

## Harvard Medical School Curriculum Vitae

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### Education

05/89-04/93	BSc	Biology	University of Ottawa
05/93-04/96	MSc	Physiology	Université de Sherbrooke (C. Casanova)
05/96-04/99	PhD	Neuroscience	Université de Montréal (C. Casanova)
05/01-04/03	OD	Optometry	New England College of Optometry
07/03-06/04	MMSc	Clinical Investigation	Harvard Medical School-MIT Health Sciences Technology (HST)
07/09-11/11	MPH	Clinical Effectiveness	Harvard School of Public Health

### Postdoctoral Training

06/01-05/03	Research Fellow	Noninvasive Brain Stimulation (A. Pascual-Leone)	Beth Israel Deaconess Medical Center Harvard Medical School, Boston, MA
06/03-06/04	Research Fellow	Neuroimaging (D. Somers)	Boston University and MGH-Martinos Center for Biomedical Imaging, Boston, MA

### Faculty Academic Appointments

07/04-01/06	Instructor	Neurology	Beth Israel Deaconess Medical Center Harvard Medical School, Boston, MA
02/06-07/10	Assistant Professor	Neurology	Beth Israel Deaconess Medical Center

06/06-05/07	Visiting Scientist	Bioengineering	Harvard Medical School, Boston, MA Universidad Miguel Hernandez, Alicante, Spain
01/07-present	Adjunct Professor	Optometry	Université de Montréal, Montreal, Canada
08/10-10/12	Assistant Professor	Ophthalmology	Massachusetts Eye and Ear Harvard Medical School, Boston, MA
08/11-11/12	Assistant Scientist	Ophthalmology	Schepens Eye Research Institute Harvard Medical School, Boston, MA
11/12-present	Associate Professor	Ophthalmology	Massachusetts Eye and Ear Harvard Medical School, Boston, MA
12/12-present	Associate Scientist	Ophthalmology	Schepens Eye Research Institute Harvard Medical School, Boston, MA
6/16-present	Visiting Professor	Brain and Behavioral Sciences	Università degli Studi di Pavia Pavia, Italy

### **Appointments at Hospitals/Affiliated Institutions**

#### **current**

07/10-present	Staff Optometrist	Vision Rehabilitation Service	Massachusetts Eye & Ear
07/11-present	Director	Howe Research Laboratories	Laboratory for Visual Neuroplasticity. Massachusetts Eye & Ear Schepens Eye Research Institute
11/14-present	Staff Optometrist	Physical Medicine & Rehabilitation	Spaulding Rehabilitation Hospital

#### **past**

06/01-07/10	Staff Optometrist	Ophthalmology	Beth Israel Deaconess Medical Center, Harvard Medical Faculty Physicians
02/06-07/10	Principal Investigator	Neurology	Center for Noninvasive Brain Stimulation, Beth Israel Deaconess Medical Center
07/03-07/11	Research Scientist	Research	Center for Innovative Visual Rehabilitation Boston VA Medical Center

### **Other Professional Positions**

2011-2012	Member of Corporation	National Braille Press. Boston, MA
2011-present	Scientist	Boston Retinal Implant Project. Boston, MA
2012-present	Board of Directors	Carroll Center for the Blind. Newton, MA

	Chair of Program Committee (2012-2015)	
2012-present	Board of Trustees	National Braille Press. Boston, MA

### **Major Administrative Leadership Positions**

#### **local**

2010-2011	Associate Director, Vision Rehabilitation	Massachusetts Eye & Ear
2010-2011	Program advisor and mentor	Harvard Latin American Initiative, Harvard University
2010-2015	Course Co-director; Clinical, Assessment, Intervention Updates in Neurorehabilitation	Harvard Medical School, CME

#### **national**

2005-2009	Conference Organizing Committee	Art Education for the Blind, Metropolitan Museum of Art. New York, NY
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### **Committee Service**

#### **local**

2012-present	Reviewer	Data Safety Monitoring Board, Boston-Harvard Burn Injury Model System (BH-BIMS). Spaulding Rehabilitation Hospital Funding: NIH/NIDRR
2012-2016	Mentor	Governor's Academy Summer Internship Program
2013-2014	Member	Internal Communications Committee, Schepens Eye Research Institute, MEEI
2013-present	Reviewer	Office of Intellectual Property & Commercial Ventures, MEEI
2016-present	Member	SERI Distinguished Lecture Series Committee

#### **regional**

2010-2011	Advisory Board	Art Beyond Site Museum Education Institute. Multi-Site Museum Study. New York, NY
2011	Curriculum Review Committee	New England College of Optometry, Boston, MA

#### **national**

2009-2014	Scientific Committee Member	Center for Advanced Research in Education (CARE). University of Chile, Chile
2010-2015	Scientific Consultant	Documentary Film: "Do You Dream in Color"
2015-2016	Advisory Board	Sandbox SEF (Shared Experimental Facility)
2015	Member	Retinal Prosthesis Study Group
2015-present	Mentor	Massachusetts Commission for the Blind Summer Internship Program
2015-present	Mentor	New England College of Optometry T35 Summer

## Mentorship Program

### **international**

2007	Medical Volunteer	Unite for Sight Africa, Ghana
2009-present	Member	Instituto Scala, Brazil

### **Professional Societies**

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

### **Grant Review Activities**

2007-present	Small Business Innovation Research (SBIR)/ Small Business Technology Transfer Grants (STTR) Center for Scientific Review NEI-NIH	Ad hoc Reviewer (co-chair 2009)
2010	Experimental and Translational Medicine Research Review Committee	Chief Scientist Office, Scotland Ad hoc Reviewer
2010	Scientific Review Committee	National Fund for Science and Technology, Chile, Ad hoc Reviewer
2011	Scientific Review, Health & Biology	Agence Nationale de la Recherche, France Ad hoc Reviewer
2012	Defense Medical Research and Development Program (DMRDP)	Vision Restoration and Rehabilitation Award (VRR), Ad hoc Reviewer
2013	Department of Veterans Affairs	Small Projects in Rehabilitation Research (SPiRE), Ad hoc Reviewer
2015	A*Star Biomedical Engineering Program	Center for Integration of Medicine and Innovative Technology (CIMIT), Ad Hoc Reviewer
2016-present	NIH Loan Repayment Program	Ad hoc Reviewer

### **Editorial Activities**

#### **Ad hoc reviewer**

Brain Research

Brain and Language  
 Case Reports in Psychiatry  
 Cerebral Cortex  
 Cortex  
 Current Biology  
 Current Directions in Psychological Sciences  
 Encyclopedia of Biomedical Engineering  
 Epilepsy and Behavior  
 European Journal of Neuroscience  
 Experimental Brain Research  
 Frontiers in Human Neuroscience  
 Frontiers in Psychology  
 IEEE Transactions in Neural Systems & Rehabilitation Engineering  
 Investigative Ophthalmology and Vision Science  
 Journal of Adaptive Control and Signal Processing  
 Journal of Neuroscience  
 Journal of Neuroscience Methods  
 Journal of Neuropsychology  
 Neural Plasticity  
 Neuroimage  
 Neuromodulation  
 Neurorehabilitation and Neural Repair  
 Neuroscience Letters  
 Neuropsychologia  
 PLoS Biology  
 PLoS One  
 Proceedings of the national Academy of Science (PNAS)  
 Restorative Neurology and Neuroscience  
 Research in Developmental Disabilities

### **Other Editorial Roles**

2012	Co-editor, special issue	Neuromodulation: Technology at the Neural Interface, "Bench to Clinical Translational Applications of Noninvasive Brain Stimulation"
2013	Co-editor, special issue	Frontiers in Human Neuroscience, "Sensory interactions in the Plastic Brain"

### **Honors and Prizes**

1996	Scholarship	Faculty of Medicine and Graduate Studies Université de Montréal	Doctoral studies
1996	Scholarship	Faculty of Medicine and Graduate Studies	Doctoral studies

		Université de Montréal	
1998	Research Internship	Fonds pour la Formation de Chercheurs et l'Aide à la Recherche (France)	Doctoral studies
1998	Scholarship	Fonds pour la Formation de Chercheurs et l'Aide à la Recherche	Doctoral studies
2001	Feinbloom Award for Excellence in Low Vision and Rehabilitation	New England College of Optometry	Clinical internship
2001	Fellowship Award	Fonds pour la Formation de Chercheurs et l'Aide à la Recherche	Postdoctoral studies
2001	Fellowship Award	Canadian Institute for Health Research	Postdoctoral studies
2001	Clinical Investigator Training Program	Harvard-MIT Division of Health Sciences Technology	Postdoctoral studies
2002	Fellow	American Academy of Optometry	
2004	Federal Loan Repayment Program	National Institutes of Health	
2005	Federal Loan Repayment Program	National Institutes of Health	
2011	Nominee, Young Mentor Award	Harvard Medical School	
2014	TEDx Cambridge	Editor's Choice Presentation	
2014	Featured Presenter: Power Of Ideas	Boston Magazine	
2015	Award of Distinguished Speaker	Principles and Practice of Clinical Research, Harvard Medical School Department of Continuing Education	
2016	Research to Prevent Blindness	Low Vision Research Award	

## **Report of Funded and Unfunded Projects**

### **Funding Information**

#### **Past**

- 2004-2005     The Role of Visual Cortex in Tactile Object Processing  
NIH/NEI NRSA F32EY015608  
PI (\$250,000)  
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.
- 2006-2009     A Multi-modal Sensory Rehabilitation Strategy for the Augmentation of Functional Vision  
US Army DoD/CIMIT W81XWH-07-2-001  
PI (\$50,000)

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.

