1st International
Neuroergonomics Conference

THE BRAIN AT WORK
AND IN EVERYDAY LIFE

OCTOBER 6 & 7, 2016

AXA Headquarters / PARIS - FRANCE

Conference Guide & Abstract Booklet

Join hundreds of scientists, leading researchers, and interested industry colleagues for two full days of high-value and exciting presentations from the community's world-leading scientists on the cutting edge of exciting new areas of Neuroergonomics research.

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WELCOME

Dear Colleagues,

On behalf of the whole Organizing Committee we would like to warmly welcome you to Paris at the **1st International Conference of Neuroergonomics**. We express our gratitude of all those who have contributed to bring this conference into existence.

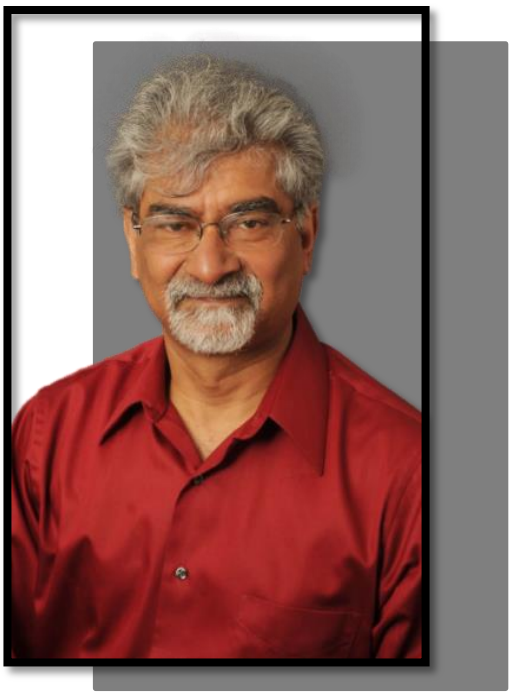
The conference is hosted by the AXA Research Fund and supported by a range of exhibitors.

A large number of abstracts were submitted at this occasion (>100). This event features 9 keynote speakers, 3 roundtables, 2 special sessions, several posters presentations, demonstrations of emerging technologies, and a 2-day long space exhibition with 6 selected exhibitors that provide state-of-the-art products, systems and services for the users, professionals, and researchers in the **Neuroergonomics** field.

NEUROERGONOMICS

Neuroergonomics is **the application of tools and knowledge of Neuroscience to Ergonomics/Humans Factors**. The overall objective of Neuroergonomics is to use existing data on human performance and brain functions to design human-centered systems to improve their safety and efficiency. The discipline also aims at providing an advanced understanding of the neural mechanisms that sustained the human performance.

RAJA PARASURAMAN



This conference is dedicated to Professor Raja Parasuraman who unexpectedly passed on March 22nd 2015. **Raja Parasuraman's pioneering work led the emergence of Neuroergonomics** as a new scientific field. He made significant contributions to a number of disciplines from human factors to cognitive neuroscience. His early work included important contributions to topics such as vigilance and human interaction with automated systems. He later consolidated his interests in human factors and cognitive neuroscience to develop a new discipline called **Neuroergonomics**, which he defined as **the study of brain and behavior at work**.

Parasuraman's prizes will be awarded for recognizing researchers' contribution to the promotion of excellence in this new scientific discipline.

HOT TOPICS

- Innovative methodologies and protocols using brain imaging techniques and psychophysiological measurements in realistic operational settings
- Formulate neurobiological models to better understand risky decision making
- Brain Computer Interfaces (BCI) and human performance monitoring in ecological conditions
- Cognitive countermeasures, augmented cognition, and brain stimulations to enhance performance and mitigate human error
- Virtual Reality and Serious Gaming
- Cognitive Performance in Psychological and Neurological Disorders
- Affective processing and emotion recognition from neural and physiological measures
- Genetic, personality and neurobiological factors influencing cognitive performance
- Assessment of cognition in various neurological disorders and in real-time settings and home environments
- Memory, skill acquisition and training assessment
- Ergonomics and Motor Control

INTRODUCTION

THE BRAIN AT WORK AND IN EVERYDAY LIFE

Frédéric Dehais Hasan Ayaz

"… A pilot decides to persist in a risky landing despite critical alarms and adverse weather conditions … A financial analyst, overwhelmed by contradictory and uncertain data, has difficulties to make a decision under time pressure … An anesthesiologist attending a long, complex surgical procedure is physically and mentally fatigued and does not notice a dangerous change in the patient's vital signs ... A brain-injured patient or an elderly fails to adapt when facing unfamiliarity in everyday life situations ..."

