

## Sean Froudish-Walsh CV

### Work Experience

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- New York University (USA) 01/09/2017 -  
Postdoctoral associate  
Xiao-Jing Wang lab  
Main project: "Connectome and biophysically-based modelling of dopamine in working memory."
- Icahn School of Medicine at Mount Sinai (USA) 01/09/2015 – 31/08/2017  
Postdoctoral fellow  
Paula Croxson lab  
Main project: "Distributed plasticity following focal hippocampal lesions in the monkey."
- Institute of Psychiatry, King's College London (UK) 10/10/2011 – 20/04/2015  
Research Worker  
Chiara Nosarti and Oliver Howes labs  
Main project: "The long-term cognitive and psychiatric effects of neonatal brain injury."
- University of Barcelona (Spain) 01/03/2011 – 31/09/2011  
MRI Analyst  
Antoni Rodríguez-Fornells lab  
Main project: "Diffusion MRI tractography investigation of language and motor recovery following stroke."
- University of Málaga (Spain) 01/12/2010 – 31/09/2011  
Specialist MR Technician  
Marcelo Berthier lab  
Main project: "Multimodal MRI investigation of recovery following aphasia and related disorders."
- Trinity College Dublin (Ireland) 01/06/2009 – 01/09/2009  
Research Assistant  
Conor Houghton lab  
Main project: "Bayesian fitting methods for analysing spike train data."

### Education

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- Institute of Psychiatry, King's College London (UK) 01/01/2012 – 01/07/2015  
**PhD in Neuroimaging**  
Advisors: Chiara Nosarti, Oliver Howes  
Thesis: "Very early brain damage leads to dopamine dysregulation in adulthood"
- Institute of Psychiatry, King's College London (UK) 01/09/2009 – 08/09/2010  
**MSc in Neuroscience** (graduated with Distinction)  
Thesis: "Disruption to the corpus callosum in adults with autism spectrum disorder"
- Trinity College Dublin (Ireland) 01/10/2005 – 25/06/2009  
**BA (Hons) in Pure and Applied Mathematics** (graduated with First Class Honours)

**Preprints**

- 1) **Froudish-Walsh S**; DP Bliss; X Ding; L Jankovic-Rapan; M Niu; K Knoblauch; K Zilles; H Kennedy; N Palomero-Gallagher; XJ Wang. A dopamine gradient controls access to distributed working memory in monkey cortex. *bioRxiv* 286500 (2020).
- 2) Klink PC, JF Aubry, V Ferrera, AS Fox, **S Froudish-Walsh** et al. Combined brain perturbation and neuroimaging in non-human primates. *OSF Preprints* (2020) doi:10.31219/osf.io/z4x89

