Victor J. Barrès, PhD

Computational Cognitive Neuroscience | Language Processing | Artificial Intelligence

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At a glance

GOAL	Seeking to use my 7+ years research experience building bridges between cognitive neuroscience and NLP computational approaches, in a dynamic and forward thinking environment focused on exploring new paradigms for solving language related A.I. problems.
LOOKING FOR	Research positions (research scientist, research engineer), or working on NLP/AI systems in creative ways, applying state of the art techniques to design innovative products.
PROGRAMMING	Python (Advanced), Matlab-Simulink (Advanced), C/C++ (intermediary), Numpy, Scikit-Learn, TensorFlow, SpaCy, NLTK, MongoDB (Intermediary), SQL (basic), AWS (basic), Unix, Git.
EXPERTISE	• Computational cognitive neuroscience, Neural networks (biological and artificial), Cognitive architectures, Computational linguistics, Computational neurolinguistics, Language-vision interactions, Visual attention models, Dynamical systems, Computational construction grammar, Unification grammars. • Experiment design and analysis, Scientific writing (peer reviewed papers, reports, LaTeX), Scientific presentation.
INTERESTS	Developing semantic focused AI/NLP models, Building hybrid systems integrating symbolic and sub-symbolic structures, representations, and processes, Developing cognitive neuroscience inspired semantic systems, Dialogue systems.

Education

PhD in Neuroscience (computational neuroscience) – University of Southern California, CA, USA — August 2017
MS in Cognitive Science – Ecole Normale Superieure, France — June 2010
MS in Physics – Ecole Polytechnique, France — August 2006
BS in Mathematics and Physics – Lycee Louis le Grand, France — August 2003

Experience

Doctoral Researcher, Computational Neuroscience

Sept 10 – Aug 17

USC Brain Project & Action Brain Language Evolution group (ABLE) – University of Southern California, CA.

• Developed SALVIA, a novel Python implemented computational cognitive level model accounting for the **dynamic coordinated interplay between visual attention, language processing, and inference** during **scene descriptions' production and comprehension**.

• Developed Template Construction Grammar, a **novel Python implemented computational construction grammar** framework. Ongoing collaborations to compare formalisms with the Fluid Construction Grammar group at Sony CSL Paris and the Robot Cognition Lab at INSERM, France.

• Advanced the cognitive modeling framework of **Schema Theory** as a model of distributed hybrid computation in a system-of-systems architecture structured according to cognitive (neuroscience) data, where symbolic operations are governed by dynamic cooperative computation.

• Co-organized **3 NSF-funded interdisciplinary workshops on language evolution** (Action Brain Language and Evolution) including researchers from neuroscience, computer science, linguistics, and primatology in order to foster inter-disciplinary exchanges furthering the research on language evolution.

• Teaching Assistant for **Brain Theory and Artificial Intelligence** (CS 564) and **Applied Natural Language Processing** (CS 544).

Research Assistant

Laboratory of Physiology of Perception and Action (LPPA) – College de France, Paris, France. — Sept 09 – June 10

• Designed, ran, analyzed and published a set of novel psychophysics experiments on the perception of multi-modal, multi-stable stimuli. (Head mounted VR display, experiment coded in Virtools & C, analysis in Matlab & Excel).

Gazzaley lab – University of California San Francisco, CA. — June 09 – Aug 09

• Ran anatomical and functional MRI scans, EEG recording, motion capture guided TMS (based on anatomical scans). EEG ERP analysis. Experiment design (Matlab, Psychtoolbox).

Selected Publications

Barrès, V. (2017) *Schema Architecture for Language Vision InterActions: A Comptuational Cognitive Neuroscience Model of Language Use*. (Doctoral Dissertation)

Barrès, V. (2017) *Template Construction Grammar: A Schema-Theoretic Computational Construction Grammar*. In 2017 AAAI Spring Symposium Series.

Arbib, M. A., Gasser, B., & **Barrès, V.** (2014). *Language is handy but is it embodied?* Neuropsychologia, 55, 57-70.

Barrès, V., Lee, J. (2014). *Template Construction Grammar: from visual scene description to language comprehension and agrammatism.* Neuroinformatics, 1-28.

Barrès, V., Simons III, A., & Arbib, M. A. (2013). *Synthetic event-related potentials: A computational bridge between neurolinguistic models and experiments.* Neural Networks, 37, 66-92.

Honors & Awards

University of Southern California Final Year Dissertation Fellowship. — 2016 – 2017
University of Southern California Provost's Ph.D. Fellowship. — 2010 – 2014