

# ELEFThERIOS GARYFALLIDIS, PhD

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	Sherbrooke J1H 4P7	E-mail:	garyfallidis@gmail.com	Marital Status:	Single
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## EDUCATION

2008 – 2012	<b>PhD in Medical Imaging</b>	University of Cambridge	UK
2004 – 2006	<b>MSc in Brain &amp; Mind Sciences</b>	University of Crete and FORTH	GR
1999 – 2003	<b>BSc in Computer Science</b>	Technological Institution of Athens	GR

## FOUNDER & LEAD SOFTWARE ENGINEER

2009 – Today   *Diffusion Imaging in Python*   diffusion MRI analysis software library   [dipy.org](http://dipy.org)

Diffusion Imaging in Python (DIPY) is a free and open source software project for the analysis of data from diffusion magnetic resonance imaging (dMRI) experiments. dMRI is an application of MRI that can be used to measure structural connectivity of the brain's white matter. DIPY today has an international team of 30+ contributors, spanning eight different academic institutions in six countries and three continents and still growing.

## RESEARCH EXPERIENCE

2012 – Today   Postdoctoral Researcher   *"Diffusion MRI Methods at the SCIL"*   University of Sherbrooke

Working on the development of new exciting methods at the Sherbrooke Connectivity Imaging Lab (SCIL) under the supervision of Professor Maxime Descoteaux.

2008 – 2012   PhD Project   *"Towards an accurate brain tractography"*   MRC – CBU, University of Cambridge

The objective of this thesis was to improve on the methods for inferring neural tracts from diffusion weighted magnetic resonance imaging (dMRI). Accordingly, I presented advancements to the reconstruction, tracking, segmentation and registration modalities of dMRI analysis. The thesis is available for download at [tinyurl.com/eleftherios-phd](http://tinyurl.com/eleftherios-phd).

2006 – 2008   Research Project   *"Direct source localization using MEG"*   DAMTP, University of Cambridge

Investigating the possibility of localizing dipoles using magnetoencephalography with a direct analytical inversion approach.

2005 – 2006   MSc 1st Project   *"Automatic shape decomposition"*   Foundation for Research and Technology Hellas

The goal of this project was to decompose complex solid shapes, e.g. binary images of human hands, into meaningful parts using machine learning and computer vision approaches.

2005 – 2006   MSc 2nd Project   *"Developing fMRI applications"*   Foundation for Research and Technology Hellas

The goal of this project was to implement standard visualization algorithms for inspecting fMRI-based activations.

2002 – 2003   BSc Project   *"Classification of OCDs and NCs using ERPs"*   Technological Institution of Athens

The purpose of this project was to encode and classify event related potentials of EEG signals between obsessive compulsive disorder patients and normal controls. For this purpose we used neural associative memories.

1. **Garyfallidis, E.**, O. Ocegueda, D. Wassermann, M. Descoteaux. "*Robust and efficient linear registration of fascicles in the space of streamlines*", Neuroimage (under revision), 2015.
2. Ocegueda, O., **E. Garyfallidis**, M. Descoteaux, M. Rivera. "*Symmetric Diffeomorphic Registration with Expected Cross-Correlation for Multi-Modal MRI*", Medical Image Analysis (submitted), 2015.
3. Renauld, E. M. Descoteaux, M. Bernier, **E. Garyfallidis**, K. Whittingstall, "*Morphology of thalamus, LGN and optic radiation do not influence EEG alpha waves*", Cortex (under submission), 2015.
4. Porro, D., E. Olivetti, B. Thien, **E. Garyfallidis**, P. Avesani, "*Visual Data Mining Tool for Brain Connectivity Analysis*", Data Mining and Knowledge Discovery (accepted), 2015.
5. **Garyfallidis, E.**, M. Brett, B. Amirbekian, A. Rokem, S. Van Der Walt, M. Descoteaux, and I. Nimmo-Smith. "*Dipy, a library for the analysis of diffusion MRI data*". Frontiers in Neuroinformatics, 1-18, 2014.
6. Daducci, A., E. Canales-Rodriguez, M. Descoteaux, **E. Garyfallidis**, Y. Gur, Y-C. Lin, M. Mani, S. Merlet, M. Paquette, A. Ramirez-Manzanares, M. Reisert, P. Rodrigues, F. Sepehrband, E. Caruyer, J. Choupan, R. Deriche, M. Jacob, G. Menegaz, V. Prckovska, M. Rivera, Y. Wiaux, and J-P. Thiran. "*Quantitative comparison of reconstruction methods for intra-voxel fiber recovery from diffusion MRI*." Transactions in Medical Imaging, 33 (2): 384-399, 2014.
7. Côté, M-A., G. Girard, A. Boré, **E. Garyfallidis**, J-C. Houde, and M. Descoteaux. "*Tractometer: Towards Validation of Tractography Pipelines*." Medical Image Analysis, 17 (7): 844-857, 2013.
8. **Garyfallidis, E.**, M. Brett, M. M. Correia , G.B. Williams, I. Nimmo-Smith. "*QuickBundles, a method for tractography simplification*." Frontiers in Neuroscience, 6-175, 2012.
9. Tsiaras, V., P.G. Simos, R. Rezaie, B.R. Sheth, **E. Garyfallidis**, E.M. Castillo, A.C. Papanicolaou, "*Extracting biomarkers of autism from MEG resting-state functional connectivity networks*.", Computers in biology and medicine 41(12): 1166-77, 2011.
10. Chamberlain S.R., A. Hampshire, L.A. Menzies, **E. Garyfallidis**, J.E. Grant, B.L. Odlaug, K. Craig, N. Fineberg, B.J. Sahakian, "*Reduced brain white matter integrity in trichotillomania: a diffusion tensor imaging study*.", Archives of General Psychiatry 67(9): 965-71, 2010.

