5) used LCS but not described in the main texts. Only those papers with targeted contents are included. **Result and conclusion.** The 23 papers can be classified into 5 types: LCS application in residential buildings (n=13); testing specific devices and sensors (n=4); assembling devices and IoT systems with LCS and testing (n=3); testing residential components with LCS (n=2); and review paper (n=1). This review aims to summarize several aspects of the active monitoring strategies in residential buildings, including (1) existing gas sensors, their target pollutants and working conditions; (2) sensor’s accuracy and calibration methods; (3) micro-controller unit selections and their monitoring applications; (4) data display and storage methods; (5) other possible application and limitations of low-cost sensors found in researches. In general, to achieve long-term indoor air quality monitoring, the devices with LCS or IoT applications are promising for ordinary residential building occupants. Also, in terms of public health, they can be considered a good strategy for guaranteeing a healthy living and working environment. Meanwhile, the cost of sensors should be further controlled to ensure they are affordable for individual users.

## **P10**

### **Never too Early, Never too Late: The Influence of Evidence-Based Design on the Independence and Well-Being of Elderly People with Dementia**

*Ciro Ferrer (Brasil)*

Evidence-based design for people with neuropathological conditions, such as Alzheimer’s Disease, plays a fundamental role in creating environments adapted to the specific needs of these individuals. Incorporating scientific knowledge and empirical data, this approach seeks to promote patients’ safety, autonomy and quality of life. Strategies include clear signage for guidance, adequate sensory stimuli, spaces that promote cognitive stimulation, flexibility to adapt to different stages of the disease and the creation of calm environments to reduce stress. Furthermore, evidence-based design emphasizes the importance of socialization, integrating spaces conducive to interaction. Interdisciplinary collaboration between architects, healthcare professionals and caregivers is essential to ensure a holistic and personalized approach to the care of Alzheimer’s patients, providing not only physical support, but also considering emotional and social aspects fundamental to the well-being of these individuals and their caregivers. . From this perspective, the diagnosis of dementia conditions has gradually increased over the years both globally and nationally. There are more than 55 million people worldwide living with dementia. And every 3 seconds someone in the world develops dementia. The number of people living with dementia is expected to increase dramatically to 153 million by 2050. In Brazil and Latin America, a 200% increase in the number of dementia cases is expected from 2019 to 2050, compared to only 100% in the United States. The term “environmental design for dementia” refers to both the process and outcomes of designing to support or improve cognitive accessibility in physical environments for such users. Environmental design for dementia is evidenced as an effective non-pharmacological intervention in treating dementia symptoms and is associated with higher levels of independence and well-being for people living with a range of age-related cognitive, physical and sensory impairments. The objective is to review evidence-based design strategies, through a literature review along with application in a case study, in order to investigate the real influence of such strategies in the daily lives of elderly people with dementia. We envision the construction of a specific multidisciplinary framework to be used by health professionals. **Keywords:** Elderly. Insanity. Evidence-Based Design. Well-being. Independence. Topic chosen: Healthy Society: promotion and prevention.

## Neuroscience, Architecture and Learning: Contributions of Environmental Enrichment to cognitive health and Lifelong Learning for the benefit of aging

