

BIOGRAPHICAL SKETCH

NAME Lotfi B. Merabet	POSITION TITLE - Assistant Professor of Ophthalmology
eRA COMMONS USER NAME (credential, e.g., agency login) lmerabet	- Associate Director, Visual Rehabilitation

EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Ottawa (Ottawa, Canada)	BSc	1989-1992	Biology
University of Sherbrooke (Sherbrooke, Canada)	MSc	1992-1995	Physiology
University of Montreal (Montreal, Canada)	PhD	1995-1999	Neuroscience
New England College of Optometry (Boston, MA)	OD	1999-2001	Optometry
Harvard-MIT (Health Sciences Technology)	MMSc	2001-2003	Clinical Investigation
Harvard Medical School (Boston, MA)	Postdoctoral	2001-2003	Brain Stimulation
Boston University - MGH Martinos Center for Biomedical Imaging (Boston, MA)	Postdoctoral	2003-2004	Neuroimaging
Harvard School of Public Health	MPH	2009-2011	Clinical Effectiveness

A. Personal Statement

As a clinician-scientist, my main research interest has been in studying the visual system and in particular, the neuroplasticity associated with the adaptation to visual impairment and blindness. My current position as Associate Director of Visual Rehabilitation at the Massachusetts Eye and Ear Infirmary allows the opportunity to work within an environment rich in clinical expertise and resources to carry out cutting edge research. Ultimately, the goal is to understand the neuroplasticity associated with vision loss and developing methods to modulate it for the optimal behavioral and functional outcomes. The importance of this line of investigation is two-fold: First, findings are likely to impact both the rehabilitation and education of the blind and visually impaired. Secondly, the neuroplastic mechanisms underlying these changes may also serve as a basis to enhance the development of novel rehabilitation approaches that are grounded in neuroscientific investigation.

B. Positions and Honors

Positions and Employment

2004-2006 Instructor in Neurology, Harvard Medical School, Boston, MA
 2006-2010 Assistant Professor of Neurology, Harvard Medical School, Boston, MA
 2006-2007 Visiting Professor, Dept. of Bioengineering, Universidad Miguel Hernandez, Spain
 2007-present Adjunct Professor Optometry, Université de Montréal, Canada
 2001-2010 Staff Optometrist, Beth Israel Deaconess Medical Center. Dept. of Surgery/Ophthalmology
 2010-present Associate Director, Vision Rehabilitation, Massachusetts Eye and Ear Infirmary. Boston, MA
 2010-present Assistant Professor of Ophthalmology. Harvard Medical School, Boston, MA

Other Experience and Professional Memberships

2007-present Small Business Innovation Research - National Institutes of Health (SBIR-NIH), Center for Scientific Review
 2007-present Unite for Sight Africa Volunteer (Ghana) and Student Advisor to the Unite for Sight Boston University Chapter, Boston, MA
 2005-present Conference Chairperson and Organizer: Art Beyond Sight and Art Education for the Blind; Metropolitan Museum of Art, New York, NY
 2009-present Scientific Committee Member, Center for Advanced Research in Education (CARE), University of Chile
 1996-present Society for Neuroscience (SFN); Member
 2001-present American Academy of Optometry (AAO); Fellow
 2002-present International Multisensory Research Forum (IMRF); Member
 2003-present Association for Research in Vision and Ophthalmology (ARVO); Member

Honors

1996 Faculty of Medicine and Graduate Studies: Scholarship for Doctoral studies, Université de Montréal
 1996 Research Group in Experimental Neuropsychology (GRENE): Scholarship for Doctoral studies, Université de Montréal
 1998 Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR-MER-MRI): Doctoral Research Internship; Toulouse, France
 1998 Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR-FRSQ-Santé): Doctoral studies
 2001 Feinbloom Award for Excellence in Low Vision and Rehabilitation (internship training)
 2001 Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (FCAR): Postdoctoral Fellow Award
 2001 Canadian Institute for Health Research (CIHR): Postdoctoral Fellow Award
 2001 Harvard-MIT Division of Health Sciences Technology-Pfizer Inc. Clinical Investigator Training Program
 2002 Fellow of the American Academy of Optometry
 2003 National Institute of Health: National Research Service Award (NIH-NEI)
 2004 National Institute of Health: K23 Career Development Award (NIH-NEI)
 2004 National Institute of Health: Loan Repayment Program (NIH-NEI)
 2006 Key Note Lecture: Blinded Veterans Association