- 2005-2008    Seeing Through the Ears  
NIH/NEI R21 EY0116168  
Investigator (\$500,000) (PI: A. Pascual-Leone)  
This R21 examines the potential of a visual-auditory sensory substitution system for the blind.
- 1998-2008    Neuroplasticity in the Adjustment to Blindness  
NIH/NEI RO1 EY12091  
Investigator (\$2,000,000) (PI: A. Pascual-Leone)  
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.
- 2008-2010    A Life-span Perspective on Cognitive Impairment in Low-Vision: Hints for Possible Rehabilitation Strategies  
Joint Declaration after the 9th Biennial Review Meeting on Scientific and Technological Cooperation between the Republic of Italy and USA  
Co-Investigator (\$50,000)  
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.
- 2005-2010    The Occipital Cortex in Cross-Modal Sensory Processing  
NIH/NEI K23 EY016131  
PI (\$700,000)  
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.
- 2007-2010    The Use of Transcranial Direct Current Stimulation (tDCS) to Enhance the Rehabilitative Effect of Vision Restoration Therapy  
NovaVision Inc., Boca Raton, FL (industry)  
PI (\$50,000)  
The goal of this project is to study the effect of combining functional brain stimulation with vision rehabilitation to potentially enhance therapeutic benefits in patients with hemianopic visual field loss.
- 2013-2014    Neuroplastic Reorganization in Cortical-Visual Impairment (CVI)  
Massachusetts Lions Eye Research Fund  
Co-PI (\$56,333)  
The goal of this investigation is to correlate visual and non-visual sensory function

with structural brain reorganization in patients with CVI.

- 2012-2013      How the Brain Re-wires Itself in Cortical Visual Impairment (CVI)  
The John W. Alden Trust  
PI (\$15,000)  
The goal of this pilot investigation is to establish a conceptual framework relating sensory function with structural brain reorganization in order to better understand the underlying developmental neurophysiology of individuals with CVI using a combined clinical and structural neuroimaging approach.
- 2012-2014      Research Supplements to Promote Diversity in Health-Related Research  
NIH/NEI R01EY019924/Merabet  
PI (\$166,861)  
This supplement is to support the mentorship of a blind student pursuing graduate level studies.
- 2010-2015      Audio Based Navigation in the Blind  
NIH/NEI RO1 EY019924  
PI (\$1,908,650)  
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 a computer-based navigation software platform called Auditory-based Environment Simulator (AbES).
- 2012-2014      Mental Maps for Navigation Through Video Games  
Chilean National Fund for Science and Technology (FONDECYT)  
International Collaborator (US \$254,000)  
To analyze the construction of mental maps to develop and improve the navigation skills in real contexts through the interaction with video games.
- 2014              Merging Neuroplasticity, Education, and Rehabilitation Studies in the Blind  
Radcliffe Institute for Advanced Study  
PI/Seminar Organizer (\$15,000)  
This exploratory seminar brings together thought leaders in the fields of neuroscience and assistive technology development, as well as education and accessibility support for the blind to develop a consensus regarding the identification of pressing questions for investigation as well as establishing collaborative research ties.
- 2014-2015      Uncovering the Relationship between Brain Reorganization and Visual Dysfunction in Adolescents with Cortical Visual Impairment (CVI)  
Deborah Munroe Noonan Memorial Research Fund  
PI (\$80,000)  
The goal of this investigation is to correlate visual and non-visual sensory function with structural brain reorganization in patients with CVI.



- 2014-215      Developing Educational Video Games for Blind Children: A Merger of Assistive Technology and Study of Brain Function  
David Rockefeller Center for Latin American Studies, Harvard-Chile Innovation Initiative Grants  
PI (\$21,500)  
We propose to organize a scientific and cultural exchange between Boston and Santiago-based academic institutions working towards the development of novel education and rehabilitation strategies for the blind.
- 2014-2015      Development of a Wearable Wireless EEG Recording System to Monitor Brain Activity in the Blind while Performing Real-World Mobility Tasks  
Massachusetts Lions Eye Research Fund  
PI (\$18,000)  
The goal of this investigation is to develop a wireless EEG system to monitor brain activity during active navigation tasks.
- Current**
- 2016-2019      Research to Prevent Blindness /Lions Clubs International Foundation Low Vision Research Award  
PI (\$300,000)  
The goal of this investigation is to better understand how individual visual impairments relate to the developmental neurophysiology of CVI. We will associate clinical diagnostic assessments of visual dysfunction with structural and functional brain imaging assays to uncover underlying brain integrity and functional connectivity.
- 2015-2019      Audio-Haptic Virtual Environments for Large-Scale Navigation in the Blind  
NIH/NEI RO1 EY019924 (competitive renewal)  
PI (\$1,500,00)  
To investigate large scale cognitive spatial mapping in the blind through audio and haptic based 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 a computer-based navigation software platform.
- 2014-2018      Optimizing Rehabilitation for Phantom Limb Pain Using Mirror Therapy and tDCS  
NIH/NCMRR 1R01HD082302-01A1 (PI: F. Fregni)  
Subcontract PI (\$15,000)  
To investigate the efficacy of a combined intervention of mirror therapy and noninvasive brain stimulation on alleviating phantom limb pain. As co-investigator, this effort will concentrate on uncovering the neural correlates associated with recovery using functional brain imaging.

**Current unfunded projects**

2011-present Co-investigator: Neuroplasticity associated with restored vision after prolonged visual deprivation (PI: Pawan Sinha, MIT)

## **Report of Local Teaching and Training**

### **Teaching of Students in Courses**

1997-1999	Ocular Motility (3 <sup>rd</sup> year Optometry students)	Université de Montréal	Course Instructor/Organizer 8 hrs total lecture time/year
2004-2005	Sensory Perception (Psychology undergraduates)	Boston University	Course Lecturer 4 hrs total lecture time/year
2015-2016	Advanced Topics in Neuroscience (Graduate Students)	Massachusetts Institute of Technology	Course Lecturer 2 hrs total lecture time/year

### **Formal Teaching of Residents, Clinical Fellows and Research Fellows**

#### **local**

2010-2015	Principles and Practice of Clinical Research (Medical students, residents, and graduate students)	Harvard Medical School (CME)	Faculty and course lecturer 3 hrs total lecture time and 8 hrs lab time/year
2011-2015	Study Coordinator Workshop (Medical students, residents, Study coordinators)	Harvard Medical School (CME)	Faculty and course lecturer 2 hrs total lecture time/year
2012-present	Vision: A System and its Assessment: Neuroimaging, Cortical Visual Pathways (Research fellows)	Harvard Medical School (CME)	Faculty and course lecturer 2 hrs total lecture time/year
2015-present	Principles and Practice of Clinical Research (Medical students, residents, and graduate students)	Harvard School of Public Health (CME)	Faculty and course lecturer 3 hrs total lecture time and 8 hrs lab time/year
2015-present	Study Coordinator Workshop (Medical students, residents, Study coordinators)	Harvard School of Public Health (CME)	Faculty and course lecturer 2 hrs total lecture time/year