**Peer-reviewed publications****1st /Joint 1<sup>st</sup> author published papers - \* signifies equal contribution**

- 3) **Froudish-Walsh, S**; PGF Browning; JJ Young; KL Murphy; RB Mars; L Fleysher; PL Croxson. "Macro-connectomics and microstructure predict dynamic plasticity patterns in the non-human primate brain". *eLife* (2018): 7:e34354
- 4) **Froudish-Walsh, S**; PGF Browning; PL Croxson; KL Murphy; JL Shamy; TL Veuthey; CRE Wilson; MG Baxter. "The rhesus monkey hippocampus contributes to scene memory retrieval, but not new learning". *Journal of Neuroscience* (2018): 38(36):7800–7808
- 5) **Froudish-Walsh, S**; MP Bloomfield; J Kroll; V Karolis; Sameer Jauhar; Ilaria Bonoldi; PK McGuire; RM Murray; S Kapur; C Nosarti; O Howes. "Presynaptic striatal dopamine dysfunction in people who experienced neonatal brain injury". *eLife* (2017): 6: e29088.
- 6) Kroll, J\*; **S Froudish-Walsh\***; PJ Brittain; CEJ Tseng; V Karolis; R M. Murray; C Nosarti. "A dimensional approach to assessing psychiatric risk in adults born very preterm." *Psych. Med* (2017): 48 (10) 738-1744
- 7) **Froudish-Walsh, S**; D López-Barroso; MJ Torres-Prioris; PL Croxson; ML Berthier. "Plasticity in the Working Memory System: Life Span Changes and Response to Injury." *The Neuroscientist* (2017): 1073858417717210.
- 8) **Froudish-Walsh, S**; V Karolis; C Caldinelli; PJ Brittain; J Kroll; E Rodríguez-Toscano; M Tesse; M Colquhoun; O Howes; F Dell'Acqua; M Thiebaut de Schotten; RM Murray; SCR Williams; C Nosarti. "Very Early Brain Damage Leads to Remodeling of the Working Memory System in Adulthood: A Combined fMRI/Tractography Study." *The Journal of Neuroscience* 35, no. 48 (2015): 15787-15799.
- 9) Salvan, P\*; **S Froudish-Walsh\***; MPG Allin; M Walshe; RM Murray; S Bhattacharyya; PK McGuire; SCR Williams; C Nosarti. "Road work on memory lane—Functional and structural alterations to the learning and memory circuit in adults born very preterm." *NeuroImage*. 102 (2014): 152-161.
- 10) Lawrence, EJ\*; **S Froudish-Walsh\***; R Neilan; KW Nam; V Giampietro; PK McGuire; RM Murray; and C Nosarti. "Motor fMRI and Cortical Grey Matter Volume in Adult Born Very Preterm." *Developmental Cognitive Neuroscience* 10 (2014): 1-9.

**2<sup>nd</sup> author published papers:**

- 11) Tseng, CEJ; **S Froudish-Walsh**; J Kroll; V Karolis; PJ Brittain; N Palamin; H Clifton; S Counsell; SCR Williams; RM Murray; C Nosarti. "Verbal fluency is affected by altered brain lateralization in adults who were born very preterm". *eNeuro* (2019): 6(2) 1-16.
- 12) Velthorst, E; **S Froudish-Walsh** et al., "Genetic risk for schizophrenia and autism, social impairment and developmental pathways to psychosis". *Translational Psych.* (2018): 8:204.
- 13) Karolis, V; **S Froudish-Walsh**; J Kroll; PJ Brittain; CEJ Tseng; KW Nam; A Reinders; RM Murray; SCR Williams; PM Thompson; C Nosarti; "Volumetric grey matter alterations in adolescents and adults born very preterm suggest accelerated brain maturation". *NeuroImage*, 163, (2017): 379-389.
- 14) Caldinelli, C; **S Froudish-Walsh**; V Karolis; CEJ Tseng; MP Allin; M Cuddy; RM Murray; C Nosarti. "White matter alterations to the cingulum and fornix following very preterm birth and their relationship with cognitive functions". *NeuroImage*. 150, (2017): 373-382.
- 15) Karolis, V; **S Froudish-Walsh**; PJ Brittain; J Kroll; G Ball; AD Edwards; F Dell'Acqua; SCR Williams; RM Murray; C Nosarti. "Reinforcement of the Brain's Rich-Club Architecture Following Early Neurodevelopmental Disruption Caused by Very Preterm Birth." *Cerebral Cortex* 26; 3 (2016): 1322-1335.

- 16) Nosarti, C; **S Froudish-Walsh**. "Alterations in development of hippocampal and cortical memory mechanisms following very preterm birth." *Developmental Medicine and Child Neurology* 58; S4 (2016): 35-45.
- 17) Tseng, CEJ, **S Froudish-Walsh**, PJ Brittain, V Karolis, C Caldinelli, J Kroll, SJ Counsell, SCR Williams, RM Murray; C Nosarti. "A multimodal imaging study of recognition memory in very preterm born adults." *Human Brain Mapping* 38, no. 2 (2017): 644-655.
- 18) Brittain, PJ; **S Froudish-Walsh**; KW Nam; V Giampietro; V Karolis; RM Murray; S Bhattacharyya; A Kalpakidou; and C Nosarti. "Neural compensation in adulthood following very preterm birth demonstrated during a visual paired associates learning task." *NeuroImage: Clinical* 6 (2014): 54-63.
- 19) Berthier, ML; **S Froudish-Walsh**; Guadalupe Dávila; and Alejandro Nabrozidis. "Dissociated repetition deficits in aphasia can reflect flexible interactions between left dorsal and ventral streams and gender-dimorphic architecture of the right dorsal stream." *Frontiers in human neuroscience* 7 (2013).