2009 Key Note Lecture: Norrie Disease Association First International Conference.

2010 Key Note Lecture: Association for the Education and Rehabilitation of the Blind and Visually Impaired.

C. Selected Peer-reviewed Publications (Selected from 42 peer-reviewed publications)

Most relevant to the current application

1. **Merabet L**, Rizzo J, Amedi A, Somers D, Pascual-Leone A. What blindness can tell us about seeing again: Merging neuroplasticity and neuroprostheses. Nature Reviews Neuroscience. 2005; 6:71-77.
2. **Merabet LB**, Swisher JD, McMains S, Halko MA, Amedi A, Pascual-Leone A, Somers D. Combined activation and deactivation of visual cortex during tactile sensory processing. Journal of Neurophysiology. 2007 Feb;97(2):1633-41.
3. Swisher JD, Halko MA, **Merabet LB**, McMains SA, Somers DC. Visual topography of human intraparietal sulcus. Journal of Neuroscience. 2007 May 16;27(20):5326-37.
4. **Merabet LB**, Hamilton R, Schlaug G, Swisher JD, Kiriakopoulos ET, Pitskel NB, Kauffman T, Pascual-Leone A. Rapid and reversible recruitment of early visual cortex for touch. PLoS One. 2008 Aug 27;3(8).
5. **Merabet LB**, Battelli L, Obretenova S, Maguire S, Meijer P, Pascual-Leone A. Functional recruitment of visual cortex for sound encoded object identification in the blind. Neuroreport. 2009 Jan 28;20(2):132-8.
6. Obretenova S, Halko MA, Plow EB, Pascual-Leone A, **Merabet LB**. Neuroplasticity Associated with Tactile Language Communication in a Deaf-Blind Subject. Frontiers in Human Neuroscience 2010 Jan 4;3:60.
7. Bolognini N, Senna I, Maravita A, Pascual-Leone A, **Merabet LB**. Auditory Enhancement of Visual Phosphene Perception: The Effect of Temporal and Spatial Factors and of Stimulus Intensity. Neurosci Lett. 2010 Jun 25;477(3):109-14.
8. **Merabet LB**, Pascual-Leone A. Neural Reorganization Following Sensory Loss: The Opportunity for Change. Nature Reviews Neuroscience. 2010 Jan;11(1):44-52.

Additional recent publications of importance to the field

- Merabet L**, Desautels A, Minville K, Casanova C. Motion integration in a thalamic visual nucleus. Nature. 1998; 396(6708):265-8.
- Ramos-Estebanez C, **Merabet LB**, Machii K, Fregni F, Thut G, Wagner TA, Romei V, Amedi A, Pascual-Leone A. Visual phosphene perception modulated by sub-threshold cross-modal sensory stimulation. Journal of Neuroscience. 2007 Apr 11;27(15):4178-81.
- Pitskel NB, **Merabet LB**, Ramos-Estebanez C, Kauffman T, Pascual-Leone A. Time-dependent changes in cortical excitability after prolonged visual deprivation. Neuroreport. 2007 Oct 29;18(16):1703-7.
- Romei V, Murray MM, **Merabet LB**, Thut G. Occipital transcranial magnetic stimulation has opposing effects on visual and auditory stimulus detection: implications for multisensory interactions. Journal of Neuroscience. 2007 Oct 24;27(43):11465-72.
- Halko MA, Datta A, Plow EB, Scaturro J, Bikson M, **Merabet LB**. Neuroplastic changes following rehabilitative training correlate with regional electrical field induced with tDCS. Neuroimage. 2011 Aug 1;57(3):885-91
- Merabet, LB**. Building the Bionic Eye: An Emerging Reality and Opportunity. Prog Brain Res. 2011;192:3-15.
- Plow EB, Obretenova S, Halko MA, Kenkel S, Jackson ML, Pascual-Leone A, **Merabet LB**. Combining Visual Rehabilitative Training and Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia: A Comparative Case Study. Physical Medicine and Rehabilitation. 2011. *In press*
- Plow EB, Obretenova SN, Fregni F, Pascual-Leone A, **Merabet LB**. Noninvasive Brain Stimulation and Visual Rehabilitation in Hemianopia: a preliminary randomized clinical trial. Neurorehabilitation and Neural Repair. 2011. *In Press*