#### **regional**

2004-2008	Neuroplasticity in the Adjustment to Blindness (Optometry residents)	New England College of Optometry	Lecturer (Summer Session) 2 hrs total lecture time/year
2004-2008	Neuroprosthesis Approaches	New England College of	Lecturer (Summer Session)

	to Restoring Vision (Optometry residents)	Optometry	2 hrs total lecture time/year
2012	Brain, Blindness, and Beyond (Teachers of visually impaired and fellows)	Perkins School for the Blind, Continuing Education	Course Instructor/Organizer 10 hrs total lecture and workshop/year

### **international**

2012-2014	Clinical Research: From Appraisal to Synthesis (Medical students and Residents)	King Saud bin Abdulaziz University Medical Center. Jeddah, Saudi Arabia	Invited lecturer 6 hrs total lecture time/year
2015	Clinical Trial Design and Principles (Graduate students)	Universidad Europea Miguel de Cervantes. Valladolid, Spain	Invited lecturer 6 hrs total lecture time/year
2015	Leadership in Clinical Research (Medical students and Residents)	Pontificia Universidad Católica Madre y Maestra. Santiago, Dominican Republic	Invited lecturer 2 hrs total lecture time/year
2016	Neuroplasticity and the Brain (Graduate and medical students)	Universita di Pavia. Pavia, Italy	Visiting Professor 12 hrs total lecture time/year

### **Clinical Supervisory and Training Responsibilities**

2004-2010	Clinical observations by rotating Interns. Dept. of Ophthalmology, Beth Israel Deaconess Medical Center	1 session per week
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### **Laboratory and Other Research Supervisory and Training Responsibilities**

2006-2011	Supervision of post-doctoral research fellows. Center for Noninvasive Brain Stimulation, Beth Israel Deaconess Medical Center	Daily mentorship
2011-present	Supervision of post-doctoral research Fellows and staff. Laboratory for Visual Neuroplasticity, Massachusetts Eye and Ear	Daily mentorship

### **Formally Supervised Trainees and Faculty**

2002	Janine Ringler, BSc/ Emmanuel College. Summer student from Emmanuel College. Completed summer research project.
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- 2003 Jessica Andrews-Hanna, PhD/ Assistant professor University of Colorado  
Summer student from Duke University. Completed summer research project and accepted to graduate school at Harvard University.
- 2004 Evan Twyford, BA/ Rhode Island School of Design  
Undergraduate scientific mentor for thesis design project (Boston Retinal Implant)
- 2004-2006 Naomi Bass-Pitskel, MD/ University of Pittsburgh  
Supervised research activities (lab research assistant). Published 2 manuscripts including one in PLoS One; Scholarship for medical studies.
- 2006-2007 Sarah Maguire, MD/ Ohio State University  
Supervised research activities (lab research assistant). Published three manuscripts including in the Journal of Neuroophthalmology and Neuroreport.
- 2007-2009 Souzanna Obretenova, BSc/ Medical Student, Georgetown University  
Supervised research activities (lab research assistant). Published six manuscripts including first author in Frontiers in Human Neuroscience.
- 2007-2009 Ela Bhat, PhD PT/ Instructor, Cleveland Clinic  
Postdoctoral fellow mentor. Published six manuscripts including first author in Neurorehabilitation and Neural Repair; NIH K awardee.
- 2007 Jascha Swisher, PhD/ Postdoctoral Fellow, University of Tennessee  
Doctoral dissertation committee, Boston University. Published three manuscripts including first author in the Journal of Neuroscience; NIH NRSA awardee.
- 2007 Ciro Ramos-Estebanez, MD/ Instructor, University of Miami School of Medicine  
Clinical research fellow mentor. Published one manuscript including first author in the Journal of Neuroscience.
- 2007 Frederique Gougoux, PhD/ Private practice (psychology)  
Doctoral dissertation committee, Université de Montréal. Doctoral work lead to eight publications including one in the journal Nature (not co-author).
- 2008 Zaira Cattaneo, PhD/Assistant Professor, University of Milan  
Postdoctoral fellow mentor. Published two manuscripts including first author in Brain Research Bulletin.
- 2008 Corinne Tremblay, PhD/ Private practice (psychology)  
Doctoral dissertation committee, Université de Montréal. Doctoral work lead to four publications including Neurology, PLoS One, and Brain (not co-author).
- 2009 Madeleine Fortin, PhD/ Private practice (psychology)  
Doctoral dissertation committee, Université de Montréal. Doctoral work lead to seven publications including Brain (not co-author).
- 2009-2012 Mark Halko, PhD/ Instructor, Harvard Medical School  
Postdoctoral fellow mentor. Harvard Catalyst KL2 Awardee. Published two manuscripts including one as first author in Neuroimage.
- 2009-2012 Seth Elkin-Frankston, PhD/ Post-doctoral fellow, University of Paris  
Doctoral dissertation committee, Boston University. Published six manuscripts including first author in PLoS One (not-co-author).
- 2010-2013 Erin Connors, MEd/ Study Coordinator, Hunter's Hope Foundation  
Supervised research activities (lab research assistant) and masters advisor as of 2012 (Harvard Graduate School of Education)  
Published three manuscripts including first author in the Journal of Visualized

Experiments.

2010-2012 Vanessa Suarez, MD/ Medical student, University of Colombia, Columbia  
Clinical research fellow mentor. Harvard Latin American Initiative

2011, 2012 Molly Connors/ Undergraduate student, Colgate University  
Summer internship student from Colgate University.

2011 Aranzau Alfaro, MD/ Medical student, University Miguel Hernandez, Spain.  
Doctoral dissertation committee. International thesis advisor. Published two manuscripts including first author in Neurocase.

2012 Andre Bruoni, MD/ Medical student, University of Sao Paulo, Brazil  
Clinical research fellow mentor. Fellowship award from the Ministry of Education, Brazil.

2012-2014 Lindsay Yazzolino, BSc/ Accessibility coordinator MBTA  
Former research assistant. Blind student with goal to pursue graduate level studies. Supported by an NIH/NEI diversity supplement.

2012-2016 Joaquín Herrera, PhD Candidate, University of Valladolid, Spain  
Doctoral dissertation committee. International thesis advisor.

2012-2014 Lorena Chanes, PhD Candidate, University of Paris, France  
Doctoral dissertation committee. International thesis advisor.

2013 Jin Young Park/ High School Student, Governor’s Academy  
Summer internship student.

2013-2016 Corinna Bauer, PhD/ Instructor, Harvard Medical School  
Postdoctoral fellow mentor. NIH LRP and Knights Templar Fellowship Awardee

2013-2016 Gabriella Hirsch, MEd/ Graduate Student, University of Chicago  
Supervised research activities, former lab study coordinator

2013-2015 William Harrison, PhD/ Postdoctoral Fellow, Harvard Medical School.  
Co-supervisor and mentor of research activities.

2015-present Francisco Costella, PhD/ Postdoctoral Fellow, Harvard Medical School.  
Co-supervisor and mentor of research activities.

2015 Bowen Zhan/ High School Student, Governor’s Academy  
Summer internship student.

2015-2016 Logan Szpond/ High school student  
Supervisor of high school senior project

2015-present Antonio Grimace/ Graduate student, University of Massachusetts  
Former Massachusetts Commission for the Blind Summer internship student.

2015 Ilknur Icke/ PhD Candidate, Boston University School of Medicine

2016 Emma Bailin  
Current lab study coordinator

2016 Della Shi/ High School Student, Governor’s Academy  
Summer internship student.

2016-present Shrinivas Pundlik PhD/ Postdoctoral Fellow, Harvard Medical School.  
Co-supervisor and mentor of research activities.

2016-present Mangyu Wang PhD/ Postdoctoral Fellow, Harvard Medical School.  
Co-supervisor and mentor of research activities.

2016-present Nan Payton/ High school student  
Supervisor of high school senior project

2016-present Yishai Barth/ University of Massachusetts  
 Supervisor of college independent study project  
 2016 Maxime Pelland PhD/ Private practice (psychology)  
 Doctoral dissertation committee, Université de Montréal. Doctoral work lead to three  
 publications including two in the journal Neuroimage (not co-author).

