

# BRANDON KING, PHD

ADVANCED TECHNOLOGY ENTHUSIAST AND NEURAL INTERFACE SPECIALIST

XBKINGX@GMAIL.COM

(401) 440-7437

1335 CHRISTINA LANE

NORTHBROOK, IL 60062

## HIGHLIGHTS

- PhD in Neuroscience from Brown University.
- Over a decade of experience in neuroengineering, brain-computer interfaces, and assistive technology.
- Significant business, communication, and management experience in private industry.
- Lifelong technology enthusiast spanning personal, academic, and professional environments.

## INTERESTS

- Small-scale, local, additive manufacturing for custom, creative, and functional solutions.
- 3D model generation via AI.
- Neuroprosthetics, neural interfaces, and biomedical devices.
- Virtual/augmented/mixed reality interaction paradigms.

## SKILLS

### 3D PRINTERS

VOXELAB  
AQUILA<sup>1</sup>

Assembly and replacement of all components, Marlin firmware, rewiring, tramming bed, tuning e-steps, redesigning the hotend, handling Bowden and direct drive extruder setups, and troubleshooting.

BAMBU LAB  
X1-CARBON

Disassembly, calibration, upgrade installation (e.g.- vented fume extraction, sound dampening, etc.), AMS<sup>2</sup> add-on applications, and troubleshooting.

### 3D SOFTWARE

**Slicers:** PrusaSlicer, Ultimaker Cura, BambuStudio, SuperSlicer, OrcaSlicer.

**Other:** Pronterface, Tinkercad, Blender, FreeCAD, OpenSCAD, MeshLab, Meshroom, Meshmixer, SmithMicro Poser, OctoPi.

### 3D MATERIALS

PLA, PETG, ASA, sub-types (silk, plus, meta, glow in the dark, coextrusion multicolor, glitter, recycled, matte, gloss, etc.) from approximately 25 different brands.

### ELECTRICAL EQUIPMENT

Soldering stations, multimeters, oscilloscopes, amplifiers, DACs and A/D converters, signal generators, data recorders.

### PROGRAMMING LANGUAGES

Matlab, LabView, C, Java, HTML, Pascal, BASIC.

### FAMILIAR WITH

Python, R, XML, C++, SQL, Lisp, CSS, Lua, Regex.

### OPERATING SYSTEMS

Windows,  
MacOS, Linux,  
iOS, Android.

### INTERFACE TECHNOLOGY

Neural data, EMG, EOG, eye tracking, motion capture, assistive keyboards and devices, audio/video capture and mixing, human interface devices, video game controllers, HTC Vive.

### OTHER

Consumer, prosumer, and enthusiast electronics and computer components. Office software (Microsoft, Libre), image/photo/video software (Adobe, GIMP), SmithMicro Poser (3D character animation, texturing, rendering), media transcoding.

1- Creality Ender 3 v2 clone

2- "Automatic Material System" - 4x 1kg filament spool management add-on

## RECENT PROJECTS

- 3D Printing (FDM) consulting.
  - Design and modification of parts and custom solutions.
  - Printer maintenance, repair, and calibration.
- Cryptocurrency and blockchain research, trading, investment, and mining.
- Volunteer at FreeGeek Chicago, a not-for-profit 501(c)(3) organization that recycles and rebuilds computers for people in disadvantaged communities.
  - Training, recruiting, and advising staff.
  - Building, testing, and troubleshooting PCs.
- Private IT consulting.

