

Toby Fernsler
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PROFESSIONAL EXPERIENCE

Ocean Imaging, Littleton Colorado

March 2012 - July 2012

Wrote back-end Python programs to automatically retrieve GIS data using OpenDAP protocols as they became available, process in ArcMAP, and deliver to customer's external servers. Optimized a Java-based neural-net program used for GIS feature identification (seaweed and oil). Created a set of virtual machines to test distributions of their software. Organized and documented source code in a central git repository.

Self-Employed, California and Colorado

September 2010-Present

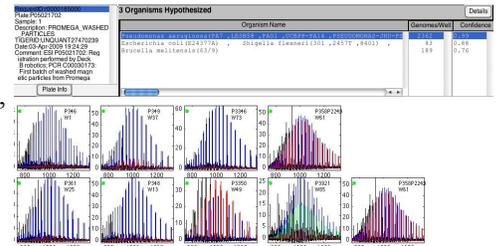
General contracting (construction) work, small software/data analysis contracts, writing a book on structured software development, pursued many aspects of a high-resolution functional brain imaging project.

Ibis Biosciences (subsidiary of Abbott Molecular), Carlsbad, CA

November 2007-September 2010

Senior Programmer

Project lead and software architect for GenX software components, refactoring, and documentation required for regulatory approval and meeting milestones for acquisition of Ibis by Abbott. GenX primarily consists of compiled Matlab code, supported by Java, MySQL, C#, .NET, C, shell scripts and Microsoft SQL.



- **Project Management:** Led critical projects in an agile software group that grew from five to thirty programmers in the course of my tenure. Directed and coordinated the tasks for ten of my coworkers.
- **Software Architect:** Designed components for unit testing, data simulations, queue management, configuration management, database integration, workflow automation, GUIs, and data visualization.
- **Code Management:** Oversaw and coordinated branching and merges of GenX code base, refactoring out of obsolete algorithmic components, and wrote design documents.

General Dynamics, San Diego, CA

September 2007-December 2007

Independent Contractor

Advised and wrote software improvements for a shipping, purchasing and inventory optimization program.

- **Research and Application:** Mastered an unfamiliar programming language (Lingo) and mathematical theory (non-linear optimization) in a timely manner and applied it.

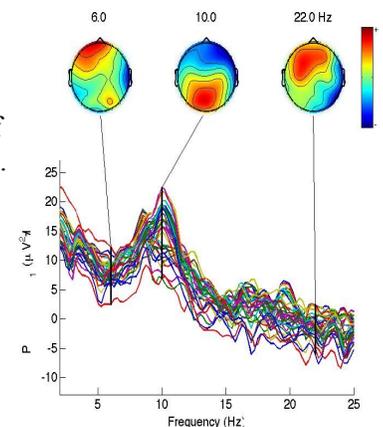
Swartz Center for Computational Neuroscience, La Jolla, CA

2005-2007

Senior Programmer

Developed and supported the widely used open-source Matlab package EEGLAB, a suite of programs which applies the latest methods in digital signal processing to functional brain imaging for integrated EEG/ERP, iEEG, MEG, and fMRI research.

- **Project Management:** Coordinated and directed the code contributions of 10+ lab members, dozens of affiliates, and occasional contributions from hundreds of users. Implemented issue-tracking, unit testing, contribution tools and guidelines.
- **Algorithm Design and Implementation:** Developed additional wavelet and statistical modules, and MRI and x-ray image coregistration.
- **Programming and Software Support:** Conducted extensive debugging, code refactoring, significant additions and revisions to documentation, customer support, workshop presentations, verifying and correcting mathematical algorithm implementations, expanding i/o capabilities with a wide variety of hardware manufacturers.



University of Colorado, Boulder, Boulder, CO **2004 - 2005**

Research Assistant

Researched and implemented multivariate non-parametric waveform significance tests for EEG research.

University of Colorado, Boulder, Boulder, CO **2002 - 2004**

Research Assistant

Participated in the creation of a highly accurate and detailed chemical model of the Mauthner neuron, as well as the assembly and configuration of the Beowulf cluster of twenty multi-core servers on which it ran.

University Corporation for Atmospheric Research, Boulder, CO **1999-2001**

Research Assistant

Supported the development of improved algorithms for the range, accuracy and visualization of doppler weather radar. These programs are implemented in several installation around the world, and are scheduled to be applied to most doppler weather radars in the US within the next several years.

University of Colorado, Boulder, Boulder, CO **1997 - 2004**

Teaching Assistant

Taught a variety of math courses: Algebra, Calculus 1 and 2, Precalculus. Designed and taught CU's Trigonometry and Algebra Lab courses. Teaching assistant for Numerical Analysis and Foundations of Math.

ILE, Boulder, CO **May-August 1998**

Localization Programmer

Re-programmed client company's software (menu, dialogue and help) to other languages.

- Successfully localized three software packages to four languages.

Naval Research Lab, Plasma Physics Division, Washington, D.C. **1996**

Research Assistant

Repaired circuitry of large power supplies and built remote sensors and controls for use in a very high energy microwave laser. Delivered mechanical support for cooling system of a variable-wavelength laser and microwave kiln.

Other work experience includes construction, Cued Speech transliteration for the deaf, and commercial fishing.

MATHEMATICAL EXPERTISE

My expertise is primarily in signal processing. This includes fourier analysis, wavelet analysis, numerical analysis, statistical significance testing, Bayesian probability methods, error analysis, optimization theory, PCA, and ICA. I am also familiar with number theory (encryption), graph theory (network analysis), ordinary and partial differential equations (modelling with FEM, and multigrid) set theory (logic), and abstract algebra (linear algebra/matrices).

PROGRAMMING

Python, Matlab, Java, Mathematica, Fortran, C, C++, Visual Basic, XHTML, C#, MySQL, SQL, R, Lingo, ArcMAP, OpenGrADS

EDUCATION

- **PhD Candidate in Mathematics and Neuroscience**, University of Colorado, **2001-2005**
- **Master of Arts In Mathematics**, University of Colorado, **2001**
- **Bachelor of Science in Mathematics, Minor in Physics**, George Mason University, **1996**

LANGUAGES

- Basic written and conversational Korean and German

