

Quantum Paradigm Psychopathology Group  
a global scientific initiative



## Research Institute for Quantitative and Quantum Dynamics of Living Organisms Center for Medicine, Mathematics & Philosophy Studies

The Quantum Paradigms of Psychopathology ("QPP") initiative began in June 2008. At that time Donald Mender, M. D., a psychiatrist on the clinical faculty of Yale University, conducted an informal poll of scientific contributors to a series of three Quantum Mind conferences affiliated with the Center for Consciousness Studies at the University of Arizona. These meetings had sought to explore the relevance of quantum physics to sentient processes in the normal brain.

In 2017, the QPP Italy is set up in Bologna as an emanation of the QPP World in order to allow a more agile exchange of information among the European members of the Group.

Since 2012, the QPP has organized a meeting every year and, today, we are at the eighth edition of the QPP Meeting.

This 2019 edition is dedicated to our friend Kary Mullis who has reached the end of his life story. An end to the dialogue but certainly not of the example and the teaching.

QPP Group

## Breve storia del QPP

A fine Aprile, i principali fautori di un'iniziativa globale (**Paradigmi Quantistici di Psicopatologia o QPP**) si sono riuniti, per la seconda volta in Italia, a Palermo, Sicilia.

L'incontro-discussione ha dibattuto l'argomento "Mente, Membrane, Microtubuli e Follia". La conferenza di Palermo, il convegno precedente tenutosi a Fano e il relativo simposio on-line del Marzo 2010, rientrano nel quadro di un progetto interdisciplinare volto a individuare ed esplorare i possibili fattori meccanico-quantistici a livello di biofisica di membrana, cibernetica del secondo messaggero e/o delle dinamiche micro-tubulari, che intervengono nella neuro-genesi della malattie mentali.

L'iniziativa del QPP è cominciata nel giugno 2008, prendendo le mosse da un sondaggio informale condotto sugli esperti che avevano preso parte a tre conferenze promosse dal Centro per gli studi sulla Coscienza dell'Università dell'Arizona. Questi incontri, inseriti in un ciclo di eventi, intitolato "Mente Quantistica-Quantum Mind" miravano a esaminare la potenziale pertinenza della fisica quantistica riguardo ai processi senzienti in un cervello normale.

I ricercatori teorетici, tra cui i fisici Hiromi Umezawa, Giuseppe Vitiello e Kunio Yasue, i matematici Roger Penrose e Paola Zizzi, e gli esperti biomedici Stuart Hameroff, Gordon Globus, e Gustav Bernroider, hanno scandagliato le profondità della struttura sub-atomica e le sue macro amplificazioni alla ricerca di substrati descrittivi e interpretativi delle interazioni fra cervello umano e software per il calcolo quantistico – algoritmico dei fenomeni coscienti.

Queste forme, apparentemente insolite, di elaborazione dati, come dimostrato da analisi formali, fornite dalla disciplina chiamata "interazione quantistica", corrispondono empiricamente, e in modo più accurato dei modelli derivanti dalle neuroscienze cognitive tradizionali, a molti importanti attributi della psiche umana.

L'intento che ha portato alla fondazione del Gruppo QPP era di poter chiarire la psicopatogenesi attraverso il riscontro di anomalie in fenomeni quantistici fisicamente realizzabili all'interno del cervello e ad applicare approfondimenti di pensiero quantistico agli aspetti neuroscientifici che sono alla base della schizofrenia, deldisturbo bipolare e di altre forme di psicopatologia.

Da qui, l'istituzione di un Comitato per un'iniziativa QPP nel 2008 che poco dopo fu riformato in Comitato per il Progetto Scientifico QPP, presieduto da Gordon Globus, Professore Emerito di Psichiatria e Filosofia presso l'Università della California, Irvine. Il QPP ha inoltre riunito un autorevole comitato consultivo, che annovera al suo interno Henry Stapp del Gruppo di Fisica Teoretica presso il "Lawrence Laboratory" di Berkeley, Walter Freeman del Dipartimento di Biologia Molecolare e Cellulare dell'Università della California, Berkeley, e due psichiatri di Yale.

I membri del Comitato per il Programma Scientifico QPP, il comitato consultivo e gli iscritti alla mailing-list hanno presto ricevuto l'invito a inviare articoli volti a estendere l'applicazione delle neuroscienze quantistiche per una migliore comprensione della psicopatologia.

Nove brillanti testi, pubblicati on-line nel marzo 2011, sono apparsi nel simposio che ne è seguito.

Particolarmente degno di nota, l'articolo di Nancy Woolf - Professore di Psicologia e Neuroscienze comportamentali all'UCLA - e co-autori, tra cui il ricercatore biofisico Jack Tuszyński, il quale offre credibili e possibili connessioni tra malattia mentale e disfunzione dei "nanowires" microtubulinici. E' stato, inoltre, proposto un collegamento integrativo, come le reti citoscheletiche e i più convenzionalmente riconosciuti transduttori sinaptici nel cervello.

Le attività del QPP, a seguito del simposio on line del marzo 2011, hanno portato a molti altri articoli. Tra questi vale la pena ricordare le pubblicazioni di Massimo Cocchi, direttore dell'Istituto Paolo Sotgiu all'Università L.U.de.S. in Svizzera, e collaboratori, che collega la serotonina e i fenomeni quantistici attraverso la biofisica di membrana e il secondo messaggero nella depressione e nella psicosi. Massimo Pagnolato Professore di Chimica Farmaceutica dell'Università di Pavia, insieme alla studiosa di fisica e matematica Paola Zizzi, ha firmato un articolo sulla possibile pertinenza della logica quantistica - computazionale applicata ai processi primari di ragionamento nella schizofrenia.

La carica di Massimo Cocchi, come tesoriere del QPP nel corso degli ultimi due anni, ha rappresentato la principale piattaforma amministrativa per le Conferenze del QPP di cui sopra, la prima, tenutasi a Fano e la seconda svoltasi nella città di Palermo.

Un altro importante vantaggio del pregevole lavoro compiuto dal tesoriere del QPP è stato di affermare l'Università L.U.de.S. come sede istituzionale per portare avanti le attività internazionali. L'America del nord continua a rivestire un ruolo importantissimo nel QPP attraverso la presenza del segretario per la corrispondenza, Mansoor Malik, Professore Associato di Psichiatria all'Università di Howard in Washington D.C. Tutti questi sviluppi promettono un futuro roseo per l'iniziativa QPP e mirano a una più ampia e profonda comprensione della morbilità neuropsichiatrica.

## Scientific Program Committee

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Section Editor for QPP, NeuroQuantology  
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Professor of Philosophy  
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# quantum paradigms of psychopathology

## The Palermo Declaration

On this day of April 27, 2013 a core international group of investigators (Aramini, Bernroider, Cocchi, Gabrielli, Globus, Malik, Mender, Mullis, Pessa, Pagnolato, Pylkänen, Rasenick, Tonello, Tuszyński, Vitiello, Werneke, Zizzi), with expertise in the fields of psychiatry, biochemistry, physics, computational neuroscience, mathematics, philosophy and theology, gathered in Palermo, Sicily, to assess the potential relevance of quantum physics and quantum chemistry in augmenting the assumptions of non-quantum biophysics and biochemistry aimed toward understanding mind-brain relations in normal and abnormal states of consciousness applicable to humans and non-human animals. It can be stated that

Recent progress of a restricted kind in mainstream consciousness research has proceeded rapidly due to dramatic technical improvements in relevant empirical research tools. Classical biophysics, which provides the paradigmatic foundation of mainstream consciousness research, has offered bountiful correlations between subjective reports of qualitative human experience and quantitative measurements of objective physical processes. However, these merely correlative advances have not at all addressed what David Chalmers has termed the "Hard Problem" of mind-brain relations by bridging what Joseph Levine has called the "Explanatory Gap" between qualitatively subjective phenomenal experience and quantifiably objective physical events. So far no explanatory bridge between consciousness and corporeal neural tissue has issued from the classical biophysics of mind and brain in homo sapiens, and, in research on non-human subjects precluding self-reports via human language abilities, even correlations have remained substantially elusive. Quantum approaches may offer greater latitude in addressing these classical deficiencies, to the extent that at least some latent links formally exist between the qualitative dimensionality and quantitative measurability of canonically conjugate quantum observables, whereas no such formal links are required with reference to the possessed observables of classical physics. Moreover, at least one interpretation of quantum measurement as formulated by John Von Neumann casts the measuring agency itself as subjectively conscious per se, in contrast to an absence of any such classical notion.

