

**Dr. Sandra E. Leh-Seal**

Toronto Western Hospital, MCL7, 417  
c/o Prof. Dr. Antonio P. Strafella  
399 Bathurst St  
Toronto, Ontario, M5T 2S8

Montreal Neurological Institute & Hospital  
Neuropsychology / Cognitive Neuroscience Unit  
3801 University Street., #251g  
Montreal (Quebec), H3A 2B4

e-mail: Sandra@bic.mni.mcgill.ca

Website: <http://www.bic.mni.mcgill.ca/~sandra>

**Citizenship:** Canadian, German

**Current Position:**

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June /08 – current    **Postdoctoral Fellowship**

Toronto Western Hospital-Research Institute, CAMH-PET centre, University of Toronto, Canada

**Research Interests:**

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Neuropsychology, Neuroophthalmology, Diffusion Tensor Imaging (DTI) tractography, functional Magnetic Resonance Imaging (fMRI), Epilepsy, Hemispherectomy, Hemianopia, Superior Colliculus, Blindsight, Inferior Colliculus, Autism and Learning Disabilities, Amblyopia, Strabism, Basal-ganglia, Brain Plasticity, Subcortical Visual Pathways, Parkinson's Disease, Neglect.

**Previous Academic Experience:**

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Sep. /03 – May/ 08    **Ph.D. in Neural Science**

Department of Neurology & Neurosurgery, McGill University, Canada  
Montreal Neurological Institute & Hospital, Douglas Research Center

Project title: 'Seeing without consciousness: Investigation of the neuronal correlate of blindsight / Revealing the contribution of the superior colliculus to blindsight in hemispherectomized subjects. A behavioural and neuroimaging study.'

Supervisor:    Alain Ptito, Ph.D., associate professor, McGill University

April /00 – Mar. /03    **Diplom (M.Sc.)**

University Hamburg, Germany

Major: Psychology / Minor: Neurology / Specialty: Cognitive Psychology  
Grade (oral examinations): Excellent (A)

Thesis: 'Investigation of the Spatial Summation Effect in normal and hemispherectomized patients. A behavioural study.'

-research, data analysis, thesis writing performed at the Montreal Neurological Institute / McGill

Supervisors: Burger Heinze, Ph.D., professor, University Hamburg  
Alain Ptito, Ph.D., associate professor, McGill University  
Grade (thesis): Excellent (A)

Oct. /98 – Mar. /00 **Prediploma (B.Sc.)**

University Hamburg, Germany  
Major: Psychology  
Grade: Superior (A-)

Jan. /92 – Mar. /95 **Orthoptist (Health professional in Neuroophthalmology, Ple- and Orthoptics)**

University Hospital Eppendorf, Germany  
Supervisor: Wolfgang Haase, M.D., professor, University Hamburg  
Elisabeth Schulz, M.D., professor, University Hamburg  
Grade: Excellent (A)

**Clinical Work and Research Experience:**

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Jun. /06 **FSL & FreeSurfer Course**

Oxford University, Oxford Centre for Functional Magnetic Resonance Imaging of the Brain (fMRIB), Siena, Italy

Sep. /05 – Dec. /05 **Teaching assistance**

Department of Medicine, McGill, Montreal, Canada  
-Anatomy class of the human brain

Feb. /05 – March /05 **Training in Diffusion Tensor Imaging Techniques (DTI) and DTI data analysis**

Oxford University, Oxford Centre for Functional Magnetic Resonance Imaging of the Brain (fMRIB), Oxford, UK

Dec. /03 **Graduate work**

Collaboration with the Centro de Neurociencias de Cuba, Havana, Cuba  
ERP study in a hemispherectomized patient

Apr. /03 – Sep. /03 **Research assistant**

Douglas Hospital Research Center, Brain Imaging Group, Verdun, Canada  
-Developed a computer-based reaction time task with emotional stimuli.  
-This study demonstrated a right hemisphere advantage for the processing of faces in unilateral conditions when healthy subjects were asked to discriminate between houses and faces.