#### **Middle author published papers:**

- 20) Milham, M et al., "Accelerating the evolution of non-human primate imaging". *Neuron* (2020). 105, 600-603.
- 21) Papini, C; L Palaniyappan; J Kroll; **S Froudish-Walsh**; RM Murray; C Nosarti. "Altered cortical gyrification in adults who were born very preterm and its associations with cognition and mental health." *Biological Psychiatry: CNI* (2020): 5(7) 640-650
- 22) Kroll, J; V Karolis; PJ Brittain; CEJ Tseng; **S Froudish-Walsh**; R M. Murray; C Nosarti. "Systematic assessment of perinatal and socio-demographic factors associated with IQ from childhood to adult life following very preterm birth." *Intelligence*. (2019) 77, 101401.
- 23) D'Ambrosio, E; T Dahoun; AF Pardiñas; M Veronese; MAP Bloomfield; S Jauhar; I Bonoldi; M Rogdaki, **S Froudish-Walsh**; JTR Walters; O Howes. "The effect of a genetic variant at the schizophrenia associated AS3MT/BORCS7 locus on striatal dopamine function: a PET imaging study." *Psychiatry Research: Neuroimaging* (2019): 291: 34-41.
- 24) Xu, T; D Sturgeon; JSB Ramirez; **S Froudish-Walsh**; DS Margulies, CE Schroeder; DA Fair; M Milham. "Inter-individual variability of functional connectivity in awake and anesthetized rhesus monkeys". *Biological Psychiatry: CNI* (2019): 4(6), 543-553.
- 25) Milham, M et al. "An open resource for non-human primate imaging". *Neuron* (2018) 100(1) 61-74.
- 26) Dahoun, T; AF Pardiñas; M Veronese; MAP Bloomfield; S Jauhar; I Bonoldi; **S Froudish-Walsh**; C Nosarti; C Korth; W Hennah; J Walters; D Prata; O D Howes; "The effect of the DISC1 Ser704Cys polymorphism on striatal dopamine synthesis capacity an [<sup>18</sup>F]-DOPA PET study". *Human Molecular Genetics* (2018): 27(20) 3498-3506.
- 27) Parvaz, MA; K Kim; **S Froudish-Walsh**, JH Newcorn, I Ivanov; "Reward-based learning as a function of severity of substance abuse risk in Drug-Naïve Youth with ADHD". *Journal of Child and Adolescent Psychopharmacology* (2018): 28(8) 547-553.
- 28) Kroll, J; PJ Brittain; V Karolis; Jane Tseng; **S Froudish-Walsh**; R M Murray; C Nosarti. "Real-life impact of executive function impairments in adults who were born very preterm." *JINS*, 23, 5 (2017): 381-389.
- 29) Catani, M; F Dell'Acqua; H Howells; S Budisavljevic; M Thiebaut de Schotten; **S Froudish-Walsh**; L D'Anna; ET Bullmore; J Suckling; S Baron-Cohen; MV. Lombardo; A Leemans; MC Craig; DGM Murphy. "Frontal networks in adults with autism spectrum disorder." *Brain* 139; no. 2 (2016): 616-630.
- 30) Papini, C; TP White; A Montagna; PJ Brittain; **S Froudish-Walsh**; J Kroll; V Karolis; A Simonelli; Steven C Williams; R M Murray; C Nosarti. "Altered resting state functional connectivity in emotion processing brain regions in adults who were born very preterm." *Psychological Medicine* (2016): 46(14) 3025-3039.
- 31) Sarkar, S; F Dell'Acqua; **S Froudish Walsh**; N Blackwood; S Scott; MC Craig; Q Deeley; DGM Murphy. "A Whole-Brain Investigation of White Matter Microstructure in Adolescents with Conduct Disorder." *PloS one* 11; no. 6 (2016): e0155475.
- 32) Nam, KW; N Castellanos; **S Froudish-Walsh**; A Simmons; MP Allin; M Walshe; RM Murray; A Evans; JS Muehlboeck; C Nosarti. "Alterations in cortical thickness development in preterm-born individuals: implications for high-order cognitive processing." *NeuroImage* 115 (2015); 64-75
- 33) White, TP; I Symington; NP Castellanos; PJ Brittain; **S Froudish-Walsh**; KW Nam; JR Sato et al.

