

Sara Assecondi

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Biomedical Engineer, MSc, PhD

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Academic Achievements

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| Sep 2009 | PhD in Biomedical Engineering | - | Ghent University, Belgium |
| Apr 2004 | MSc in Biomedical Engineering | 93/100 | Polytechnic University of Milan, Italy |
| Jul 1996 | High School degree | 53/60 | Liceo Scientifico G. Galilei, Italy |

Other Qualifications and Training

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| Sep 2009 | Doctoral training in Biomedical Engineering | - | Ghent University, Belgium |
| Jun 2004 | Professional Practice Exam - Electronical Engineering | - | Polytechnic University of Milan, Italy |

Research Interests

I am interested in memory and how memory performance as we study it in the lab, transfers to everyday life. In the labs, I use a range of state-of-the-art techniques to assess cognitive decline and its impact on everyday life by incorporating naturalistic scenarios in more traditional lab testing procedures. I use electroencephalography to quantify brain activity during memory tests and to understand how behavioural interventions can manipulate brain networks, and I use virtual reality to recreate real-life situations that are affected by memory decline. At the same time, I am working on interventions that can improve or slow down memory decline, and I do so by combining brain stimulation and brain training exercises. I am an expert in multimodal approaches for understanding cognition in health and disease. I have a special interest in EEG and ERP signal processing and recordings, connectivity in EEG, ERP and fMRI, and the integration of different modalities for human brain mapping (EEG, TMS, fMRI, NIRS).

Employment / Mobility

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| 09/20 – today | University of Trento, IT Assistant Professor (Ricercatore tipoA), CiMeC Strategies to improve cognition in the elderly |
| 04/16 – 07/20 | University of Birmingham, UK Research fellow , School of Psychology Combined cognitive intervention and brain stimulation: memory improvement and its impact on quality of life in the elderly Supervisor: Prof. Kimron Shapiro |
| 10/15 – 04/16 | University of Birmingham, UK Research fellow (part-time) , School of Psychology Supervisor: Prof. Kimron Shapiro, Prof. Jane Raymond |

- 01/14 – 10/15 **Career break**, parental caring responsibilities
- 11/11-12/13 University of Birmingham, UK
Research fellow, School of Psychology
Development and experimental validation of an information theoretic approach to the multimodal integration of human EEG and fMRI data.
Supervisor: Dr Andrew P. Bagshaw
- 11/09-10/11 University of Trento, Italy
Research fellow, Center for Mind and Brain Sciences (CIMeC)
Development and optimization of EEG acquisition and analysis methods in simultaneous recordings with functional MRI at high static fields.
Supervisor: Dr Jorge Jovicich
- 01/05-09/09 Ghent University, Belgium
PhD student, Department of Electronics and Information Systems (MEDISiP)
Automated subject-specific peak identification and ballistocardiographic artifact correction in EEG-fMRI.
Supervisors: Prof. S. Staelens, Prof. P. Boon

Ongoing projects

BRAINSTORMING: The impact of concurrent BRAIN STimulation and wORKing Memory trainING on cognitive performance in acquired brain injury. In collaboration with the Northamptonshire Health Care N H S Foundation Trust. Secured NHS ethical approval, starting recruiting in September.

Does transcranial direct current stimulation boost the benefits of cognitive training in acute stroke patients? In collaboration with the First People's Hospital in Guangzhou, China. Starting recruitment.

Publications: In Preparation

S. Asseondi, K. Shapiro. *Modulation of EEG attention networks by combined cognitive training and brain stimulation*. Completing data collection and analysis.

S. Asseondi, R. Hu, G. Eskes, J. Kroeker, K. Shapiro. *The benefits of combined brain stimulation and cognitive training in the elderly*. In preparation.

S. Asseconi, R. Hu, G. Eskes, X. Pan, J. Zhou, K. Shapiro. Impact of tDCS on working memory training is enhanced by strategy instructions in individuals with low working memory capacity. *Under review*.