Oct. /01 – Oct. / 02 **Clinical and research assistant**  
Montreal Neurological Institute & Hospital, Quebec, Canada

Clinical:

- Administration of a clinical neuropsychological battery to population with various neurological disorders (Epilepsy, Parkinson's disease, etc.)

Research:

- Design of a specific computer-based visual task to show a significant summation effect
- Pilot study on Residual Vision

Supervisors: Alain Ptito, Ph.D., associate professor, McGill University  
Marylin Jones-Gotman, Ph.D., professor, McGill University

Jan. /01 – Jun. /01 **Clinical and research training**  
University Hospital Eppendorf, Department of Neurology and Psychiatry, Hamburg, Germany

Clinical:

- Neuropsychological assessment and psychopathological assessment of psychiatric patients (anxiety disorders, addiction, schizophrenia, obsessive compulsive disorders, depression,...)
- Practice seminar with a computer-based cognitive training program (CogPack) used in rehabilitation
- Report writing

Research:

- Developed an emotional memory test adopted by department for research purpose
- Participation in an advanced statistical program seminar (SPSS 10.)
- Involved in various research projects

Supervisors: Steffen Moritz, Ph.D., University Hamburg  
Burghardt Andresen, Ph.D., University Hamburg

Apr. /95 – June /98 **Orthoptist**  
Alfred Pauer, M.D., clinic, Rosengarten 5, 22880 Wedel, Germany  
(4 days / week).

Mar. /95 – Mar. /03 **Orthoptist**  
Friedrich Flohr, M.D., clinic, Tangstedter Landstr. 28, 22415 Hamburg, Germany  
(1 - 2 days / week).

## **Collaborations:**

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- 2007      **Antonio Strafella, MD**  
Toronto Western Hospital-Research Institute, CAMH-PET centre, University of Toronto, Canada
- Collaboration with on DTI tractography study of basal ganglia in healthy subjects and subjects with movement disorders.
- Oct./06      **Dr. Nicol Korner-Bitensky & Tatiana Ogourtsova**  
McGill University Health Center Department of Occupational Therapy
- Spatial Summation Effect in neglect patient after stroke.
- March /06      **Robert Zatorre, Ph.D. & Marc Schoenwiesner, Ph.D.**  
Cognitive Neuroscience Unit, Montreal Neurological Institute, Montreal, Canada
- Auditory fMRI experiment and Diffusion Tensor Imaging (DTI) in hemispherectomized subjects
- Jan. /05      **Kathy, Mullen, Ph.D.**  
Vision Research Centre, Royal Victoria Hospital, Montreal, Canada
- Development of a computer-based reaction time test to investigate the neuronal correlate underlying blindsight
- Sep. /04      **Heidi Johansen-Berg, Ph.D.**  
Centre for Functional Magnetic Resonance Imaging of the Brain (FMRIB), Department of Clinical Neurology, University of Oxford, United Kingdom
- Diffusion Tensor Imaging Study in hemispherectomized subjects with and without blindsight
- Dez. /03      **Alejandro Perez**  
Centro de Neurociencias de Cuba, Havana, Cuba
- International ERP study in a hemispherectomized subject
  - Attention and dyslexia
- Sep. /03      **José Louis Montes, M.D. & Jean-Pierre Farmer, M.D., C.M., F.R.C.S.(C)**  
Pediatric Neurosurgery, Montreal Children's Hospital, Montreal, Canada
- Project on hemispherectomized subjects

## **Publications :**

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### **Articles:**

**Leh, S.E.,** Mullen, K.T., and Ptito, A. (2006). Absence of S-cone input in human blindsight. *European Journal of Neuroscience* 24(10): 2954-60.

**Leh, S.E.,** Johansen-Berg, H. and Ptito,A. (2006). Unconscious vision: New insights into the neuronal correlate of blindsight using Diffusion Tractography. *Brain* 129(Pt7): 1822-32.