In each of these scenarios, decision making and executive functioning are impaired with potentially serious consequences, particularly when humans interact with a dynamic, uncertain or stressing environment. Traditionally, the analysis of such interactions, as practiced by professionals in the field of Human Factors and Ergonomics, has primarily focused on the human operator's behavior and the subjective evaluation. However, recent advances in Cognitive Neuroscience and imaging techniques allow researchers to examine the brain mechanisms in increasingly-naturalistic work and everyday life settings. Moreover, progress in artificial intelligence proposes new models to better understand cognitive processing.

This interdisciplinary approach — termed **Neuroergonomics** — has witnessed extensive growth since its development a decade ago. Accordingly, the time is right to take stock of the achievements of Neuroergonomics research in order to discuss and develop ideas for the future. This is the principal aim of this conference. **Leading investigators in Neuroergonomics from around the world will meet to describe their findings and to reveal their vision of the future of this exciting interdisciplinary field.**

INVITED SPEAKERS

1. Banu Onaral
2. Frédéric Dehais
3. Andreas Fallgatter
4. Hasan Ayaz
5. Stéphane Perrey
6. Lewis Chuang
7. Daniel Callan
8. Sébastien Tremblay
9. Carryl Baldwin
10. Peter Hancock

THURSDAY, OCTOBER 6th

---- 08:00 ----
WELCOME
[in front of audit A&B]

---- 09:00 ----
CONFERENCE OPENING
[audit A]

---- 09:30 ----
Keynote Speaker
PETER HANCOCK
[audit A]
NEUROERGONOMICS CHALLENGES / APPLIED HUMAN FACTORS

---- 10:30 ----
Session 1
POSTERS
[poster rooms]
#2 #14 #17 #25 #28 #30 #32 #36 #39 #50 #54 #56 #57 #58 #62 #66 #69 #72 #73 #77 #79 #81 #85 #90 #91 #92 #107

---- 10:30 ----
Demo
BIOPAC
[audit A]

---- 11:00 ----
Demo
BIONIC
[audit B]

---- 11:30 ----
Plenary Speaker
ANDREAS FALLGATTER
[audit A]
MEASURING THE BRAIN AT WORK WITH NIRS / MEDICAL

---- 12:00 ----
Chaired by AXA
ROUNDTABLE
[audit A]
HUMAN AFTER ALL -- HOW TECHNOLOGICAL ADVANCEMENTS REACH AND IMPACT… YOU

---- 12:30 ----
LUNCH
offered by generous sponsors
[atrium]

---- 13:30 ----
Plenary Speaker
LEWIS CHUANG
[audit A]
HOW DOES STEERING DISTRACT US FROM PROCESSING AUDITORY INFORMATION?

---- 14:00 ----
SPECIAL SESSIONS

Chaired by Lewis Chuang
[audit A]
DRIVING (THE) DISTRACTION
#103 #104 #105 #106

Chaired by Alain Hamaoui
[audit B]
ERGONOMICS AND MOTOR CONTROL
#22 #12 #23 #24 #27

---- 15:00 ----
Session 1
POSTERS
[poster rooms]
#2 #14 #17 #25 #28 #30 #32 #36 #39 #50 #54 #56 #57 #58 #62 #66 #69 #72 #73 #77 #79 #81 #85 #90 #91 #92 #107

---- 16:00 ----
Chaired by AXA
ROUNDTABLE
[audit A]
ARTIFICIAL INTELLIGENCE, THE NEW FRONTIER OF FINANCE?