A1 Journal publications

- S. Asseconi**, G. Eskes, C. Griffith, M. Read, K. Shapiro. BRAINSTORMING: A randomized double-blind clinical trial to assess the impact of concurrent BRAIN STimulation (tDCS) and wORKing Memory trainING on cognitive performance in acquired brain injury (ABI) (2020). *BMC Psychology* 26;8(1):125 (IF = 2.170).
- C F. Tagliabue, **S. Asseconi**, G. Cristoforetti, V. Mazza. Working memory practice enhances object individuation and memorization in the elderly (2020). *Scientific Reports* 10, 19957 (IF = 3.998).
- D. Lindh, I. Sligte, **S. Asseconi**, K. Shapiro, I. Charest. Conscious access to visual information is supported by specific image features (2019). *Nature Communications* 10, 4106 (IF = 11.880).
- S. Asseconi**, C. Lavalley, P. Ferrari, J. Jovicich. Length matters: Improved high field EEG–fMRI recordings using shorter EEG cables (2016). *Journal of neuroscience methods* 269, 74-87 (IF = 2.668).
- D. T. Rollings, **S. Asseconi**, D. Ostwald, C. Porcaro, D. McCorry, M. Bagary, I. Soryal, A. P. Bagshaw. Early haemodynamic changes observed in patients with epilepsy, in a visual experiment and in simulations (2016). *Clinical Neurophysiology*, 127, 245-253 (IF = 3.614).
- S. Asseconi**, D. Ostwald, A. P. Bagshaw. Reliability of information-based integration of EEG and fMRI data: a simulation study (2015). *Neural Computation*, Vol. 27 281–305 (IF = 1.651).
- J.F. Oldenburg, C. Roger, **S. Asseconi**, F. Verbruggen, W. Fias. Repetition priming in the stop signal task: The electrophysiology of sequential effects of stopping (2012). *Neuropsychologia*, Vol. 50(12) 2860-8, (IF = 2.888).
- S. Asseconi**, K. Vanderperren, N. Novitskiy, J. Ramautar, W. Fias, S. Staelens, P. Stiers, S. Sunaert, S. Van Huffel, I. Lemahieu (2010). Effect of the static magnetic field of the MR-scanner on ERPs: evaluation of visual, cognitive and motor potentials. *Clinical Neurophysiology* Vol. 121(5) 672-685 (IF = 3.614).
- K. Vanderperren, M. De Vos, J. Ramautar, N. Novitskiy, **S. Asseconi**, B. Vanrumste, P. Stiers, B. Van den Bergh, J. Wagemans, L. Lagae, S. Sunaert, S. Van Huffel (2010). Removal of BCG artifacts from EEG recordings inside the MR scanner: a comparison of methodological and validation-related aspects. *NeuroImage*, Vol. 50(3) 920-934 (IF = 5.426).
- S. Asseconi**, A.M. Bianchi, H. Hallez, S. Staelens, S. Casarotto, I. Lemahieu, G.A. Chiarenza (2009). Automated identification of ERP peaks through Dynamic Time Warping: an application to developmental dyslexia. *Clinical Neurophysiology*, Vol. 120(10) 1819-1827 (IF = 3.614).
- H. Hallez, M. DeVos, B. Vanrumste, P. Van Hese, **S. Asseconi**, K. Van Laere, P. Dupont, W. Van Paesschen, S. Van Huffel, I. Lemahieu (2009). Removing muscle and eye artifacts using blind source separation techniques in ictal EEG source imaging. *Clinical Neurophysiology*, Vol. 120(7) 1262-72 (IF = 3.614).

S. **Assecon**di, H. Hallez, S. Staelens, A.M. Bianchi, G. Huiskamp, I. Lemahieu (2009). Removal of the ballistocardiographic artifact from EEG-fMRI data: a canonical correlation approach. *Physics in Medicine and Biology*, Vol. 54 (2) 1673-1689 (IF = 2.665).

Supervision of undergraduate and postgraduate students

- 1 PhD student in co-supervision;
- 12 MSc thesis supervision;
- 3 internships;
- 12 undergrads final projects.