Quantum generalization of classical biophysics opens up the possibility that relevant brain processes may reach both beneath the scale and beyond the boundaries of discrete neurons and the synaptic connections among those classically cellular "nodes." Quantum-germane structures and dynamics within the brain may include superposed dimeric tubulin conformations in the microtubular cytoskeleton spanning both intraneuronal and interneuronal spaces, ordered water in relation to cytoskeletal proteins, membrane channels and lipids along with their second messenger pipe lines to neuronal interstices, and solitons communicating along cytoskeletal routes between classical and quantum aspects of brain function. Max Tegmark's objections to the thermodynamic feasibility of such quantum structures and processes surviving thermal decoherence at biological temperatures entailing orders of magnitude comparable to those within the human skull have been thrown into doubt by the recent work of Gregory Engel's group, which demonstrated non-trivial quantum computation in photosynthesis. The ubiquity of water, cytoskeletal tubulin, membrane lipids, and second messengers in non-human life suggests that a new biophysics accounting for quantum-generalized processes in living tissue may lead to future predictions about consciousness not only in human beings but also in organisms lacking any semblance of human brain architecture at the level of organized neuronal networks or "higher."

Emmanuel Pothos and Jerome Busemeyer have presented abundant empirical evidence that properties of normal mental life may be more parsimoniously modeled by abstract quantum formalisms than by classical computational algorithms. The quantum wetware outlined above is more compatible with these formalistic findings than is any classical model of neural biophysics. Both quantum-logical and quantum-physical approaches to mind and brain also promise to generate avenues for better comprehension of neurophysiology in psychopathology. Explanatory and even psychotherapeutic opportunities may emerge from considerations of superpositional logic and malattunement in the primary process thinking of schizophrenia, Everett's quantum ontology in the "alternate worlds" of psychotic perception, and membrane and second-messenger interfaces between serotonin biochemistry and quantum-microtubular nanowire dysfunction in mood disorders. Aberrations of scale emergence in quantum thermofield phase transitions and problematic barriers to Bohmian holism may be important in multiple forms of mental illness.

We declare the following: "The absence of neurons and their synaptic connections does not preclude the presence of at least rudimentary phenomenal experience in organisms endowed with superposed microtubular dimers, ordered water, membrane ion channels, and/or crucial lipid raft assemblies connected to selected second messenger systems. In addition, quantum-biophysical aspects of these and/or other yet undiscovered structures and related processes may prove to be potent factors in the deeper etiologies and improved treatments of psychiatric disorders."

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In the light of diagnostic possibilities that these disciplines will give to the subjectivity of the psychiatric interpretation, it seems inevitable the rise of ethics aspects.

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## THE HUMAN BRAIN SEEN FROM MULTIPLE PERSPECTIVES

*The views from Philosophy, Physic, Mathematics, Biochemistry, Neuroscience, Psychiatry and Psychology Perspectives*

Sabato 14 Settembre 2019 dalle 8.30 alle 16.00

*Università degli Studi di Torino*

Palazzo del Rettorato (Aula Magna) – Via Verdi 8 - 10124 Torino  
(altro ingresso Via Po, 17)

### PROGRAMMA DELLA GIORNATA

È prevista la traduzione simultanea

Responsabile Scientifico: Prof. Jack Adam Tuszynski

8.30 - 9.00 Registrazione dei partecipanti

9.00 - 9.30 Ted Dinan

Batteri “felici” e batteri “malinconici”: il network Intestino-Microbiota-Cervello

9.30 - 10.00 Massimo Cocchi, Giovanna Traina

Ansia, stress e microbiota

10.00 - 10.30 Mark Rasenick

Nuovi correlati molecolari e cellulari per una terapia personalizzata dei disordini dell’umore

10.30 - 11.00 Gustav Bernroider

A view from multiple aspects: Neural sense relations and brain function

11.00 - 11.30 *Pausa caffè offerta da Bromatech*

11.30 - 12.00 Jack Adam Tuszynski

Il “Connettoma”: la nuova geografia del cervello

**12.00 - 12.30 Lucio Tonello**

Reti neurali e alterazioni del tono dell'umore: la visione del Matematico

**12.30 - 13.00 Gustav Bernroider, Massimo Cocchi, Hans Summhammer**

A view from Physics: Forces from Lipids and Ionic Diffusion - the cooperation of membrane pressure profiles with ion channel signalling

**13.00 - 14.00 *Pausa pranzo offerta da Bromatech***

**14.00 - 14.30 Ursula Werneke**

Rilevazione e gestione degli effetti collaterali dei farmaci psicotropi: la sindrome serotoninergica

**14.30 - 15.00 Fabio Gabrielli**

“Sudditi dello Stress” nell'impero della seduzione e della velocità estrema

**15.00 - 15.30 Stuart Hameroff**

Consciousness and Brain

**15.30 - 16.00 Chiusura del corso e verifica dell'apprendimento ECM**

Numero massimo di partecipanti 100, all'evento nr. 265075 sono stati concessi nr. 5 crediti ECM

Per maggiori informazioni:  
Gabriella Casalis 3332056262  
Alexa Chicos 333 2457403

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email: [direzioneformazione@yahoo.com](mailto:direzioneformazione@yahoo.com) o fax 031 6348585

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Research Institute for Quantitative and Quantum Dynamics of Living Organisms  
Center for Medicine, Mathematics and Philosophy Studies

**Sala Convegni Hotel Michelangelo**  
**Piazza Luigi di Savoia, 6 Milano**  
**Sabato, 13 Ottobre 2018**

**Microbiota e Cervello: Gli organi pensanti**  
**Microbiota & Brain: The thinking organs**  
**Chairperson**

**<sup>1</sup>Ted Dinan & <sup>2</sup>Mansoor Malik**

**<sup>1</sup>Department of Psychiatry and Neurobehavioral Science& APC Microbiome Institute, University College Cork**

**<sup>2</sup>Director, Psychiatry Residency Program, Department of Psychiatry and Behavioral Sciences, Howard University Hospital, Washington DC.**

**9.30 - 10. 00 Bugs, Guts and Brains: how the gut microbiota shapes your body and mind**  
**Virus, intestino e cervello: come il microbiota intestinale plasma il corpo e la mente**

**Helen Raybould**

**Department of Anatomy, Physiology and Cell Biology, University of California Davis School of Veterinary Medicine, Davis, California**

**10.00 - 10.30 The Hibernator Microbiome: Host-Bacterial Interactions in an Extreme Nutritional Symbiosis**

**Il Microbioma Ibernante: Interazioni Ospite-Batteri in una forma estrema di simbiosi nutrizionale**

**Hannah Carey**

**University of Wisconsin, School of Veterinary Medicine, Department of Comparative Biosciences**

**10.30 - 11.00 What are the real targets of psychiatric drugs?**

**Quali sono i veri bersagli degli psicofarmaci?**

**Mark M Rasenick**

**Department of Physiology & Biophysics and Psychiatry, University of Illinois College of Medicine, Chicago**

**11.00 - 11.30 How the brain meets consciousness**

**Come il cervello incontra la coscienza**

**Paavo Pylkkanen**

**Department of Philosophy and Cognitive Neuroscience, University of Skovde, Sweden,**  
**Department of Philosophy, University of Helsinki**

**11.30 Coffee break offerto da Bromatech**

**12.00 - 12.30 Brain & Mast Cells**

Cervello & Mastociti

Giovanna Traina

Department of Pharmaceutical Sciences, University of Perugia

**12.30 - 13.00 The mint and the man: anthropological reflections**

La zecca e l'uomo: riflessioni antropologiche

Fabio Gabrielli

Theological Faculty of Northern Italy

**13.00 Lunch offerto da Bromatech**

**Chairperson**

<sup>1</sup>Jack A. Tuszyński & <sup>2</sup>Giuseppe Vitiello

**1Departments of Physics, Electrical Engineering, Medical Microbiology and Immunology and Oncology, University of Alberta, Polytechnic University of Turin**

**2 Department of Physics, "E.R.Caianiello", University of Salerno**

**14.00 - 14.30 Subjective reality, consciousness and brain topology**

Realtà soggettiva, coscienza e topologia cerebrale

Gustav Bernroider

Department of Ecology and Evolution, University of Salzburg

**14.30 - 15.00 Patterns of calcium signaling: A link between chronic emotions and cancer**

*Pattern dei segnali di calcio: una correlazione tra emozioni croniche e cancro*

Massimo Pregnolato

Department of Pharmaceutical Sciences, University of Pavia

**15.30 - 16.00 Brain activity and mental activity: impulse responses of brains to electric shocks**

Attività cerebrale e attività mentale: risposte impulsive del cervello a shock elettrici

Giuseppe Vitiello

Department of Physics, "E.R. Caianiello", University of Salerno

**16.00 - 16.30 Theoretical conclusions**

Conclusioni teoretiche

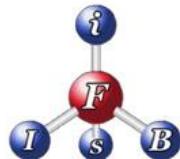
Don Mender<sup>1</sup>, Massimo Cocchi<sup>2</sup>

<sup>1</sup>QPP Founder, <sup>2</sup> Department of Veterinary Medicine , University of Bologna

**16.30 - 17.30 Reimpiantologia batterica probiotica: una pratica salutistica**

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**17.30 Chiusura Evento ECM e verifica dell'apprendimento**



FEDERAZIONE ITALIANA  
SOCIETÀ BIOLOGICHE FISBI

The 6<sup>th</sup> **qpp** Meeting  
**Quantum Paradigms of Psychopathology**

**Department of Veterinary Medical Sciences  
Alma Mater Studiorum  
Aula Messieri  
Via Tolara di Sopra 50, 40064 Ozzano dell'Emilia, Bologna**