## CONFERENCE PUBLICATIONS

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1. **Garyfallidis, E.** M-A Côté, J. Hau, G. Perchey, L. Petit, S. C. Cunanne, M. Descoteaux. "*Recognition of bundles in healthy and severely diseased brains*". Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM), Toronto, Canada, 2015.
2. Côté, M-A., **E. Garyfallidis**, H. Larochelle, and M. Descoteaux. "*Cleaning up the mess: tractography outlier removal using hierarchical QuickBundles clustering*". Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM), Toronto, Canada, 2015.
3. Ocegueda O., **E. Garyfallidis**, M. Descoteaux, and M. Rivera. "*An algorithm and quantitative evaluation framework for registration of multi-modal brain MRI*", Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM), Toronto, Canada, 2015.
4. Tax C.M.W., D.S. Novikov, **E. Garyfallidis**, M.A. Viergever, M. Descoteaux and A. Leemans, "*Localizing and characterizing single fiber populations throughout the brain*", Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM), Toronto, Canada, 2015.
5. Chekir, A., M. Descoteaux, **E. Garyfallidis**, M-A. Cote , F. Oulebsir-Boumghar, "*A Hybrid Approach for Optimal Automatic Segmentation of White Matter Tracts in HARDI*", IEEE Conference on Biomedical Engineering and Sciences, Sarawak, Malaysia, 2014.