*Ciro Ferrer (Brasil)*

Population aging and the decline in fertility rates are globally evident, resulting in an increase in the elderly population and a reduction in births. Furthermore, more than 55 million people worldwide live with dementia, and every 3 seconds someone develops this condition. It is estimated to increase to 153 million cases by 2050, with a 200% increase in dementia cases predicted in Brazil and Latin America from 2019 to 2050, compared to 100% in the United States. Given this, governments have a responsibility to increase awareness, detection and diagnosis of dementia, in accordance with the WHO Global Action Plan on Dementia. The synergistic integration of Neuroarchitecture principles and enriched environment concepts offers a scientifically based approach to optimizing architectural environments, prioritizing lifelong learning and promoting cognitive health in elderly populations. The design of flexible, adaptive and biophilic spaces, combined with assistive technology and sensory stimuli, creates environments that not only facilitate ongoing learning, but also nurture brain health over time. Outdoor areas, innovative technologies like virtual reality, and promoting social interaction are crucial to enriching and inclusive learning experiences. Based on a multidisciplinary exploratory research methodology, this research aims to assist designers and health professionals in designing built spaces capable of adequately supporting brain plasticity and, consequently, mental health and lifelong learning. of users. To this end, the experimental concept of Environmental Enrichment (EA) will be explored, taking into account its neuroscientific contributions regarding the substantial influence that the physical environment and its possibilities can have on the structure of the brain, also resulting in behavioral and well-being changes. general. Generally, research on EA and Brain Plasticity has shown that exposure to enriching environments can lead to beneficial structural changes in the brain, resulting in improvements in cognitive capabilities such as learning and cognitive reserve. The practical application of the concepts proposed by the EA is envisioned from a guide of project propositions, capable of being incorporated into current and future architectural and urban constructions. Given the potential that the built environment has in influencing human behavior, approaches linked to neuroscience, architecture and learning are fundamental for creating spaces aligned with cognitive health throughout life, possibly mitigating cognitive declines in the population worldwide. Keywords: Neuroscience. Architecture. Learning. Aging. Topic chosen: Healthy Society: promotion and prevention.

## Meta-Design Principles & Strategies for Designing Next Generation Hospitals using Flexible Modular Design

*Daniel Hany Ibrahim, Andrea Brambilla, Stefano Capolongo (Italy)*

The health industry is constantly advancing and innovating causing hospitals to have short lifespans. Hospitals in the European Union tend to have an operational lifecycle of 10-20 years before they are considered outdated. This research delved into the topic of the future hospital and look at the methods and principles necessary to keep medical facilities relevant to their programming long after they are built. It explored this topic through the use of flexible modular design. This leads to the question of what is the optimal design strategies and functional setting to serve as a meta project for the hospital of the future and how in this meta project can it utilize a flexible module? In order to successfully perform the design for the meta-project, a very detailed and analytical research approach was taken that began by looking at previously established meta-projects to serve as a base and provide an understanding the program of the hospital. From there an analysis of the most current hospital design strategies was conducted basing principles off of the most current and official documentation of hospital design to help guide the design of the meta-project. Afterwards an analysis of the strategies used to apply these principles was done by investigating a series of case study projects that are considered best practice. These case studies also served to understand programmatic area distributions and structural grids that helped inform the meta-design. Finally, a set of case study project on modular and flexible design were studied to understand modular design and how it could be applied. From there a flexible module was established using the structural grid determined previously. Afterwards a resulting three meta-designs were drawn based on a basic, level I and level II hospital sizes established by the Italian health building codes. The three meta-designs shared common elements of having connections to nature for all users and a clear hierarchy with public functions being located on the ground floor and the privacy of the function increasing further up the building. An order of intensity of the functions was also established with less intensive programming at the front and more intensive located at the back. The grid and flexible module allowed for a cleared organization of the hospital design and allowed for interchangeability/adaptability of the space. In conclusion the results of the three meta-designs prove how a flexible module in cooperation with future design principles can create a lasting facility.

## The local healthcare delivery in lombardy region: a systematic review of the “services charters” of the community health centers (CHCs)

Arruzzoli Stefano, Brusamolin Erica, Leoni Olivia, Capolongo Stefano (Italy)

**Objectives** The community health centers (chcs) have been recently introduced in Italy, as the new local healthcare facilities for communities. The role of the regional authorities as the directorate of welfare of Lombardy region (dgw) is to monitor the healthcare delivery provided by the chcs. Each service must be reported in the “services charter” of every chc and published on the official sources of the local healthcare authorities. The objective of this research is to find which kind of services are reported by the “services charters” of the chcs currently active in Lombardy and how they are distributed through the territories, and which services are provided more frequently. **Methodology** The criteria for including the single chc in this study have been two: 1) the facility is currently active; 2) the “services charter” of the chc is provided and published on the official sources. The services reported have been collected according to the categories defined by the meta-project of the chcs of the Italian National Agency for Regional Healthcare Services (agenas) and Politecnico di Milano. The chcs included have been listed according to their affiliated local healthcare authority. The study has been carried on from June 2023 to September 2023. Sa performed the analysis of the documentation and the data collection, then the other authors reviewed the process and validated the results. **Results** 75 chcs have been included in the study. 44 different typologies of deliveries, 43 specialized outpatient care visits have been detected, and totally 1505 single services mapped. Averagely, each facility provides 20 services. The most frequent services in the Lombardy chcs are related to the first access to care for citizens (99%), blood draw point and tests (86%), and medical clinics for community nurses (83%). 7 of the 44 typologies of services are provided just by a single chc. **Conclusions** In conclusion, one main tendency turns up from this study: the socio-healthcare delivery of the chcs in Lombardy is wide and involves several aspects of health provision and promotion, and it generally guarantees continuity of care and assistance for frailties. Anyway, the delivery looks unbalanced, including numerous health services, but few utilities for the community and for fostering social inclusion.