### Formal Teaching of Peers

#### local

2002-2011	Fellowship in Transcranial Magnetic Stimulation: Safety and TMS use	Harvard Medical School CME	Faculty, course lecturer
2010-2015	Clinical, Assessments, and Intervention Updates in Neurorehabilitation: Virtual Reality	Harvard Medical School CME	Course co-director, lecturer
2015-present	The Adaptive Brain of the Blind	MGH Institute of Health Professions	Course lecturer

#### regional

2016	Comparing Neuroplastic Changes in Ocular versus Cerebral Causes of Visual Impairment	Perkins School for the Blind Webinar	Course lecturer
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#### national

2002	Developments in Visual Neuroprosthetics	American Academy of Optometry CME	Course lecturer
2005, 2013	Developments in Visual Neuroprosthetics	Eye Sight 20/20 Optometry CME	Course lecturer
2016	Developing Spatial Navigation Skills Through	Virginia School for the Deaf and the Blind	Course lecturer

#### international

2012	Reading: Clinical Rehabilitation and Neuroplasticity	Radcliffe Institute for Advanced Study	Workshop co-organizer
2014	Merging Neuroplasticity, Education, and Rehabilitation in the Blind	Radcliffe Institute for Advanced Study	Workshop organizer
2017	Perspectives on Cortical Visual Impairment (CVI): Establishing a Global Clinical, Education, and Research Network	Radcliffe Institute for Advanced Study	Workshop co-organizer

## Local Invited Presentations

Year	Title of Presentation/Sponsor
2004	Neuroplasticity: the Adjustment to Blindness, and the Restoration of Sight. Longwood Medical Area Ophthalmology Grand Rounds.
2007	Guerilla Eye Care in the Third World: Ghana, Africa. Harvard School of Public Health.
2008	What Neuroplasticity can tell us about Neurorehabilitation in the Blind and Visually Impaired. Longwood Medical Area Ophthalmology Grand Rounds.
2009	Guerilla Eye Care in the Third World: Ghana, Africa. Longwood Medical Area Ophthalmology Grand Rounds. Beth Israel Deaconess Medical Center Behavioral Neuroscience Seminar.
2009	Neuro-Rehabilitation Combined with Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia. Annual Neuro-ophthalmology Conference, Massachusetts Eye and Ear.
2010	Audio-based Video Games for Developing Navigation Skills in the Blind. Massachusetts Eye and Ear Ophthalmology Grand Rounds.
2010	Combining Rehabilitation and Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia. Updates on Noninvasive Brain Stimulation in Neurorehabilitation. Spaulding Rehabilitation Hospital. Boston, MA.
2011	Developing Navigation Skills in the Blind through Gaming: A Clinical Neuroscience Approach. Boston VA Optometry Grand Rounds. Boston, MA
2011	Unlocking the Potential of the Visual Brain in the Blind. Children's Hospital Boston Grand Rounds Lecture Series. Boston, MA.
2011	Developing Navigation Skills in the Blind through Gaming: A Clinical Neuroscience Approach. VIVO Talks, Schepens Eye Research Institute.
2012	Use of Noninvasive Brain Stimulation for Visual Rehabilitation in Hemianopia. Boston VA Optometry Grand Rounds.
2012	Use of Noninvasive Brain Stimulation for Visual Rehabilitation in Hemianopia. Boston VA Optometry Grand Rounds.
2013	Understanding Blindness by Understanding the Brain: From Neuroscience to the Classroom VIVO Talks, Schepens Eye Research Institute.
2014	Characterizing Neuroplastic Changes in Cortical/Cerebral Visual Impairment (CVI). VIVO Talks, Schepens Eye Research Institute.
2014	Using Advanced Neuroimaging to Characterize Neuroplastic Changes in Cortical Visual Impairment (CVI). Neuro-ophthalmology Rounds, Massachusetts Eye and Ear.
2015	Characterizing Neuroplastic Changes in Cortical/Cerebral Visual Impairment (CVI). VIVO Talks, Schepens Eye Research Institute.
2015	Using Brain Imaging to Characterize Neuroplastic Changes in Cortical/Cerebral Visual Impairment (CVI). MEEI Faculty Research Meeting.
2015	Comparing the Adaptive Brains of Individuals with Ocular Blindness and Cortical Visual Impairment. Children's Hospital Boston Grand Rounds Lecture Series.
2015	The Adaptive Brain of the Blind. MGH Institute of Health Professionals.
2015	Characterizing Motion Perception Deficits in Cortical Visual Impairment. VIVO Talks, Schepens Eye Research Institute.

2017 Noninvasive Brain Stimulation and Chronic Corneal Pain. Massachusetts Eye and Ear Ophthalmology Grand Rounds.

### **Report of Regional, National, and International Invited Teaching and Presentations**

#### **regional**

No presentations below were sponsored by outside entities

- 2005 Seeing in the Blind: Merging Neuroprosthetics and Neuroplasticity (lecture). Boston University Medical Center. Boston, MA
- 2006 The Merger of Neuroplasticity and Visual Neuroprostheses (lecture). Center for Integration of Medicine and Innovative Technology (CIMIT): Innovation Congress. Boston, MA
- 2006 Learning to See Again: The Merger of Neuroplasticity and Visual Neuroprostheses (lecture). Center for Integration of Medicine and Innovative Technology (CIMIT) Forum. Boston, MA
- 2004 Neuroplasticity of the Occipital Cortex: the Adjustment to Blindness (lecture). Boston University Medical Center Grand Rounds. Boston, MA
- 2004 Studying the Brain of the Blind: What can be Learned? (lecture). Association for Education and Rehabilitation of the Visually Impaired and Blind. Newport, RI
- 2008 Guerilla Eye Care in Third World: Ghana, Africa (lecture). Unite for Sight Chapter, Boston University. Boston, MA
- 2009 Combining Rehabilitation and Noninvasive Brain Stimulation to Enhance Visual Function in Patients with Hemianopia (lecture). Boston University Medical Center Neurology Grand Rounds. Boston, MA.
- 2010 Guerilla Eye Care in the Third World: Ghana, Africa (lecture). Boston University. Boston, MA.
- 2010 Neuroplasticity and Blindness: A Neuroscience and Clinical Approach (key note lecture). Northeast Chapter of the Association for the Education and Rehabilitation of the Blind and Visually Impaired (NE/AER). Rockport, ME.
- 2012 How the Brain Changes in Response to Blindness (lecture). Boston University Medical Center Neuroscience Lectures. Boston, MA
- 2012 How the Brain Changes in Response to Blindness (lecture). New College of Optometry Grand Rounds. Boston, MA
- 2012 How the Brain Changes in Response to Blindness (key note lecture). In Focus Conference by the Perkins School for the Blind. Boston, MA.
- 2013 Using Advanced Neuroimaging to Investigate What do the Blind "See" (lecture). Department of Brain and Cognitive Sciences. Massachusetts Institute of Technology. Boston, MA.
- 2013 How the Brain Changes in Response to Blindness (lecture). New England College of Optometry. Boston, MA.
- 2013 Brain Changes Following Visual Deprivation and Blindness (course lecture). Department of Brain and Cognitive Sciences. Massachusetts Institute of Technology. Boston, MA.
- 2013 Advanced Structural Imaging to Characterize Neuroplastic Changes Following Blindness (lecture). New England College of Optometry. Boston, MA.
- 2014 Using Brain Imaging to Characterize Neuroplastic Changes in Cortical/Cerebral Visual Impairment (CVI) (lecture). New England College of Optometry. Boston, MA.
- 2014 Innovative Use of video games for blind education (lecture). Evenings at the MEME. Boston, MA.
- 2015 How studying blindness tells us something about the brain's ability to adapt (key note lecture).



- Massachusetts Lions Eye Research Fund Meeting. Boston, MA.
- 2015 Comparing How the Brain Re-wires Itself in Ocular Blindness and Cortical/Cerebral Visual Impairment (CVI) (key note lecture). Perkins School for the Blind Symposium on CVI. Boston, MA.
- 2015 How the Brain Changes in Response to Blindness. New England College of Optometry. Boston, MA.
- 2015 Looking Under the Hood: Using Brain Imaging to Characterize Neuroplasticity Changes in CVI (key note lecture). Northeast Chapter of the Association for the Education and Rehabilitation of the Blind and Visually Impaired (NE/AER). North Falmouth, MA.
- 2016 Characterizing How the Brain Changes in CVI (lecture). Perkins School for the Blind. Watertown, MA.
- 2016 Use of Noninvasive Brain Stimulation for Visual Rehabilitation (lecture). MIT-France Visiting Neuroscience Initiative. Boston, MA.
- 2016 Rehabilitative therapy for visual field deficits and other cortical visual disorders (lecture and panelist). New England Ophthalmological Society (NEOS). Boston, MA.

