



PCN - Horizon2020

Luminous

H2020, FET-Open-RIA (2015)

Fabrice Wendling

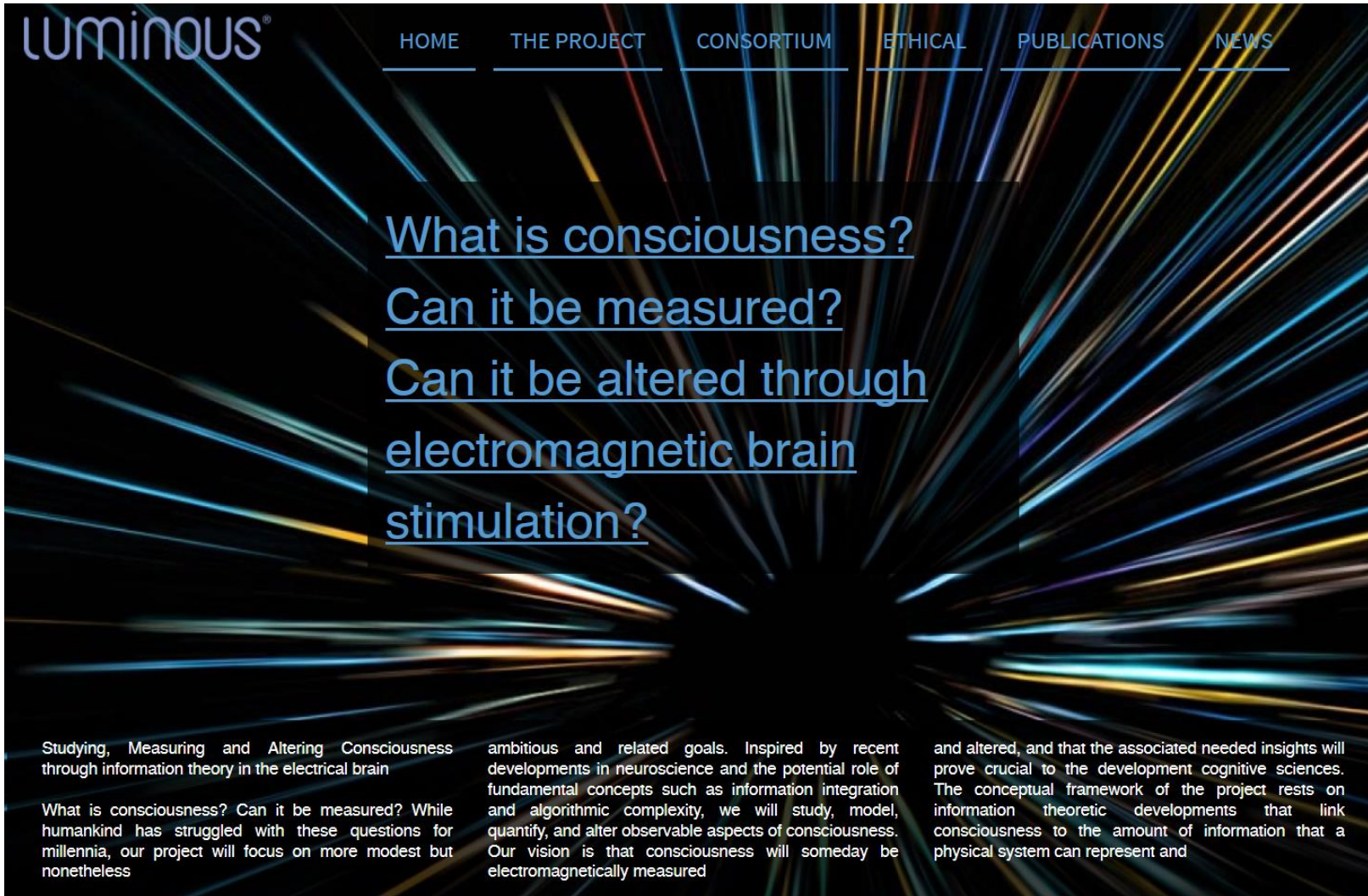
Laboratory of Signal and Image Processing (**LTSI**)

INSERM U1099 - University of Rennes

France

<http://perso.univ-rennes1.fr/fabrice.wendling/>

Sujet - Enjeux



LUMINOUS

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What is consciousness?
Can it be measured?
Can it be altered through
electromagnetic brain
stimulation?

