

JASON SHERWIN, Ph.D.

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EDUCATION

- 08/05 – 05/10 **Georgia Institute of Technology, Atlanta, Georgia;**
Doctor of Philosophy, Aerospace Engineering, 2010 under Prof. Dimitri Mavris
Master of Science, Aerospace Engineering, 2006 under Prof. Dimitri Mavris
- 09/01 – 06/05 **University of Chicago, Chicago, Illinois;**
Bachelor of Arts, Physics with honors, 2005 under Prof. Donald Q. Lamb
Double Major: Music with honors under Prof. Marta Ptaszynska
- 09/97 – 06/01 **The Latin School of Chicago, Chicago, Illinois;**
High Honor Roll, 1997-2001
Cum Laude Society, 2000-2001

WORK EXPERIENCE

- 09/10 – present **Columbia University, New York, New York;**
Post-doctoral Research Scientist, Laboratory for Intelligent Imaging and Neural Computing:
 - Developing advanced machine learning techniques to detect neural correlates of perceptual decision-making
 - Performing and analyzing neuroimaging (EEG and EEG-fMRI) experiments on expertise, media consumption (e.g., audio and video), and data-rich evidence-gathering scenarios (e.g., baseball pitch classification)
 - Engaging prospective and current government agency collaborators (e.g., DARPA, NGA, IARPA, ARL)
 - Engaging in technology transfer with Columbia Technology Ventures (baseball pitch classification)
- 09/11 – present **U.S. Army Research Laboratory, Aberdeen Proving Grounds, Maryland;**
Post-Doctoral Research Fellow, Human Research and Engineering Directorate:
 - Applying basic neuroscience techniques to army-relevant problems in the Translational Neuroscience Branch
- 01/12 – present **IEEE Trans. on Neural Systems and Rehabilitation Engineering, New York, New York;**
Managing Editor:
 - Overseeing day-to-day editorial issues of the journal, including submissions, rejections and other aspects
- 09/12 – present **DARPA Narrative Networks Seedling Grant, City College of New York, NY;**
Consultant:
 - Initiated and overseeing collaboration with startup, Harmony Institute (New York, NY), and City College of New York (CCNY) to understand interplay of social media and cognition in the social impact of entertainment
 - Providing computational and neuroscience expertise in this multimedia-stimulus environment (e.g., video)
- 09/10 – 09/12 **Neuromatters, LLC, New York, New York;**
Consultant:
 - Facilitated government agency interactions (e.g., NGA, DARPA, NSA)
 - Provided technical expertise on cognitive science behind cortically-coupled computer vision (C3Vision)
 - Provided technical expertise and professional contacts related to entrepreneurship opportunities
- 08/05 – 08/10 **Aerospace Systems Design Laboratory, Atlanta, Georgia;**
Graduate Researcher:
 - Used machine learning algorithms based on cortical circuitry to analyze complex system engineering problems, specifically looked at decision-making during the Iraq War (Doctoral Thesis Topic)
 - Worked on and published results on both environmental and economic effects of automation in the automotive traffic system
 - Worked on and published results on strategic decision-making for space demonstrators with AFRL
 - Worked on and published results on design of a planetary defense system (Master's Research topic)
 - Worked on design of propulsion system for Crew Exploration Vehicle with NASA
 - Worked on design of bi-modal nuclear thermal rocket with Pratt & Whitney
- 6/05 – 8/05 **H-Bar Technologies, Batavia, IL;**
Researcher
 - Worked on software and hardware necessary for developing antimatter-based technologies
- 9/04 – 6/05 **ASC /Alliances Center for Astrophysical Thermonuclear Flashes, Chicago, IL;**
Researcher
 - Completed Bachelor of Arts thesis on computational simulations of supernovae
- 6/04 – 9/04 **Lawrence Livermore National Laboratory (LLNL), Livermore, CA;**
Summer Fellowship
 - Performed research into computational simulations of astrophysical phenomena

- 9/03 – 6/04 **Kavli Institute for Cosmological Physics, Chicago, IL;**
Researcher
- Participated in research group under Prof. Sean Carroll, developing theories of cosmological origins