# Here's where quality care counts

## A global partner for future-proof buildings

We are a multinational multidisciplinary consultancy providing end-to-end solutions for the entire lifecycle of buildings, from concept to detailed design, engineering, construction, and after-sales support. Specialising in MEP systems and sustainable solutions, with over 600 experts and 17 offices across 9 countries, we deliver over 65 million euros worth of services and products annually, with a project track record spanning 60 countries. Setting ourselves apart with innovative design, market technology expertise, and offering cutting-edge, high-quality solutions on an international scale.

 **Deerns**  
[www.deerns.com](http://www.deerns.com)

**Sector Director Healthcare**  
**Eduard Boonstra:**  
[eduard.boonstra@deerns.com](mailto:eduard.boonstra@deerns.com)  
+31620494448

**Business Development Manager Healthcare**  
**Arianna Surace:**  
[arianna.surace@deerns.com](mailto:arianna.surace@deerns.com)  
+39 345 252 2389



# INTERNATIONAL ACADEMY AWARDS

## International Research Project

### Criteria

International Research Award, Research Project Awarded for a completed, innovative, independently assessed, piece of research focused on a particular aspect of the design, function, construction, financing or maintenance of a healthcare facility or addressing a relevant topic concerning public health in the context of the working environment.



### Lead Judge

Prof. Hessam Ghamari, Ph.D. USA

### Panel Judge

Dr. Sahand Abbasi, Ph.D. (USA)

Dr. Nasrin Golshany, Ph.D. (USA)

### Finalists

#### Sook Young Lee, Ph.D.

Yonsei Symbiotic Life-Tech Institute, Seoul, South Korea

Impact of the Built Environment on Resident's Well-Being & Staff's Care Practice of Dementia Care

#### Ghaydaa A. Hemaidah, Ph.D.

College of Design, Imam Abdulrahman Bin Faisal University, Saudi Arabia

Towards Healing Environments in Healthcare Facilities

#### Fei Lian, Ph.D.

School of Architecture, Harbin Institute of Technology (HIT), HARBIN, China,

Effects of Neighborhood Environment on People with Cognitive Impairments



# International Health Project

## Criteria

International Health Project, an award for an outstanding healthcare building where human health considerations are as evident as clinical and managerial priorities. The project must demonstrate an understanding of the principles of Salutogenesis, and show how innovative design permits ongoing flexibility of use and addresses issues of sustainable healthy building.



### Lead Judge

Arch. Felicia Cleper-Borkovi, ARUP, USA

### Panel Judge

Arch. Roberto Copreni, Italy

Dr. Massey Nazarian Ph.D., UK

Arch. Mikael Paatela, Finland

Arch. Sandra Surkamp, Australia

## Finalists

### Helmsley Cancer Centre

Commissioned by Margolin Brothers

Designed by Farrow Partners

### Peel Region's Mayfield Seniors Apartments

Commissioned by Isotherm Engineering Ltd.

Designed by ARK, Toronto, ON. Canada

### Radboudumc Main Building, Nijmegen, The Netherlands

Commissioned by Radboudumc

Designed by EGM Architects, Dordrecht, The Netherlands



## Mental Health Project

### Criteria

Mental Health Project, an award for a mental health facility where an effective reconciliation between operational requirements for security and supervision and the imperative for a civilizing and humane environment that supports therapeutic intervention is evident. Submissions should show an understanding of the principles and practice of Salutogenesis.



