Victor J. Barrès, PhD

Computational Neuroscience | Language Processing | Artificial Intelligence

Permanent Resident | (+1) 323-599-7019 | victor.barres@gmail.com | www.victorbarres.com | victorbarres | victor-barres-35349a73

Skills

PROGRAMMING
- Python (Advanced), Matlab-Simulink (Advanced), C/C++ (intermediary), SQL (basic), AWS (basic), Unix, Git.

TECHNIQUES
- Brain modeling (neural networks, hybrid systems, symbolic A.I), Computational linguistics, NLP, Machine learning.
- Experiment design and analysis.
- Scientific writing (peer reviewed papers, reports, LaTeX), Scientific presentation.

EXPERTISE
Neuro-cognitive modeling, Neural networks, Dynamical systems, Computational neurolinguistics, Dynamics of language-vision interactions, Computational construction grammar, Visual attention, Cognitive linguistics.

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

Work Experience

Doctoral Researcher, Computational Neuroscience

Sept 10 – Aug 17

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

- Developed and implemented SALVIA, a novel computational cognitive level model accounting for the **dynamic coordinated interplay between visual attention, language processing, and inference** during **scene descriptions' production and comprehension**.
- Developed and implemented Template Construction Grammar, a **novel 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 **Schema Theory** as a Brain Theory 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 and participated in **3 NSF founded Action Brain Language and Evolution (ABLE) workshops** bringing together researchers from neuroscience, computer science, linguistics, and primatology in order to foster trans-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

- Daily 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.

Selected Talks

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

Barrès, V. (2017) *Description of visual scenes as well as sentence comprehension, using the Schema Architecture Language-Vision InterAction (SALVIA) cognitive model*. Center for Research in Language Talk. UCSD

Barrès, V. (2014) *Template Construction Grammar: Neuro-Computational Modeling of the Vision-Language Interface* . Cluster of Excellence Cognitive Interaction Technology (CITEC), Germany.

Honors & Awards

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