

## Jonathan Downar, MD PhD

Human Neuroimaging Laboratory  
Baylor College of Medicine  
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### **Education**

- 2008-present      Visiting Postdoctoral Associate, Human Neuroimaging Laboratory  
Baylor College of Medicine, Houston, Texas, USA. Completion Date: Oct 2009
- 2005-present      Residency Training, Department of Psychiatry.  
University of Toronto, Ontario, Canada. Completion Date: July 2010
- 2002-2005        M.D. Faculty of Medicine, University of Calgary, Alberta, Canada.
- 1998-2002        Ph.D. (Neuroscience); Diploma in Teaching in Higher Education  
Institute of Medical Science, University of Toronto, Ontario, Canada.
- 1993-1997        B.Sc. (Hon). Department of Biology, McGill University, Montréal, Canada.
- 1987-1993        Ontario Secondary School Diploma (Hons)  
University of Toronto Schools, Toronto, Ontario, Canada.
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### **Employment and Work Experience**

- 2007-present      Co-creator, Course Co-coordinator, and Co-presenter  
(with Dr Omar Ghaffar, Dept of Psychiatry, University of Toronto)  
*Neuroimaging Week for PGY-1 Residents 2007 and 2008*  
As a PGY3 resident, devised and delivered a pioneering, annual 5-day  
curriculum in the fundamentals of neuroimaging and relevant functional  
neuroanatomy for the first-year residents in the Department of Psychiatry,  
University of Toronto. Pilot year curriculum “met or exceeded” expectations in  
100% of residents and “achieved personal learning objectives” in >95%. Specific  
feedback comments very positive: “Dr Downar’s teaching was unquestionably the  
highlight.”
- 2001-2006        Screenwriter, Neuroscience Consultant, Lecturer  
“Wired to Win”: An IMAX film following the riders of the Centennial 2003 Tour de  
France cycling race, describing how their brains work to meet the challenges of  
this grueling competition. Worked with the director and producer to write the  
original screenplay that won a \$3m grant from the US National Science  
Foundation. During production, served as a screenwriter and neuroscience  
consultant. Served as a public lecturer and educator after the release of the film.  
[http://www.wiredtowinthemovie.com/profile\\_jonathandownar.html](http://www.wiredtowinthemovie.com/profile_jonathandownar.html)
- 2002              Course Developer, University of Toronto, Department of Zoology  
Created an undergraduate laboratory course in human brain imaging methods.  
Collected sample fMRI data and developed instructional material for the course,  
which has been well received by students ever since.
- 1999-2002        Teaching Assistant, University of Toronto, Department of Zoology  
Developed laboratory course material. Demonstrated laboratory techniques,  
graded lab reports, and provided individual / group instruction in course material  
and lab report preparation.

1998-present	Editorial Consultant Revised, edited, and indexed secondary-school-level educational materials on a contractual basis.
1997	Editor-in-Chief, <i>Montage</i> Creative Journal Organized, edited, and secured funding for a 100-page annual review of writing and photography at McGill University.
1996	Research Student, Montréal Neurological Institute Awarded a student fellowship for summer research. Designed visual memory task for post-operative evaluation of epileptic patients.
1996	Producer/Director, <i>Synesthesia</i> Fine Arts Festival Conceived, organized, and directed a two-day multimedia performance of film, art, storytelling, and music by artists at McGill University.
1994	Summer Research Student, Toronto Hospital Awarded student fellowship for summer research. Worked under the supervision of Dr. Peter Liu, establishing cell lines transfected with cloned genes.
1993	Summer Research Student, Toronto Hospital Awarded Martin L. Willis Scholarship for summer research. Worked under the supervision of Dr. Tom Parker, establishing cardiac cell cultures and studying the effects of growth factors on gene expression.

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### **Scholarships and Awards**

<b>Award</b> (Pursuing medical training from 2003-present)	<b>Institution</b>	<b>Year</b>	<b>Value</b>
Departmental Nomination – NSERC Doctoral Prize 2003	University of Toronto	2003	\$10 000
Trainee Presentation Award	Organization for Human Brain Mapping	2001	US\$500
Merit Scholarship	University of Toronto	2000-2001	\$1 000
Laidlaw Prize, IMS Manuscript Competition	Institute of Medical Science (University of Toronto)	2000	\$100
MRC Doctoral Research Award	Medical Research Council of Canada	2000-2003	\$19 530 pa
Connaught Scholarship (declined due to MRC award)	University of Toronto	2000	\$15 000 pa
Merit Scholarship	University of Toronto	1999-2000	\$2 107
Ontario Graduate Scholarship in Science and Technology	Ontario Government	1999-2000	\$15 000
Open Fellowship	University of Toronto	1998-1999	\$4 000
Scarlet Key Award for Leadership	McGill University	1996-1997	-