### **national**

No presentations below were sponsored by outside entities

- 2004 Merging Neuroplasticity and Neuroprostheses: Understanding Blindness and the Restoration of Sight (lecture). National Eye Institute: the David Cogan Symposium. Washington, DC
- 2005 Restoring Vision is Not Enough to See. Symposium on Plasticity (platform lecture). Society for Neuroscience. Washington, DC
- 2005 Advances in Neuroprosthesis Development for the Blind (lecture). American Academy of Optometry. San Diego, CA
- 2006 Artificial Retina: Current Progress and Future Directions (lecture). State of the Science Workshop: Sensory Impairment. Walter Reed Army Medical Center. Washington, DC
- 2006 Activation and Deactivation of Visual Cortical Areas During Tactile Processing (lecture). Association for Research in Vision and Research (ARVO). Ft. Lauderdale, FL
- 2006 Advances in Retinal Prosthesis Development: Teaching the Blind to See Again (key note lecture). Blinded Veterans Association National Convention. Buffalo, NY
- 2007 Neuroplastic Changes Associated with Blindness...Is it Relevant? (lecture) Smith-Kettlewell Eye Research Institute. San Francisco, CA
- 2008 What Neuroplasticity can tell us about Neurorehabilitation in the Blind (lecture). Dept. of Psychology, University of California Los Angeles. Los Angeles, CA
- 2008 Promoting Visual Rehabilitation by Brain Stimulation (platform lecture). American Clinical Physiology Conference. Savannah, GA
- 2008 Is the Visual Cortex Really Visual? (lecture). Oxopia Invited Lecture Series. School of Optometry, University of California at Berkeley. Berkeley, CA
- 2009 Neuroplasticity Following Sensory Loss (key note lecture). First Annual Norrie Disease Conference. Massachusetts General Hospital. Boston, MA
- 2011 Developing Navigation Skills in the Blind Through Play and Neuroscience (lecture). AER National Conference. Boston, MA.
- 2012 Rehabilitation and Education in the Blind Using Video Games: The Impact of Neuroplasticity (lecture). Emory University Eye Center. Grand Rounds Vision Research. Atlanta, GA.

- 2013 Gaming your life. Tech at LEAD Conference (platform lecture). Washington, DC.
- 2014 Neuroplastic Changes in Ocular vs. Cerebral Blindness (lecture). Emory University Eye Center. Grand Rounds Vision Research. Atlanta, GA.
- 2015 Neurophysiologic Assessment of the Neurorehabilitation Patient: Using fMRI as a Marker of Response (lecture). North American Neuromodulation Society. Las Vegas, NV.
- 2015 Looking Inside the Adaptive Brain of the Blind (lecture). National Institutes of Health Behavioral and Social Sciences Seminar Series. Washington, DC.
- 2015 Looking Inside the Adaptive Brain of Individuals with Ocular Blindness and Cortical Visual Impairment (key note lecture) Southwest Orientation and Mobility Association Conference. Texas School for the Blind & Visually Impaired. Austin, TX
- 2015 Developing Spatial Navigation Skills through Video Games (lecture). Southwest Orientation and Mobility Association Conference. Texas School for the Blind & Visually Impaired. Austin, TX
- 2016 Investigating the Neurophysiology of CVI with Brain Imaging (lecture and panelist). American Foundation for the Blind. Washington, DC.
- 2016 Characterizing Neuroplasticity in the Setting of Blindness: The Development of Assistive Technology and Education Strategies (lecture). National Advisory Eye Council/National Institutes of Health. Washington, DC.
- 2016 Neuroplasticity and Compensatory Behaviors. Texas School for the Blind and Visually Impaired: Texas Focus Conference (key note lecture). Arlington, TX
- 2016 Current Brain Imaging Research on CVI. Texas School for the Blind and Visually Impaired: Texas Focus Conference (lecture). Arlington, TX
- 2016 Comparing Neuroplastic Changes in Ocular versus Cortical Causes of Visual Impairment. Bureau of Education and Services for the Blind (lecture). Windsor, CT
- 2016 Looking Inside the Adaptive Brain of the Blind (lecture). University of Chicago. Chicago, IL.
- 2017 Comparing Brain Plasticity in Ocular vs Cerebral Causes of Visual Impairment: A Clinical Challenge for Research and the Classroom (grand rounds). Dept. Ophthalmology. Stanford University. Palo Alto, CA
- 2017 Comparing Brain Plasticity in Ocular vs Cerebral Causes of Visual Impairment: A Challenge for Rehabilitation. Center for Applied and Translational Sensory Science. University of Minnesota. Minneapolis. MN

**international**

No presentations below were sponsored by outside entities

- 2004 Developments in Retinal Prosthesis Research (lecture). Department of Neurology, Guttman Rehabilitation Institute, University of Barcelona. Barcelona, Spain
- 2005 Visual Neuroprosthesis Development: The Implications of Neuroplasticity (platform lecture). International Multisensory Research Forum (IMRF). Trento, Italy
- 2006 Voir sans les yeux: le lien entre la neuroplasticite et neuroprothese (lecture). Brain and Research Center. Université de Toulouse. Toulouse, France
- 2006 What do the Blind See? (lecture). International Council for Education of People with Visual Impairment. Kuala Lumpur, Malaysia
- 2007 Visual neuroprosthetics: Science fiction or scientific reality? (platform lecture) Canadian Ophthalmological Society. Montreal, Canada
- 2008 What Do Blind People See? (key note lecture) Association for the Education and Rehabilitation

- of the Blind and Visually Impaired. Montreal, Canada
- 2008 Neuroplasticity, Neurostimulation and Neurorehabilitation in the Blind (teaching tele-lecture). University of Sao Paulo. Sao Paulo, Brazil
- 2008 Retinotopic Visual Cortex Mapping Using a Visual-to-Auditory Sensory-Substitution Device (lecture). International Conference on Cognitive Neuroscience. Bodrum, Turkey.
- 2008 Neuroplasticity and Neurorehabilitation (platform lecture). Vision 2008 Conference. Montreal, Canada
- 2008 Advances in Retinal Prosthesis Research and Future Directions (lecture). Vision 2008 Conference, Montreal, Canada
- 2008 Neuroprosthetic Approaches to Restoring Sight in the Blind: Science Fiction or Scientific Reality? (lecture). Dept. Ophthalmology Grand Rounds. Dalhousie University. Halifax, Canada
- 2009 Life After 20/200: How the Brain Adapts to Blindness (lecture). Canadian Association of Optometrists. Charlottetown, Canada
- 2009 The Visual Brain of the Blind: Neuroplasticity and Rehabilitation (lecture). Dept. of Psychology University of Milan. Milan, Italy.
- 2009 Neuroplasticity in the Blind: Towards Developing Assistive Technology (lecture). Dept. of Computer Science. University of Chile. Santiago, Chile
- 2009 Developing Navigation Skills in the Blind: A Clinical-Neuroscience Approach. International Conference on Educational Software. Santiago, Chile.
- 2009 What Happens to the Brain when there is Vision Loss? (lecture). International Conference on Educational Software. Santiago, Chile.
- 2010 Use of noninvasive brain stimulation for visual recovery (lecture). International Symposium on Frontal Cortex Function. Vitoria, Brazil.
- 2010 Use of Noninvasive Brain Stimulation for Visual Recovery (lecture). International Symposium on Neuromodulation. Sao Paulo, Brazil.
- 2010 What Happens to the Brain when there is Vision Loss? (lecture). Envisioning the Future: New Developments in Vision Science. Canadian National Institute for the Blind. Toronto, Canada.
- 2010 The Role of Neuroplasticity in the Effort to Restore Sight Montreal Enhancing performance for Action & Perception, Multisensory Integration, Neuroplasticity & Neuroprosthetics (lecture). Montreal, Canada.
- 2010 Crossmodal Neuroplasticity: The Case of Deaf Blind (platform lecture). Canadian Neuroscience Meeting. Ottawa, Canada.
- 2010 Développement des habiletés de navigation spatiale chez l'aveugle: une approche clinique et neuroscientifique. University of Montreal Vision Day. Université de Montreal. Montreal, Canada.
- 2010 Plasticity: Research and Applications. Interdisciplinary Congress on Research in Education. Santiago, Chile.
- 2010 The Use of Neuromodulation for Visual Rehabilitation. XXII Brazilian Congress on Physical and Rehabilitation Medicine (platform lecture). Sao Paulo, Brazil.
- 2011 Développement des habiletés compensatoires chez l'aveugle: une approche clinique et neuroscientifique (key note lecture). Scientific Research Day, School of Optometry, Université de Montréal. Montreal, Canada.
- 2011 Brain Plasticity: Implications for Rehabilitation and Learning (lecture). International Conference on Educational Software. Santiago, Chile
- 2011 Brain Stimulation for Visual Rehabilitation (lecture). International Symposium on Frontal Cortex Function. Vitoria, Brazil

