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<http://3e.org>

Unix, Python, ETL, human factors, neuroimaging, robots, human factors, data analysis. Boston.

- POST-PHD **Ab Initio Software** Lexington, MA 2016 –
Internal Consultant
I support clients, including 46 of the Fortune 50, in their use of the Ab Initio ETL software and its underlying systems. I build software solutions on Linux, Solaris, and AIX ranging from low-level system utilities to high-performance data processing engines operating over data warehouse systems spanning tens of thousands of database tables and hundreds of petabytes of data. I implement systems to provide data lineage traceability and provide build systems that supply reproducible reporting to end users.
- Harvard, McLean Hospital** Belmont, MA 2015 –
Volunteer Visiting Scientist/Developer
I occasionally assist researchers with data analysis and software toolchain development. I study researchers' workflows and suggest and implement improvements.
- Interactive Motion Technologies** Watertown, MA 2012 – 2016
Scientist, Software Architect
I developed software (Python, bash, Tcl/Tk, and C, on Linux) for FDA and CE certified robots that assist stroke and other patients with rehabilitation; I worked with clinical staff to design research-based treatment protocols and translate these into products. I made sure the robots followed Asimov's Laws of Robotics.
- Rewrote tens of thousands of lines of legacy Tcl/Tk code in (much less) Python
 - Developed software in C for an Atmel microcontroller, replacing the PLC in a new product line
 - Developed robot mechanical dynamics simulations in Jupyter/IPython Notebook
 - Rewrote the central Xenomai-based real-time robot control loop to use a CANbus architecture
 - Redesigned software deployment mechanism, which had been based mostly on manual instructions and loose collections of shell scripts, to use modern Debian packages and containerization
 - Mentored junior programmers and interns
- Design Science / Core HF** Philadelphia, PA (remote, consultant) 2010 – 2012
Usability Specialist
I focused on heuristic analysis, usability testing, statistics, data analysis, and background research in the service of medical device usability and safety, including human factors testing for regulatory approval. I specialized in applying principles of human psychology and cognitive performance to improving usability. I remain on staff as a consultant to Core HF.
- PRE-PHD **AT&T Easylink, TransactPlus/JP Morgan, Bristol-Myers Squibb** 1999 – 2002
Lead, Network Operations; Systems Analyst
At these three positions, I developed tools to monitor Unix systems and networks. I supported Unix systems providing financial and other messaging services to 100,000+ customers in a high availability environment. Mentored programmers. I created formal documentation of procedures that had previously been passed down orally.

EDUCATION

University of Pennsylvania

Ph.D. 2009, Psychology (cognitive neuroscience).

I showed a new method of computationally modeling and analyzing functional neuroimaging data using multidimensional scaling-like methods, allowing researchers for the first time to detect certain very small scale properties of neural populations using non-invasive techniques such as fMRI and EEG. Code (primarily Matlab) written for my dissertation is available at github.com/dmd/thesis. In practice, I spent a great deal of time writing tools in Python and Matlab to manage long-running computation jobs to handle terabyte-scale datasets.

I also had training in the theory of human decision-making: the science of how and why people and organizations make mistakes, and how to overcome these mistakes and make rational decisions instead.

I am, in general, especially interested in how large quantities of information can be transformed in ways that allow people to quickly and accurately make decisions – whether that be by making computational tools to automate procedures so people can focus on higher-level concepts, or making simulations of large systems and datasets to help quantify how a particular experiment or change in behavior will turn out.

Rutgers University

B.A., 2002, Psychology

KEY PAPERS

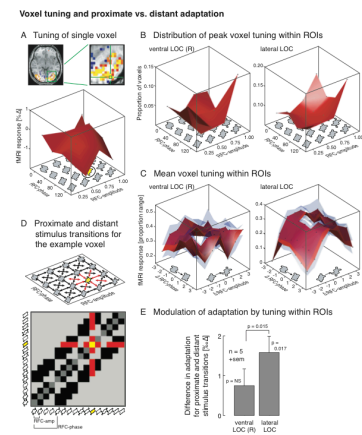
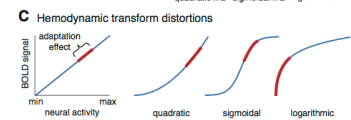
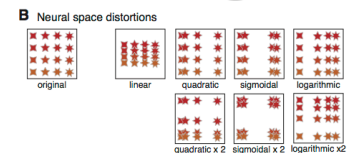
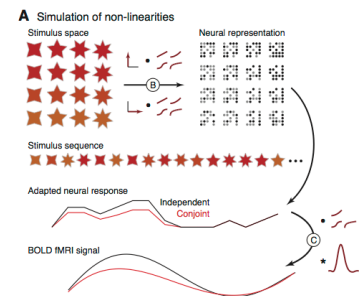
Drucker DM, Kerr WT, Aguirre GK. 2009. *Distinguishing conjoint and independent neural tuning for stimulus features with fMRI adaptation.* J Neurophysiology. 3e.org/paper/dc

I showed that by examining an fMRI signal from the point of view of Minkowsky space metrics, it is possible to use adaptation to identify conjoint vs. independent populations of neurons. This paper received a “must read” review from the Faculty of 1000 (Biology).

Drucker DM, Aguirre GK. 2009. *Different spatial scales of shape similarity representation in lateral and ventral LOC.* Cerebral Cortex. 3e.org/paper/scale

I used the above method, as well as a meta-method of comparing adaptation and distributed machine learning (support vector machine) methods to show varying spatial scales of shape similarity representation across various regions of cortex thought to be involved in object representation.

I presented this research at the 38th Society for Neuroscience and the 8th and 9th Vision Sciences Society. This work was supported by a NIMH predoctoral fellowship, Behavioral and Cognitive Neuroscience Training Grant.



EXTRAS

I am a licensed pilot and fly small sport aircraft; I contribute to numerous open source projects, submitting patches and participating in mainline development; I contradance and participate in other folk music events.

I have managed my own mail and other network services on Linux at 3e.org for more than 20 years. I have been using, programming, and administering Unix since 1991.