"Dysconnectivity of neurocognitive networks at rest in very-preterm born adults." *NeuroImage: Clinical* 4 (2014): 352-365.

- 34) Tuomiranta, LM.; E Càmarà; **S Froudish-Walsh**; P Ripolles; JP Saunavaara; R Parkkola; N Martin; A Rodríguez-Fornells; M Laine. "Hidden word learning capacity through orthography in aphasia." *Cortex* 50 (2014): 174- 191.
- 35) De-Torres, I; G Dávila; ML Berthier; **S Froudish-Walsh**; I Moreno-Torres; R Ruiz-Cruces. "Repeating with the right hemisphere: reduced interactions between phonological and lexical-semantic systems in crossed aphasia?." *Frontiers in human neuroscience* 7 (2013).
- 36) Moreno-Torres, I; ML Berthier; M del Mar Cid; C Green; A Gutiérrez; N García-Casares; **S Froudish-Walsh** et al. "Foreign accent syndrome: a multimodal evaluation in the search of neuroscience-driven treatments." *Neuropsychologia* 51; no. 3 (2013): 520-537.
- 37) García-Casares, N; ML Berthier Torres; **S Froudish-Walsh**; P Gonzalez-Santos. "A model of musical cognition and amusia." *Neurología* 28; no. 3 (2013): 179-186.
- 38) Amengual, JL; AValero-Cabré; MV de las Heras; N Rojo; **S Froudish-Walsh**; P Ripollés; N Bodammer et al. "Prognostic value of cortically induced motor evoked activity by TMS in chronic stroke: Caveats from a revealing single clinical case." *BMC neurology* 12; no. 1 (2012).
- 39) Berthier, ML; N Garcia-Casares; **S Froudish-Walsh**; A Nabrozidis; MRJ Ruiz; et al. "Recovery from post-stroke aphasia: lessons from brain imaging and implications for rehabilitation and biological treatments." *Discovery medicine* 12; no. 65 (2011): 275-289.

#### Grants, Awards and Fellowships

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| 1) CRCNS, NIH R01MH122024 (PI: XJ Wang, co-PI N Palomero-Gallagher). Gradients of receptors underlying distributed cognitive functions. (Co-written with Dr. Palomero-Gallagher & Prof. Wang). Role: Key Personnel. | 2019-2022 |
| 2) NIMH/Kavli/Wellcome Travel Grant. PRIME-DE Conference, London, UK.   | 2019      |
| 3) Trinity Visiting Academic Programme, Trinity College Dublin, Ireland.  | 2019      |
| 4) International Postdoc Fellowship, Brain & Spine Institute, Paris, France (Declined).   | 2017      |
| 5) Young Investigator Award. Persistent Maladaptive Beh. Conf. Rochester, NY, USA.  | 2016      |
| 6) Future Leaders in Science Education and Communication Scholar. Mount Sinai, USA.   | 2015-2016 |
| 7) Brain Travel Grant, Pediatric Academic Societies Meeting. Washington DC, USA.  | 2013      |
| 8) King's College London, UK. MSc Neuroscience Bursary.   | 2009-2010 |

