

1
00:00:00,079 --> 00:00:06,419
so most of the time you end up with the

2
00:00:03,689 --> 00:00:08,849
meat of the talk at the end when there's

3
00:00:06,419 --> 00:00:11,189
no time left so I put at the beginning

4
00:00:08,849 --> 00:00:15,480
so you got time to digest a little bit

5
00:00:11,189 --> 00:00:17,129
and essentially here there's a couple of

6
00:00:15,480 --> 00:00:20,039
terms that you may not be familiar with

7
00:00:17,129 --> 00:00:22,320
the quantum nesting of rhythms being one

8
00:00:20,039 --> 00:00:24,118
of them during the talk you may want to

9
00:00:22,320 --> 00:00:26,910
pay attention to things about cross

10
00:00:24,118 --> 00:00:29,428
spectral correlation and nesting of

11
00:00:26,910 --> 00:00:33,530
rhythms because this is a key portion of

12
00:00:29,428 --> 00:00:36,539
the model and it also suggests that

13
00:00:33,530 --> 00:00:39,210
there are two entities one being the

14
00:00:36,539 --> 00:00:42,000
mind one being what we typically think

15
00:00:39,210 --> 00:00:44,910
of as the brain and the neural aspect of

16
00:00:42,000 --> 00:00:46,950
the brain and the consciousness here is

17
00:00:44,909 --> 00:00:53,549
an emergent property as opposed to an

18
00:00:46,950 --> 00:00:57,230
entity unto itself and here i will be

19
00:00:53,549 --> 00:01:01,108
using the term the mind for things like

20
00:00:57,229 --> 00:01:05,039
intention attention motivation covert

21
00:01:01,109 --> 00:01:09,629
states not externally behaviorally

22
00:01:05,040 --> 00:01:13,670
observable and these in neurology which

23
00:01:09,629 --> 00:01:17,368
is where i come from basically have a

24
00:01:13,670 --> 00:01:20,570
rich history of being monitored the

25
00:01:17,368 --> 00:01:24,000
ability to intend or attend or

26
00:01:20,569 --> 00:01:27,209
motivational aspects and perceptual set

27
00:01:24,000 --> 00:01:30,978
can all be identified as direct current

28
00:01:27,209 --> 00:01:33,298
field potentials within the the EEG

29

00:01:30,978 --> 00:01:35,908
classically you can go back to the

30
00:01:33,299 --> 00:01:38,189
literature the term right shafts

31
00:01:35,909 --> 00:01:41,280
potential is associated with the

32
00:01:38,188 --> 00:01:43,349
intention to move will show you some

33
00:01:41,280 --> 00:01:47,790
data on this as opposed to just talking

34
00:01:43,349 --> 00:01:50,489
and when we talk about the brain the

35
00:01:47,790 --> 00:01:52,350
neuro brain here I'm going to

36
00:01:50,489 --> 00:01:54,289
specifically refer to neural networks

37
00:01:52,349 --> 00:01:58,589
because that's how the brain works in

38
00:01:54,290 --> 00:02:03,030
distributed networks and here gamma is

39
00:01:58,590 --> 00:02:03,900
an eg frequency that emerges from bound

40
00:02:03,030 --> 00:02:08,280
network

41
00:02:03,900 --> 00:02:12,360
so the gist of the model is that when

42
00:02:08,280 --> 00:02:15,319
the mind which is glial and the neural

43
00:02:12,360 --> 00:02:18,180

networks which you can see as gamma

44

00:02:15,319 --> 00:02:20,549

interact consciousness is the emergent

45

00:02:18,180 --> 00:02:25,230

property now you may think that this is

46

00:02:20,550 --> 00:02:29,640

a wild leap of faith to even discuss

47

00:02:25,229 --> 00:02:32,969

however you'll notice that there's the

48

00:02:29,639 --> 00:02:36,179

FDA that has actually approved a medical

49

00:02:32,969 --> 00:02:38,669

device that's been used for well over a

50

00:02:36,180 --> 00:02:41,270

decade now called the by spectral

51

00:02:38,669 --> 00:02:45,089

monitor that's used to titrate

52

00:02:41,270 --> 00:02:47,580

anesthesia in as of five years ago they

53

00:02:45,090 --> 00:02:50,129

had done over 9 million surgeries where

54

00:02:47,580 --> 00:02:52,590

the anaesthetic was titrated based on

55