**Lead Judge**  
Arch. Tye Farrow Canada

**Panel Judge**  
Dr. Jenna E. Mikus, Ph.D. Australia  
Arch. Shai Ofer, Israel

### Finalists

#### **Kimmeridge Court Eating Disorders Unit**

Commissioned by Dorset HealthCare University NHS Foundation Trust

Designed by Medical Architecture, UK

#### **Mount Sinai Hospital Kwong Centre for Mental Health and Wellness**

Commissioned by Pro-Air Testing, Toronto, ON. Canada

Designed by ARK, Toronto, ON. Canada

#### **Sycamore at Northgate Park Hospital**

Commissioned by NTW Solutions - Cumbria, NHS Foundation Trust

Designed by Medical Architecture, UK



# Use of Art in Public and Private Spaces

## Criteria

Use of Art in Public and Private Spaces, an award that recognizes the effective application of creative endeavor which further advances knowledge of the potential of the arts to support therapeutic outcome and impact the health process. Preference will be given to success in new and innovative approaches of using Art in public spaces to create mental process and thereby stimulate positive emotional experiences.



### Lead Judge

Dr. Calvin Luk, Hong Kong

### Panel Judge

Prof. Kenneth Fong N.K. Hong Kong

## Finalists

### Sinai Health – Circle of Care: Adult Day program

Commissioned by Mic Mechanical Contracting, Ontario Canada

Designed by ARK Toronto, ON. Canada

### Mount Sinai Hospital Kwong Centre for Mental Health and Wellness

Commissioned by Pro-Air Testing, Ontario, Canada

Designed by ARK Toronto, ON. Canada

### 12 Floors Around the World

Commissioned by The Children Memorial Health Institute

Designed by Medical Design Studio, Poznan, Poland



# Future Healthy Built Environment Project

## Criteria

Future Healthy Built Environment Project (Projects should be in design or under construction), An award for the design of a future any built environment that recognizes the changing role of the built environment in relation to health and wellbeing of people or local community. The project must demonstrate a ‘Salutogenic’ vision for healthy environments that addresses anticipated socioeconomic challenges of the future.



**Lead Judge**  
Dr. Andrea Rebecchi, Ph.D. Italy

## Finalists

**Herzog Medical Center, Jerusalem**  
Commissioned by Herzog Medical Center  
Designed by Farrow partners



# Interior Design Project

## Criteria

Interior Design Project, an award to recognize a therapeutic space that enhances the health, wellbeing and quality of life of the patients, staff and visitors. Preference will be shown to innovative projects, which show understanding of the principles of Salutogenesis, respect the privacy and dignity of patients, as well as provide an enjoyable experience that reduce stress.



### Lead Judge

Prof. Ellen Fisher, Ph.D. USA

### Panel Judge

Dr Lisa Tucker, Ph.D. USA

Arch. Silvia Mangili, Italy

## Finalists

### Sinai Health – Circle of Care: Adult Day program

Commissioned by Mic Mechanical Contracting, Ontario Canada

Designed by ARK Toronto, ON. Canada

### Helmsley Cancer Centre

Commissioned by Margolin Brothers

Designed by Farrow Partners



# Salutogenic Design Project

## Criteria

Salutogenic Design Project, awarded for the design of a completed project of any type of built environment, which clearly demonstrate that are comprehensible, manageable and meaningful, thereby fostering a strong sense of coherence amongst its users that promotes their health and wellbeing. Submissions must show how environmental, social and economic sustainability is improved.



**Lead Judge**  
Arch. Angela Lee, Singapore

**Panel Judge**  
Arch. Suzy Genzler, M.Sc., USA

## Finalists

**Roberto Rocca Innovation Building**  
Commissioned by Pieve S.r.l. Milano  
Designed by FTA | Filippo Taidelli Architetto

**Helmsley Cancer Centre**  
Commissioned by Margolin Brothers  
Designed by Farrow Partners



# INTERNATIONAL ACADEMY AWARD

## Lifetime Leadership Award

### Criteria

Awarded to a healthcare leader and visionary who has shown and ongoing lifelong commitment to enhancing the health, wellbeing and quality of people's lives through their dedication to health and design. The award recognizes the human and personal qualities needed to push back the boundaries of progress and inspire future generations!