Teaching activity

- 2019 Transcranial current brain stimulation, , University of Birmingham
- 2019 Introduction to EEG fMRI, **Guest Lecture for Neuroscience Methods**, University of Birmingham
- 2018 Transcranial current brain stimulation, **Lecture** (1h), University of Birmingham
- 2018 Introduction to EEG fMRI, **Guest Lecture for Neuroscience Methods**, University of Birmingham
- 2010 EEG and EEG-fMRI recording and analysis, **Lecture** (6h), University of Trento
- 2009 EEG and ECG signal processing, **Exercise** (8h), Ghent University
- 2008 EEG and ECG signal processing, **Exercise** (8h), Ghent University
- 2007 EEG and ECG signal processing, **Exercise** (8h), Ghent University

Grants, Honours and awards

- 2019, Canadian International Seed Funds (VPRIS), Co-I (£5,900)
- 2018, travel grant - Guarantors of Brain (£1000)
- 2017, project grant - MRC Proximity to Discovery, Co-I (£8100)
- 2013, travel grant - Guarantors of Brain (£500)
- 2013, travel grant - College Post-Doc Career Development Competition (£500)
- 2008, Poster Prize, Liege Image Days, Liege, Belgium (£100)

Conference / symposium organization

- 2018, *ERP Bootcamp 4.0*, University of Birmingham, UK: In-loco co-organizer
- 2018, *Non-Invasive Brain Stimulation Workshop*, University of Birmingham, UK: In-loco co-organizer
- 2017, *Brain Neuroscience Association: Festival of Neuroscience*, UK, 2017: organizer of the booth of the College of Life and Environmental Sciences
- 2016, *ERP Bootcamp 3.0*, University of Birmingham, UK: In-loco co-organizer
- 2013, *ERP Bootcamp 2.0*, University of Birmingham, UK: in-loco co-organizer
- 2012, *ERP Bootcamp 1.0*, University of Birmingham, UK: in-loco co-organizer
- 2010, *Brain Vision Analyzer 2 Workshop on EEG/fMRI*, University of Trento, Italy: In-loco organizer

Public Engagement

- 2019, Agewell: Meet the researcher, Birmingham UK
- 2019, Invited talk: University of the third age (U3A): Scientific branch, Birmingham UK
- 2018, Dreamboat, IKON Gallery, Birmingham UK
- 2018, Agewell: Meet the researcher, Birmingham UK
- 2017, Invited talk: Secondary School, Birmingham, UK
- 2017, Birmingham Neuroscience Association, Outreach Booth, Birmingham, UK
- 2017, Good kids can spit, Library of Birmingham, Birmingham, UK
- 2017, Community Day, Birmingham, UK
- 2017, Brain Awareness Week at the Think Tank Science Museum, Birmingham, UK
- 2013, Community Day, Birmingham, UK
- 2012, Brain Awareness, Week, Birmingham, UK
- 2011, Researcher's Night, Trento, Italy

Laboratory responsibilities

2015-today University of Birmingham

As a research fellow, I am responsible for designing, conducting and analysing cognitive experiments (behavioural, EEG, non-invasive brain stimulation), securing Ethics approvals from the University and the NHS, and I have been heavily involved in the management and maintenance of the two common EEG labs. As lab manager, beside maintaining the three testing labs, I also train researchers on the use of brain stimulation (specifically Transcranial Current Stimulation), and the Virtual Reality facility.

2011-2014 University of Birmingham

As a postdoctoral research fellow, I was responsible designing, collecting and analysing cognitive experiments (simultaneous EEG-fMRI, simultaneous EEG-TMS), operating 32-channels EEG system (BrainProducts) used within a 3T Philips MR-scanner.

2009-2011 University of Trento, Italy

As a postdoctoral research fellow, I was responsible for the MR-compatible electrophysiological sensors (EEG system, 64 channels, BrainProducts; EMG and GSR sensors, BrainProducts), used within a 4T Bruker MR-scanner. My duties include the management of instrumentation-related issues (users training in terms of subject preparation, system usage and data analysis, consumables, documentation).

2005-2009 Ghent University, Belgium

As a PhD student, I was responsible for collecting data (simultaneous EEG-fMRI), operating 32-channels EEG system (BrainProducts and EBNeuro) used within a 3T Siemens MR-scanner, and for writing ethics.