***Evolution, Space, Hibernation & Gut Bacteria***

***"Biological consciousness"  
A journey from Bacteria to Animals and Humans***

**Friday, June 16, 2017, 3 pm**

**Saturday, June 17, 2017, 9.30 am**

**Friday, June 16, 2017, 3 pm**

**Welcome of the Academic Authorities**  
**Maria Laura Bacci & Pier Paolo Gatta**

***Evolution, Space, Hibernation & Gut Bacteria***  
***Fabio Gabrielli & Matteo Cerri***

Introduction to the theme between Philosophy and Anthropology

“Paolo Sotgiu” Institute for Research in Quantitative & Quantum  
Psychiatry & Cardiology, LUDES HEI, Malta

Department of Biomedical and NeuroMotor Sciences of the University of Bologna, Italy

***Hannah Carey***

“Building the Microbiome into the Hibernator Metabolic Phenotype” Department of Comparative Biosciences, University of Wisconsin

***Ted Dinan & John Kelly***

Melancholic Microbes: understanding the gut-brain relationship  
Department Psychiatry University College Cork

***Chiara Minuto***

Membrane, Cholesterol and Linoleic Acid: A Milestone in Brain Evolution?  
*From Bacteria, Fungi and Plants to Animal and Human Beings*

***Andrea Maglioni***

Gut Microbiota and Probiotic Strategy

**Saturday, June 17, 2017, 9.30 am**

**"Biological consciousness"**

**A journey from Bacteria to Animals and Humans**

***Fabio Gabrielli***

Introduction to the theme between Philosophy and Anthropology  
"Paolo Sotgiu" Institute for Research in Quantitative & Quantum  
Psychiatry & Cardiology, LUDES HEI, Malta

***Contzen Pereira & J. Shashi Kiran Reddy***

Understanding the emergence of microbial consciousness:  
From a perspective of the subject-object model (SOM)  
Nandadeep, 302, Tarun Bharat Soc, Chakala, Andheri (East), Mumbai 400 099, India

***Massimo Cocchi & Attilio Accorsi***  
Consciousness between Animal & Human

***Lucio Tonello & Jack Tuszynski***

Stream of Consciousness

***Giovanna Traina***

Mast Cells and Brain

Department of Pharmaceutical Sciences, University of Perugia, Italy

**Saturday, June 17, 2017, 3 pm**

Molecular Substrates of Consciousness and Mood

***Massimo Cocchi, Mark Rasenick, Jack A. Tuszynski, Gustav Bernroider***

***Massimo Cocchi:*** Cell membrane: cholesterol, linoleic acid and temperature

***Gustav Bernroider:*** Membranes, mirrors and feelings: On a functional role of chirality and molecular sense relations for conscious experience.

***Jack Tuszynski:*** Possible existence of optical communication channels in the brain

***Mark Rasenick:*** Cellular Dynamics of Depression and Antidepressants

***Andrea Maglioni***

Gut Microbiota and Probiotic Strategy

***Guest of the Meeting: Christine Castellitto, Marcello Romeo, Luciano Lozio***

**This conference addresses with scientific personalities one of the most sensitive issues now emerging in the evaluation of those aspects which distinguish the difference between men and animals compared to the state of consciousness, that is self-awareness.**

**They will discuss the most current scientific theories that see in molecular link between the main cell structures (cytoskeleton, G<sub>α</sub> protein, cell membrane and ion channels) the ability to interpret the conscious phenomenon.**

**The Meeting will highlight the critical points that recently made it possible to hypothesize as linoleic acid can be the most critical element in the fatty acid composition of cell membranes of the brain in certain pathological dynamics and, possibly, its role as the key that unlocks the quantum brain.**

**It will also be dealt with the logic correspondence between human and bacterial cell with regard to the basic and common aspects of the defense mechanisms.**



In collaborazione con **BROMATECH**



Quantum Paradigm  
Psychopathology Group  
Italian Section



## ***Looking for the Quantum Brain... Cercando il cervello quantistico...***

### **Meeting Introduction/Introduzione al Meeting Kary Mullis-Nobel Prize**

**Giuseppe Vitiello  
Quantum Brain: Overture  
Il cervello quantistico: Overture**

**Eliano Pessa  
Quantum Models of Psychopathology  
Modelli quantistici della Psicopatologia**

**Gustav Bernroider, Francesco Cappello, Massimo Cocchi,  
Fabio Gabrielli, Mark Rasenick, Lucio Tonello, Jack Tuszynski**

***Present/Presentano***

**Advances in Quantum Neuron Molecular Mapping Project  
Stato di avanzamento sul progetto di mappatura molecolare del neurone**  
**“The experimental strategy”**  
**“La strategia sperimentale”**

- **Quantum chemical scale of neural signals/scala chimica quantistica dei segnali neurali by Gustav Bernroider**
- **Membrane Dynamics/Dinamiche della membrana by Massimo Cocchi, Lucio Tonello & Fabio Gabrielli.**
- **The role of lipid raft and G protein/Il ruolo del raft lipidico e della proteina G by Mark Rasenick.**
- **Microtubules and Tubulins/Microtubuli e Tubuline by JackTuszinsky.**
- **The neuron cultures and the exosomes/Le colture neuronali e gli esosomi by Francesco Cappello.**

**&**

**...for the Gut-Brain Axis  
e l'asse intestino-cervello**

**Ted Dinan: Psychobiotics: A new therapeutic paradigm in psychiatry/Psicobiotici: Un nuovo paradigma terapeutico in psichiatria**  
**Massimo Cocchi: Ischemia & Depression or Depression & Ischemia?/Ischemia e Depressione o Depressione e Ischemia?**

**Giovanna Traina: Gut Epithelial Barrier: the experimental model/La barriera epiteliale intestinale: il modello sperimentale**

**Luciano Lozio e Marcello Romeo: The Microbiota in mediating and conditioning the silent inflammation/Il Microbiota mediatore e condizionatore dell'infiammazione silente**

## 4th QPP Meeting

# Quantum Psychopathology Conference

“Emerging from the darkness”

# Quantum Neuron Molecular Mapping Q-NeMoMa Project

## COCCHI&TONELLO

Membrane Fatty Acids  
& Mobility

## BERNRROIDER

Quantum Chemical Scale  
of Neural Signals

## CAPPELLO

Neuron Cultures  
& Exosomes

## RASENICK

Lipid Raft  
& Gsa

## TUSZYNSKI&PREGNOLATO

Microtubules

## MENDER&GABRIELLI

Consciousness

Sala Meeting Hotel Palace di Como

3-4 Giugno 2015

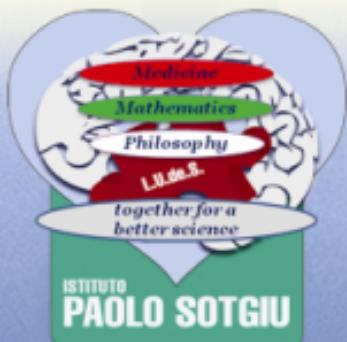
QPP Scientific Board

Jack Tuszynski, Ph. D., QPP Scientific Program Committee Chair

Massimo Cocchi, M. D., QPP Treasurer

Mansoor Malik, M. D., QPP Corresponding Secretary

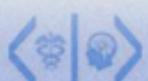
George J. Agich, Ph.D., Gustav Bernroider, Ph. D., Peter Bruza, Ph. D., Francesco Cappello, M.D., Walter J. Freeman, M. D., Fabio Gabrielli D., Gordon Globus, M. D., Stuart Hameroff, M. D., Donald Mender, M. D., Kary Mullis, Nobel Prize, Eliano Pessa, Ph. D., Massimo Pregno Ph. D., Paavo Pykkänen, Mark M. Rasenick M. D., John Z. Sadler, M.D., Henry P. Stapp, Ph. D., Sultan Tarlaci, M. D., Lucio Tonello, M.S. Giuseppe Vitiello, Ph. D., Ursula Werneke, M. D., J. Melvin Woody, Ph.D., Nancy J. Woolf, Ph. D., Paola Zizzi, Ph. D.