#### Invited and contributed talks

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| 1) American Psychological Association (APA) (Invited) - "The rhesus monkey hippocampus contributes to scene memory retrieval, but not new learning". Session cancelled due to coronavirus pandemic.                                   | 2020 |
| 2) MMTI Seminar, Department of Psychiatry, Stony Brook University, New York, USA (Invited). "Dopaminergic modulation of large-scale cortical circuits underlying working memory".   | 2019 |
| 3) Flux Congress, New York, USA (Invited). "Brain injury at birth disrupts the development of dopamine and working memory networks in humans".  | 2019 |
| 4) British Neuroscience Association Conf. Dublin, Ireland. (Selected Rapid-fire talk). "Emergence of working memory in macaque cortical areas with high neurotransmitter density."  | 2019 |
| 5) Neuroscience Society seminar, Trinity College Dublin, Ireland (Invited). "Distributed effects of hippocampal and prefrontal cortical lesions."   | 2019 |
| 6) Large-Scale Gradients in Brain Organization Meeting, Collège de France, Paris, France (Organized). "Dopamine gradients modulate distributed working memory representations."   | 2019 |
| 7) Séminaire Exceptionnel, Brain & Spine Institute, Hôpital Pitié Salpêtrière, Paris, France (Invited). "Distributed effects of hippocampal and prefrontal cortical lesions in space and time."                                       | 2019 |
| 8) C-BIN Science Lecture Series, Nathan Kline Institute, New York, USA (Invited). "Distributed effects of hippocampal lesions in space and time."   | 2018 |
| 9) Large-scale Trends in Cortical Organisation Meeting, Leipzig, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany (Invited). "Linking gradients of cortical microstructure to plasticity and cognition." | 2017 |
| 10) Brain Imaging Centre Symposium; Icahn School of Medicine at Mount Sinai; New York; USA. (Selected talk). "Local and global network alterations following focal hippocampal lesions in   |      |

- the monkey." 2016
- 11) Pediatric Academic Societies Meeting (Selected talk). Baltimore; MD; USA "Alterations to memory-related tracts in adults who were born very preterm." 2016
  - 12) Brain Imaging Centre Symposium; Icahn School of Medicine at Mount Sinai; New York; USA (Selected talk). "Prematurity-related brain injury leads to altered dopamine function and whole brain connectivity in adult life." 2015
  - 13) Cognition and Brain Plasticity Unit; University of Barcelona; Spain (Invited). "Dopamine function and reorganisation of brain networks after very early brain injury." 2015
  - 14) Centre for Neuroimaging Science, King's College London, UK (Invited). "Reorganisation of brain networks following neonatal brain injury. A 30 year study." 2015
  - 15) Friedman Brain Institute; Icahn School of Medicine at Mount Sinai; New York; USA (Invited). "Reorganisation of brain networks following neonatal injury. A 30-year study." 2014
  - 16) Pediatric Academic Societies Meeting (Selected talk). Vancouver; Canada. "The effects of preterm birth and periventricular hemorrhage on working memory function in adult life: An fMRI Study." 2014
  - 17) Pediatric Academic Societies Meeting (Selected talk). Washington; D.C.; USA. "Road work on memory lane - functional and structural alterations to the learning and memory circuit in adults born preterm." 2013

#### Teaching and outreach experience

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- 1) Bellwether Hub podcast. Host: Jim Frawley. Interviewed about learning and memory. 2020
- 2) Tourist Information podcast (by The Ring Magazine). Host: Brin-Jonathan Butler. Interviewed about dopamine, brain injury and learning. 2020
- 3) Responsible Conduct in Research Course (Racism in Science) – co-organiser. Audience – graduate students. 2020
- 4) Neuroconnect Course. Diffusion MRI course at Mount Sinai. Developed and taught a class on 'Promises and Pitfalls of Tractography' and a practical on 'Manual dissection of white matter tracts'. Audience: Postdocs – Associate Professors. 2016
- 5) Sinai Methods Bootcamp. Taught introduction to fMRI, diffusion MRI and structural MRI. Audience: new PhD students. 2016
- 6) Center of Excellence in Youth Education, Mount Sinai, New York. Co-organised and taught classes and activities for the neuroscience engagement day for 45 local students. Audience: 16-17 year olds. 2016
- 7) Boys and Girls Harbor School (East Harlem, New York). Taught neural connectivity class to 5<sup>th</sup> grade children. Audience: 10-11 year olds. 2016
- 8) Curriculum Design Team; Centre for Excellence in Youth Education; Icahn School of Medicine at Mount Sinai. Planned and taught range of classes and activities. Audience: adolescents in New York schools. 2015-2016
- 9) Eagle Academy for Young Men (Bronx; New York). Taught three classes on brain disorders to 9<sup>th</sup> and 10<sup>th</sup> grade adolescents. Audience: 16-17 year olds. 2015
- 10) Eagle Academy for Young Men (Queens; New York). Taught a class on brain disorders to 9<sup>th</sup> and 10<sup>th</sup> grade adolescents. Audience: 16-17 year olds. 2015
- 11) King's College London. Neuroanatomy lecturer. Audience: MSc in Mental Health students. 2012