---- 16:30 ----
Plenary Speaker
STÉPHANE PERREY
[audit A]
NEUROSTIMULATION / HUMAN MOVEMENT SCIENCES

---- 17:00 ----
Regular Talks

Chaired by Sébastien Scannella
DRIVING
[audit A]
#38 #10 #15 #19 #37 #96

Chaired by Andreas Fallgatter
EMERGING
[audit B]
#3 #33 #68 #75 #87 #93

---- 18:30 ----
Plenary Speaker
CARRYL BALDWIN
[audit A]
NEUROERGONOMICS IN AUTONOMOUS SYSTEMS

---- 19:00 ----
PARASURAMAN PRIZES
[audit A]

---- 19:30 ----
COCKTAIL & #GALADINNER
[atrium]

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DRIVING (THE) DISTRACTION

THURSDAY, OCTOBER 6th
---- 14:00 ----
SPECIAL SESSIONS

DRIVING HEADLONG INTO THE UNCANNY VALLEY OF AUTONOMOUS DRIVING

Lewis Chuang, Dietrich Manstetten, Christian Janssen, Gianluca Borghini, Jochem Rieger

Driving has always been a distraction from the activities that we would rather be doing instead, be it reading or playing mobile games (Hancock, 2013). Therefore, we welcome the promise of autonomous driving. Progress in automation technology for automobiles, from gear transmission to lane change maneuvers to route-planning, casts the illusion that we are within reach of a cheap equivalent of a human chauffeur. This is because we expect machines to perform tasks just as we would ourselves, only safer, and faster. Unfortunately, it is false to assume that artificial intelligence achieves task competencies in the same way as our own minds. The algorithms that underlie "self-driving" cars are unlike our own minds. This has been tragically demonstrated by the recent fatality in the so-called self-driving Tesla automobile (Model S). Furthermore, research in neuroscience often reveals that our minds rarely operate in the way that we think they do. Although self-driving vehicles promise to relieve drivers from the dull aspects of the perceptual-motor task of steering, it does not explicitly promise that drivers will be free to attend to non-driving tasks. Rather, it will require the driver to merely monitor the driving situation without acting on it, except when the occasion requires it; this is a task that the human mental condition might be ill-suited for (Parasuraman, Sheridan, & Wickens, 2000). How should humans negotiate task-sharing with an automobile with automation capabilities? How can we operate safely in a vehicle environment wherein driving is the distraction? This symposium will address how non-driving tasks can be performed in the context of self-driving vehicles, without compromising the situational awareness and safety of drivers. Our speakers will address the following. **Dr. Lewis Chuang** (Max Planck Institute for Biological Cybernetics, Germany) will address the aspects of manual steering that affect our ability to process information. **Prof. Dietrich Manstetten** (Robert Bosch GmbH, Germany) will explain the actual proficiencies and limitations of state-of-the-art advanced driving assistance systems. **Dr. Chris Janssen** (Utrecht University, Netherlands) will present contemporary cognitive models of distraction during driving. **Dr. Gianluca Borghini** (Brainsigns; Sapienza University of Rome, Italy) will present on the sensor technologies for estimating user states in driving environments. Prof. Jochem Rieger (University of Oldenburg, Germany) will explain the relevance of our current understanding of brain functions to operational safety in the vehicle environment. This session will be concluded with a round-table discussion to identify the anticipated challenges that arise from the gap between user expectations in automated driving scenarios and the realistic limitations of human capabilities as well as the technologies that support automated driving.

DEMONSRATIONS

Special satellite demonstration sessions are organized during this Conference, highlighting the main technology developments and recent research developments of **Neuroergonomics**.
The purpose of these sessions is to provide all participants an exciting and highly interactive opportunity to showcase and discuss live demonstrations with our exhibitors.