PUBLICATIONS

- Sherwin, J., and Sajda, P. (2013).** “Musical experts recruit action-related neural structures in harmonic target detection: Evidence for embodied cognition in expertise.” *Brain and Cognition* (in press).
- Shows neural signatures for musical expertise and supports evidence of embodied cognition
- Sherwin, J., Gaston, J. and Ries, A. (2013).** “Neural Correlates of Small Arms Fire Localization Reveal Economy of Resources and Action-Based Perception in Soldiers and Marksmen.” *Frontiers in Human Neuroscience* (in revision). Invited Paper for Special Issue on Neural Implementations of Expertise (Eds. Bilalic et al.).
- Sherwin, J., Muraskin, J. and Sajda, P. (2012).** “You can’t think and hit at the same time: Neural correlates of baseball pitch classification.” *Frontiers in Decision Neuroscience*, Vol. 6: 177. doi: 10.3389/fmins.2012.00177.
- Shows evolution in spacetime of neural signatures involved in time-pressured spatio-temporal evidence gathering and decision-making
- Sherwin, J., and Gaston, J. (2012).** “Soldiers and marksmen under fire: Monitoring performance with neural correlates of small arms fire localization.” *Frontiers in Human Neuroscience*. Vol. 7: 177. doi: 10.3389/fnhum.2013.00067.
- Shows a method to grade expertise for arms fire localization based on neural response
- Sherwin, J., and Mavris, D. (2012).** Leveraging neural systems in the post-factum analysis of complex systems. *Systems Engineering: Practice and Theory*. Cogan, B. (Ed.), Intech Publishing.
- Describes the use of neurally-inspired algorithms for analyzing complex systems, as well as the insights emerging from neuroscience that can further our understanding of these systems
- Gordon, G., Kaplan, D., Lankow, B., Little, D., Sherwin, J., Suter, B., and Thaler, L. (2011).** “Toward an integrated approach to perception and action: Conference report and future directions.” *Frontiers in Systems Neuroscience*, Vol. 5: 20. doi: 10.3389/fmins.2011.00020.
- Provides an account of the state-of-the-art in the integration of robotics and theoretical neuroscience to understand the combination of perception and action in the brain
- Sherwin, J., and Mavris, D. (2011).** “A computational approach to situational awareness: A follow-up on the details.” *Journal of Battlefield Technology*, Vol. 11(1): 1-11.
- Elaborates the technical details and analysis of a machine learning implementation for policy-making decision support
- Sherwin, J., and Mavris, D. (2010).** “A survey of issues in computational situational awareness: The case of network-centric warfare.” *International Journal of Computational Science*, Vol. 4(5): 383-410.
- Provides a survey of the computational implementation of situational awareness, blending psychology and machine learning
- Sherwin, J. (2010).** “An approach towards holism in science and engineering.” *Journal of Systems Science and Systems Engineering*, Vol. 19(3): 285-305.
- Argues for a philosophical shift in science and engineering from reductionism towards holism to study complex systems
- Sherwin, J. (2010).** “A computational approach to situational awareness.” *Journal of Battlefield Technology*, Vol. 13(1): 1-7.
- Describes a machine learning implementation for policy-making decision support
- Sherwin, J. (2009).** “Toward an intelligent automotive system.” *Journal of Intelligent Systems*, Vol. 18(1-2): 123-142.
- Describes the results of an agent-based model used to simulate lateral/longitudinal cruise control effects on highway traffic
- Ender, T., Sherwin, J., and Mavris, D. (2008).** “Strategic decision-making support for AFRL space demonstrator effort.” *Air Force Research Laboratory Technical Report, AFRL-RB-WP-TR-2008-3149*.
- Describes a decision-making support tool for a space demonstrator effort

RECENT TEACHING EXPERIENCE

- 01/12 – present **Electrical and Computer Engineering Dept., Columbia University;**
Ph.D. Thesis Advisee:
 - Created joint research project for a Ph.D. student in computer vision to examine predictability of neural correlates of engagement from video features
- 06/12 – present **Amgen Scholars Program, Columbia University;**
Research Advisor:
 - Created summer research project jointly with undergraduate Amgen Scholar and continuing to refine results for upcoming publication on neural data decoding optimization
- 05/12 – present **Intel International Science and Engineering Fair (ISEF), Columbia University;**
Scientist Mentor:
 - Created summer research project jointly with high school science student from Heschel Academy (NY, NY) on visual perceptual decision-making in semantic contexts (e.g., language) and advising on final submission

- 09/08 – 05/10 **Ph.D. Qualifying Exams in Aerospace Engineering, Georgia Institute of Technology;**
Teaching Assistant/Mentor:
 - Mentored and coached graduate students planning to take Ph.D. qualifying exams

REVIEWER EXPERIENCE AND SOCIETY MEMBERSHIPS

- Reviewer for IEEE International Symposium on Resilient Controls, 2012**
- Reviewer for IEEE Journal on Emerging and Selected Topics in Circuits and Systems, 2011**
- Member of IEEE and IEEE Engineering in Medicine and Biology Society, 2012-13**
- Member of Society for Neuroscience, 2010-13**
- Member of Organization for Human Brain Mapping, 2012-13**