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## "Paolo Sotgiu" Research Institute - L.U.de.S. University

Karry Mullis (Nobel Laureate);

QPP Group

Gustav Bernroider (Salzburg University);

Francesco Cappello (Palermo University);

Massimo Cocchi (L.U.de.S. University);

Fabio Gabrielli (L.U.de.S. University);

Gordon Globus (California University);

Giovanni Lercker (Bologna University);

James Lindesay (Howard University, Washington);

Mansoor Malik (Howard University, Washington);

Donald Mender (Yale University);

Eliano Pessa (Pavia University);

Paavo Pylkkänen (Helsinki University, Skövde University);

Massimo Pregnolato (Pavia University);

Mark Rasenick (Chicago University);

Lucio Tonello (L.U.de.S. University);

Jack Tuszyński (Alberta University, Canada);

Giuseppe Vitiello (Salerno University);

Paola Zizzi (Pavia University)

## Quantum Paradigms of Psychopathology and the Decoherence Problem:

### Theoretical Challenges and Empirical Promise

Department of Veterinary Medical Sciences, University of Bologna

Bologna, 19-20 June 2014



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[info@uniludes.ch](mailto:info@uniludes.ch)



 qpp  
quantum paradigms of psychopathology  
Group





*Siamo giunti al terzo appuntamento del QPP e mi preme sottolineare che abbiamo ricevuto aiuti disinteressati, semplicemente finalizzati a realizzare un forte recupero culturale e scientifico dello studio delle dinamiche quantistiche del cervello, nelle sue espressioni psicopatologiche. Non ci sono, nel QPP, speculazioni di alcun genere se non quelle squisitamente scientifiche. Scienziati di grande fama internazionale si riuniscono per discutere sullo stato di avanzamento di questa complessa disciplina, con l'umiltà che accompagna sempre i grandi saperi. Il Gruppo che si presenta a questo nuovo appuntamento è compatto e determinato a realizzare una task force permanente, finalizzata alla ricerca delle complesse modificazioni molecolari della psicopatologia, che coinvolge biochimici, biologi molecolari, chimici, psichiatri, matematici, fisici e filosofi. L'impegno è di consegnare elementi di concretezza sperimentale utili alla definizione dei paradigmi quantistici della psicopatologia. Da queste valutazioni quantistiche si potranno ottenere squarci importanti di conoscenza sulla complessità dei fenomeni che implicano il determinismo dell'elaborato cosciente degli individui e degli animali. Si materializzerà un sogno, come, fino a poco tempo fa, era un sogno pensare che saremmo riusciti a rendere davvero operativo il QPP, offrendo a molti dei suoi membri la possibilità di incontrarsi fisicamente, trasformando, in questo modo, la relazione virtuale in un socratico "sfregamento di anime", con tutta la straordinaria ricchezza che il dialogo in "carne ed ossa" comporta. A tutti coloro che hanno consentito la realizzazione di questo evento, va il ringraziamento più sincero di tutto il QPP.*

Massimo Cocchi

**Bologna, Third QPP Meeting**  
**19-20 Giugno 2014, 10 a.m.**  
**Departement of Veterinary Medical Sciences, University of Bologna**  
**Aula Magna**

**Opening Ceremony**

Pier Paolo Gatta, Head of the Departement

Anna Zaghini, President, School of Agriculture and Veterinary Medicine, University of Bologna

Kary Mullis, Nobel Prize

Manuela Di Martino, President, L.U.de.S. University, Lugano

Antonello Martinez, Rector, L.U.de.S. University, Lugano

**"Quantum Paradigms of Psychopathology and the Decoherence Problem: Theoretical Challenges and Empirical Promise"**  
**"Paradigmi Quantistici della Psicopatologia e il Problema della Decoerenza: Sfide Teoretiche e Promesse Empiriche"**

**Estratto dalla "Dichiarazione di Palermo" (2013)**

"Persino l'assenza di connessioni sinaptiche di particolare complessità tra i neuroni non preclude la presenza di esperienze fenomeniche quantomeno rudimentali in organismi dotati di dimeri microtubolari sovrapposti, acqua strutturata, canali ionici di membrana e/o importanti gruppi di zattere lipidiche connesse a sistemi selezionati di secondo messaggero.

Inoltre, gli aspetti biofisico-quantistici di tali e/o altre strutture ancora non mappate e i processi ad essi connessi potrebbero rivelarsi potenti fattori per eziologie più approfondate e migliori trattamenti dei disturbi psichiatrici.

L'ubiquità dell'acqua, la tubulina citoscheletrica, i lipidi di membrana e i secondi messaggeri in forme di vita non-umana suggeriscono che una nuova biofisica, equivalente a processi quantistico-generalizzati in tessuti viventi, possa portare a previsioni future circa la coscienza non solo negli esseri umani, ma anche in organismi sprovvisti di ogni sembianza di architettura cerebrale umana a livello più "alto" o di reti neurali organizzate.

From "the Declaration of Palermo (2013)

We declare the following: "The absence of neurons and their synaptic connections does not preclude the presence of at least rudimentary phenomenal experience in organisms endowed with superposed microtubular dimers, ordered water, membrane ion channels, and/or crucial lipid raft assemblies connected to selected second messenger systems. In addition, quantum-biofysical aspects of these and/or other yet undiscovered structures and related processes may prove to be potent factors in the deeper etiologies and improved treatments of psychiatric disorders."

Both quantum-logical and quantum-physical approaches to mind and brain also promise to generate avenues for better comprehension of neurophysics in psychopathology.

The ubiquity of water, cytoskeletal tubulin, membrane lipids, and second messengers in non-human life suggests that a new biophysics accounting for quantum-generalized processes in living tissue may lead to future predictions about consciousness not only in human beings but also in organisms lacking any semblance of human brain architecture at the level of organized neuronal networks or "higher".

**QPP Group**

Bernroider, Cocchi, Gabrielli, Globus, Malik, Mender, Mullis, Pessa, Perngolato, Pylkkanen, Rasenick, Tonello, Tuszynski, Vitiello, Zizzi

**Invited Speakers**

Accorsi, Cappello, Delogu, Lercker, Lindesay

Find themselves on the occasion of Bologna for the annual deepening of the psychopathological problems that are woven into the complexities of biochemistry, molecular biology, quantum physics and philosophy.

Si ritrovano nell'occasione di Bologna per l'approfondimento annuale delle problematiche psicopatologiche che s'intrecciano nella complessità della biochimica, della biologia molecolare, della fisica quantistica e della filosofia.

**Thursday, June 19, 2014, 10 am**

**Chairperson:** Mario Pappagallo

**QPP Lecture**

**Jack Tuszynski**

"From Quantum Biology to Quantum Psychiatry;  
the Use of Quantum Physics Concepts in Life Sciences"

**Lectures**

**Gustav Bernroider**

"Toward a Quantum Biology of Experience:  
Neural transition dynamics within ion channels  
and their role for conscious perceptive states (CPS)"

**Mark Rasenick**

"Neuronal proteins for signaling and structure: Does their  
subcellular distribution dictate depression?"

**Massimo Perngolato**

"Static Magnetic Fields Effects on Enzyme Kinetics"

**Francesco Cappello**

"Stress, plasma membrane and molecular chaperones"

**13 pm Lunch**

**15 pm**

**Keynote Address**

**Giuseppe Vitiello**

"The quantum field theory approach to living systems.

"Why quantum? Why fields?"

**Lectures**

**Gordon Globus**

"Deconstructing the Measurement Problem  
with a Contribution from Quantum Brain Dynamics"

**Mansoor Malik**

"Quantum Model of Memory in Brain"

**Paavo Pylkkanen**

"Weak vs. strong quantum cognition"

**Eliano Pessa**

"The influence of top-down causation on decoherence

phenomena in quantum models of psychopathology"

**Paola Zizzi**

"The Logic of Autism"

**Fryday, June 20, 2014, 10 am**

Massimo Cocchi, Lucio Tonello, Giovanni Lercker, Fabio Gabrielli,  
Pier Attilio Accorsi, Mauro De Logu

"Cell Membrane and Consciousness, between biology and ethics"

Massimo Cocchi

"The biochemistry of consciousness"

Lucio Tonello

"The mathematics of consciousness"

Giovanni Lercker

"The chemistry of consciousness"

Fabio Gabrielli

"The philosophy of consciousness"

Pier Attilio Accorsi, Mauro De Logu

"Reasoning of consciousness in animals"

**12.30 pm**

Paolo Castrogiovanni

**Concluding Remarks**

During the Meeting, it will be presented the "QPP Quantum Neuroethics Task Force Members' Questionnaire" (Author: Donald Mender) for official discussion and approval from the QPP members.



**Gustav Bernroider**  
Ph D, Assoc. Prof. Neurobiology  
Department of Organismic Biology, Neurosignaling Unit,  
University of Salzburg, Austria

**Gustav Bernroider** is leading a research unit for Neurosignaling and Neurodynamics in the Department for Organismic Biology, University of Salzburg, Austria. His research focuses on neural correlates of higher level brain functions, such as conscious perceptive states, cognition and emotions. His work integrates theoretical, physical, modellistic and empirical research within the field of behavioral and comparative neurobiology and comparative cognition. Gustav Bernroider has organized several international conferences and workshops related to consciousness research and the mind-brain interface (e.g. Quantum-Mind 2007, Salzburg). His main working hypothesis assumes that consciousness is a purely perceptive property that is based on multiple-scaled transition dynamics ranging from atomic to classical states, hosted by membrane channel proteins and organized along the sensory-motor segregation pattern in the brain. His more recent behavioural work is summarized in Neuroscience and Biobehavioral Reviews, 35, 2009-2016 (2011).



