Brett Graham PhD

github.com/braingram - linkedin.com/in/bjgraham/ - jenandbrett.com/brett

12 Webster St
Waltham MA, 02453
(302) 588-1736
brettgraham@gmail.com

EXPERIENCE

Harvard University, Cambridge MA — *Neuroengineer*

AUG 2017 - PRESENT

Serve 40+ labs at the Center for Brain Science consulting with scientists to understand instrument and analysis needs and leading the development of custom software, hardware, mechanical, electronic and full-stack solutions

- Designed and built custom embedded microcontroller solution along with Python analysis software for tracking 200+ mice for 250+ days
- Wrote Python and Bash software for capturing and recording 10+ terabytes of videos of 60 developing bumblebee colonies over 3 months

Harvard Medical School, Boston MA — *Electron Microscopy Engineer*

AUG 2013 - AUG 2017

Developed instrumentation that accelerated collection of connectomics brain-circuit diagram datasets allowing for the first complete capture of a cortical column occupying over 1 cubic millimeter, imaged at 4 nanometer pixels producing a 2 terabyte image dataset acquired over 6 months

- Developed Python motor control and custom computer vision software for an automated closed-loop reel-to-reel laser marking machine that has produced hundreds of meters of product
- Added sensors to a commercial tissue slicing machine and wrote custom Python software to allow automated closed-loop collection of thousands of consecutive 40 nanometer thin sections of brain tissue
- Invented, designed, machined parts for and wrote software to control an automated electron microscope with robotic sample exchange, computer vision for image quality assessment and network system to coordinate over 20+ Python processes running on 6 computers able to acquire images at 160 MPix/s

Rowland Institute, Cambridge MA — *Postdoctoral Researcher*

AUG 2009 - AUG 2013

Uncovered object recognition related neural signals in rodent cortex through the development of novel instrumentation and software

- Constructed hardware and wrote software for analysis of 3D surgical scans and robotic placement of electrodes
- Built custom electronics to modify audio recording hardware for use as a 32 channel low noise voltage digitizer for neural recordings
- Wrote Python code for denoising, thresholding, waveform decomposition and clustering of 10s of terabytes of neural time-series data

PROGRAMMING LANGUAGES

10+ years Python (2, 3)

Bash, C/C++, Javascript, R, Matlab, LabVIEW

SKILLS

3D robotics and physics simulation: ROS, OpenGL, Bullet, Blender

Realtime and offline image analysis: OpenCV, OpenCL, CUDA

Numeric signal analysis: NumPy, SciPy

Linux server, desktop and embedded systems administration

Mechanical engineering: CAD (Solidworks), CAM (HSMWorks), CNC Mill and CNC Lathe operator

Electrical engineering: PCB design (KiCad), embedded programming, test equipment use (oscilloscope, logic analyzer, DAQ)

HOBBY PROJECTS

6+ year Somerville-Cambridge Elder Services Brown Bag Volunteer

4+ Project Hexapod teammate: projecthexapod.com

EDUCATION

University of Delaware, Newark DE — *PhD Neuroscience*

AUG 2004 - AUG 2009

Electrophysiology and computational modeling of fish vision for collision avoidance with applications to mobile robots and simulated unmanned aerial vehicles

Millersville University, Millersville PA — *BA Psychology*

SEPT 2000 - MAY 2003

SELECT PUBLICATIONS

Hildebrand D, Cicconet M, Torres R, Choi W, Quan T, Moon J, Wetzel A, Champion A, **Graham B**, Randlett O, Plummer G, Portuges R, Bianco I, Saalfeld S, Baden A, Lillaney K, Burns R, Vogelstein J, Schier A, Lee WC, Jeong WK, Lichtman J, Engert F (2017) Whole-brain serial-section electron microscopy in larval zebrafish. *Nature*, 545, 345-349.

Lee WC, Bonin V, Reed M, **Graham B**, Hood G, Glattfelder K & Reid RC (2016) Anatomy and function of an excitatory network in the visual cortex. *Nature*, 532(7599), 370-374.

Zoccolan D, **Graham B**, & Cox D (2010) A self-calibrating, camera-based eye tracker for recording of rodent eye movements. *Frontiers in Neuroscience.* 4(193).

PATENTS

Graham B, Lee WC & Hildebrand D (2016) GridTape Imaging Stage. U.S. Provisional Patent Application: Application 62/420,550, Nov 10, 2016

Hildebrand D, **Graham B** & Lee WC (2016) GridTape for Fast Nanoscale Imaging. U.S. Provisional Patent: Application Application 62/325,747, Apr 21, 2016

TEACHING AND MENTORSHIP

Harvard University, Instructor — *Freshman Physics Seminar with Jene Golovchenko*

Spring & Fall 2017

Harvard Medical School, Instructor — *Arduino Nanocourse*

Fall 2016, Spring & Fall 2017

Harvard Medical School, Manager — *Mentored 4 scientific programmers*

AUG 2013 - AUG 2017

University of Delaware, Instructor — *Sensation & Perception*

Fall 2007, Spring 2008

References and CV available by request