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**From:** Ed Boyden, [REDACTED]  
**Sent:** Monday, July 11, 2016 10:07 AM  
**To:** jeffrey E.  
**Subject:** Re:

That is very interesting -- will meditate upon this, this week...

On Sun, Jul 10, 2016 at 1:06 PM, jeffrey E. <jeevacation@gmail.com> wrote:

I would ask you to think about music and melody, I will send you a copy of what I sent to Chomsky. I think the concept of harmonies, inter and intra-actions, of an ensemble of elements is a complex problem. A melody is more than a collection of notes. It has an inter relation based on key, rhythms, and progressions as well as variations on a theme. A series of notes like a series of neuronal firings won't tell much, it needs to be combined into a coherent shape. It is easy for a novice to pick out a wrong note in a melody heard for the first time. A disjointedness. The smooth shapes have spikes that don't belong. It's the ensemble of neurons, firing rates times and interactions that may be able to be mapped, I have no idea, algebraic geometry, algebraic topology, (surfaces rather than shapes), Skype anytime you like.

Today I conducted an experiment encouraged by Noa's wholly justified aggressive and detailed directives to Joshua. Joshua focused on layers being developed in the brain. The timing for the development of each layer being different per species.

I postulate that music might be a frosted window into that structure. Symphonies begin with their first "layer" a theme. In fact, there might be more than one theme in the first layer, the second part of symphonic form is the complex development stage where those themes are inverted, deconstructed, reconstructed, and the development stage takes the most time. In the conclusion of the symphonic form the recapitulation of all that has come before it forms a "phenomenon of the piece" a whole, made up of its smaller concepts. As opposed to listening to music to record which neuron is firing, as most neuroscientists attempt. I propose that the music may be the audible result of those neurons firing, made possible by a select few who would attempt to notate those neuronal firings. Beethoven for example.

The experiment. I mashed all of the four symphonies together, playing recordings of the 3rd 5th 6th 7th all overlaid on each other, playing at the same time. - the way a brain might develop. I expected an ordered noise but to the surprising contrary, IT WAS AMAZING. You can hear new "concepts" forming,

I wonder whether in the mind of a blind child, the "music" would be created even without the visual reference. But created none the less. Later when the visual can be tied to concepts, the anatomy may be hijacked to produce sounds that somehow relate to the concepts.

I tried to mix music from different cultures- it didn't work. African does not work with western Europe, Chinese works with neither of the other two. But within the same cultural music (the brain of the local species) the mash ups are beautiful.

I would note that computers engage in "parallel processing" only in order to take a hard problem and break it into its component parts, working on each component separately, here each problem interacts and the their resolutions interact in remarkable ways.

On Sun, Jul 10, 2016 at 2:52 PM, Ed Boyden, <[REDACTED]>

> wrote:

Want to continue to discuss how we might model brain circuits in mathematically meaningful ways? Sounds like there could be some good synergies here (especially since I'm going to be spending my Fall focused on learning the necessary mathematics, hopefully to the point where I'll have creative new ideas about how we can model the structure and function of the brain, and make a contribution)!

Ed

On Wed, Jun 29, 2016 at 4:34 PM, Ed Boyden, <[REDACTED]>

> wrote:

> Ok, adding you now!

>

> Ed

>

> On Wed, Jun 29, 2016 at 4:33 PM, jeffrey E. <jeevacation@gmail.com <mailto:jeevacation@gmail.com>> wrote: >> tried your phone my skype is jeevacation

>>

>>

>> On Wed, Jun 29, 2016 at 12:24 PM, Ed Boyden, <[REDACTED]>

> <[REDACTED]> wrote:

>>>

>>> Great! Just call me at [REDACTED]

>>>

>>> Ed

>>>

>>> On Wed, Jun 29, 2016 at 12:13 PM, jeffrey E. <jeevacation@gmail.com> wrote:

>>> > as i will be in the car. lets phone instead of skype at 430 if that

>>> > works.

>>> > .

>>> >

>>> > --

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>>> Ed Boyden, Ph. D.  
>>> Leader, Synthetic Neurobiology Group  
>>> Associate Professor, MIT Media Lab and McGovern Institute,  
>>> Departments of Biological Engineering and Brain and Cognitive Sciences  
>>> Co-Director, MIT Center for Neurobiological Engineering  
>>> New York Stem Cell Foundation-Robertson Investigator  
>>> Massachusetts Institute of Technology



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> --  
> Ed Boyden, Ph. D.  
> Leader, Synthetic Neurobiology Group  
> Associate Professor, MIT Media Lab and McGovern Institute,  
> Departments of Biological Engineering and Brain and Cognitive Sciences  
> Co-Director, MIT Center for Neurobiological Engineering  
> New York Stem Cell Foundation-Robertson Investigator  
> Massachusetts Institute of Technology



--

Ed Boyden, Ph. D.

Leader, Synthetic Neurobiology Group

Associate Professor, MIT Media Lab and McGovern Institute,

Departments of Biological Engineering and Brain and Cognitive Sciences

Co-Director, MIT Center for Neurobiological Engineering

New York Stem Cell Foundation-Robertson Investigator

Massachusetts Institute of Technology

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Ed Boyden, Ph. D. Leader, Synthetic Neurobiology Group Associate Professor, MIT Media Lab and McGovern Institute,  
Departments of Biological Engineering and Brain and Cognitive Sciences Co-Director, MIT Center for Neurobiological  
Engineering New York Stem Cell Foundation-Robertson Investigator Massachusetts Institute of Technology Building