**Massimo Cocchi**  
[Kary Mullis, Nobel Prize](#)  
**Lucio Tonello**

**Massimo Cocchi** is Full Professor of Nutrition Biochemistry at LUdeS University and Contract Professor of Human Nutrition Biochemistry at the Department of Veterinary Medical Sciences, Bologna University. The major scientific research has always been connected with study, teaching and application on: Ethanol and lipid; Unusual fatty acids; Dietary lipids and tissue lipids; Essential Fatty Acids (EFA); Fatty Acids of the n-6 and n-3 series; Cellular nutrition; Lipid metabolism during development and growth; Molecular aspects in quantitative psychiatry; Molecular aspects in ischemic heart disease, Non-linear approach to cell dynamics. He is Director of "Paolo Sotgiu" Institute for Quantitative & Quantum Psychiatry & Cardiology Research.

His scientific activity is very intense: he is author of several scientific publications and a successful organizer of numbers of scientific meetings. In 2008, he was honored, together with prof. Lucio Tonello, with the Kyoto Prize nomination for their work concerning Psychopathology (i.e. Mood disorders) and Cardiovascular Disease (i.e. Ischemia), currently ongoing.

**Lucio Tonello** is Full Professor of Bio-mathematical Sciences at L.U.de.S. University (Lugano, Switzerland) and Deputy Director of "Paolo Sotgiu" Institute for Quantitative & Quantum Psychiatry & Cardiology Research. His most distinctive feature is his multidisciplinary approach, which made him focus on the study of brain, mind and consciousness and their related mathematical and physical models. He applies his analytical skills to any situation by using both traditional and "different" methods, such as: Artificial Intelligence, Connectionist Paradigm (e.g. Artificial Neural Network), Artificial Life, Complexity Theory, Chaos Theory, Game Theory, Fuzzy Logic, Statistical Learning, Membrane Computing, Quantum Computation. In 2008, he was honored, together with prof. Massimo Cocchi, with the Kyoto Prize nomination for their work concerning Psychopathology (i.e. Mood disorders) and Cardiovascular Disease (i.e. Ischemia), currently ongoing.

**Kary Mullis** was awarded the Nobel Prize for developing the Polymerase Chain Reaction (or PCR) method. This technique allows the *in vitro* amplification of DNA fragments. The improvements he made allowed PCR to become a central technique in biochemistry and molecular biology, with numerous applications to the medical, agricultural and investigation fields. Mullis was also awarded the Japan Prize in 1993.



**Fabio Gabrielli, PhD**  
[Dean of the Faculty of Human Sciences and Full Professor of Anthropological Philosophy, L.U.de.S. University, Lugano – Switzerland](#)

**Fabio Gabrielli**, holder of a degree in Philosophy and a PhD in Anthropology, has been, since 2008 the Dean of the Faculty of Human Sciences and Full Professor of Philosophical Anthropology at L.U.de.S. University of Lugano. He is the author of numerous scientific essays and papers in the field of applied anthropology and philosophy, focusing particularly on biological and cultural issues. He is now investigating biological and cultural dynamics of consciousness and mood disorders, especially Major Depression. He is a member of the Quantum Paradigm Psychopathology Group (QPP) and the Scientific Committee of "Paolo Sotgiu" Institute for Research in Quantitative and Quantum Psychiatry and Cardiology.



**Jack A. Tuszyński**  
[Department of Physics, University of Alberta Edmonton,](#)  
[Canada and Division of Experimental Oncology,](#)  
[Cross Cancer Institute](#)

As the Allard Research Chair in Oncology, **Jack Tuszyński** is the head of an interdisciplinary team that is focused on building "designer drugs" able to kill tumors and eventually lead to improved cancer cures. Through his work in computational biophysics Jack is attempting to create the perfect drugs that would target cancerous cells while reducing side effects to the healthy cells. In collaboration with researchers from Texas Jack has already developed a new generation of chemotherapy drugs that are derivatives of colchicine, the new class of these drugs preferentially affects cancerous cells. To achieve success in this new, but promising field of biological modeling, he drawsupon his physics background to create computer software that scans molecular targets against all available drug entities to find the perfect match. Jack works in a cancer clinic environment with the sole objective of offering hope to patients who are otherwise out of luck. Jack is also a full time Professor at the University of Alberta and on the editorial board of the Journal of Biological Physics, Journal of Biophysics and Structural Biology (JBSB), Quantum Biosystems, Research Letters in Physics, Water: A Multidisciplinary Research Journal and Interdisciplinary Sciences-Computational Life Sciences. He is an Associate Editor of The Frontiers Collection, Springer-Verlag, Heidelberg.



**Giuseppe Vitiello**  
[Department of Physics, "E.R.Caianiello", University of Salerno, 84100 Salerno, Italy](#)

**Giuseppe Vitiello** is Professor of Theoretical Physics at the University of Salerno, Department of Physics and Istituto Nazionale di Fisica Nucleare (INFN). His research activity is focused on elementary particle physics and the physics of living matter and brain. He is author of about 140 research papers, many reports to International Conferences and of the books: *Quantum Mechanics*, co-authored with H. Umezawa (Bibliopolis, Napoli 1985 and, translated in Japanese, Nippon Hyoron Sha. Co.Ltd., Tokyo, Japan 2005), *My Double unveiled* (John Benjamins Publ. Co., Amsterdam 2001). *Quantum field theory and its macroscopic manifestations*, co-authored with Massimo Blasone and Petr Jizba (Imperial College Press, London 2011). Together with Gordon Globus e a Karl Pribram, he is editor of the book *Brain and Being. At the boundary between science, philosophy, language and arts.* (John Benjamins Publ. Co., Amsterdam, 2004).



**Donald Mender**

Formerly Faculty co-sponsor of the Yale Philosophy and Psychiatry Group

**Donald Mender**, M. D., F. A. P. A., is currently a faculty co-sponsor of the Yale Philosophy and Psychiatry Group. He served in the past as an Executive Council member of the Association for the Advancement of Philosophy and Psychiatry (AAPP) and founded the AAPP's New York City Chapter. He has also served as the original organizer of the initiative on Quantum Paradigms of Psychopathology (QPP), as the first corresponding secretary of QPP's Scientific Program Committee, and as the first QPP section editor of the NeuroQuantology Journal. Dr. Mender has published numerous works related to quantum neurodynamics with a recent focus on potential psychiatric applications. His latest publication attempts to reframe elements of thermofield theory and orchestrated reduction in light of the anthropic principle, aiming at a normative consideration of quantum neurodynamical function.



**Massimo Pregnolato**

Medicinal Chemistry Professor at the University of Pavia, Italy

**Massimo Pregnolato** is Professor of "Medicinal Chemistry" and "Synthesis of Drugs" within the "Pharmaceutical Chemistry and Technology" degree course at the Faculty of Pharmacy, University of Pavia. Professor by the Medical and Cellular Molecular Biotechnology course, University Vita-Salute San Raffaele - Milan. Director of Quantum Bio Lab. Founder of Quantumbionet and quantIP in October 2006. Founder of Italian Biocatalysis Center in July 2007. Chief Editor of Quantum Biosystems. Chairman of Quantum Paradigms of Psychopathology (QPP). Member of Scientific Committee of Istituto di Ricerca "Paolo Sotgiu" in Psichiatria e Cardiologia Quantitativa ed Evoluzionistica, Università L.U.de.S. of Lugano, Switzerland. 2010 Giorgio Napolitano Medal Prize. Advisory Board Member of DNA Decipher Journal , Antropologia della Salute, Scientific GOD Journal. Member of Quantum Art Group Italy priced by "Italia degli Innovatori" Agency for the dissemination of technologies for innovation. Presidency of the Council of Ministers. Prof. Pregnolato has published numerous works related to chemistry and biotechnology and he filed about ten patent applications. His most recent publications on quantum biology focus on potential psychiatric interest of subcellular nanonetworks as quantum biosystems.



**Mansoor Malik, M.D**

Associate Professor of Psychiatry,  
Howard University Medical School,  
Washington, DC, USA

**Mansoor Malik** MD is board certified in psychiatry, geriatric psychiatry and psychosomatic medicine by the American Board of Psychiatry and Neurology. He has extensive teaching, clinical and research experience. He graduated from University of Punjab, Pakistan in 1995 and was trained in Royal College of Psychiatrist, London before moving to USA. He completed his residency from Drexel University and fellowship from Dartmouth Medical School. He is an enthusiastic and effective teacher. He has been serving as the Program Director since 2009 and works tirelessly to improve clinical training and teaching. His research interests include HIV psychiatry, mood disorders and medical education.



**James Lindesay**

Research Fields: Astrophysics, Particle and Nuclear Physics, Condensed Matter Physics, Biophysics, Computational Physics  
Email: JLindesay@Howard.edu  
Website: <http://www.physics.howard.edu/staff/JLbioWWW.htm>

He received his SB in physics from MIT (see MIT curriculum), where he did research in scattering theory with Francis Low, helped design and build drift chambers with Ulrich Becker and Samuel C.C. Ting, and wrote a (published) thesis on macroscopic quantum fluids working with Harry Morrison. He received his MS from Stanford University (see Stanford curriculum) while studying the phenomenology of photo-production of hadrons with Stan Brodsky. He received his PhD developing the theory for few particle relativistic dynamics working with H. Pierre Noyes at the Stanford Linear Accelerator Center (SLAC). During his tenure as a graduate student, he received Stanford University's highest teaching honor (Gores Award), as well as being given the honorary faculty position Acting Instructor by the faculty of the Stanford Physics Department. He was the Resident Fellow of Lagunita East Residences, and the second Resident Fellow of Ujamaa, the African-American Theme Residence at Stanford University.