**Leh, S.E.,** Ptito, A., Chakravarty, M.M. and Strafella, A. (2007). Fronto-striatal Connections in the Human Brain: A Probabilistic Diffusion Tractography Study. *Neuroscience Letters* 419(2): 113-8.

**Leh, S.E.,** Chakravarty, M.M. & Ptito, A. (2008). The Connectivity of the Human Pulvinar: A Diffusion Tensor Imaging Tractography Study. *Int J Biomed Imaging* 2008: 789539.

Perez, A., Garcia, L., Lage, A., **Leh, S.E.,** Valdes-Sosa, M. (2008). Right impairment of temporal order judgements in dyslexic children. *Laterality* 23:1-16.

**Leh, S.E.** (2008). Neuronal Substrates of Blindsight in Hemispherectomized Subjects: Behavioral and Diffusion Tensor Imaging Tractography Studies. VDM Verlag ISBN 3639045769.

**Leh, S.E.,** Ptito, A., Schönwiesner M., Chakravarty, M.M., Mullen, K.T. (J Cogn Neurosci. 2009, in press). Blindsight Mediated By a S-cone Independent Collicular Pathway: An fMRI Study in Healthy and Hemispherectomized Subjects.

#### **Invited Articles:**

Ptito, A. and **Leh, S.E.** (2007). Brain Mechanisms of Blindsight. Invited Review; *Neuroscientist*. 13(5): 506-18.

**Leh SE,** Petrides M, Strafella AP. The neural circuitry of executive functions in healthy subjects and Parkinson's disease. *Neuropsychopharmacology*. 2010 Jan;35(1):70-85.

#### **Abstract and poster presentations**

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|----------|---|
| Jun. /10 | <b>Abstract and poster presentation</b><br>Working memory deficit in PD subjects due to a decrease in frontal and frontal-striatal connectivity. Human Brain Mapping, Annual Meeting, Barcelona, Spain. |
| Jun. /10 | <b>Abstract and poster presentation</b><br>Frontal-striatal connectivity in healthy subjects in a working memory study using fMRI and DTI. Human Brain Mapping, Annual Meeting, Barcelona, Spain.       |
| May /09  | <b>Abstract and poster presentation</b><br><u>Blindsight is color-blind to blue/yellow stimuli as revealed by fMRI study.</u><br>Vision Sciences Society, Annual Meeting, Naples, Florida, USA          |
| Sep. /08 | <b>Abstract and poster presentation</b>   |

Fronto-striatal connections in humans. Transcranial Magnetic Stimulation and Neuroimaging in Cognition and Behaviour Conference, Montreal, Canada

May /07

**Abstract and poster presentation**

The connectivity of the human pulvinar: A Diffusion Tensor Imaging Tractography Study. [Abstract]. *Journal of Vision*, 7(9), 224a

<http://journalofvision.org/7/9/224/>, doi:10.1167/7.9.224

Vision Sciences Society, Annual Meeting, Sarasota, Florida, USA

Oct. /06

**Abstract and poster presentation**

Cortical connections of the basal-ganglia: A probabilistic Diffusion Tractography study.

Society of Neuroscience, Annual Meeting, Atlanta, USA

May / 06

**Abstract and poster presentation**

The involvement of the superior colliculi in hemispherectomized subjects with blindsight. [Abstract]. *Journal of Vision*, 6(6), 55a,

<http://journalofvision.org/6/6/55/>, doi:10.1167/6.6.55.

Vision Sciences Society, Annual Meeting, Sarasota, Florida, USA

Jun. /06

**Abstract and poster presentation**

Investigation of cortico-striatal connectivity using Probabilistic Diffusion Tractography.

Human Brain Mapping, Annual Meeting, Florence, Italy

Jun. /06

**Abstract and poster presentation**

Identifying pathways to blindsight in hemispherectomized subjects using DTI.

Human Brain Mapping, Annual Meeting, Florence, Italy

Apr. /04

**Abstract and poster presentation**

Cognitive Neuroscience Society, Annual Meeting, San Francisco, USA

Apr. /03

**Poster presentation**

Spatial Summation and perception of emotional faces in healthy and a hemispherectomized subject: A preliminary study.