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THURSDAY, OCTOBER 6th
---- 10:30 ----
DEMONSTRATION
INTEGRATING EYETRACKING DATA WITH PHYSIOLOGICAL SIGNALS

FRIDAY, OCTOBER 7th
---- 10:00 ----
DEMONSTRATION
INTEGRATING FNIR DATA WITH PHYSIOLOGICAL SIGNALS

Bionic®

THURSDAY, OCTOBER 6th
---- 11:00 ----
DEMONSTRATION
MULTIMODALITY LANDSCAPES IN NEUROERGONOMICS: LIVEAMP AND NIRSPORT INTEGRATION (EEG/fNIRS)

FRIDAY, OCTOBER 7th
---- 09:30 ----
DEMONSTRATION
THE LIVEAMP, THE FLEXIBLE SOLUTION FOR NEUROERGONOMIC INVESTIGATION (EEG)

FRIDAY, OCTOBER 7th

---- 08:00 ----
WELCOME
[in front of audit A&B]

---- 08:30 ----
Chaired by Carryl Baldwin
SPECIAL SESSION
[audit A]
NEUROERGONOMICS IN AUTONOMOUS SYSTEMS
#82 #108
#109 #110

---- 09:30 ----
Session 2
POSTERS
[poster rooms]
#4 #6 #7 #13 #16 #18 #26 #29 #34 #46 #47 #48 #51 #52 #55 #59 #60 #61 #63 #74 #76 #80 #82 #84 #89 #95 #99 #101

---- 09:30 ----
Demo
BIONIC
[audit A]

---- 10:00 ----
Demo
BIOPAC
[audit B]

---- 10:30 ----
Plenary Speaker
DANIEL CALLAN
[audit A]
AVIATION CEREBRAL EXPERIMENTAL SCIENCES

---- 11:00 ----
Regular Talks

Chaired by Stéphane Perrey
NEUROSTIM.
[audit A]
#40 #35
#70 #88

Chaired by Kevin Mandrick
AVIATION
[audit B]
#11 #64
#71 #94

---- 12:00 ----
Plenary Speaker
FRÉDÉRIC DEHAIS
[audit A]
A NEUROERGONOMICS APPROACH TO UNDERSTAND PERSEVERATION

---- 12:30 ----
LUNCH
offered by generous sponsors
[in front of audit A&B]

---- 13:30 ----
Plenary Speaker
HASAN AYAZ
[audit A]
NEUROENGINEERING / BCI

---- 14:00 ----
Regular Talks

Chaired by Hasan Ayaz
NEURO. INTERFACES #1
[audit A]
#83 #9 #97

Chaired by Frédéric Dehais
REFLEXIONS & SCOPES
[audit B]
#49 #42
#65 #67

---- 15:00 ----
Session 2
POSTERS
[poster rooms]
#4 #6 #7 #13 #16 #18 #26 #29 #34 #46 #47 #48 #51 #52 #55 #59 #60 #61 #63 #74 #76 #80 #82 #84 #89 #95 #99 #101

---- 16:00 ----
Plenary Speaker
SÉBASTIEN TREMBLAY
[audit A]
URBAN SCIENCES

---- 16:30 ----
Regular Talks

Chaired by Banu Onaral
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[audit A]
#21 #31 #44
#98 #102

Chaired by Sébastien Tremblay
HCI & NAVIGATION
[audit B]
#53 #5 #8
#43 #45 #86

---- 17:30 ----
Chaired by Banu Onaral
ROUNDTABLE
[audit A]
PROMISES AND POTENTIALS OF NEUROERGONOMICS

CONCLUSION
[audit A]

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#23 by **TEBBACHE** (nadege.tebbache@univ-jfc.fr) from Univ. Albi, France title EFFECT OF SEAT AND BACKREST SLOPING ON THE BIOMECHANICAL STRAIN SUSTAINED BY THE BODY

#24 by **SOUISSI** (hibasouissi89@gmail.com) from Univ. Albi, France title EFFECT OF HUMAN EXPOSURE TO WHOLE-BODY VIBRATION IN TRANSPORT

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#34 by **BANVILLE** (hubert.banville@emt.inrs.ca) from Univ. Québec, Montréal title TOWARDS MENTAL WORKLOAD MEASUREMENT USING MULTIMODAL EEG-FNIRS MONITORING

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