**Gordon Globus M.D.**

Professor Emeritus of Psychiatry and Philosophy at the University of California Irvine.

**Gordon Globus** is a Distinguished Life Fellow of the American Psychiatric Association. He has been publishing in the area of quantum neurophilosophy from a Continental rather than Anglo-American perspective since 1995. His most recent books are: *Quantum Closures and Disclosures*. Thinking together postphenomenology and quantum brain dynamics (John Benjamins 2003) and *The Transparent Becoming of World*. A crossing between process philosophy and quantum neurophilosophy (John Benjamins 2009). His most recent paper is "Consciousness v. Disclosure: A Deconstruction of Consciousness Studies" (J. of Consciousness Studies, in press). He has published on quantum psychiatry in *NeuroQuantology* (2010) and on quantum neurology in *Medical Hypotheses* (2010).



**Mark M. Rasenick**

Distinguished UIC Professor of Physiology & Biophysics and Psychiatry Director  
U. Illinois Chicago College of Medicine

**Mark. Rasenick**'s responsibilities have been, primarily, to conduct research on G protein signaling and the cytoskeleton and to probe the relationship of this to neurodegenerative disorders, mood disorders and the normal function of the human brain. He has been continually funded by the National Institute of Mental Health since his arrival at UIC and has also been funded by the National Institute on Aging, the Air Force Office of Scientific Research and various corporate and philanthropic sources.



**Paavo Pylkkänen**

Department of Philosophy and Cognitive Neuroscience, University of Skövde, Sweden Department of Philosophy, University of Helsinki, Finland

**Paavo Pylkkänen** (born 1959) is a Finnish philosopher of mind. He is associate professor in philosophy at [Skövde University College](#) and senior lecturer of philosophy at the [University of Helsinki](#). He is particularly known for his work on mind-body-studies, building on [David Bohm's](#) interpretation of quantum mechanics, in particular Bohm's view of the cosmos as an *enfolding and unfolding whole* including mind and matter. Pylkkänen's areas of specialization are philosophy of mind, philosophy of science, scientific metaphysics, philosophy of physics, philosophy of cognitive (neuro)science, consciousness studies and mind-matter research. His topics of interest include the philosophical implications of quantum theory and their potential relevance to a wide range of topics (e.g. mental causation, intentionality, consciousness, social ontology...), as well as philosophical naturalism, naturalistic metaphysics, the relation of scientific structuralism to Bohm's notions of implicate order and active information, process philosophy and quantum cognition. Since 1996 he has been employed at the University of Skövde in [Skövde, Sweden](#), where he initiated a consciousness studies program combining philosophy and cognitive neuroscience. He is currently temporary university lecturer in theoretical philosophy at the Department of Philosophy, History, Culture and Art Studies, University of Helsinki, where he has regularly worked since 2008. Pylkkänen interacted with David Bohm from the early 1980s until 1992 and has also worked and published together with theoretical physicist [Basil Hiley](#), close co-worker of David Bohm over three decades. Hiley and Pylkkänen together addressed the question of the relation between mind and matter by the hypothesis of an *active information* within the conceptual framework of the [de Broglie–Bohm theory](#). Pylkkänen's work *Mind, Matter and the Implicate Order* (2007) builds upon Bohm's [ontological](#) interpretation of quantum theory, in which quantum processes are understood as a [holomovement](#) in terms of [implicate and explicate orders](#).



**Paola Zizzi**

"Paolo Sotgiu" Institute for research in Quantitative & Quantum Psychiatry & Cardiology L.U.de.S. of Lugano, Switzerland

**Paola Zizzi** is a theoretical physicist.

Paola Zizzi is perhaps most notable for her work in the field of Loop quantum gravity theory that regards the early universe as a kind of quantum computer. She proposed that the universe could have achieved the threshold of computational complexity sufficient for the emergence of consciousness during the period of cosmic inflation, in a paper entitled "Emergent Consciousness: From the Early Universe to Our Mind" gr-qc/0007006, which has become known as the Big Wow theory. She gives a detailed description of the quantum gravitational aspects of this notion in a later paper entitled "A Minimal Model for Quantum Gravity" gr-qc/0409069, that derives the conditions for quantum gravity from a minimal set of assumptions, and is also called Computational Loop Quantum Gravity, or CLQG. She may have coined the phrase 'It from Qubit' in imitation of John Archibald Wheeler, who used the term "It from Bit" to describe how the universe came to be.

Zizzi's work was cited by Seth Lloyd and Jack Ng in their cover article for the November 2004 Scientific American, entitled "Black Hole Computers," and by Gregory Chaitin in his paper "Epistemology as Information Theory: From Leibniz to  $\Omega$ ," which was the Alan Turing Lecture on Computing and Philosophy, in Västerås, Sweden June 2005. Paola is becoming well-known in the field of Quantum Computing, as well as Astrophysics. She presented her work on "Quantum Computability at the Planck Scale" at CiE 2005, and on "The Logic of Entanglement" at DICE 2006. In April 2008 she presented a successful seminar by the Physics Department "A. Volta" - University of Pavia entitled A sequent calculus for quantum computing.



**Eliano Pessa**

Full Professor of General Psychology

Department of Brain and Behavioral Sciences, University of di Pavia

**Eliano Pessa** graduated and specialized in Physics at the University of Rome and is currently full professor of General Psychology at *Università degli Studi di Pavia*, where he also teaches Techniques of Psychological Research and Data Analysis. He has been Associate Professor of Artificial Intelligence Theories and Systems within the Faculty of Psychology at *Università La Sapienza di Roma*. His research activity, presented in more than 200 publications, including 8 books, focuses on issues such as Neural Networks, Robotics, Artificial Intelligence, theoretical and experimental studies on long-term memory, visual perception global and local factor analysis, attention patterns, economic competition and behavior, mathematical models in neural activity, quantum models of memory, General Systems Theory, patterns of self-organization in complex systems.



**Francesco Cappello**

Associate Professor of Human Anatomy, University of Palermo, Palermo, Italy

Research Associate, Institute of Biophysics, National Research Council, Palermo, Italy

Director, Euro-Mediterranean Institute of Science and Technology, Palermo, Italy

Scientific Committee Member, Institute "Paolo Sotgiu", L.U.de.S. University, Lugano, Switzerland

Studies and Academic Career:

1997: Degree with honor in Medicine and Surgery from the University of Palermo, Italy, awarded Best Thesis Prize.

2002: Specialist in Surgical Pathology and Histopathology at the University of Palermo, Italy.

Honorary Appointments:

Since 2009, Scientific Director of the Euro-Mediterranean Institute of Science and Technology (IEMEST).

Since 2012, Member of the Scientific Board of the Institute "Paolo Sotgiu" for Research in Quantitative & Quantum Psychiatry & Cardiology, L.U.de.S. University, Lugano, Switzerland.

Since 2013, Associate Researcher at the Institute of Biophysics, National Council of Research, Palermo, Italy.

Since 2014, "Associate Member" of the Faculty at the Neuroscience Graduate Program at the University of Texas Medical Branch (UTMB), Galveston (TX), USA.



**Giovanni Lercker**  
Alma Mater Professor  
[giovanni.lercker@unibo.it](mailto:giovanni.lercker@unibo.it)

Prof. **G. Lercker's** research activity focuses on the field of fatty food substances, with particular reference to their composition and the role of technology as to their production and preservation. His work focuses also on the creation of micro and macro analysis methods. Recently, he has also been studying oxidative stability in both model and real systems. Part of this research has been developed through the study of sterols oxidation products, the creation of analysis methods and the inspection of the products on the market. He is the author and co-author of more than 500 publications.



**Mauro Delogu**  
[mauro.delogu@unibo.it](mailto:mauro.delogu@unibo.it)  
Aggregate Professor  
[Department of Veterinary Medical Sciences, University of Bologna](#)

He graduated in Veterinary Medicine at Università degli Studi di Bologna in 1992. In 1997, he earned a PhD degree. He was awarded a post-doctoral scholarship and carried out research at the Unit of Avian Pathology within the Veterinary Public Health Department of Università degli Studi di Bologna, and at the National Institute for Wildlife. He is in charge of the Pathogen Ecology Lab at Università degli Studi di Bologna. His research focuses on the ecology of communicable diseases in wildlife species, with particular reference to public health-related pathologies.

He is the author of more than 150 scientific papers published on both national and international specialized journals, as well as author of general-audience articles.