D. Research Support

Ongoing Research Support

Grant Title: Audio Based Navigation in the Blind

Grant Type and Number: NIH/NEI RO1 EY019924-01

Role on Project (total direct costs): PI (\$1,908,650)

Description of major Goals: To investigate cognitive spatial mapping in the blind through virtual navigation and assess the ability to generate spatial cognitive maps, the transferability of acquired spatial information to real-

world navigation scenarios, and their associated neural correlates using of a computer-based navigation software platform called Auditory-based Environment Simulator (AbES).

Completed Research Support

Grant Title: The Occipital Cortex in Cross-Modal Sensory Processing

Grant Type and Number: NIH/NEI K23 EY016131 (2005-2010)

Role on Project (total direct costs): PI (\$700,000)

Description of major Goals: The goal of this project is to study the role of occipital visual cortex in non visual forms of sensory processing in the blind and sighted. The investigation uses neuroimaging and neurostimulation techniques.

Grant Title: The Use of Transcranial Direct Current Stimulation (tDCS) to Enhance the Rehabilitative Effect of Vision Restoration Therapy (2007-2010)

Grant Type and Number: NovaVision Inc., Boca Raton, FL (industry)

Role on Project (total direct costs): PI (\$120,000)

Description of major Goals: The goal of this project is to study the effect of combing functional brain stimulation with vision rehabilitation to potentially enhance therapeutic benefit in patients with hemianopic visual field loss.

Grant Title: The Role of Visual Cortex in Tactile Object Processing

Grant Type and Number: NIH NRSA F32EY015608 (2004-2005)

Role on Project (total direct costs): PI (\$250,000)

Description of major Goals: The goal of this project is to study the role of occipital visual cortex in non visual forms of sensory processing in the blind and sighted. The investigation uses neuroimaging and neurostimulation techniques.

Grant Title: A Multi-modal Sensory Rehabilitation Strategy for the Augmentation of Functional Vision

Grant Type and Number: US Army DoD/CIMIT W81XWH-07-2-0011 (2006-09)

Role on Project (total direct costs): PI (\$50,000)

Description of major Goals: The goal of this project is to develop a crossmodal sensory platform (audio-haptic enabling technology) to enhance sensory integration and rehabilitation in patients with visual impairment.

Grant Title: Seeing Through the Ears

Grant Type and Number: NIH/NEI R21 EY0116168 (2005-08)

Role on Project (total direct costs): Co-Investigator (\$500,000)

Description of major Goals: This R21 examines the potential a visuo-auditory sensory substitution system for the blind.

Grant Title: Neuroplasticity in the Adjustment to Blindness

Grant Type and Number: NIH/NEI RO1 EY12091 (1998-08)

Role on Project (total direct costs): Co-Investigator (\$2,000,000)

Description of major Goals: This project studies mechanisms of recruitment of the occipital striate cortex for Braille reading in the blind by visually depriving sighted volunteers and teaching them intensively how to read Braille by touch.

Grant Title: Joint Declaration after the 9th Biennial review meeting on Scientific and Technological Cooperation between the Republic of Italy and the United States of America (2008-2009)

Grant Type and Number: international collaborative effort

Role on Project (total direct costs): Co-PI (\$50,000)

Description of major Goals: This project studies the neuroplasticity related to blindness and the development of novel rehabilitative approaches. Funding supports international travel to promote collaborative exchanges between the two host countries.