00:02:50,129 --> 00:02:54,990

the relationship between DC field

56

00:02:52,590 --> 00:02:57,539

potentials and gamma that's the secret

57

00:02:54,990 --> 00:03:01,140

formula within their little patented box

58
00:02:57,539 --> 00:03:02,579
that you get a little dumb down box it

59
00:03:01,139 --> 00:03:05,189
gives you a number from zero to a

60
00:03:02,580 --> 00:03:06,840
hundred they and you hover them in the

61
00:03:05,189 --> 00:03:09,719
right range and and you have a good

62
00:03:06,840 --> 00:03:13,289
surgical outcome so this this isn't

63
00:03:09,719 --> 00:03:18,449
radical or a wild theory it's actually

64
00:03:13,289 --> 00:03:22,319
the heart of a medical device and when I

65
00:03:18,449 --> 00:03:25,409
talk about gulia being the source of DC

66
00:03:22,319 --> 00:03:30,209
field potentials and gamma emerging from

67
00:03:25,409 --> 00:03:32,069
bound networks this is not my opinion

68
00:03:30,209 --> 00:03:33,810
this is actually the position paper of

69
00:03:32,069 --> 00:03:36,620
the International Federation of clinical

70
00:03:33,810 --> 00:03:39,569
neurophysiology so this isn't a wild

71
00:03:36,620 --> 00:03:42,629
statement either but very well

72
00:03:39,569 --> 00:03:44,549
documented the position paper on EEG

73
00:03:42,629 --> 00:03:48,629
generators was published in nineteen

74
00:03:44,550 --> 00:03:51,900
ninety by a large group headed by stereo

75
00:03:48,629 --> 00:03:53,340
tea who unfortunately has passed but

76
00:03:51,900 --> 00:03:56,969
they haven't reinvented the brain since

77
00:03:53,340 --> 00:04:01,739
1990 so luckily the position paper still

78
00:03:56,969 --> 00:04:04,099
appears to be fairly valid so the DC

79
00:04:01,739 --> 00:04:10,709
field potentials literally can modulate

80
00:04:04,099 --> 00:04:14,608
neural networks you actually can turn on

81
00:04:10,709 --> 00:04:16,040
or off brain areas using the DC field

82
00:04:14,609 --> 00:04:18,490
potentials

83
00:04:16,040 --> 00:04:22,250
the direct current field potentials

84
00:04:18,490 --> 00:04:24,290
control the AC EEG the alternating

85
00:04:22,250 --> 00:04:27,050
currents that you see as the EEG the

86

00:04:24,290 --> 00:04:29,450
oscillatory patterns that we print out

87
00:04:27,050 --> 00:04:32,030
on paper when we still killed trees to

88
00:04:29,449 --> 00:04:33,949
do eeges and now it's all digital and

89
00:04:32,029 --> 00:04:36,519
we don't put it on paper typically

90
00:04:33,949 --> 00:04:38,959
unless somebody needs a report and

91
00:04:36,519 --> 00:04:40,490
voluntary control over these direct

92
00:04:38,959 --> 00:04:43,279
current field potentials is well

93
00:04:40,490 --> 00:04:46,069
established you can do neurofeedback

94
00:04:43,279 --> 00:04:48,469
which can be seen as slow cortical

95
00:04:46,069 --> 00:04:53,089
potential training this has been done

96
00:04:48,470 --> 00:04:55,970
since the early 1970s in Europe

97
00:04:53,089 --> 00:04:57,709
typically the United States most of the

98
00:04:55,970 --> 00:04:59,750
neurofeedback people threw away the slow

99
00:04:57,709 --> 00:05:01,250
cortical potentials as an artifact and

100
00:04:59,750 --> 00:05:03,290

in Europe they threw away the

101

00:05:01,250 --> 00:05:05,629

alternating current EEG is an artifact

102

00:05:03,290 --> 00:05:07,069

so and until you actually get both of

103

00:05:05,629 --> 00:05:11,439

those together you don't really see how

104

00:05:07,069 --> 00:05:14,599

the brain works to create consciousness

105

00:05:11,439 --> 00:05:17,389

yoga and that type of an approach

106

00:05:14,600 --> 00:05:21,830

literally can give you voluntary control

107

00:05:17,389 --> 00:05:23,899

over the DC field potentials and I I've

108

00:05:21,829 --> 00:05:28,759

actually published in a MEDLINE listed

109