**Lead Judge**  
Prof. Stefano Capolongo, Ph.D. Italy

### Winner

Will be communicated during the gala dinner



# GALA DINNER VENUE

## Exposition Room

Milano Città Studi - Via Giovanni Ponzio 31

Building Edificio 13 - Trifoglio - Ground floor

*How to reach Trifoglio building*

### Milano Centrale Station

Take Line 2 of the underground railway (MM2 green line), towards Cologno Nord / Gessate as far as PIOLA station (third stop). Continue on foot, taking the left-hand exit from Piola station; take the first street on the left (via Compagni) and then the second on the right (via Ampère). At the end of via Ampère, turn left and continue along via Bonardi; at the traffic light, turn left into via Ponzio. You will find the entrance to the Politecnico on the left.

### Piola Station

On foot, take the left-hand exit from Piola underground railway station; take the first street on the left (via Compagni) and then the second on the right (via Ampère). There you will find the entrance to the School of Architecture on the left.

### Milano Cadorna Station

Take Line 2 of the underground railway (MM2 green line), towards Cologno Nord / Gessate as far as PIOLA station (eighth stop). Continue on foot, taking the left-hand exit from Piola station; take the first street on the left (via Compagni) and then the second on the right (via Ampère). There you will find the entrance to the School of Architecture on the left.

### Milano Lambrate Station

Take Line 2 of the underground railway (MM2 green line) towards Abbiategrasso as far as PIOLA station (first stop). Continue on foot, taking the left-hand exit from Piola station; take the first street on the left (via Compagni) and then the second on the right (via Ampère). There you will find the entrance to the School of Architecture on the left.





# URBAN HEALTH WALKING TOUR

## Milano healthy city of culture

09.30 am  
11.00 am  
or  
11.30 am  
01.00 pm

### Viale Argonne New Metro M4

Meeting point @Politecnico di Milano  
Connection by walk

The new linear park built in Viale Argonne, Milan, alongside the new Metro Line Blu, is a vibrant addition to the cityscape. Stretching along the metro line's path, this park offers a green oasis in the urban environment. Lined with trees, shrubs, and flowers, it provides a peaceful retreat for pedestrians and cyclists. The park features walking and biking paths, benches for relaxation, and perhaps even art installations or recreational areas. Its integration with the new metro line makes it easily accessible and adds to the appeal of public transportation in Milan.