## CORE PROJECTS AND EXPERIENCE

### NEUROSCIENCE DOCTORAL CANDIDATE

BROWN UNIVERSITY

BRAINGATE PROJECT  
LAB OF JOHN P. DONOGHUE

PROVIDENCE, RI  
AUG. 2005 - MAY 2017

- Investigated brain-computer interface safety and usability factors essential for transitioning BCI technology from a controlled lab environment to the unpredictable outside world.
- Catalyzed project-wide changes to experimental design, post-implant initial evaluation, and participant instruction.
- Collected, analyzed, and verified high volume, high resolution neural data sets across large variable spaces for dissertation study and collaborating projects, requiring precise knowledge of signal conditioning, filtering, aligning, and processing.
- Defended thesis successfully without revision.
- Thesis title: *Volitional Strategies Engaged During Neural Interface Control: The Impact of Watching, Imagining, and Attempting Movement on Neural Activity.*

*The BrainGate Project seeks to use an implantable neural interface to drive prosthetic devices by harnessing brain activity related to movement. Such a device may one day restore the ability to communicate to people who remain cognitively intact, but unable to speak or move due to illness or injury.*

### PHARMACEUTICAL REPRESENTATIVE

ABBOTT LABORATORIES

ABBOTT PARK, IL  
FEB. 2002 - APR. 2005

- Drove territory regional ranking from bottom third to top 10%.
- Increased sales to 125% over quota annually.
- Developed Excel macros for physician data portability and prescription trend analysis featuring novel, effective methods of identifying key prescribers. Distributed macros and peer reviewed literature to coworkers.

*Pharmaceutical reps liaise between medical professionals and company research divisions, providing medical information and resources related to company products.*

### NEUROPHYSIOLOGIST & PROGRAMMER

NEURAL SIGNALS, INC.

LAB OF PHILIP R. KENNEDY

ATLANTA, GA  
MAY 1999 - FEB. 2002

- Implemented a fully mobile data analysis rack system.
- Designed and implemented programs to aid data collection and analysis.
- Collected and analyzed data leading to published findings.
- Broad duties, spanning all project facets, from working with participants to presenting to investors.
- Full-time position while full-time student.

*Neural Signals, Inc. created the first fully implantable brain-computer interface for human use and conducted the first long term studies of high-resolution neural data from human subjects.*

## EDUCATION

### PHD IN NEUROSCIENCE

BROWN UNIVERSITY  
LAB OF JOHN P. DONOGHUE

PROVIDENCE, RI  
AUG. 2005 - MAY 2017

- Teaching Assistant for Introduction to Neuroscience.
- Coordinated 12 undergraduate assistant TAs for class of 300+ students.
- Led two-hour-long weekly review sessions for groups of 20-50 students.
- Held regular office hours for tutoring and large pre-exam review sessions.

### BSc NEUROSCIENCE, BSc COMPUTER SCIENCE

EMORY UNIVERSITY

ATLANTA, GA  
SEP. 1996 - MAY 2001

- Research assistant and programmer.
- Designed and implemented a variety of software programs that measured research variables during rat ICSS experiments on behavior and reward.
- Designed and implemented experimental protocol to record neural and eye-tracking data from rhesus monkeys.
- Member of the Dean's List and Emory Neuroscience Honor Society.
- Course work in Java, C, Lisp, SQL, system architecture, artificial intelligence, behavior, perception, and computational neuroscience.
- Minor in Philosophy, Vice President of Fencing Club, and Senior Writer of the Arts & Entertainment Magazine.

## ANCILLARY PROJECTS

### COMMUNITY LIAISON

MENDELEY LTD.  
(BOUGHT BY ELSEVIER)

LONDON, UK  
MAR. 2009 - AUG. 2009

- Cofounded the Community Liaison Program, an early social media outreach program connecting the company with users and university libraries.
- Tested and compiled community feedback on social reference management service and desktop application.

*Mendeley is a cross platform reference manager that allows users to locate, organize, sync, and share scientific articles.*

### FOUNDER / BLOGGER

DIRECT NEURAL  
INTERFACE

PROVIDENCE, RI  
MAY 2007 - JUNE 2010

- Maintained curated lists of recent publications used by many leading brain-computer interface research labs.
- Posted regular articles highlighting the interactions between technology, science, and current events.

*Direct Neural Interface aggregated news related to biotech, such as BCIs, HCI, AR, robotics, consumer electronics, AI, and statistics.*

### SENIOR EDITOR

DIGITALTRENDS.COM

SHERWOOD, OR  
APR. 2003 - JAN. 2009

- Reviewed cutting edge consumer and prosumer hardware from technology companies prior to being released to market.
- Engineered, produced, and hosted weekly technology news podcast.
- Addressed questions and comments concerning products and trends in technology in online forums.