Neuropsychology Day, Montreal Neurological Institute & Hospital, Canada

Apr. /03

**Abstract and Poster presentation**

Cognitive Neuroscience Society, Annual Meeting, New York City, USA

Apr. /02

**Poster presentation**

Spatial Summation across the vertical meridian: A preliminary study.

Neuropsychology Day, Montreal Neurological Institute & Hospital, Canada

**Oral Presentations:**

- Oct./08                    **Neuronal substrates of blindsight in hemispherectomized subjects**  
Annual Meeting, Réseau FRSQ de recherché en santé de la vision, Canada
- May 08                    **Behavioral and neuroimaging techniques to investigate the neuronal correlate of blindsight**  
Annual Meeting, Réseau FRSQ de recherché en santé de la vision, Canada
- Oct. 07                    **The involvement of the superior colliculi in blindsight**  
Centre de recherché interdisciplinaire en réadaptation (CRIR) Annual Meeting, Canada
- Jun. /06                    **Identifying pathways to blindsight in hemispherectomized subjects using DTI.**  
Human Brain Mapping, Annual Meeting, Florence, Italy
- Feb., 3<sup>rd</sup> 06                **‘Neuronal Correlate of blindsight – recent findings’**  
Vision Research Centre, Royal Victoria Hospital, Montreal, Canada
- Feb., 9<sup>th</sup> 06                **‘Subcortical visual pathways in hemianopic hemispherectomized subjects’**  
Cognitive Neuroscience Seminar, Montreal Neurological Institute, Canada
- Apr. /04                    **“Processing of complex stimuli in a hemispherectomized patient with blindsight: A preliminary fMRI study.”**  
Douglas Hospital Research Centre, Research Day, Canada
- May /03                    **“Spatial Summation of emotional faces in healthy subjects and in a patient with blindsight“**  
Douglas Hospital Research Centre, Brain Imaging Group, Canada.
- Jan. /95                    **Presentation at the regional meeting of orthoptists**  
German Association of Orthoptists (BOD)
- Aug. /96                    **“Prevention, diagnosis and treatment of childhood eye diseases”**  
Rosengarten 5, Wedel, Germany  
Disease prevention seminar for paediatricians
- Sep. /97                    **“Learning disabilities and differential diagnosis”**  
Albert-Schweitzer-School, Wedel, Germany  
Seminar for diagnosis, treatment, and training possibilities for learning disabilities and related disorders

#### **Additional Experience:**

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- March/10                    **Research Seminar on Diffusion Tensor Imaging**  
Invited lecture, PSY 6032, Unité de neuroimagerie fonctionnelle, Université de Montréal

- Jan. /07                    **Reviewer**  
Human Brain Mapping Annual Conference 2007
- Sep. /05 – Dec. /05   **Teaching Assistant**  
Neuroanatomy Class, McGill University, Montreal, Canada.
- Aug. /04                    **Committee Member, Brain Awareness Week**  
Society of Neuroscience, <http://www.sfn-montreal.ca/baw/main.htm>
- Mar. /04                    **Volunteer teaching**  
Sinclair Laid elementary school, Montreal, Canada  
Brain Awareness Week, public information campaign on brain functions and the importance of brain research
- Jun. /01                    **Training program „CogPack“ for rehabilitational purposes**  
Janssen-Cilag GmbH, Germany.
- Sep. /00                    **Internship**  
Dr. Bodenburg, Neuropsychologist, Hamburg, Germany.
- Oct. /94 – Nov. /94   **Clinical training in neuroophthalmology**  
University Hospital Münster, Germany,  
Section: Neuroophthalmology, Ple- and Orthoptics.
- Oct. /94                    **Training the blind in mobility / rehabilitation and integration of the blind**  
IRIS Institute (Low Vision Institute), Hamburg, Germany.

