

Michael A. Repucci, Ph.D.

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EXPERIENCE

2012–current

Director of Engineering, Evoke Neuroscience, New York, NY.

- Lead agile design and development of software used in hundreds of medical clinics to collect and analyze EEG, ERP, and ECG data, and provide users with bio- and neurofeedback. Employ requirements engineering to carefully trace business needs to written code and ensure verifiability and testing of assessment and biofeedback software under FDA regulation.
- Maintain full stack flagship product codebase and documentation, companion applications, and software development. Manage team of 5 developers. Work closely with Director of IT and other management team.
- Serve as technical and scientific advisor on new initiatives. Provide customer technical support and resolution.

Techniques: C#/.NET/WPF, Matlab, Java EE 7, C/C++, Scrum, Microsoft Visual Studio 2013, Netbeans, Wildfly 10, Microsoft SQL, Jira/Confluence/Service Desk, Subversion.

2010–2012

Researcher/System Lead, Neuromatters, New York, NY.

- Design and develop brain-computer interface (BCI) system for P300-based image triage under the DARPA NIA program. Employed industry-standard design patterns, multithreading, computer vision, and machine learning.
- Lead team of 4 developers and manage large codebase to support new BCI systems under current development.

Techniques: C/C++, STL, Microsoft Visual Studio 2010 (w/C++0x), Qt, OpenCV, VXL, OpenGL, Microsoft Concurrency Runtime, Subversion, Matlab.

2009–2010

Research Associate, Laboratory of Neuroinformatics, Weill Cornell Medical College, New York, NY.

- Develop and manage toolkit for information theoretic analysis of neural data (STAToolkit @ neuroanalysis.org). Respond to user support requests. Administer toolkit wiki.
- Assist with medical school education by running small-group conferences on (neuro)physiology as part of a course titled *Molecules, Genes, and Cells*.

Techniques: information theory, Ubuntu Linux, C/C++, Matlab, DokuWiki.

2008–2009

Scientific Programmer, State University of New York, College of Optometry, New York, NY.

- Developed Python and C++ code to support real-time 3D stereoscopic visual experiments on depth perception and motion parallax. Employed OpenGL-based virtual reality (VR) APIs to create flexible and extensible infrastructure for scientific visual stimuli. Developed complete Django-based web application to provide user-manageable lab website. Managed Apache server.

Techniques: Python, C++, Django, Apache, OpenGL, Vizard, VRJuggler, real-time programming, synchronized 3D stereo video.

2008–2009

Scientific Programmer, Dr. Jerome Swartz, The Swartz Foundation, New York, NY.

- Developed a Matlab GUI for use in human psychophysics research. Employed PsychToolbox to present visual stimuli and record subject reaction times.

Techniques: Matlab, GUI, PsychToolbox, OpenGL.

2006–2008

Statistical Analyst, New York Methodist Hospital, Brooklyn, NY.

- Coordinated medical research (as independent contractor) funded by Codman: retrospective study of neurosurgical patients treated for normal pressure hydrocephalus with ventriculo-peritoneal shunt. Performed population statistics on subject pool and regression analysis to uncover correlations between MRI features and clinical outcome measures.

Techniques: linear regression, Pearson correlation, statistical analysis, CT/MRI assessment, medical record review, hiring and personnel management, grant writing.

2005–2007

Quantitative Analyst, Weill Cornell Medical College, New York, NY.

- Developed trading strategy (as independent contractor) in high-frequency currency markets based on multivariate decomposition algorithm. Ran high-volume time-series analysis on minute-by-minute currency data from five major inter-traded markets (e.g., USD-JPY-EUR-GBP-AUD). Predicted currency fluctuations

based on nonlinear signature and hidden linear relationships among currencies.

Techniques: high-frequency quantitative analysis, financial trading models, programming in C#, Matlab.

2004–2005

Post-Doctoral Associate, Dr. György Buzsáki, Rutgers University, Newark, NJ.

- Investigated cortico-hippocampal communication and memory consolidation. Established system for simultaneous two-photon laser scanning cortical fluoroscopy and hippocampal micro-electrode recording to probe neurons *in vivo* in mice. Performed Fourier analysis and pixel-based statistics on images and electrode recordings to recover cellular activity profile and examine correlations between fluoroscopic and electrical signals.

Techniques: two-photon laser scanning microscopy, small animal surgery, *in vivo* fluorescent labeling, Fourier analysis, linear regression.

1999–2004

Graduate Fellow, Dr. Jonathan D. Victor, Weill Graduate School of Cornell University, New York, NY.

- Characterized linear and nonlinear spatiotemporal dynamics of receptive fields in cat primary visual cortex (Ph.D. Thesis).
- Developed patented algorithm for decomposition of multivariate time series—analyzed dynamics in ictal EEG records.

Techniques: nonlinear systems analysis, computational modeling, physiological preparation and maintenance in acute animal studies, tetrode electrophysiology, programming in Matlab, Delphi, OpenGL API, Windows API.

EDUCATION

2004

Ph.D., Neuroscience, Weill Graduate School of Cornell University, New York, NY.

Supported by institutional Kirschstein-NRSA vision research training grant.

Courses included mathematical structures in neuroscience, mathematical aspects of neurophysiology, visual motion, integrative neuroscience, ion channels.

1998

B.S., Chemistry, The College of William and Mary, Williamsburg, VA.

Majored in chemistry, honors thesis in organic chemistry, concentration in psychology.

Graduated *cum laude*, Dean's List 5/7 semesters, GPA 3.6.

EXPERTISE

Computers

Experienced: C#/.NET/WPF, Matlab, C/C++, STL, Agile/Scrum, Subversion, Windows 10/7/XP, Microsoft Visual Studio.

Proficient: Java EE 7, Python, Django, Qt, OpenCV, OpenGL, Ubuntu Linux, Win32 API, (X)HTML, CSS, Microsoft Concurrency Runtime.

Familiar: Android, Netbeans, Wildfly, Jira/Confluence/Service Desk, Apache, JavaScript, PHP, SQL, XML.

Mathematics

Experienced: Signal Processing, Information Theory, (Non)Linear Decomposition, Spectral Analysis, Multivariate Regression.

Proficient: Machine Learning, Curve Fitting, Probability Theory, Statistics.

Familiar: Modeling, ODEs, PDEs.

Languages

English (native), German (proficient), French (proficient), Spanish (basic).

PUBLICATIONS

- Victor, J.D., Mechler, F., Repucci, M.A., Purpura, K.P., and Sharpee, T. (2006) Responses of V1 neurons to two-dimensional Hermite functions. *Journal of Neurophysiology*. 95:379-400.
- Wang, G., Zhou, P., Repucci, M.A., Golanov, E.V., and Reis, D.J. (2001) Specific actions of cyanide on membrane potential and voltage-gated ion currents in rostral ventrolateral medulla neurons in rat brainstem slices. *Neuroscience Letters*. 309(2):125-9.
- Repucci, M.A., Schiff, N.D., and Victor, J.D. (2001) General strategy for hierarchical decomposition of multivariate time series: Implications for temporal lobe seizures. *Annals of Biomedical Engineering*. 29(12):1135-49.

PERSONAL

I study Buddhism, cycle, cook, play chess, travel, sing, attend contemporary music/dance/theatrical performances, visit modern art museums/galleries, am happily married, am a proud father, *et cetera*.