*Digital Trends provides consumers with technology news, product reviews, and unique industry insights.*

# PUBLICATIONS

## JOURNAL ARTICLES

- Kennedy PR, Kirby MT, Moore MM, King B, Mallory A. "Computer Control Using Human Cortical Local Field Potentials." *IEEE Transactions on Neural Systems and Rehabilitation Engineering* 12.3 (2004).
- Kennedy PR, Andreasen D, Ehirim P, King B, Kirby MT, Mao H, Moore MM. "Using Human Extra Cortical Field Potentials to Control a Switch." *Journal of Neural Engineering* 1 (2004): 72-77.
- Kennedy PR, Andreasen DS, King B, Kirby MT, Mao H, Moore MM, Ehirim P. "Correlations between human motor cortical local field potentials, action potentials, contralateral arm EMG activity and digit movements." Submitted to *Journal of Neural Engineering* (2005).
- Vargas-Irwin CE\*, Feldman JM\*, King B\*, Simeral JD, Sorice BL, Oakley EM, Cash SS, Eskandar EN, Friehs GM, Hochberg LR, Donoghue JP. "Watch, Imagine, Attempt: Motor Cortex Single-Unit Activity Reveals Context-Dependent Movement Encoding in Humans With Tetraplegia." *Frontiers in Human Neuroscience* 12 (2018): 1-13.  
*\* Equal contribution*

## BOOK CHAPTER

- Kennedy PR, King B. "Dynamic Interplay of Neural Signals during the Emergence of Cursor Related Cortex in a Human Implanted with the Neurotrophic Electrode." *Neural Prostheses for Restoration of Sensory and Motor Function*. Ed. John Chapin. Danvers, MA: CRC Press, 2001. 221-233.

## CONFERENCE POSTERS AND PRESENTATIONS

- Kennedy PR, Moore MM, King B. Directionality coding in human cortical area 4: role of phase relationships of individual action potentials. Program No. 590.10. 2000 Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience, 2000. Online.
- Kennedy PR, King B, Kirby MT, Moore MM, Blankowski M. Motor cortical control of a Cyber digit by a patient implanted with the Neurotrophic Electrode. Program No. 63.5. 2001 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2001. Online.
- Kennedy PR, Kirby MT, Adams K, Mallory A, King B. (2001). The role of tactile feedback in the control of cortical neural signals two years after implantation in patient TT with mitochondrial myopathy. In *Thirty Second Annual Neural Prosthesis Workshop* (October 17, 2001). Bethesda, MD: NINDS, NIH.
- Kennedy PR, King B, Kirby MT, Adams K. Directionality may be inherent in Local Field Potentials (LFPs) recorded via the Neurotrophic Electrode in human cortex. Program No. 357.15. 2002 Neuroscience Meeting Planner. Orlando, FL: Society for Neuroscience, 2002. Online.
- King B, Truccolo W, Friehs GM, Stein J, Donoghue JP, Hochberg LR. Motor cortex local field potentials and multi-unit activity during intended movements in humans with tetraplegia. Program No. 517.15/VV1. 2007 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2007. Online.
- King B, Feldman JM, Hochberg LR, Donoghue JP. Verbal instructions to watch, imagine, or attempt movement differentially engage neurons in the motor cortex of humans with tetraplegia. Program No. 899.4/HHH45. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.
- Feldman JM, King B, Truccolo W, Hochberg LR, Donoghue JP. Decoding neural representations of action from motor cortex ensembles during action observation in humans with tetraplegia. 2011 Neuroscience Meeting Planner (p. 142.14). Washington, DC: Society for Neuroscience, 2011. Online.
- Hochberg LR, Bacher D, Barefoot L, Berhanu E, Black MJ, Cash SS, King B, ..., Donoghue JP. Use of the BrainGate Neural Interface System for more than five years by a woman with tetraplegia. 2011 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience. 2011. Online.