6. **Garyfallidis, E.**, D. Wassermann and M. Descoteaux. "*Direct native-space fiber bundle alignment for group comparisons*". Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM). Milan, Italy, 2014.
7. **Garyfallidis, E.**, M. Zuchelli, J-C. Houde, and M. Descoteaux. "*How to perform best ODF reconstruction from the Human Connectome Project sampling scheme?*" Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM). Milan, Italy. 6838, 2014.
8. **Garyfallidis, E.**, A. Rokem, B. Amirbekian, S. van der Walt, M. Zucchelli, J-O. Ocegueda-Gonzalez, S. St-Jean, G. Girard, M. Paquette, I. Nimmo-Smith, M. Brett, and M. Descoteaux. "*The new methods available in Dipy 0.7.0+ that you should know about.*" Proceedings of: Organization of Human Brain Mapping (OHBM). Hamburg, Germany, 2014.
9. Zuchelli, M., **E. Garyfallidis**, M. Paquette, S. Merlet, G. Menegaz, and M. Descoteaux. "*Comparison between discrete and continuous propagator indices from Cartesian q-space DSI sampling.*" Proceedings of: International Society of Magnetic Resonance in Medicine (ISMRM). 6762, 2014.
10. **Garyfallidis E.**, S. St-Jean, M. Paquette, P. Coupé, and M. Descoteaux. "*Constrained spherical deconvolution on signal and ODF values.*" Proceedings of: ISBI HARDI Reconstruction Challenge. 16, 2013.
11. **Garyfallidis E.**, S. St-Jean, M. Paquette, P. Coupé, and M. Descoteaux. "*Deconvolution enhanced Generalized Q-Sampling 2 and DSI deconvolution.*" Proceedings of: ISBI HARDI Reconstruction Challenge. 17, 2013.
12. Paquette, M., **E. Garyfallidis**, S. St-Jean, P. Coupé, and M. Descoteaux. "*Particle Swarm Optimization in Multi-Tensor Imaging*". Proceedings of: ISBI HARDI Reconstruction Challenge. 15, 2013.
13. **Garyfallidis E.**, Gerhard S., Avesani P., Nguyen T., Tsiaras V., Nimmo-Smith I., Olivetti E., "*A software application for real-time, clustering-based exploration of tractographies*", 18th Annual Meeting of the Organization for Human Brain Mapping, 2012.
14. Olivetti E., Nguyen TB., **Garyfallidis E.**, "*The Approximation of the Dissimilarity Projection*", 2nd IEEE International Workshop on Pattern Recognition in NeuroImaging, 2012.
15. **Garyfallidis E.**, Nimmo-Smith I., "*Cartesian grid q-space reconstruction*", HARDI Reconstruction Workshop of the 9th IEEE International Symposium on Biomedical Imaging, 2012.
16. Correia M.M., Williams G.B., Yeh F-C, Nimmo-Smith I., **Garyfallidis E.**, "*Robustness of diffusion scalar metrics when estimated with Generalized Q-Sampling Imaging acquisition schemes*", 19th Proceedings of the International Society of Magnetic Resonance in Medicine, 2011.
17. **Garyfallidis E.**, Brett M., Amirbekian B., Nguyen C., Yeh F-C., Olivetti E., Halchenko Y., Nimmo-Smith I., "*Dipy - a novel software library for diffusion MR and tractography*", 17th Annual Meeting of the Organization for Human Brain Mapping, 2011.
18. Tsiaras V., Simos P.G., Rezaie R., Sheth B.R., **Garyfallidis E.**, Castillo E.M., Papanicolaou A.C., "*Extracting biomarkers of autism from MEG resting-state functional connectivity networks.*", Computers in biology and medicine 41(12):1166-77, 2011.
19. **Garyfallidis E.**, Brett M., Nimmo-Smith I, "*Fast Dimensionality Reduction for Brain Tractography Clustering*", 16th Annual Meeting of the Organization for Human Brain Mapping, 2010.
20. **Garyfallidis E.**, Brett M., Tsiaras V., Vogiatzis G., Nimmo-Smith I., "*Identification of corresponding tracks in diffusion MRI tractographies*", 18th Proceedings of the International Society of Magnetic Resonance in Medicine, 2010.

## ORAL CONFERENCE PRESENTATIONS

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1. Garyfallidis, E., D. Wassermann, and M. Descoteaux, "Direct native-space fiber bundle alignment for group comparisons", International Society of Magnetic Resonance in Medicine (ISMRM). Milan, Italy. 7796, 2014.

## INVITED TALKS

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1. Garyfallidis E. (Oct. 2014), "Hack the white matter with Dipy", Ignite speaker in Brainhack EDT (brainhack.org), University of Montreal, Canada.
2. Garyfallidis E. (May 2014), "Diffusion MRI workshop", University of Verona, Italy.
3. Garyfallidis E. (Mar. 2013), "Quickbundles-based Segmentation", Harvard University, USA.
4. Garyfallidis E. (May 2013), "Diffusion imaging course with Dipy", University of California at Berkeley, USA.
5. Garyfallidis E. (Sep. 2012), "DIPY 0.6 on the edge of diffusion MR analysis", Cimec, FBK, Trento, Italy.
6. Garyfallidis E. (Jul. 2012), "Accuracy in voxel reconstruction using dMRI", Stanford University, USA.

## OUTREACH

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Presented at the 350th celebration of the Royal Society, London, UK. In the presence of Her Majesty Queen Elizabeth II and His Royal Highness the Duke of Edinburgh. Video available at [tinyurl.com/dipyfirst](http://tinyurl.com/dipyfirst). The title of the presentation was "*Surfing your Brain Super-Highways*".

Interviewed by The Scientist Magazine <http://www.the-scientist.com/?articles.view/articleNo/41266/title/White-s-the-Matter/>