Studying, Measuring and Altering Consciousness through information theory in the electrical brain

What is consciousness? Can it be measured? While humankind has struggled with these questions for millennia, our project will focus on more modest but nonetheless

ambitious and related goals. Inspired by recent developments in neuroscience and the potential role of fundamental concepts such as information integration and algorithmic complexity, we will study, model, quantify, and alter observable aspects of consciousness. Our vision is that consciousness will someday be electromagnetically measured

and altered, and that the associated needed insights will prove crucial to the development cognitive sciences. The conceptual framework of the project rests on information theoretic developments that link consciousness to the amount of information that a physical system can represent and

STARLAB (Barcelona, Spain) - Coordinator



UNIVERSITY OF LIEGE (Belgium)

UNIVERSITY OF MILAN (Italy)

UNIVERSITY "EBERHARD KARLS" OF TUEBINGEN (Germany)

UNIVERSITY OF OXFORD (UK)

HELMHOLTZ Research Center (Munich, Germany)

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ET DE LA RECHERCHE MEDICALE (France)**



HIVE project (FP7, FET-open, 2008-12)

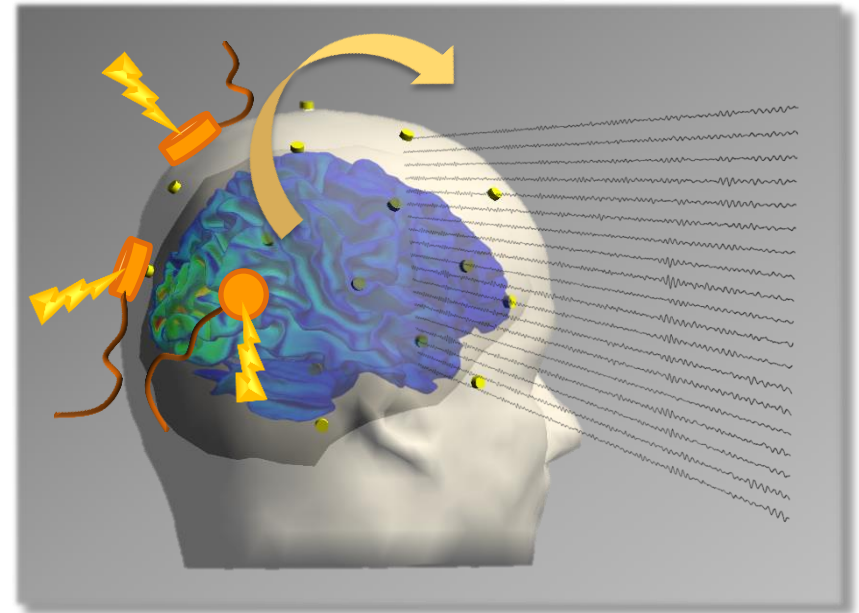
<http://hive-eu.org/>

Main outputs

- **Results (NIBS, tCS)**
- International meetings & workshops
- Models of tCS effects
- Prototype for multisite-tCS
- Startup : NE (neuroelectrics)
- Commercial product (EC-marked)

Potential applications

Luminous



“Gatekeepers”

Long-term vision

“Our vision is that information theoretic principles will play a central role in the understanding of consciousness, that consciousness will someday be widely and easily measured, quantified and safely altered through electromagnetic interaction”

Scientific breakthrough and technological target

- ***“The first breakthrough proposed is the creation of a new class of consciousness-probing technologies that bypass or minimize the use of sensory, motor or executive functions”***
- ***“The second breakthrough targeted here is the electric alteration of consciousness”***

Novelty

“pioneering work in basic science, including information theory concepts, and experimental physiology, clinical applications and technology”

Foundational

“metrics for consciousness; NIBS as intervention”

Risks

Description of risks / Risk-mitigation measures

Interdisciplinary

Engineering, Technology, Maths, Physics, Neuroscience, Neurology

- Lack of support for “Technologies for Health”
- Design of experimental plans involving healthy volunteers/patients
- Ethical issues (acceptance of brain stimulation technologies)
- Signature of consortium agreement

- Be ambitious (long-term vision)
- “Think FET” (technological breakthrough)
- Innovate (change paradigms, provide new foundations)
- Take risks (*but start from preliminary results*)
- Gather excellent & **complementary** academic partners (interdisciplinarity)
- Motivate high-tech SMEs