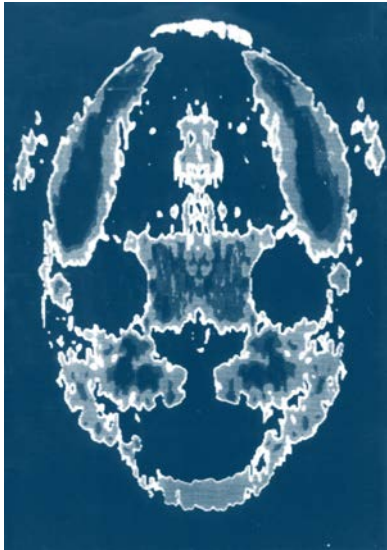


Brainfingers



What is consciousness? For millennia, scientists, philosophers and artists have searched for its origin and expression in our brains, in our hearts, and in the sky. No one has found it yet, and we still can't say how it arises. Our own perceptual apparatus may in fact be blinding us to the source.

Maybe we're looking in the wrong place. Maybe it's something we share, but don't exactly possess. Until the current era, research has almost always focused on the structures and functions of the brain, the senses and the nervous system in individuals. But in the long term, it is very likely that research into the dynamics of group interactions will prove to be just as important.

In the age of social media, and at the dawn of the era of virtual realities, brain-computer interfaces and artificial intelligence, our need to understand consciousness has acquired new urgency. The potential implications for society are profound, spanning education, the environment and politics. The potential applications for commerce are unprecedented.

The Brainfingers Project is developing mind activated technology that can be used to control prosthetic limbs, vehicles, video games and a multitude of other devices. Their use is not limited to individuals - we can potentially develop equipment that can be controlled by groups of people acting collectively. These applications both depend on investigation of consciousness and enable it. We can utilize brain state changes initiated by consciousness-shifting techniques to drive media and operate many tools.

It's a fantasy, however, to think that by simply putting on a headset we will be able to instantly control things with our thoughts. Practice is required to do anything well, whether you are playing golf or playing guitar. Eastern meditative traditions long ago pioneered effective methods to control and focus the mind. These techniques are remarkably relevant and useful today in designing the brain activated devices of the future.



Joy is contagious. So are many other states of being and awareness. The changes that occur in the brain when people sing, dance or meditate in unison are the result of complex interactions between the limbic, endocrine and autonomic nervous systems, triggered by repetition and regulated by breathing.

The effects are amplified when these activities occur in a group setting. These physiological systems have electrical signatures, which can be monitored using electrodes in headsets coupled with an array of filters. The resulting signals can be used to drive media, or move objects. Most previous research has utilized MRI technology, which is expensive, intrusive and unsuited for use with groups.

We propose to equip groups of 150-200 people with a new generation of lightweight Brainfingers EEG headsets connected by Bluetooth technology to their smartphones. These headsets are non-intrusive and allow participants to move and behave normally. The groups will engage in ecstatic state-shifting practices like chanting, dancing, yoga or meditation, and data will be gathered from the changes that occur on both individual and collective levels.

Brain states can be easily monitored with a graphic screen interface. The collective capacity of 200 smart phones will allow researchers to record a tremendous amount of data. The individual outputs can also be mixed together to create a signal that reflects the collective shift in consciousness over time. This signal will drive changes in visual media such as lighting, or the rate of dissolve between images, creating a kind of biofeedback loop. The mirror effect of this could exponentially magnify the effect on the crowd. We intend to market this app and the accompanying headsets to a general audience, and further refine the headsets for use as controllers for many different devices.

Objectives

- ✦ Develop brain activated technologies with commercial, social and artistic applications.
- ✦ Gather scientific data on how crowds connect and interact.
- ✦ Validate a more scientific approach to ecstatic experiences that is not linked to cultural or religious beliefs.
- ✦ Create a compelling theatrical experience with scientific, entertainment and technological cash value.