Computer skills

Operating system: Windows, basic knowledge of Linux and Unix

Software: Signal processing (Matlab, Python, MNE-Python, BrainVision Analyzer, Recorder, Recview, EEGLab, ERPLab), Image Processing (FSL, basic knowledge of SPM, MRIConvert, MRICron), statistics (R, JASP, SPSS), stimulus presentation (Psychtoolbox, Presentation, E-Prime, Psychopy), editing (Office, Latex), image manipulation (Corel Draw, Gimp, Inkscape)

Scientific activity

Reviewer's activity

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| Abstracts reviewer | XII Mediterranean Conference on Medical and Biological Engineering and Computing (MEDICON) (2010); 10th IEEE International Conference on Information Technology and Applications in Biomedicine (2010); Organization for Human Brain Mapping Annual Meeting (HBM) (2011) |
| Referee for scientific journals | Physiological Measurements, Annals of Biomedical Engineering, Brain Topography, Scientific Reports, Physics in Medicine and Biology, NeuroImage, Cortex, IEEE Transaction in Biomedical Engineering, International Journal of Psychophysiology, Journal of Neural Engineering, Behavioural Research Methods, Entropy, Human-Computer Interaction, PLOSone |
| Referee for funding bodies | Research Foundation - Flanders |

Invited talks

- 2017, *Boosting Cognitive training for home therapy in the elderly*. University of Birmingham, School of Computer Science
- 2009, *Removal of BCG artefact from EEG-fMRI data by means of CCA*, Katholieke Universiteit Leuven, SISTA, Dep of Electrical Engineering
- 2007, *Time-frequency analysis of EEG and ERP data*, Ghent University, Department of Experimental Psychology
- 2007, *ERPs in dyslexia*, Gasthuisberg University Hospital, Leuven

Continuing Professional Development

- 2011: Workshop, *Brain Vision Analyzer 2 Workshop on EEG/fMRI*, Trento, Ital
- 2010: Summer School, 5th Int. Summer School in Biomedical Engineering: *Multimodal integration of functional brain measurements*. Wittenberg, Germany
- 2009: Workshop, *Brain Vision Analyzer 2 Workshop on EEG*, Bangor, United Kingdom
- 2007-2008: Course, *Presentation techniques: effective scientific presentation*, Ghent, Belgium
- 2006-2007: Course, *Research methodology*, Ghent, Belgium
- 2007: Study day, *Technology in revalidation and biomedical signal processing*, Geel, Belgium
- 2007: Summer school, *Multivariate, multiorgan, multiscale integration of information in biomedical signal processing*, Siena, Italy
- 2006: Summer school, *Pattern recognition*, Plymouth, United Kingdom