E. R. Crawford Scholarship	McGill University	1996-1997	\$1 000
E. R. Crawford Scholarship	McGill University	1995-1996	\$1 000
J. W. McConnell Award	McGill University	1995-1996	\$1 000
J. W. McConnell Award	McGill University	1994-1995	\$2 000
Hewlett-Packard Prize	McGill University	1994-1995	-
Martin L. Willis Scholarship	Ontario Heart and Stroke Foundation	1993-1994	\$2 000

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### **Technical Skills**

#### Software Proficiency:

Programming: Visual C++, Visual Basic

fMRI Data Analysis: BrainVoyager, SPM99, AFNI

Multimedia: Adobe PhotoShop, Adobe Premiere, PowerPoint, DreamWeaver

Statistics: SAS, SigmaPlot/SigmaStat, Excel

#### Construction Techniques:

MRI-compatible device fabrication using wood / plastic / metalworking

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### **Peer Reviewer Experience**

2006-present            Invited Peer Reviewer, *Cerebral Cortex*

2004-present            Invited Peer Reviewer, *Psychological Science*.

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### **Refereed Publications**

(ISI Web of Science citations to date given for major first-authored publications)

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. fMRI of the transmodal network for involuntary attention. Society for Neuroscience Abstracts, Vol 25, Session 115.6. 1999.

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. A multimodal cortical network for the detection of changes in the sensory environment. *Nature Neuroscience* 3(3): 277-283. 2000.

**ISI citations to date: 210**

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. fMRI of the cortical response to relevant vs. irrelevant changes in visual and auditory stimuli. Society for Neuroscience Abstracts, Vol. 26, Session 595.5. 2000.

Mailis A, **Downar J**, Kwan C, Nicholson K, Mikulis DJ, and Davis KD. fMRI in unexplainable widespread somatosensory deficits (WSDS) in patients with chronic pain. Proceedings, American Pain Society 19<sup>th</sup> Annual Meeting, Atlanta, GA. Abstract 760. 2000.

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. A cortical network for the detection of novel events across multiple sensory modalities. *NeuroImage* 13(6): S310. 2001.

Davis KD, Giannoylis I, **Downar J**, Kwan C, Mikulis DJ, Crawley AP, Nicholson K, and Mailis A. SI cortex is shut down in chronic pain patients with hysterical anesthesia. *NeuroImage* 13(6): S781, 2001.

Davis KD, **Downar J**, Pope G, Crawley AP, Mikulis DJ. Identification of pain and attention networks evoked by noxious stimuli using fMRI. Society For Neuroscience Abstracts Vol. 27, Session 507.5. 2001

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. The effect of task-relevance on the cortical response to changes in visual and auditory stimuli: an event-related fMRI study. *NeuroImage* 14: 1256–1267. 2001. **ISI citations to date: 70**

**Downar J**, Crawley AP, Mikulis DJ, and Davis KD. A cortical network sensitive to stimulus salience in a neutral behavioral context across multiple sensory modalities. *Journal of Neurophysiology* 87: 615–620. 2002. **ISI citations to date: 94**

**Downar J.** *Neuroimaging evidence for the representation of salience in the neural correlates of attention and awareness in the human brain.* Doctoral Thesis, Institute of Medical Science, University of Toronto, 2002.

Mailis A, Giannoylis I, **Downar J**, Kwan CL, Mikulis DJ, Crawley AP, Nicholson K and Davis KD, Altered central somatosensory processing in chronic pain patients with "hysterical" anaesthesia. *Neurology* 60: 1501-1507. 2003. **ISI citations to date: 50**

**Downar J**, Mikulis DJ, and Davis KD. Neural correlates of the prolonged salience of painful stimulation. *NeuroImage* 20: 1540-51. 2003. **ISI citations to date: 20**

**Downar J**, Montague PR. How do we get what we need? Review in preparation, Dec 2008.

**Downar J.** The emerging neuroanatomy of psychotic symptoms in schizophrenia. Review in preparation, Jan 2008.

Downar J, Krizova A, Ghaffar O, Zaretsky A. Neuroimaging Week: a novel, engaging, and effective curriculum for teaching neuroimaging to junior psychiatry residents. Submitted, Feb 2009.

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### ***Invited Publications***

**Downar J**, Kapur S. Biological theories of schizophrenia and mechanisms of antipsychotic drugs. In: *Clinical Handbook of Schizophrenia*. Eds. KT Meuser and DV Jeste. Guilford Press, New York, NY. 2006.

**Downar J**, Kapur S. Brain pharmacology and neurochemistry. In: *The Year in Schizophrenia: Volume 1*. Eds. G Thaker and WT Carpenter. Clinical Publishing, Oxford, United Kingdom. 2006.

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### ***Selected Presentations***

“The 21<sup>st</sup> century brain: neuroanatomy with the psychiatrist in mind.” Department of Psychiatry, University of Toronto. Presented by invitation at University Health Network Grand Rounds, Centre for Addiction and Mental Health Grand Rounds, and Sunnybrook Hospital Neurosciences Rounds in Toronto, Ontario. September 2008.