#### Mentoring experience

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##### *PhD students:*

- Xingyu Ding (PhD student at New York University, USA) 2017-2020
- Winnie Yang (PhD student at New York University, USA) 2019

##### *MSc students:*

- Chiara Caldinelli (now PhD student at Trinity College Dublin, Ireland). 2015
- Prakriti Agarwal (now Director of Little Newton Autism Centre, Bengaluru, India). 2014
- Anita Montagna (now MRC PhD student at King's College London, UK). 2013
- Kerry Stephenson (now Founding Director at Mind over Monkey, London, UK). 2013
- Piergiorgio Salvan (now Postdoc at University of Oxford, UK). 2012

##### *Undergraduate students:*

- Hector Sainvet (now MSc student at École Polytechnique, Paris, France). 2020
- Hanqing Wang (now PhD student at Johns Hopkins University, Baltimore, USA). 2018

## Further education

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Deep Learning Specialization. deeplearning.ai/Coursera.	January 2020
Sequence Models. deeplearning.ai/Coursera.	January 2020
Convolutional Neural Networks. deeplearning.ai/Coursera.	March 2018
Neuronal Networks. Courant Institute of Mathematical Sciences, New York University.	Fall 2017
Structuring Machine Learning Projects. deeplearning.ai/Coursera.	November 2017
Improving Deep Neural Networks . deeplearning.ai/Coursera.	October 2017
Neural Networks and Deep Learning. deeplearning.ai/Coursera.	September 2017
Science Education and Communication. Mount Sinai.	October 2015- June 2016
Python data structures. University of Michigan/Coursera.	March 2016
Python for everybody. University of Michigan/Coursera.	March 2016
Dynamical Modeling Methods for Systems Biology. Mount Sinai/Coursera.	January – March, 2016
Machine Learning. Stanford University/Coursera.	July – September 2015
Computational Neuroscience. University of Washington/Coursera.	May-June 2015
Live Science Communication Training. Science Museum, London.	September 2014
Advanced Neuroimaging Summer Program. UCLA.	July 2013
Open Collaboration & Innovation Programme. University of London.	December 2011 - June 2012
FSL course. University of Oxford (online).	October 2010
Neuroanatomy and Tractography Workshop. King's College London.	March 2010

## Workshops organised

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Large-scale gradients in cortical organisation. Collège de France (Paris, France).	2019
Mechanisms of dopamine ramping. New York University (USA).	2018

## Further skills

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Programming languages: Python, Matlab, R, shell scripting.  
Neuroimaging software packages: FSL, SPM, ExploreDTI, FreeSurfer; ANTs, Connectome Workbench  
Statistical analysis programs: R; SPSS  
Task presentation programs: PsychToolbox; MonkeyLogic

Nationality: Irish/Australian (dual nationality)  
Languages spoken: English (native); Spanish (fluent); Italian (upper intermediate); French (intermediate);  
Irish Gaelic (intermediate).

## Reviewer for academic journals

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Biological Psychiatry, Nature Communications, Cerebral Cortex, Journal of Neuroscience, Lancet Child & Adolescent Health, Cortex, PLoS ONE.

## Academic society memberships

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NYU Neuroscience Postdoc Organisation (Co-founder), Society for Neuroscience, Federation of European Neuroscience Societies, Neuroscience Ireland, Organization for Human Brain Mapping (occasional)