APPENDIX: Proceedings in international and national conferences

1. **S. Assecondi**, R. Hu, K. Shapiro (2019) *The impact of strategy on the efficacy of cognitive training combined with brain stimulation*. RAW, Rovereto, Italy
2. C.F. Tagliabue, **S. Assecondi**, V. Mazza (2019) *Working memory practice enhances object individuation and memorization in the elderly*. European Conference on Visual Perception, Leuven, Belgium
3. **S. Assecondi**, R. Hu, G. Eskes, J. Kroeker, K. Shapiro (2018) *The benefits of combined brain stimulation and cognitive training: a pilot study in the elderly*. TBS CNW, Rovereto, Italy.
4. **S. Assecondi**, K. Shapiro (2018) *The benefits of combined brain stimulation and cognitive training: a pilot study*. VSS Annual Meeting, Journal of Vision 18 (10), 119
5. D. Lindh, **S. Assecondi**, I. Sligte, K. Shapiro, I. Charest (2017) *Using Deep Convolutional Neural Networks to predict image-specific behavioural dynamics in the conscious access to visual objects*. 13th International Conference of Cognitive Neuroscience, Amsterdam, The Netherlands
6. D. Lindh, **S. Assecondi**, I. Sligte, K. Shapiro, I. Charest (2017) *Categorical differences in the conscious access to visual objects*. VSS Annual Meeting, Journal of Vision 17 (10), 964-964
7. I. Charest, D. Lindh, **S. Assecondi**, M. Treder (2017) *Revealing the temporal dynamics of individually unique object representations*. VSS Annual Meeting, Journal of Vision 17 (10), 1343-1343
8. **S. Assecondi**, D. Ostwald, A. P. Bagshaw (2013). *Characterization of information coding in simulated EEG-fMRI datasets*. International conference on Basic and Clinical multimodal Imaging (BaCI).
9. R. Wilson, S. D. Mayhew, **S. Assecondi**, T. N. Arvanitis, A. P. Bagshaw (2013). *The Effect of Epoch Length on Functional Connectivity within the Default Mode Network*. International conference on Basic and Clinical multimodal Imaging (BaCI).
10. P. Ferrari, **S. Assecondi**, J. Jovicich (2013). *A new methodological approach to improve safety, quality and reproducibility during concurrent EEG/fMRI: a feasibility study*. VIII Congresso nazionale - Associazione Italiana di Fisica Medica, Turin, Italy.
11. **S. Assecondi**, P. Ferrari, J. Jovicich (2013). *A compact setup to improve the quality of EEG data recorded during fMRI*. VIII Congresso nazionale - Associazione Italiana di Fisica Medica, Turin, Italy.
12. Z. Zakeri, **S. Assecondi**, A.P. Bagshaw, T.N. Arvanitis (2013) *Influence of signal preprocessing on ICA-based EEG decomposition* Proceeding of the XIII Mediterranean Conference of Medical and Biological Engineering and Computing, Sevilla Spain.
13. R. Wilson, S.D. Mayhew, **S. Assecondi**, T.N. Arvanitis, A.P. Bagshaw (2013). *Functional Connectivity within the Default Mode Network: The Effect of Epoch Length* Proceeding of the 19th Annual Meeting of the OHBM, Seattle, USA.
14. **S. Assecondi**, N. Shalev, S.D. Mayhew, C. Mevorach, A.P. Bagshaw (2013). *Data Quality of Concurrent EEG-TMS in a Faces-Scenes Discrimination Task* Proceeding of the 19th Annual Meeting of the OHBM, Seattle, USA.
15. **S. Assecondi**, D. Ostwald, A.P. Bagshaw (2013). *Reliability of Information-based Integration of EEG and fMRI Data: A Simulation Study* Proceeding of the 19th Annual Meeting of the OHBM, Seattle, USA.
16. **S. Assecondi**, P. Ferrari, J. Jovicich (2013). *Optimization of a compact setup to improve the quality of EEG data recorded during fMRI* Proceeding of the 20th Annual Meeting of the ISMRM, Salt Lake City, USA.
17. **S. Assecondi**, A.M. Bianchi, P. Ferrari, V. Mazza, J. Schwarzbach, J. Jovicich (2010). *Optimization of BCG artifact removal for single-trial EEG-fMRI recordings at 4 T* Proceedings of the IVth European Conference of Medical Physics, Udine, Italy.
18. **S. Assecondi**, A.M. Bianchi, M. Buiatti, P. Ferrari, V. Mazza, J. Schwarzbach, J. Jovicich (2010). *A nonlinear template-based approach for BCG artifact removal in EEG-fMRI recordings at high fields* Proceedings of the 16th Annual Meeting of the Organization for Human Brain Mapping, Barcelona, Spain.
19. **S. Assecondi**, M. Buiatti, P. Ferrari, V. Mazza, J. Schwarzbach, J. Jovicich (2010). *Ballistocardiographic artifact removal from simultaneous EEG-fMRI recordings at 4 T* ISMRM Italian Chapter, Milan, Italy.
20. G. Huiskamp, **S. Assecondi** (2009). *EEG-correlated fMRI in epilepsy* Proceedings of the Neuromath Workshop, Leuven, Belgium.