- 2011 Neuromodulation with Video Games: The Impact on Plasticity of the Blind (lecture). International Symposium on Neuromodulation. Sao Paulo, Brazil
- 2011 Brain Stimulation for Visual Rehabilitation. International Symposium on Neuromodulation (lecture). Sao Paulo, Brazil
- 2011 Developing Navigation Skills in the Blind through Gaming: A Clinical Neuroscience Approach (lecture). Annual International Technology & Persons with Disabilities Conference. San Diego, CA.
- 2012 Visual field training for hemianopia with transcranial direct cortical stimulation. European Federation of Neurological Societies (platform lecture). Stockholm, Sweden.
- 2013 Developing Skills in the Blind Through Virtual Environments, Play, and Neuroscience. Asociación de Profesionales de la Rehabilitación de Personas con Discapacidad Visual (lecture). Tenerife, Spain.
- 2013 Neuroprostheses and neuroscience: theory and application. Department of Psychology and Neuroscience (lecture). University of Pavia. Pavia, Italy.
- 2013 Cross-Modal Neuroplasticity Associated with Navigation Skill in the Early Blind (platform lecture). Society for Neuroscience. San Diego, CA.
- 2013 Developing Skills in the Blind through Virtual Environments, Play, and Neuroscience (lecture). The Blind Brain Workshop. Pisa, Italy.
- 2014 Visual Plasticity and Rehabilitation. Neurorehabilitación y Neuroplasticidad. XVIII Jornadas Internacionales de Salud (lecture). Aguascalientes, Mexico.
- 2014 Comparing Neuroplasticity Associated with Ocular and Cortical Blindness. University of Montreal (lecture). Montreal, Canada.
- 2014 Educational Game Software for Blind Children. The MIT-Andrea Bocelli Foundation International Workshop (lecture). Boston, MA.
- 2015 Comparing Neuroplasticity in Ocular and Cerebral Blindness and Visual Impairment. University Europa Miguel de Cervantes (lecture). Valladolid, Spain.
- 2016 Looking Inside the Adaptive Brain of the Blind (lecture). University of Milan. Milan, Italy.
- 2016 Visual Field Training for Hemianopia Combined with Transcranial Direct Cortical Stimulation (tDCS). Hôpital Universitaire Pitié-Salpêtrière (lecture). Paris, France.
- 2016 Comparing Neuroplastic Changes in Ocular versus Cortical Causes of Visual Impairment. University of Brescia (grand rounds lecture). Brescia, Italy.
- 2016 Comparing Neuroplastic Changes in the Brain of Individuals with Ocular versus Cortical Causes of Visual Impairment. University of Trento (lecture). Trento, Italy.
- 2016 Comparing Neuroplastic Changes in Ocular versus Cerebral Causes of Visual Impairment of Early Onset. University of Montreal (lecture). Montreal, Canada.
- 2016 Development of an Audio-haptic Virtual Interface for Navigation of Large-scale Environments for People who are Blind. Human Computer Interaction Conference (lecture). Toronto, Canada.
- 2017 Comparing Brain Plasticity in Ocular vs Cerebral Causes of Visual Impairment: A Challenge for Rehabilitation. University of Dortmund (lecture). Dortmund, Germany.

### **Published meeting abstracts**

L. Merabet, N. Gallo-Payet, M. Payet, M. de Gasparo, C. Casanova, C. Angiotensin II reduces light evoked potentials in the adult rat's superior colliculus. 1994 Invest. Ophthalmol. Vis. Res. (suppl.) 35:1975.

- L. Merabet, H. McLelland, C. Casanova. Nonspecific effects of Angiotensin II and its agonists and antagonists in the superficial layers of the rat superior colliculus. 1994 Society for Neuroscience Abstract. 20:1185.
- C. Casanova, T. Savard, K. Minville, L. Merabet, L. Boumghar. Motion sensitivity of cells in the striate-recipient zone of the cat's LP nucleus II: Modulatory influence of a moving texture background on spatial frequency tuning. 1994 Society for Neuroscience Abstract. 20:771.
- L. Merabet, A. Marois, C. Casanova. Action inhibitrice de l'Angiotensine II dans le colliculus supérieur du rat: Contribution des récepteurs AT1 and AT2. 1995 Annales d'endocrinologie. 56:470-431.
- T. Savard, K. Minville, L. Merabet, C. Casanova. Properties of cells in the striate recipient zone of the cat's LP: Length summation, Contrast, and Phase sensitivity. 1995 Society for Neuroscience Abstract. 21:659.
- L. Merabet, K. Minville, A. Desautels, J.F. Giguère, C. Casanova. Propriétés des neurones du cortex suprasylvien (PMLS) du chat: détection du mouvement et discrimination "objet arrière-plan". 1996 Medecine Science 12:34.
- K. Minville, L. Merabet, A. Desautels, C. Casanova. Properties of Neurons in the cat PMLS cortex: Responses to moving texture patterns. 1996 Society for Neuroscience Abstract. 22:1062.
- L. Merabet, K. Minville, C. Casanova. Modulatory Influence of a moving texture background on responses of cells in the cat's postero-medial lateral suprasylvian (PMLS) cortex. 1997 Invest. Ophthalmol. Vis. Res. (suppl.) 38:624.
- A. Desautels, J.F. Giguère, L. Merabet, K. Minville, C. Casanova. Récupération fonctionnelle après lésion du cortex visuel: rôle du complexe latéral postérieur-pulvinar. 1997 Medecine Science (suppl.) 2:18.
- K. Minville, L. Merabet, A. Desautels, C. Casanova. Response properties of cells in the cat's AMLS cortex. 1997 Society for Neuroscience Abstract. 23:1030.
- A. Desautels, L. Merabet, K. Minville, J.F. Giguère, C. Casanova. Receptive field properties of neurons in the cat's lateral posterior-pulvinar complex following neonatal lesion of the visual cortex. 1997 Society for Neuroscience Abstract. 23:1820.
- L. Merabet, A. Desautels, K. Minville, C. Casanova. Comparison of motion integration at the cortical and subcortical level: pattern-selective responses to moving plaids in the cat LP-pulvinar complex. 1997 Society for Neuroscience Abstract. 23:2230.
- C. Casanova, L. Merabet, A. Desautels, K. Minville, M. Filali, M. Motion integration at the thalamic level: Contribution of the visual cortex. 1998 J. Res. Exp. Clin. Ophthalm. (suppl.) 30:125.
- L. Merabet, M. Filali, A. Desautels, K. Minville, C. Casanova, C. Effect of cortical deactivation on pattern-selective responses to moving plaids in the cat LP-pulvinar complex. 1998 Society for

Neuroscience Abstract. 24:1396.

H. Theoret, E. Robertson, N. Chhabra, A. Valero, L. Merabet, A. Pascual-Leone, A. The contribution of the cerebellum to sequence learning: a repetitive transcranial magnetic study. 2002 Federation of European Neuroscience Societies.

L. Merabet, M. Kobayashi, J. Barton, A. Pascual-Leone. Suppression of visual hallucinations following occipital cortex stroke damage: A preliminary trial using transcranial magnetic stimulation. 2002 Opt. Vis. Sci. 79:57.

Merabet L, Kobayashi M, Barton J, Pascual-Leone A. Suppression of visual hallucinations following occipital cortex stroke damage: A preliminary trial using transcranial magnetic stimulation. Opt. Vis. Sci (suppl.) 79:57. 2002

L. Merabet, J. Andrews, H. Theoret, A. Pascual-Leone. The Role of the Occipital Cortex in Tactile Processing: a Transcranial Magnetic Stimulation Study. 2002 The Human Brain: The Structural Basis for Understanding Human Brain Function and Dysfunction.

L. Merabet. Neuro-prosthetic Implants in the Blind. 2002 Scientific Symposium on Visual Incapacity and Readaptation.

L. Merabet, J. Andrews, H. Theoret, A. Pascual-Leone, A. Investigating the Role of Occipital Cortex in Tactile Processing: In Search of a Meta-modal Brain. 2003 International Multisensory Research Forum.