00:05:23,899 --> 00:05:30,409

journal yogi from Japan who came over

110

00:05:28,759 --> 00:05:33,889

and stuck skewers through his neck and

111

00:05:30,410 --> 00:05:35,990

his tongue experiencing no pain and I

112

00:05:33,889 --> 00:05:37,939

identified the mechanism of turning off

113

00:05:35,990 --> 00:05:40,220

the somatosensory strip using the direct

114

00:05:37,939 --> 00:05:43,459

current field potentials as the trick

115
00:05:40,220 --> 00:05:47,930
that he had learned through decades and

116
00:05:43,459 --> 00:05:50,539
decades and decades of practice and he's

117
00:05:47,930 --> 00:05:53,660
quite good at it it's not a fakir who

118
00:05:50,540 --> 00:05:56,840
does sticks all the time he does this on

119
00:05:53,660 --> 00:05:59,720
rare occasion and I actually show you a

120
00:05:56,839 --> 00:06:01,159
little bit of that and this isn't some

121
00:05:59,720 --> 00:06:04,880
esoteric thing that requires

122
00:06:01,160 --> 00:06:07,880
neurofeedback or extensive yoga training

123
00:06:04,879 --> 00:06:10,459
in order to do when you simply shift

124
00:06:07,879 --> 00:06:13,610
your attention you literally are

125
00:06:10,459 --> 00:06:16,009
shifting your DC field potentials when

126
00:06:13,610 --> 00:06:19,040
you pay attention to your feet and then

127
00:06:16,009 --> 00:06:21,230
your hands and then your face you can

128
00:06:19,040 --> 00:06:24,260
literally track the DC field potentials

129
00:06:21,230 --> 00:06:26,360
from the location the homunculus the

130
00:06:24,259 --> 00:06:29,629
somatosensory strip from the feet to the

131
00:06:26,360 --> 00:06:32,150
hand to the face and I'll show you

132
00:06:29,629 --> 00:06:35,769
a small example of that as well and then

133
00:06:32,149 --> 00:06:38,989
you can also control these exogenously

134
00:06:35,769 --> 00:06:42,049
DC field potentials can be manipulated

135
00:06:38,990 --> 00:06:43,400
using a variety of techniques one of

136
00:06:42,050 --> 00:06:45,800
them that works very nicely as

137
00:06:43,399 --> 00:06:48,799
transcranial direct current stimulation

138
00:06:45,800 --> 00:06:51,199
you can take a 3 volt battery and a

139
00:06:48,800 --> 00:06:52,970
couple of wires and literally modulate

140
00:06:51,199 --> 00:06:56,120
the brain function under the appropriate

141
00:06:52,970 --> 00:06:58,640
electrodes the anode will increase brain

142
00:06:56,120 --> 00:07:00,590
activity it modulates an increase or

143

00:06:58,639 --> 00:07:04,159
decrease of about forty percent in the

144
00:07:00,589 --> 00:07:07,239
the cortical function and essentially

145
00:07:04,160 --> 00:07:10,850
this is shifting the basal membrane DC

146
00:07:07,240 --> 00:07:13,189
negativity and as you enhance the amount

147
00:07:10,850 --> 00:07:16,220
of negativity if you put the anode which

148
00:07:13,189 --> 00:07:18,139
is the + electrode above an area you're

149
00:07:16,220 --> 00:07:20,570
literally increasing the negativity of

150
00:07:18,139 --> 00:07:22,879
the basal membrane and turning on that

151
00:07:20,569 --> 00:07:27,110
brain area enhancing the amount of gamma

152
00:07:22,879 --> 00:07:28,490
and beta content in the area I told you

153
00:07:27,110 --> 00:07:32,150
I'd show you something with attentional

154
00:07:28,490 --> 00:07:35,389
shifts here we we actually have an

155
00:07:32,149 --> 00:07:37,489
example of somebody staring at a dot but

156
00:07:35,389 --> 00:07:39,979
paying attention with the flashlight as

157
00:07:37,490 --> 00:07:42,379

they say of attention to the left

158

00:07:39,980 --> 00:07:43,430

hemifield in the right side of the back

159

00:07:42,379 --> 00:07:46,250

of the head lights up with

160

00:07:43,430 --> 00:07:48,319

electronegativity if you then don't move

161

00:07:46,250 --> 00:07:50,149