GRANTS, AWARDS AND ACCOMPLISHMENTS OF INTEREST

- Provisional Patent 070050.4649, United States Patent Office, 2012**
 - Joint patent with collaborators on “Neural correlates of baseball pitch classification” filed with Columbia Technology Ventures
- DARPA Seedling Grant (\$140K/year), Narrative Networks (N2) Program, 2012-present**
 - Created partnership between academia (City College of New York) and private company (Harmony Institute, New York, NY)
 - Nurtured collaboration and contributed to successful grant application
- Principal Investigator (PI) on Army Research Laboratory (ARL) Protocol 12-029, 2012-present**
 - Granted ARL IRB approval for investigating neural correlates of localization of small arms fire
- Oak Ridge Associated Universities Post-Doctoral Fellowship (\$120K/year), 2011-present**
 - Awarded to continue research in neuroengineering and to foster collaboration between Army Research Laboratory (Aberdeen, MD) and Columbia University (New York, NY)
 - Aimed at translating neuroscience findings to ready application on military problems
- Nunn-MacArthur Security Program Fellowship, 2009-10**
 - Awarded to study interactions with the policy community on matters of science & technology as they relate to national security
- Georgia Tech Graduate Student Research Symposium Award, 2009**
 - Presented work on enhancing situational awareness of decision-makers in network-centric warfare
- Mars Desert Research Station (Hanksville, Utah) Crew Member, 2006**
 - Selected as joint radiation research and public affairs officer for MDRS Crew 47 (appeared in *Chicago Tribune* and *Washington Times*)
- Third-Year BA Research International Travel Grant, 2004**
 - Awarded to collect research in music for Bachelor of Arts thesis project

SELECTED CONFERENCE PUBLICATIONS AND PRESENTATIONS

- Society for Neuroscience, San Diego, CA, October 2013**
 - Will present work on expert/novice differences in a gunshot localization paradigm
- Organization for Computational Neuroscience, Paris, France, July 2013**
 - Presented work on logistic regression parameter optimization using genetic algorithms
- Organization for Human Brain Mapping, Seattle, WA, June 2013**
 - Presented work on simultaneous EEG-fMRI recording of a time-pressured evidence gathering decision paradigm (i.e., baseball pitch classification in a go/no-go setting)
- Society for Neuroscience, New Orleans, LA, October 2012**
 - Presented work on neural correlates of baseball pitch recognition
- Bernstein Conference 2012, Munich, Germany, September 2012**
 - Presented work on musical expertise using EEG decoding and neuronal current source reconstruction
- Organization for Human Brain Mapping, Beijing, China, June 2012**
 - Presented work on musical expertise, analyzed with EEG decoding and neuronal current source reconstruction, amongst professional cellists and non-cellists
- City College of New York Cognitive Neuroscience Colloquium, New York, NY, March 2012**
 - Presented work on music cognition, expertise and baseball-related cognition, all studied with EEG decoding
- Society for Neuroscience, Washington, DC, November 2011**
 - Presented work on music cognition and expectation violation as measured with decoded EEG
- Bernstein Conference 2011, Freiburg, Germany, October 2011**
 - Presented work on music cognition and learning as measured with decoded EEG
- DARPA Narrative Networks Workshop: Modeling and Simulation, Arlington, VA, June 2011**
 - Presented work on music cognition as an experimental paradigm for understanding cognition of narratives
- DARPA Narrative Networks Workshop: The Neurobiology of Narratives, San Francisco, CA, April 2011**

- Presented work on music cognition and EEG decoding using Hierarchical Bayesian Modeling

Emory University Colloquium, Atlanta, GA, April 2010

- Presented work on Ph.D. thesis project concerning the situational awareness of complex systems

IEEE Aerospace Conference, Big Sky, MT, March 2009

- Presented conference paper on “Hierarchical temporal memory algorithms for understanding asymmetric warfare”

SAE Power Systems Conference, Seattle, WA, November 2008

- Presented on “Hierarchical Temporal Memory Algorithms for power system health”

Aerospace Systems Design Lab (Georgia Tech) External Advisory Board, Atlanta, GA, May 2008

- Presented to industry and government representatives on integration of intelligent agents into automotive system

Planetary Defense Conference, Washington, DC, March 2007

- Presented conference paper on “Probabilistic Design of a Planetary Defense System”

International Biometrics Conference, Montreal, Canada, July 2006

- Presented work on a mathematical theory of narrative acquisition

NASA Revolutionary Aerospace Concepts Academic Linkage, Cape Canaveral, FL, May 2006

- Presented work on probabilistic design of a planetary defense system