## AWARDS/HONORS

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1. Winner of the international scientific competition: IEEE ISBI HARDI Challenge, San Francisco, 2013.  
[http://hardi.epfl.ch/static/events/2013\\_ISBI/workshop.html#results](http://hardi.epfl.ch/static/events/2013_ISBI/workshop.html#results)
2. Invited speaker for OHBM Diffusion MRI Educational course, 2014.
3. Official OHBM exhibitor for DIPY, Honolulu, Hawaii, 2015.
4. Consultant for R01 of P.I. Prof. Cameron Craddock from the Child Mind Institute, New York, 2015.
5. Consultant for R01 of P.I. Arno Klein from the University of Columbia, 2012.
6. Mentor in Google Summer of Code with the Python Software Foundation, 2015.
7. Consultant in Startup Event, Microsoft Athens, 2012.
8. Topic Editor in Frontiers in Human Neuroscience, 2014.
9. RBIQ Travelling Award for attending ISMRM 2014.
10. Distinction Award for the MSc – Grade 8.65/10.
11. Distinction Award for the BSc Thesis – Grade 10/10.
12. Scholarship from the Board of Graduate Studies, University of Cambridge (2009 – 2010).
13. EPSRC funding for College and Tuition Fees for the 4 years of the PhD course.
14. Sponsorship from the Vergottis Foundation for the living expenses for the PhD course.
15. Scholarship (Jul. 2004 – Jun. 2005) awarded after competitive examination at the MSc course.
16. Scholarship (Mar. 2006 – Jul. 2006) from the Computational Vision and Robotics Laboratory, FORTH, GR.
17. Life member of Wolfson College, Cambridge, UK.
18. Member of Quebec Neuroimaging Network, CA.

## PAST EMPLOYMENT

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2004 – 2006 **Freelance Developer** Applications for Booking Air-tickets, Athens, GR.  
2002 – 2003 **Security Analyst (White Hat)** National Center for Scientific Research, Athens, GR.  
2000 – 2001 **UI Developer** AlphaCyber Group, Stock Market Analysis, Athens, GR.  
1997 – 2000 **Sales/Promotion** Golden Jewellery Shop, Family business, Athens, GR.

## PROGRAMMING

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I am a professional software engineer. I have programmed in more than 20 different languages. I am a professional Python developer and experienced in C/C++ and Cython. Apart from developing and leading the development of DIPY I have also worked extensively in scientific visualization. Here is a project that I started developing in 2010 using Python and OpenGL.

2010 – 2012 **Free on Shades** medical imaging and network visualization library [fos.me](#)

A 3D visualization software library using OpenGL and the Python programming language for extremely efficient and interactive experience of tractographies from neuroanatomists.

## TEACHING

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I have taught advanced courses in Machine Learning (Medical Research Council), Python Development for Medical Imaging (University of Sherbrooke) and taught in summer schools for DIPY (CREATE/NSERC/QBIN).

## PHD COURSES

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Machine Learning, Statistical Pattern Processing, Signal Detection and Estimation, High Performance Computing, Statistical, Methods, and Complex Optimization.

## MSc COURSES

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Medical Imaging, Neurobiology, Neurophysiology, Introduction to Robotics, Developmental Psychology, Biomedical Technology, Robotic Action, Biomimetic Robotics, Philosophy of the Mind, and Machine Vision.

## ACTIVITIES & SPORTS

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Swimming, Martial Arts, Freeletics, Co-Founder of the Ultimate Workout, Cryptocurrencies.

## PERSONAL CHARACTERISTICS

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Team player, Passionate, Friendly, Hard Working, Inventive.

## REFERENCES

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<b>Prof. Maxime Descoteaux</b>	Position:	Chair of Neuroinformatics University of Sherbrooke Sherbrooke, CA	Telephone:	+1 819 580 1456
			E-mail:	maxime.descoteaux@gmail.com
			Relationship:	Postdoc supervisor
<b>Dr. Ian Nimmo-Smith</b>	Position:	Head of Methods Group MRC – CBU Cambridge, UK	Telephone:	+44 7966 699 097
			E-mail:	iannimmosmith@gmail.com
			Relationship:	PhD 1st advisor
<b>Dr. Matthew Brett, MD</b>	Position:	Lead Engineer at NIPY University of California Berkeley, US	Telephone:	+1 5106 434 053
			E-mail:	matthew.brett@gmail.com
			Relationship:	Collaborator
<b>Dr. Emanuele Olivetti</b>	Position:	Senior Research Associate Foundation Bruno Kessler Trento, IT	Telephone:	+39 3200 642 102
			E-mail:	olivetti@fbk.edu
			Relationship:	Collaborator
<b>Dr. Guy Williams</b>	Position:	Senior Research Associate WBIC, University of Cambridge Cambridge, UK	Telephone:	+44 1223 746 464
			E-mail:	gbw1000@cam.ac.uk
			Relationship:	PhD 2nd advisor
<b>Prof. Antonis Argyros</b>	Position:	Researcher FORTH Crete, GR	Telephone:	+30 2810 391 704
			E-mail:	argyros@ics.forth.gr
			Relationship:	MSc supervisor
<b>Prof. Nikolaos Vassilas</b>	Position:	Head of Informatics Technological Institution of Athens Athens, GR	Telephone:	+30 6977 840 215
			E-mail:	nvas@teiath.gr
			Relationship:	BSc supervisor