the eyes you keep focusing on the dot

162

00:07:48,319 --> 00:07:52,610

but you shift your attention to the

163

00:07:50,149 --> 00:07:53,689

right side it lights up the left side of

164

00:07:52,610 --> 00:07:56,060

the back your head with more

165

00:07:53,689 --> 00:07:58,370

electronegativity so simply shifting

166

00:07:56,060 --> 00:08:00,139

attention but folk keeping your visual

167

00:07:58,370 --> 00:08:01,879

focus on an area but shifting your

168

00:08:00,139 --> 00:08:03,949

attention from one hemifield to the

169

00:08:01,879 --> 00:08:06,500

other can shift the DC negative

170

00:08:03,949 --> 00:08:11,360

potentials within the brain in a very

171

00:08:06,500 --> 00:08:16,250

dramatic dynamic fashion this is calico

172
00:08:11,360 --> 00:08:17,930
me whose Kundalini Yoga expert he's got

173
00:08:16,250 --> 00:08:21,649
a big school of people in Japan that

174
00:08:17,930 --> 00:08:23,449
follow him this was actually him on

175
00:08:21,649 --> 00:08:26,329
stage with his physiology being

176
00:08:23,449 --> 00:08:29,409
projected onto the wall behind him as he

177
00:08:26,329 --> 00:08:32,299
skewered his neck through an out-and-out

178
00:08:29,410 --> 00:08:34,700
kind of up with a barbecue skewer this

179
00:08:32,299 --> 00:08:36,839
was not a sharpened instrument and and

180
00:08:34,700 --> 00:08:39,690
although people who are going

181
00:08:36,840 --> 00:08:41,700
you know when I present this at a

182
00:08:39,690 --> 00:08:43,200
university usually they go yeah well

183
00:08:41,700 --> 00:08:46,140
pierced something important and then

184
00:08:43,200 --> 00:08:47,610
we'll get attention you know so so this

185
00:08:46,139 --> 00:08:49,799
this is really not that dramatic two

186
00:08:47,610 --> 00:08:51,240
younger folks but I can seize people in

187
00:08:49,799 --> 00:08:56,399
the audience you're squirming a little

188
00:08:51,240 --> 00:08:58,860
bit so this is culturally less

189
00:08:56,399 --> 00:09:01,110
appropriate for this grouping and some

190
00:08:58,860 --> 00:09:05,129
at the University where piercings are

191
00:09:01,110 --> 00:09:09,029
not at all uncommon and the this was

192
00:09:05,129 --> 00:09:11,250
actually in hasselt Belgium and the

193
00:09:09,029 --> 00:09:13,049
press was there and they want to make

194
00:09:11,250 --> 00:09:14,669
sure he didn't have a pre pierced tone

195
00:09:13,049 --> 00:09:17,309
so he pulled his tongue out and they

196
00:09:14,669 --> 00:09:19,769
they looked for prior pierce marks and

197
00:09:17,309 --> 00:09:21,869
so forth and it was wasn't there wag his

198
00:09:19,769 --> 00:09:25,319
tongue at the camera you know is really

199
00:09:21,870 --> 00:09:27,690
quite a joker and literally his trick is

200

00:09:25,320 --> 00:09:29,550
to drop the DC negativity towards

201
00:09:27,690 --> 00:09:32,850
electropositive turning off the

202
00:09:29,549 --> 00:09:34,939
alternating current EEG and at that

203
00:09:32,850 --> 00:09:37,769
point he does the stick turns the

204
00:09:34,940 --> 00:09:39,840
somatosensory strip back on because once

205
00:09:37,769 --> 00:09:43,049
it's stuck in it doesn't hurt and he can

206
00:09:39,840 --> 00:09:44,730
sit there and and on stage demonstrate

207
00:09:43,049 --> 00:09:46,709
the fact that he actually had no

208
00:09:44,730 --> 00:09:49,740
experience of pain no change in muscle

209
00:09:46,710 --> 00:09:51,780
tension no electrodermal activity which

210
00:09:49,740 --> 00:09:54,000
electrodermal activity if you you're

211
00:09:51,779 --> 00:09:56,399
familiar with that if you clap your hand

212
00:09:54,000 --> 00:09:57,990
next to somebody or ask them to think

213
00:09:56,399 --> 00:10:01,939
about their girlfriend or something

214
00:09:57,990 --> 00:10:01,940

about two seconds later you see this big