**Pier Attilio Accorsi**  
[pierattilio.accorsi@unibo.it](mailto:pierattilio.accorsi@unibo.it)  
Associate Professor  
[Department of Veterinary Medical Sciences, University of Bologna](#)

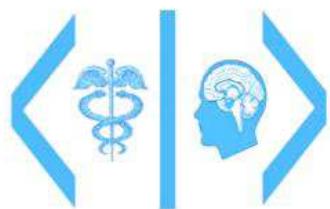
His current research aims at investigating dogs' well-being in the perspective of their relationship with humans. This groundbreaking research has a multidisciplinary approach: behavioral, psychological and physiological aspects are taken into account. The project focuses on the understanding of the emotional bonds existing between humans and dogs and the stress experienced by dogs during training. Research delves deeper into the aspects likely to undermine dogs' wellbeing as to their relationship with humans. The scientific goal is to evaluate neuro-hormonal (steroid hormones) and physiological substrata (cardiac activity) that can lead to a better comprehension of the interactions between wellbeing, dog-man relationship and training. Moreover, the links between stress, wellbeing and immunity will be further investigated also in other species of veterinary interest, such as ruminants, horses, pigs, and cats. Human and animal molecular aspects are currently being assessed and compared in order to get a better understanding from the behavioral point of view.



**Mario Pappagallo**  
Medical-scientific journalist of Corriere della Sera newspaper and commentator.  
Chairperson of the QPP Meeting



**Paolo Castrogiovanni**  
Full professor of Psychiatry  
Former Director of the Unit of Psychiatry, Department of Neuroscience  
University of Siena  
Concluding Remarks of the QPP Meeting



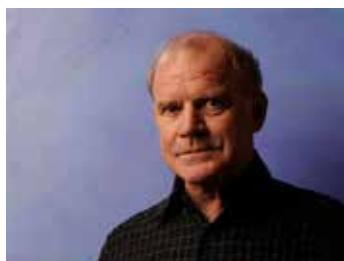
# qpp

quantum paradigms of psychopathology

Research Group



MINDS, MEMBRANES, MICROTUBULES, AND MADNESS:  
CURRENT PROGRESS IN QPP-RELATED RESEARCH  
*Molecular and Quantum Approaches to Psychopathology.*  
*An Interdisciplinary Dialog with Psychiatrists*  
April 26th-27th, 2013  
Palermo, Italy



**Special Guest:**  
**Kary Mullis, Nobel Laureate (PCR) 1993**

"...Turning points in medicine tend to be inconspicuous early on. Big changes always creep up on people. Early stages in major advancements are never heralded or even noticed. It is years or decades before things that will dominate a field are obvious to careful observers..." Kary Mullis

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Ph. D**  
QPP Scientific Program  
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University of Pavia, Italy



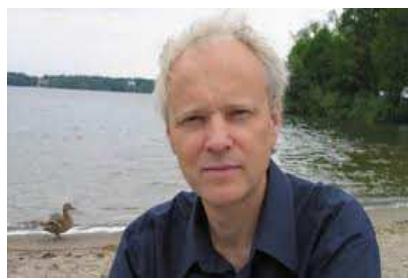
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Lecturer in Psychiatry, Yale  
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## Quantum Paradigms of Psychopathology (QPP) Group Second International Symposium

### MINDS, MEMBRANES, MICROTUBULES, AND MADNESS: CURRENT PROGRESS IN QPP-RELATED RESEARCH *Molecular and Quantum Approaches to Psychopathology. An Interdisciplinary Dialog with Psychiatrists*

April 26<sup>th</sup>-27<sup>th</sup>, 2013

Palermo, Italy

#### Venues:

April 26<sup>th</sup>: Sala delle Capriate, Palazzo Steri, Piazza Marina 61.

April 27<sup>th</sup>: Villa Malfitano "Whitaker", Via Dante 167.

### Special Guest: Kary Mullis, Nobel Laureate



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**Paola Zizzi, Ph.D.**  
 Institute Paolo Sotgiu, L. U. de S. University, Switzerland



**qpp**

**quantum paradigms of psychopathology**

**April 26<sup>th</sup>, 2013**

**Venue: Sala delle Capriate, Palazzo Steri, Piazza Marina 61, Palermo, Italy**

**4:00 p.m.: Official Welcome**

Roberto Lagalla, Rector of the University of Palermo  
 Salvatore Amato, President of the Council of Physicians of Palermo  
 Giuseppe Amodei, Chief of Regional Agency for Students' Rights, Palermo  
 Giuseppe Mogavero, Mayor of Isnello (Palermo)  
 Giovanni Zummo, Director of the Department BIONEC, Univ. of Palermo  
 Bartolomeo Sammartino, President of IEMEST, Palermo  
 Manuela Di Martino, President of LUdeS University, Lugano, Switzerland  
 Massimo Cocchi, Director of "Paolo Sotgiu Institute", Lugano, Switzerland

**Introduction to the Meeting:  
*Kary Mullis, Nobel Laureate***

**4:30 p.m., FIRST SESSION: PHILOSOPHY, THEOLOGY AND PHYSICS**

**Chairpersons:**

**Daniele La Barbera**, Director of Psychiatric Unit, BIONEC Department, University of Palermo, Italy  
**Massimo Cocchi**, L.U.de.S. University, Lugano, Switzerland & University of Bologna, Italy

**Keynote Address:**

**THE CUNNING OF THE OBSERVABLE**

**Donald Mender, M.D., F.A.P.A.**

*Professor of Psychiatry, L. U. de S. University, Lugano, Switzerland  
 Lecturer in Psychiatry, Yale University, USA*

**5.00 p.m.: ORTHOTES AS METAPHYSICAL VIOLENCE. MAJOR DEPRESSION**

**AND BIPOLAR DISORDER: FROM IDEOLOGY TO BIOLOGY**

**Fabio Gabrielli, Professor of Philosophical Anthropology,  
 L.U.de.S. University, Lugano, Switzerland**

**5:30 p.m.: A DIALOGUE BETWEEN ETHICS AND NEUROSCIENCE**

**Michele Aramini, Professor of Moral Theology, Catholic University, Milan, Italy**

**6:00 p.m.: NEW DEVELOPMENTS IN QFT MODELING OF THE BRAIN AND LIVING MATTER**

**Giuseppe Vitello, Professor of Theoretical Physics, University of Salerno, Italy**

**6:30-7:00 p.m.: General Discussion**

**7:30: Conclusions**

April 27<sup>th</sup>, 2013

Venue: Villa Malfitano "Whitaker", Via Dante 167, Palermo, Italy

9:00 a.m.: **SPECIAL LECTURE**

Chairperson: Paolo Castrogiovanni, Past Professor of Psychiatry, University of Siena, Italy

*Claudio Mencacci, Head of Psychiatry, Fatebenefratelli Hospital, Milan, Italy - President of the Italian Society of Psychiatry: WHAT'S RIGHT AND WHAT'S WRONG IN PSYCHIATRY?*

10:00 a.m., **SECOND SESSION: BIOMOLECULAR AND QUANTUM APPROACHES TO PSYCHIATRY**

Chairpersons:

Massimo Pagnolato, QPP Scientific Program Committee Chair; Founder, Quantumbionet; Professor of Medicinal Chemistry, University of Pavia, Italy

Mansoor Malik, QPP Corresponding Secretary, Section Editor for QPP, NeuroQuantology Journal; Professor of Psychiatry, Howard University, USA

Introductory lecture:

*Gordon Globus, Professor Emeritus of Psychiatry, Professor Emeritus of Philosophy University of California at Irvine, USA: A QUANTUM BRAIN THEORY OF DREAMS*

(Open bar for coffee break from 10.15 a.m. to 11.15 a.m.)

Special guests' talks

11:00 a.m.: *Efstratios Manousakis, Professor of Physics, Florida State University, USA:*

**FOUNDING OUR MATHEMATICAL DESCRIPTION OF OUR PERCEPTION OF NATURE ON THE PROPERTIES OF CONSCIOUSNESS**

11:30 a.m.: *Mario Rasetti, Professor of Theoretical Physic Models and Mathematical Methods, Politecnico di Torino, Italy: A QUANTUM LIFE MODEL*

12:00 p.m.: *Mark Rasenick, Professor of Psychiatry Department of Physiology & Biophysics, College of Medicine, University of Illinois, USA: G PROTEINS AND LIPID RAFTS AS REGULATORS OF BOTH MICROTUBULES AND MOOD*

12:30 p.m.: *Andy Marlow, UK: A QUANTUM PSYCHOPATHOLOGICAL ACCOUNT OF ANOREXIA NERVOSA*

1:00 p.m.: Lunch Break

2:00 p.m.: **THIRD SESSION: ROUND TABLE OF QPP GROUP.**

Chairperson: Massimo Pagnolato, QPP Scientific Program Committee Chair Founder.