### **Language skills:**

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German, French, English

- Sep. /01 – Sep. / 02   **French lessons**  
Jan. /08 - current      Montreal, Canada  
2 hours/per week.
- Mar. /02 – Apr. /02    **“Science writing and publishing” Course**  
Mc Gill University, Montreal, Canada  
-including abstract and review article writing  
-training in giving an effective talk
- Sep. /00 – Dec./00    **English course certificate for scientists**  
University of Hamburg, Germany.
- Jun. 95                    **French language certificate**



College (CEGEP) “Gymnasium Oberalster” Hamburg, Germany  
Entry certificate for francophone universities and exemption from taking french language tests.

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**Honours and Awards:**

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- June /08                   **Postdoctoral Fellowship**  
Réseau FRSQ de recherché en santé de la vision, Canada
- Oct./ 07                   **Award for Excellence of Research / Best Presentation**  
Réseau Vision Annual Meeting, Quebec-City, Canada
- June /07                   **Publication Award**  
Prix Réseau Vision, Canada  
For my publication > Leh, S.E., Mullen, K.T. and Ptito, A. (2006). Absence of S-cone input in human blindsight. *European Journal of Neuroscience* 24(10): 2954-60.<
- Sep. /06                   **Publication Award**  
Prix Réseau Vision, Canada  
For my publication > Leh, S.E., Johansen-Berg, H. and Ptito,A. (2006). Unconscious vision: New insights into the neuronal correlate of blindsight using Diffusion Tractography. *Brain* 129(Pt7): 1822-32.<  
<http://www.reseauvision.ca/vision-FR/news-prixetudiant-fr.html#prixetudiant9>
- Jun. /06                   **Travel Grant**  
National Institutes of Health (NIH) (2R13 MH062008-06)
- Sep. / 06 – Sep. /08   **Doctoral Scholarship**  
Fonds de Recherche en Santé de Québec (FRSQ), Canada  
<http://ric.uthscsa.edu/hbmtravelawards/awardees2006.htm>
- Sep. /03 – Sep. /06   **Bourse de doctorat**  
Centre de recherché interdisciplinaire en réadaptation (CRIR), Canada
- Jul. / 04                   **Training Award**  
Regroupement Provincial pour la Recherche en Imagerie Cérébrale (REPRIC), Canada
- Apr. /04 & Apr./06   **Travel Grants**  
Réseau FRSQ de recherché en santé de la vision, Canada
- Mar. /04                   **Alma Mater Student Travel Grant**  
Graduate scholarship, McGill University, Canada
- Mar. /03                   **German licensure Psychologist**

Nov. /02	<b>Article of my studies and work in Montreal</b> In the German-Canadian newspaper “Das Echo”, Montreal, Canada
Oct. /00 – Mar. /03	<b>Government grant “Bafög”</b> Graduate scholarship, Germany
Sep. /01 – Sep. /02	<b>Graduate Scholarship</b> “Kölner Gymnasial- und Stiftungsfonds”, Germany
Sep. 01	<b>Travel Grant</b> Graduate scholarship, University Hamburg, Germany
Oct. /99 – Sep. /00	<b>Government grant “Bafög”</b> Undergraduate scholarship, Germany

**Licensures:**

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- **Canadian licensure as a Psychologist**
- **German licensure as a Psychologist**
- **German licensure as an Orthoptist (Health Professional in Neuroophthalmology)**

## **Membership:**

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- **GPNS** ( Gesellschaft fuer Neuropsychologie e.V., German association for Neuropsychology)
- **BDP** (Berufsverband Deutscher Psychologinnen und Psychologen, German association for Psychologie)
- **REPAR** (Réseau Provincial de Recherche enAdpatation-Readaptation)
- **REPRIC** (Regroupement Provincial pour la Recherche en Imagerie Cérébrale)
- **VSS** (Vision Sciences Society)
- **OHBM** (Organization for Human Brain Mapping)
- **SFN** (Society for Neuroscience)
- **Ordres des Psychologues du Québec, Canada** (Canadian association for Psychologie)
- **CPA** (Canadian Psychological Association)
- **APA** (American Psychological Association)
- **COS** (Canadian ophthalmological Society)