*PGY-1 Neuroimaging Week 2007 and 2008.* Co-creator, -coordinator and -presenter of 5-day lecture series on neuroimaging and functional neuroanatomy for first-year residents in the Department of Psychiatry at the University of Toronto. Centre for Addiction and Mental Health, Toronto, Ontario. September 2007 and August 2008.

“Salience and Decision-Making: Neuroimaging studies.” Invited talk. Baylor College of Medicine. Houston, Texas. August 2007.

“Why can’t we do what we know is right? Clinical implications of neuroeconomics.” Grand Rounds. Department of Psychiatry, Sunnybrook Hospital, Toronto, Ontario. March 2007.

"The new neuroscience of moral cognition: clinical implications." Grand Rounds, Rotman Research Institute, Baycrest Hospital, Toronto, Ontario. October, 2007.

"fMRI and the neural correlates of conscious perception." Invited talk. Department of Diagnostic Imaging, University of Calgary, Calgary, Alberta. April 2004.

"Sensory Awareness: from the Upanishads to the Century of the Brain." Invited talk. Departments of Neurology and Neurosurgery, National Institute of Mental Health and Neuroscience, Bangalore, India. June 2003.

"New answers to old questions: neuroimaging attention, awareness, and salience." Invited talk. Southern Ontario Neuroscience Association annual meeting, May 2002, Toronto, Ontario.

"Synchronization and effective connectivity analysis." Slide presentation. Toronto Western Hospital, April 2002, Toronto, Ontario.

"Identification of pain and attention networks evoked by noxious stimuli using fMRI." Poster Presentation, Society for Neuroscience 31<sup>st</sup> annual Conference, November 2001, San Diego, California.

"A cortical network for the detection of novel events across multiple sensory modalities." Poster Presentation; Trainee Travel Award Recipient. 7<sup>th</sup> Annual Meeting, Organization for Human Brain Mapping, June 2001, Brighton, United Kingdom.

"Neural correlates of attention and awareness revealed by fMRI." Invited Talk. Centre for Vision Research, York University, May 2001, Toronto, Ontario.

"Imaging the neural correlates of conscious perception using peri-threshold auditory stimuli." Slide Presentation. Toronto Western Hospital, April 2001, Toronto, Ontario.

"Newish approaches to fMRI data analysis: Boolean conjunction analysis and event-related multifactorial ANOVA." Slide Presentation. Toronto Western Hospital, March 2001, Toronto, Ontario.

"Attention, awareness, and salience in the temporoparietal junction: an fMRI tryptich." Invited Talk. Department of Physiology, University of Toronto, December 2000, Toronto, Ontario.

"fMRI of the cortical response to relevant vs. irrelevant changes in visual and auditory stimuli." Slide Presentation. Society for Neuroscience 30<sup>th</sup> Annual Conference, November 2000, New Orleans, Louisiana.

"The effect of task-relevance on the cortical response to changes in the sensory environment." Poster presentation. Toronto Western Research Institute Research Day, October 2000, Toronto, Ontario.

"A multimodal cortical network for the detection of changes in the sensory environment." Laidlaw Prize Presentation, Institute of Medical Science Scientific Day, University of Toronto, May 2000, Toronto, Ontario.

"Overlap maps': a new technique for assessing the incidence of cortical activation across subjects." Slide Presentation. Toronto Western Hospital, April 2000, Toronto, Ontario.

"A multimodal cortical network for the detection of changes in the sensory environment: implications for schizophrenia." Invited Talk. Clarke Institute of Psychiatry, October 1999, Toronto, Ontario.

"fMRI of the transmodal network for involuntary attention." Slide Presentation. Society for Neuroscience 29<sup>th</sup> Annual Conference, October 1999, Miami, Florida.

"A multimodal cortical network for the detection of changes in the sensory environment." Invited Talk. Hospital for Sick Children, June 1999, Toronto, Ontario.

“The Transmodal Network for Involuntary Attention.” Poster presentation. Southern Ontario Neuroscience Association / University of Toronto Neuroscience Joint Meeting, May 1999, Toronto, Ontario (Honourable Mention in Poster Competition).

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**Other Interests and Activities**

Writing and Public Science Education	Collaborator on <i>Wired to Win</i> IMAX film screenplay as described above; Co-creator of preproduction documentary “The Anatomy of a Superstition”; Author of a short fiction piece optioned for television entitled "Fishermen of the Orphan Isle"; Author of other 6 published short stories.
Music	Piano, Singing, Songwriting. Styles of current interest: improvisational, Afro-Cuban, and contemporary pieces by independent artists.
Athletics	Competitive Swimming (Captain of high school team 1990-1993). Sports of current interest include rock climbing, canoeing, kayaking, and more recently, kiteboarding.
Travel	Hitchhiking/writing tour of Canada, Montreal-Inuvik, 1995; Similar tours of Spain (1998), North Scotland (2001), Cuba (2002), and the Karnataka state of India (2003). Kiteboarding tours of Costa Rica (2006), Cuba and Outer Banks, North Carolina (2007).