*Gustav Bernroider, Professor of Biology, Neurosignaling Unit, University of Salzburg, Austria: NEURAL D-*

**SEPARATIONS AND TRANSIENT BRAIN DYNAMICS: UNRAVELING THE CAUSAL CHAIN FROM BRAIN SPACE TO MIND**

*Massimo Cocchi, QPP Treasurer - Director, Institute "Paolo Sotgiu" L.U.deS. Univ., Switzerland; Professor of Nutritional Biochemistry, University of Bologna, Italy: CONSCIOUSNESS FROM ANIMALS TO HUMANS: QUANTUM AND MOLECULAR PATHWAYS*

*Mansoor Malik, QPP Corresponding Secretary, Section Editor for QPP, Neuro-Quantology Journal; Associate Professor of Psychiatry, Howard University, USA: PARADIGM SHIFTS IN MENTAL HEALTH*

*Eliano Pessa, Department of Behavioral and Brain Sciences, University of Pavia, Italy: TOWARDS AN INTEGRATED MODEL OF CYTOSKELETAL QUANTUM DYNAMICS*

*Massimo Pagnolato, Professor of Medicinal Chemistry, University of Pavia, Italy; Ignazio Licata, Director, Institute for Scientific Methodology: QUANTUM LOGIC, THE COLLECTIVE UNCONSCIOUS AND THE BIOLOGICAL BASIS OF PSYCHOPATHOLOGY*

*Paavo Pylkanen, University Lecturer in Theoretical Philosophy, University of Helsinki, Finland: PSYCHOPATHOLOGY IN LIGHT OF THE ONTOLOGICAL INTERPRETATION OF QUANTUM THEORY*

*Lucio Tonello, Professor of Biomathematical Sciences, L.U.deS. University, Switzerland: STREAM OF CONSCIOUSNESS: QUANTUM AND BIOCHEMICAL ASSUMPTIONS REGARDING PSYCHOPATHOLOGY*

*Jack Tuszyński, Professor and Allard Research Chair, Division of Experimental Oncology, Cross Cancer Institute, Canada: TOWARDS NANONEUROSCIENCE: THE POTENTIAL OF NANOTECHNOLOGY FOR THE TREATMENT OF NEUROLOGICAL DISORDERS*

*Ursula Werneke, Professor of Psychiatry, Umea University, Sweden; Consultant Psychiatrist, Director of Postgraduate Education, Sunderby Hospital, Sweden: INTUITION - COUNTERINTUITION AND MEDICAL JUDGEMENT*

*Paola Zizzi, Institute Paolo Sotgiu, L.U.de.S. University, Switzerland: THE MIND AND THE QUANTUM*

5:30 p.m.: Conclusions



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## **A Long Shadow Over the Soul: Molecular and Quantum Approaches to Psychopathology An Interdisciplinary Dialog with Psychiatrists**

*“...Turning points in medicine tend to be inconspicuous early on.  
Big changes always creep up on people. Early stages in major advancements  
are never heralded or even noticed. It is years or decades before things  
that will dominate a field are obvious to careful observers....”*

*Kary B. Mullis, Nobel Laureate  
September 12, 2007*

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**Conference Location**  
*Sala Riunioni Del Centro Pastorale  
Via Roma, 118-Fano, Italy*

**Dates of Conference**  
*29, 30, 31 March 2012*

### **Chairpersons**

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## Opening Proceedings

### Official Welcome

**Introduction to the Meeting**  
**Raimondo Venanzini and Massimo Cocchi**

### Chairperson

**Emma Rabino Massa**

*President of the Italian Society of Experimental Biology*

**Fabio Gabrielli, Professor of Philosophical Anthropology**

*L.U.de.S, University, Lugano, Switzerland*

### **Philosophy and Psychiatry**

**“The violated body in the era of the invisible man”**

**Michele Aramini**

*Professor of Moral Theology*

*Catholic University, Milan, Italy*

### **Theology and Psychiatry**

**Stuart Hameroff**

*Professor of Anesthesiology and Psychology*

*Director of the Center for Consciousness Studies at the University of Arizona, Tucson*

**“Quantum computation in microtubules”**

**Giuseppe Vitiello**

*Professor of Theoretical Physics, University of Salerno*

**“The dissipative quantum model of brain”**

**Elio Conte**

*Professor of Psychophysiology, University of Bari*

**“Quantum mechanics in the analysis of human perceptual and cognitive functions”**

**Kary B. Mullis**

*Nobel Laureate*

**“Tunnel Vision”**



## Round Table

### Lecture

**Giovanni Broggi**

*Professor of Neurosurgery*

*Fondazione IRCCS Istituto Neurologico C. Besta*

**“Neuromodulation in psychiatric disorders”**

### Chairpersons

*Paolo Castrogiovanni and Claudio Mencacci*

**“What’s right and what’s wrong in psychiatry?”**

### Lectures and Discussion

*Monsignor Elio Sgreccia, Fabio Gabrielli, Vincenzo Guerracino,  
Ines Caneponi, Alfredo De Filippo, Angelo Manenti, Andrea Peracino*

### Special Lectures

**Cesario Bellantuono**

*Professor of Psychiatry, University of Ancona*

**“Lights and shadows in psychiatric therapy”**

**Claudio Mencacci**

*Head of Psychiatry, Fatebenefratelli Hospital, Milan*

**“The different levels of bipolarity”**

**Avi Peled**

*Chair of Dept SM, Mental Health Center*

*Lecturer 'Technion' Israel Institute of Technology*

**“Clinical brain profiling, a future diagnostic system for psychiatry”**



## The Biomolecular Approach to Psychiatry

**Chairperson**  
**Orlando Todarello**

*Professor of Psychiatry, University of Bari*

**Mark Rasenick**

*Professor of Psychiatry*

*Director, Biomedical Neuroscience Training Program*

*Department of Physiology & Biophysics, College of Medicine, University of Illinois, USA*

**“Quantitative psychiatry: a future in psychiatry”**

**Lucio Tonello**

*Professor of Bio-Mathematical Sciences*

*Faculty of Human Sciences*

*L.U.de.S. University, Lugano, Switzerland*

**“How mathematics can inform the diagnosis of mood disorders”**

**Massimo Cocchi**

*Professor of Nutrition Biochemistry*

*Institute "Paolo Sotgiu" For Quantitative and Evolutionary Psychiatry and Cardiology*

*L.U.de.S. University, Lugano, Switzerland*

*Department of Medical Veterinary Sciences, University of Bologna*

**“The molecular hypothesis of consciousness and its psychiatric implications”**

**Johanna Assies**

*Professor of Psychiatry*

*Department of Psychiatry, Academic Medical Center*

*Meibergdreef 5, Amsterdam, The Netherlands*

**“Fatty acids and mood disorders”**

### Molecular Changes in Mood Disorders

### Results of the Marche Region Special Project

*Project Coordinator: Prof. Franco Canestrari*

*Scientific Project Leader: Prof. Massimo Cocchi*

#### Clinical Aspects

*Dott. Raimondo Venanzini, Dott.ssa Raffaella Silvestri*

#### Blood Chemistry Analysis

*Dott. Massimo Valentini*

#### Markers of Oxidative Stress

*Dott. Serena Benedetti, Dott. Maria Chiara Tagliamonte*

#### Platelet Membrane Markers

*Prof. Anna Rita Mastrogiovanni, Dott. Valerio Marconi,  
Dott. Sabina Buccarelli, Prof. Mark Rasenick*

#### Gene Expression

*Prof. Maria Stella Colombo, Prof. Armando Gregorini*



## Quantum Paradigms of Psychopathology (QPP Symposium)



**Massimo Pagnolato**  
*Chairperson, QPP Group*  
**Mansoor Malik**  
*Corresponding Secretary, QPP Group*

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### Keynote Address **Gordon Globus**

*Professor Emeritus of Psychiatry and Philosophy  
University of California at Irvine, USA  
“Mal-attunement in schizophrenia”*

**Orlando Todarello**  
*Professor of Psychiatry  
Department of Neurological and Psychiatric Sciences, University of Bari  
“From psychiatric experience to the quantum frontier”*

**Ursula Werneke**  
*Associate Professor of Psychiatry  
Department of Psychiatry, Umeå University and Sunderby Hospital, Luleå, Sweden  
“Psychiatry and reality—perception of matter or matter of perception?”*

**Peter Bruza**  
*Professor of Science and Technology  
Queensland University of Technology, Australia  
“Idealistic quantum psychopathology: a way forward?”  
“Modes of dissipation: the green episteme and its not-so-green psychopathologies”*

**Donald Mender**  
*Lecturer in Psychiatry,  
School of Medicine, Yale University, USA  
“Psychopathology and the subjective foundations of quantum physics”*

**Efstratios Manousakis**  
*Professor of Physics  
Florida State University  
“Paradigm shifts in mental illness”*

**Gustav Bernroider**  
*Associate Professor of Neurobiology  
University of Salzburg, Austria  
“Neural correlates of higher level brain functions”*

**Jack Tuszyński**  
*Professor and Allard Research Chair  
Department of Physics, University of Alberta, Canada  
“Is there a rationale for designing new psychiatric drugs?”*

**Massimo Pagnolato**  
*Professor of Medicinal Chemistry  
University of Pavia  
“The role of microtubules in psychopathology”*

**Concluding remarks: Eliano Pessa and Paola Zizzi**