### IMPORTANT INFO & ACTIVITIES PLANNING

**9.30 am I tour Meeting point**  
Corso Plebisciti, 18

**9.45 am Starting tour**  
Viale Argonne

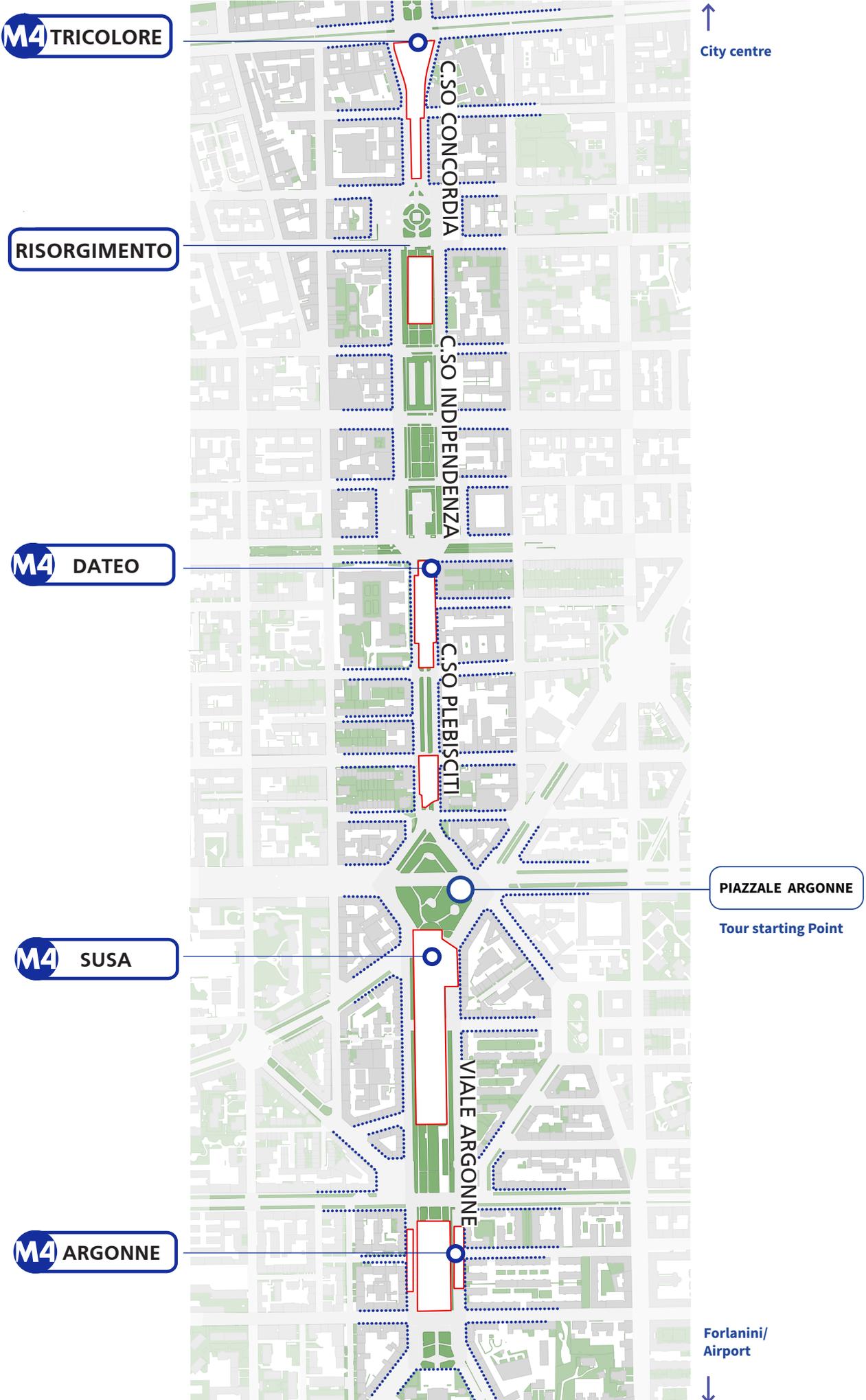
**11.00 am Back to Meeting Point**  
Corso Plebisciti, 18

**11.30 am II tour Meeting point**  
Corso Plebisciti, 18

**11.45 am Starting tour**  
Viale Argonne

**13.00 am End of the tour**  
Corso Plebisciti, 18





# HOSPITAL DESIGN WALKING TOUR

## Salutogenic healthcare environment

09.30  
11.30

### Humanitas Research Centre

Meeting point @Politecnico di Milano  
Connection with a bus

The Humanitas University, Simulation Center, Innovation Building, and Research Centre at Humanitas Rozzano Hospital collectively form a cutting-edge hub for medical education, research, and innovation.

Humanitas University provides modern medical education with a focus on hands-on learning and research. The Simulation Center offers realistic training for medical professionals using advanced technology. The Innovation Building fosters collaboration between researchers, clinicians, and industry partners to develop new medical technologies and treatments. The Research Centre conducts groundbreaking biomedical research in fields such as oncology, cardiology, and neurology. Together, these facilities create a dynamic ecosystem driving excellence in healthcare, education, and medical advancements.