F. BERPPOHL, N. Gaab, F. Fregni, L. Merabet, G. Schlaug, A. Pascual-Leone, G. Northoff. Attentional modulation of emotional processing - an fMRI study. 2004 Society for Neuroscience Abstract. 203.3

F. BERPPOHL, G. Northoff, N. Gaab, F. Fregni, L. Merabet, G. Schlaug, A. Pascual-Leone. Neural correlates of emotional expectancy. 2004 Organization for Human Brain Mapping. S26.

F. BERPPOHL, F. Fregni, P.S. Sergio, G. Northoff S.P. Rigonatti, M.A. Marcolin, A. Pascual-Leone. TMS over right DLPFC improves affective set-shifting in patients with major depressive disorder. 2004 Annual Meeting of the American Psychiatric Association.

L. Merabet, C. Ramos-Estebanez, K. Machii, V. Romei, F. Fregni, J.F. Rizzo, A. Pascual-Leone. Tactile Modulation of Occipital Cortex Function: A TMS Study. 2004 Annual Multisensory Research Forum.

F. Fregni, S. Thome-Souza, F. BERPPOHL, P. Boggio, L. Merabet, S. Rigonatti, M.A. Marcolin, A. Pascual-Leone, K. Valente. Low frequency transcranial magnetic stimulation decreased cortical excitability of patients with cerebral cortical malformations: a TMS and EEG study. 2004 International Neuroscience Conference.

BERPPOHL F, Gaab N, Fregni F, Merabet L, Schlaug G, Pascual-Leone A, Northoff G: Attentional modulation of emotional processing. 2004 Society for Neuroscience Abstract.

Bermpohl F, Northoff G, Gaab N, Fregni F, Merabet L, Schlaug G, Pascual-Leone A: Neural correlates of emotional expectancy. 2004 Organization for Human Brain Mapping (Suppl): S26.

L.B. Merabet, L. B. J. Swisher, S. McMains, M. Halko, A. Amedi, A. Pascual-Leone, D. Somers. Tactile cross-modal processing in visual cortex. 2005 Society for Neuroscience Abstract. 388.2

A. Pascual-Leone, P. Pietrini, E. Ricciardi, K. Sathian, B. Roeder, A. Amedi, M. Lassonde, L. Merabet. What have we learned about seeing from the blind? 2005 Society for Neuroscience Abstract. 807

A. Amedi, F. Bermpohl, J. Camprodon, S. Fox, L. Merabet, P. Meijer, A. Pascual-Leone. Neural correlates of visual-to-auditory sensory substitution in proficient blind users. 2005 Organization for Human Brain Mapping (OHBM)

A. Amedi, J. Camprodon, L. Merabet, F. Bermpohl, E. Haligan, S. Fox, E. Ozdemir, I. Ronen, D.S. Kim, A. Pascual-Leone. Neural and behavioral correlates of drawing objects and scenes in an early blind painter. 2005 Organization of Human Brain Mapping.

A. Amedi, F. Bermpohl, J. Camprodon, S. Fox, L. Merabet, P. Meijer, A. Pascual-Leone. Neural correlates of visual-to-auditory sensory substitution in proficient blind users. 2005 Cognitive Neuroscience.

A. Amedi, L. Merabet, F. Bermpohl, J. Camprodon, S. Fox, A. Pascual-Leone. Visual-to-auditory sensory substitution in proficient blind users: Neural correlates and potential application in neuroprostheses research. 2005 American Academy of Neurology.

L. Merabet, J. Swisher, S. McMains, M. Halko, A. Amedi, A. Pascual-Leone, D. Somers. Activation of occipital cortex relates to tactile task difficulty. 2005 Annual Multisensory Research Forum.

L. Merabet, A. Pascual-Leone, JF Rizzo. The future of visual prosthesis research: insights learned from studying the blind. 2005 International Council for Education of People with Visual Impairments.

N. Bass Pitskel, S. Gautum, R. Hamilton, G. Schlaug, L.B. Merabet, A. Pascual-Leone. Changes in tactile spatial acuity in sighted subjects in response to five days of complete visual deprivation and intensive Braille training. 2006 Society for Neuroscience Abstract. 137.6

J.D. Swisher, L. Merabet, A. Pascual-Leone, D.C. Somers. Distinct regions of tactile and visual activation in human parietal cortex 2006 Society for Neuroscience Abstract. 437.1

A. Amedi, J. Camprodon, L. Merabet; P. Meijer; A. Pascual-Leone. Towards closing the gap between visual neuroprostheses and sighted restoration: Insights from studying vision, cross-modal plasticity and sensory substitution. *Journal of Vision*. 2006; 6(13):12-12.

A. Amedi, F. Bermpohl, J. Camprodon, L. Merabet, P. Meijer, A. Pascual-Leone. LO is a meta-modal operator for shape. An fMRI study using auditory-to-visual sensory substitution. 2006 Organization for Human Brain Mapping (OHBM)

- A. Amedi, J. Camprodon, L. Merabet, F. Bormpohl, E. Haligan, N. Bass-Pitskel, I. Ronen, D. Kim, A. Pascual-Leone. Highly transient activation of primary visual cortex (V1) for tactile processing in sighted following 5 days of blindfolding. 2006 Society for Neuroscience Abstract. B201
- M.L. Kenney, P. Sinha, L.S. Snebold, L.B. Merabet, J.F. Rizzo. Development of a Battery of Visual Tests to More Reproducibly Assess Vision in Patients With Severe, Acquired Blindness. *Invest. Ophthalmol. Vis. Sci.* 2006; 47(13):5698.
- L.B. Merabet, J. Swisher, S. McMains, M. Halko, J.F. Rizzo, III, A. Pascual-Leone, D. Somers. Activation and Deactivation of Visual Cortical Areas During Tactile Processing. *Invest. Ophthalmol. Vis. Sci.* 2006; 47(13):5877.
- L.B. Merabet, A. Pascual-Leone, E. Fernandez, J. F. Rizzo. Decisions and Issues Relating to Visual Neuroprosthesis Development, Neuroplasticity and Patient Testing. *Invest. Ophthalmol. Vis. Sci.* 2007; 48(13):3767.
- D. Yun, D.C. Gotto, L. Merabet, J. F. Rizzo. Boston Retinal Implant Project: An Accessible Web-Based Educational Resource. *Invest. Ophthalmol. Vis. Sci.* 2007; 48(13):2558.
- L. Merabet, D. Poppel, W. Stern, E. Bhatt, C. Hemond, S. Maguire, P. Meijer, A. Pascual-Leone. Activation of visual cortex using crossmodal retinotopic mapping. 2008 Organization for Human Brain Mapping (OHBM).
- M. Dye, F. Pavani, C. Karns, F. Jiang, L. Merabet, M. Bedny. Sensory Deprivation and Brain Plasticity: Insights from Behavioral and Neuroimaging Studies of Deaf and Blind Individuals. 2013 Society for Neuroscience Abstract. 497
- M.A.K. Peters, B. Thompson; L.B. Merabet; A.D. Wu; L. Shams. Anodal tDCS to V1 blocks visual perceptual learning consolidation. *Journal of Vision.* 2013; 13(9):602-602
- C.M. Bauer, G. Heidary, B.B. Koo, R. Killiany, and L.B. Merabet. Extrageniculate-striate visual pathway changes in cortical visual impairment characterized by HARDI. 2014 Organization for Human Brain Mapping (OHBM).
- Z. Cattaneo, S. Bona, C. Bauer, J. Silvanto, L.B. Merabet, T. Vecchi. Symmetry detection in the sighted and blind brain. 2014 European Workshop on Imagery and Cognition.
- C.M. Bauer, B.B. Koo, L. Zajac, and L.B. Merabet. Occipital networks in the blind and visually impaired. The 4th Biennial Conference on Resting State Brain Connectivity. 2014 Harvard Medical School Ophthalmology Annual Meeting.
- C.M. Bauer, L. Zajac, B.B. Koo, G. Heidary, and L.B. Merabet. Choice of optimal quantitative anisotropy threshold for clinical HARDI reconstruction. 2014 Biennial Conference on Resting State Brain Connectivity.



C.M. Bauer, G. Heidary, and L.B. Merabet. Diffusion tractography and network characteristics in CVI and the ocular blind. 2014 MGH Clinical Research Day.