Implementation and Products

- ✦ Code an app for iPhone and Android devices, featuring a panel that allows for selecting and changing filters as needed, allowing users to see and record changes in their individual states on their smart phones.
- ✦ Manufacture EEG Headsets with Bluetooth capability.
- ✦ Design a mixer and interface that can sum the signals from all of the headsets, using processing in the cloud, creating a single signal reflecting the collective shifts in brain state that can drive visual media.
- ✦ Collect data and run a series of scientific experiments with groups using headsets and the smartphone app.
- ✦ Create extensions of the app for use in controlling many different devices.
- ✦ Publish a book written for a general audience that explains the findings of the scientific study.
- ✦ Launch a touring exhibition and marketing engine designed for theatrical and museum venues.

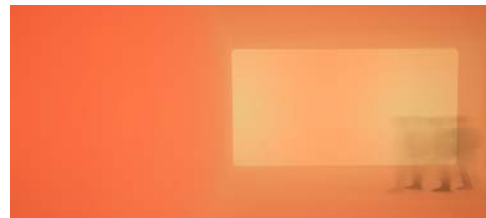
Initial Cost Estimates : \$2.1 million

- ✦ Headset manufacturing \$250K
- ✦ Technology development, testing and manufacturing \$750K
- ✦ Scientific research and creative development \$750K
- ✦ Media, lighting and staging costs \$250 K
- ✦ Publicity \$100K



Downstream Revenues

- ✦ Royalties from licensing technology applications
- ✦ Income from sales of headsets and smartphone app
- ✦ Royalties from book sales and theatre tickets



Timeline : 12-18 months

- ✦ 6 months technology development and scientific framing
- ✦ 6 months scientific and technology testing.
- ✦ First public tests 12 months after funding. Wider release 18 months after funding.

Equipment

- ✦ Headband with sensors that make contact with the user's cranium. The sensors are connected via Bluetooth to a mobile phone with software that amplifies, filters, and digitizes the signals and then sends them to a central computer via the cloud.
- ✦ Software driver that interprets the signals and can be used to drive hardware or devices that are usually controlled with a mouse or keyboard.
- ✦ Headband sensors detect three types of biometric signals: EOG, EMG and EEG , primarily alpha (8 - 12 Hz) and beta (>12 Hz).
- ✦ Algorithms separate the different types of signals and further divide them into distinct frequency bands. Each signal type and frequency band is then used to control a particular software trigger.

Project Pilots



Andrew Newberg M.D.
RESEARCH DIRECTOR

Dr. Andrew Newberg is Director of Research at the Myrna Brind Center for Integrative Medicine at Thomas Jefferson University, an Adjunct Professor of Religious Studies and an Associate Professor of Radiology at the University of Pennsylvania School of Medicine. He is a prominent researcher in the fields of nuclear medical brain imaging and neurotheology. Newberg's research has been featured in *Newsweek*, the *Los Angeles Times*, and the *New Scientist*, and he appeared in the films *What the Bleep Do We Know!?* and *Religulous*. He is the author of six books and many articles, including *The Mystical Mind*, *Why God Won't Go Away*, and *Why We Believe What We Believe*.

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Dave Stringer
ARTISTIC DIRECTOR

Dave Stringer is a Grammy-nominated producer, singer, composer, writer, and teacher who has been widely profiled as one of the most innovative artists of the modern Yoga movement. His work engages the traditions of yoga philosophy, chanting, and meditation with the language and methods of neuroscience, translating them into modern participatory theatre, open to a multiplicity of interpretations and accessible to all. Dave is an articulate and inspiring public speaker, and is featured in the upcoming film *Mantra: Sounds Into Silence*. He has toured extensively, leading concerts, workshops and retreats all over the world.

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Dr. Andrew Junker is the founder of Brain Actuated Technologies. He was previously a research scientist in the Aerospace Medical Research Labs at Wright Patterson Air Force Base in Dayton, OH, and holds a Ph.D. in Electrical Engineering from the University of Connecticut. Junker was also the Director of the Human Factors Engineering Program at Wright State University. He is a noted brain-computer-interface (BCI) expert, has published research papers extensively and is author of key BCI patents. Junker's work has been featured on television shows on PBS, BBC, NBC, and ABC's Good Morning America.

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