### IMPORTANT INFO & ACTIVITIES PLANNING

**9.30 am Tour Meeting point @Politecnico di Milano**

Piazza Leonardo da Vinci

**10.00 am Arrival @Humanitas Rozzano**

Via Alessandro Manzoni, 56, 20089 Rozzano MI

**11.00 am Back to Politecnico di Milano**

Piazza Leonardo da Vinci



# HEALTHY BUILDING WALKING TOUR

## Salutogenic regeneration of building

09.45 am  
11.00 am  
or  
11.45 am  
01.00 pm

### Museo d'Arte Fondazione Luigi Rovati

Meeting point @Politecnico di Milano  
Connection by public transports

The Museo d'Arte Fondazione Luigi Rovati is a notable art museum located in Milan, Italy. It showcases a diverse collection of art, including paintings, sculptures, and other forms of visual art. The museum is known for its focus on contemporary art, featuring works by both established and emerging artists. Visitors can explore various exhibitions and displays that highlight the dynamic and ever-evolving landscape of contemporary art. The museum recently underwent a significant renovation, enhancing its facilities and exhibitions. The renovation aimed to create a more modern and immersive experience for visitors, with updated exhibition spaces and improved lighting. Additionally, the museum expanded its collection, acquiring new works by contemporary artists. This renovation has transformed the museum into a dynamic and vibrant cultural hub, showcasing the latest trends and innovations in contemporary art.

### IMPORTANT INFO & ACTIVITIES PLANNING

**9.45 am I tour Meeting point @Fondazione Rovati**

Corso Venezia 52 – 20121 Milano

**10.00 am Starting of the I tour**

Corso Venezia 52 – 20121 Milano

**11.00 am End of the first tour**

Corso Venezia 52 – 20121 Milano

**11.45 am II tour Meeting point @Fondazione Rovati**

Corso Venezia 52 – 20121 Milano

**12.00 am Starting of the II tour**

Corso Venezia 52 – 20121 Milano

**13.00 am End of the second tour**

Corso Venezia 52 – 20121 Milano



# PARTNERS & ADVOCACY

## International Academy for Design & Health

The International Academy for Design and Health is a leading global, interdisciplinary knowledge community dedicated to the stimulation and application of research concerning the interaction between design, health, science & culture.



## Politecnico di Milano

Politecnico di Milano is a scientific - technological university that trains engineers, architects and designers.

Focuses on the quality and innovation of teaching and of research, developing a fruitful relationship with economic and productive realities.



## Centro Nazionale Edilizia e Tecnica Ospedaliera (CNETO)

CNETO, the Italian National Center for Hospital Building and Technology, is a leader association, founded in 1954, in Italy which merges several expertise related to healthcare design. It is a forum for sharing best practice, knowledge, innovation and thought leadership relating across the healing environments.

Although it is small size association, it merges all the hospital designers on the entire Italian territory and its added value is defined by the presence of medical directors who allow us to broaden the point of view and the organization of the processes.



## ACCADEMIA LOMBARDA

The Lombard Academy of Public Health (ALSP), a nonprofit association founded in 2017, aims to promote progress in Public Health (SP) through the involvement of scholars engaged in various capacities in the multiple fields of SP such as hygiene, epidemiology, prevention, environment, health management, health construction, management, law, and health economics.



## EUPHA

The European Public Health Association, or EUPHA in short, is an umbrella organisation for public health associations and institutes in Europe. EUPHA was founded in 1992 by 15 members (12 countries). EUPHA now has 83 members from 47 countries.



## ASPHER

The Association of Schools of Public Health in the European Region (ASPHER) is the key independent European organisation dedicated to improving and protecting the public health by strengthening education and training of public health professionals for both practice and research.



# REGISTRATIONS

Complete the registration on the website <https://www.dhamilan24.com/> to discover the discounted packages.

Registration options available for <u>SOCIAL EVENTS</u>	Standard fee*
<b>Urban Health walking tour</b> Sunday 14 <sup>th</sup> April at 9:30-11:00 or 11:30-13:00	50,00€
<b>Hospital Design case study visit</b> Sunday 14 <sup>th</sup> April at 9:30-11:00 or 11:30-13:00	50,00€
<b>Healthy Building case study visit</b> Sunday 14 <sup>th</sup> April at 9:30-11:00 or 11:30-13:00	50,00€
<b>Official welcome reception:</b> opening remarks & cocktail @POLIMI (open free event, but registration is required)	free
<b>Academy Award Gala Dinner</b> Saturday 13 <sup>th</sup> April evening 20:00-23:00	120,00€
*all prices are in Euros, VAT excluded; in case of cancellation after registration, no refund can be requested	













## Contacts



Design & Health International Academy

[info@designhealth.academy](mailto:info@designhealth.academy)

[www.designhealth.academy](http://www.designhealth.academy)

Milano, Italy 11-14 April 2024

# Design & Health

13TH WORLD CONGRESS & EXHIBITION