C.M. Bauer, B.B. Koo, L. Zajac, and L.B. Merabet. Differential involvement of long versus short range WM connections in CVI. 2015 International Society for Magnetic Resonance in Medicine.

C.M. Bauer, B.B. Koo, and L.B. Merabet. Neuroplastic changes in visual cortex of the early blind characterized by whole brain connectivity. 2015 Organization for Human Brain Mapping.

A. Kalia, L.B. Merabet, and P. Sinha. Top-Down Knowledge Improves Recognition of Noisy Haptic Patterns in the Blind and Sighted. 2016 VSS Annual Meeting.

C.M. Bauer, P. Bex, K. Devaney, D. Somers, and L.B. Merabet. Neural correlates of optic flow motion deficits in cortical/cerebral visual impairment. 2016 Organization for Human Brain Mapping.

D. Doruk, L. Chanes, D. Jacobs, L. Merabet, A. Valero-Cabré, and F. Fregni. Clinical and neurophysiological commonalities among chronic corneal pain patients enrolled in a clinical trial. 2016 Tear Film & Ocular Surface Society (TFOS).

A.M. Guimares, N.A. Giudice, E.S. Bailin, L.B. Merabet. The impact of strip maps on trip planning and execution in Boston subways. 2017 International Technology and Persons with Disabilities Conference (CSUN).

## **Report of Clinical Activities and Innovations**

### **Current Licensure and Certification**

2002-present Massachusetts State Optometry License

### **Practice Activities**

2004-2010	Comprehensive Ophthalmic care	Dept. of Ophthalmology, Beth Israel Deaconess Medical Center	One session per week
2011-present	Vision rehabilitation	Dept. of Ophthalmology, Massachusetts Eye and Ear	One session per month
2014-present	Vision rehabilitation	Dept. of PM&R, Spaulding Rehabilitation Hospital	One session per week

## **Report of Education of Patients and Service to the Community**

### **Activities**

2007-2010 Unite for Sight, Boston University Student Chapter. Boston, MA  
Served as student advisor to prospective local volunteers preparing to serve overseas

2008-present Carroll Center for the Blind. Newton, MA

2014	Participated in presentations and workshops discussing living with visual impairment. Foundation Fighting Blindness. Waltham, MA.
	Panelist discussing upcoming treatments for blindness
2016	“Blindness and the Brain” presentation to the Reading Lions Club of Massachusetts
2016	Massachusetts Commission for the Blind Task Force for Cortical Visual Impairment

(no activities were sponsored by outside entities)

### **Educational Material for Patients and the Lay Community**

2005	The Bionic Eye	Chapter insert in: Science Physics First Textbook. CPO Science.
2007	Blinded by Science	Radio Interview “Quirks and Quarks” by CBC Radio
2009	Take Two Video Games and Call Me in the Morning	Editorial appearing in Scientific American magazine
2010	Game On	News feature appearing in Harvard Medicine magazine
2011	Playing by Ear	News feature and podcast appearing in Science magazine
2011	New Video Game Helps the Blind Navigate Using “Virtual Maps”	Radio interview hosted by WBUR-NPR
2012	Seeing your Eye Doctor: What to Expect	Instructional video for patients with Autism Sponsored by Autism Speaks and the Autism Treatment Network.
2013	Rethinking Visual Impairment	Feature appearing in International Innovation, Research Media, Ltd.
2014	Blindness is Another Way of Seeing	TEDx Cambridge
2015	CVI Research	“Blind on Blind”, Radio Interview by Perkins School for the Blind.
2015	Do You Dream in Color	Consultant. Documentary Feature Film
2016	The Senses	Interview appearing in Muse (educational science magazine)
2016	Brain Plasticity	Interview appearing in Men’s Health Magazine

### **Report of Scholarship**

#### **Publications (h Index: 30)**

#### **Peer Reviewed Publications**

Research investigations

1. **Merabet L**, de Gasparo M, Casanova C. Neuromodulatory effects of angiotensin II in the visual layers of the rat superior colliculus. Neuroreport. 1994; 5(18):2649-52.
2. **Merabet L**, de Gasparo M, Casanova C. Dose-dependent inhibitory effects of angiotensin II on visual responses of the rat superior colliculus: AT1 and AT2 receptor contributions.

- Neuropeptides. 1997; (5):469-81.
3. **Merabet L**, Desautels A, Minville K, Casanova C. Motion integration in a thalamic visual nucleus. *Nature*. 1998; 396(6708):265-8.
  4. Casanova C, **Merabet L**, Minville K, Desautels A. Un nouveau rôle pour le thalamus? *Médecine sciences*. 1999 ;11:1302-1304.
  5. **Merabet L**, Minville K, Ptito M, Casanova C. Responses of neurons in the cat posteromedial lateral suprasylvian cortex to moving texture patterns. *Neuroscience*. 2000; 97(4):611-23.
  6. Casanova C, **Merabet L**, Desautels A, Minville K. Higher-order motion processing in the pulvinar. *Progress in Brain Research*. 2001;134:71-82.
  7. **Merabet L**, Maguire D, Warde A, Alterescu K, Stickgold R, Pascual-Leone A. Visual hallucinations during prolonged blindfolding in sighted subjects. *Journal of Neuro-ophthalmology*. 2004; 24(2):109-13.
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#### Thesis Dissertation

**Merabet L**. Mechanisms in Motion Perception: The Implication of Cortico-thalamic Loops [dissertation]. Montreal, Quebec: Université de Montreal: 1999.

#### Narrative Report

As a clinician-scientist, my main research interests have focused on studying the visual system and, in particular, understanding how the brain adapts to the loss of sight. My training as a neuroscientist, optometrist, and in public health has led to an independent line of investigation focused on basic science, clinical investigation, and novel education strategies. At the intersection, I conduct translational research that aims to improve the lives of individuals living with visual impairment and profound vision loss. The majority of my activities are dedicated to research, teaching, mentoring, clinical care, and patient advocacy. Nationally and

internationally, I lecture extensively and serve on a number of scientific review committees and advisory boards. Currently, my research is federally supported and I have published the results of my work in basic science, engineering, and clinical journals (with over 60 peer and non-peer reviewed publications) and our work was recently described in a news feature appearing in *Science*.

My doctoral work focused on investigating the role of compensatory visual pathways using electrophysiological recording techniques in animal models. After my PhD, I completed a second accelerated doctoral degree in clinical optometry. Following my doctorate level training, I pursued two post-doctoral fellowships developing expertise in clinical trial design and advanced investigative neuroscience methodologies, including noninvasive brain stimulation and functional neuroimaging. I subsequently pursued two further graduate training degrees in clinical investigation as well as a Masters in Public Health.

I have remained clinically active by practicing comprehensive eye care throughout my postdoctoral fellowships and while establishing my own independent research career. In the future, my clinical practice will specialize in providing eye care for patients with intellectual disabilities as well as visual impairment. In keeping with my humanitarian interests, I have also served as a clinical volunteer in Ghana, Africa for a non-profit eye care organization.

The evolution of my clinical research interests commenced with my doctoral studies, which investigated the neuroplasticity of the visual system and the mechanisms associated with sensory processing. This led to a first-author publication in the journal *Nature* describing a new role for sub-cortical structures in visual processing. My subsequent clinical and post-doctoral training has now led to a line of research that combines my expertise in neuroscience with clinical translational efforts related to develop novel rehabilitative strategies for the blind. With federal (NIH) funding support (including an NRSA, K-23 award and RO1), my current work concentrates on developing auditory-based video games for improving navigation and other cognitive skills in the blind. This line of investigation is likely to provide insight into how we can enhance the development of novel rehabilitative and education strategies for the blind.

Teaching and mentoring are a major focus of my activities. I am course a co-director of Harvard CME course in Neurorehabilitation and faculty lecturer in Principles of Clinical Trials. These courses are taught within the local medical community as well as at international sites including South America and Asia. I have mentored students at various levels of their academic careers (from summer internships to post-doctorate fellowships) and, as of this year, I have committed to mentoring a blind student who is pursuing graduate studies in neuroscience.

I continue to lecture extensively and attend international meetings in areas of basic and clinical research as well as education and rehabilitation. I also serve as an ad hoc reviewer for the National Eye Institute and international scientific review committees. Finally, to promote awareness and enhance relations between clinical academic institutions and the general public, I continue to serve as an advisor and board member within the blind community, advocating for improvement in education, Braille literacy, and independence for individuals living with visual impairment.