21. P. van Mierlo, H. Hallez, **S. Assecondi**, S. Staelens, E. Carrette, I. Lemahieu, P. Boon (2009). *Feasibility study of the time-variant functional connectivity pattern during an epileptic seizure* Proceedings of the 7th NFSI and ICBEW Conference, Rome.
22. J. Oldenburg, F. Verbruggen, **S. Assecondi**, W. Fias (2009). *The locus of interference in primed inhibition: an ERP study* Proceedings of the 16th Annual Meeting of the Cognitive Neuroscience Society, San Francisco, USA.
23. T. Franchin, A.M. Bianchi, V. Cannatà, E. Genovese, F. Nocchi, **S. Assecondi**, S. Cerutti (2008). *A robust independent component analysis algorithm for removing ballistocardiogram artifacts from EEG and fMRI recordings* Proceedings of the 4th European Conference of the International Federation for Medical and Biological Engineering.
24. P. van Mierlo, **S. Assecondi**, S. Staelens, P. Boon, I. Lemahieu (2008). *Changes in connectivity patterns in the kainate model of epilepsy* Proceedings of the 4th European Conference of the International Federation for Medical and Biological Engineering.
25. **S. Assecondi**, H. Hallez, P. Van Hese, A.M. Bianchi, S. Staelens, P. Boon, I. Lemahieu (2008). *Blind source separation to remove BCG artifact from EEG/fMRI data* Proceedings of Lige Image Days 2008: Medical Imaging.
26. **S. Assecondi**, P. Van Hese, H. Hallez, Y. D'Asseler, I. Lemahieu, A.M. Bianchi, P. Boon (2008). *Ballistocardiographic artifact removal from simultaneous EEG/fMRI recording by means of canonical correlation analysis*. Proceedings of the International Conference on Bio-inspired systems and signal processing, BIOSIGNALS.
27. **S. Assecondi** (2008). *Removal of ballistocardiographic artefact from EEG-fMRI data: a canonical correlation approach*. 9e UGent-FirW doctoraatssymposium.
28. H. Hallez, B. Vanrumste, S. Delputte, P. Van Hese, **S. Assecondi**, Y. D'Asseler, I. Lemahieu (2007). *Dipole estimation errors in EEG source localization due to not incorporating anisotropic conductivities of white matter in realistic head models*. Proceedings of 2007 joint meeting of the 6th International Symposium on Noninvasive Functional Source Imaging of the Brain and Heart and the International Conference on Functional Biomedical Imaging.
29. **S. Assecondi**, H. Hallez, Y. D'Asseler, I. Lemahieu (2007). *Comparison of different auto-solid angle approximations in BEM for EEG dipole source localization*. Proceedings of the joint meeting of the 6th International Symposium on Noninvasive Functional Source Imaging of the Brain and Heart and the International Conference on Functional Biomedical Imaging.
30. Y. De Deene, S. Baete, E. Fieremans, S. Delputte, B. Ozkalayci, **S. Assecondi**, V. Keereman, M. Ozdemir, S. Vandenberghe (2007). *MR Engineering Research at Ghent University*. Abstract book first Benelux in vivo MR methods symposium.
31. **S. Assecondi**, S. Casarotto, A.M. Bianchi, G.A. Chiarenza, Y. D'Asseler, I. Lemahieu (2006). *Automatic measurement of reading related potentials in dyslexia*. Proceedings of the IEEE/EMBS Benelux symposium, Belgian Day on Biomedical Engineering.
32. **S. Assecondi** (2006). *Co-recording of EEG and fMRI data: EEG artifact removal*. Abstracts 7eUGent-FirW doctoraatssymposium.
33. A.M. Bianchi, **S. Assecondi**, S. Casarotto, G.A. Chiarenza (2006). *Computation of templates for reading related potentials by means of wavelet decomposition and dynamic time warping*. Journal of Psychophysiology, Abstracts of the XII Congress of the Italian Society of Psychophysiology, SIPF. Vol. 20(3).
34. A.M. Bianchi, **S. Assecondi**, S. Casarotto, G.A. Chiarenza, S. Cerutti (2004). *Multiresolution analysis of reading related potentials to calculate activation maps in dyslexia*. Proceedings of X Mediterranean Conference on Medical and Biological Engineering.
35. **S. Assecondi**, A.M. Bianchi, S. Casarotto, S. Cerutti, G.A. Chiarenza (2004). *Analysis of reading-related potentials by combining wavelet decomposition and dynamic time warping*. International Journal of Psychophysiology. Vol. 54.