WEBVTT

NOTE duration:"00:13:51"

NOTE recognizability:0.806

NOTE language:en-us

NOTE Confidence: 0.888837601111111

00:00:00.000 --> 00:00:04.002 We're now going to hear three

NOTE Confidence: 0.888837601111111

00:00:04.002 --> 00:00:06.382 exciting short presentations that

NOTE Confidence: 0.888837601111111

00:00:06.382 --> 00:00:09.358 are from the what was one of our

NOTE Confidence: 0.888837601111111

00:00:09.358 --> 00:00:12.668 main research modules that highlight

NOTE Confidence: 0.888837601111111

00:00:12.668 --> 00:00:15.508 Yale strengths and neuroimaging,

NOTE Confidence: 0.888837601111111

00:00:15.510 --> 00:00:17.795 which is for which Yale

NOTE Confidence: 0.888837601111111

00:00:17.795 --> 00:00:19.166 is known internationally.

NOTE Confidence: 0.888837601111111

00:00:19.170 --> 00:00:20.958 So our first presenter

NOTE Confidence: 0.908258335

00:00:21.170 --> 00:00:22.878 is Doctor Todd Constable,

NOTE Confidence: 0.8520293375

00:00:23.190 --> 00:00:26.352 who is Vice chair of Radiology

NOTE Confidence: 0.8520293375

00:00:26.352 --> 00:00:29.390 and and heads component of the

NOTE Confidence: 0.8520293375

00:00:29.390 --> 00:00:31.568 MRI Center. So Todd, please.

NOTE Confidence: 0.92318325

00:00:36.580 --> 00:00:37.270 Thank you John.

NOTE Confidence: 0.898966625

00:00:39.750 --> 00:00:42.446 I don't have it explicitly in my slides,

NOTE Confidence: 0.898966625

00:00:42.450 --> 00:00:44.538 but thank you to the Reverend and Tisha

NOTE Confidence: 0.898966625

00:00:44.538 --> 00:00:46.910 for that insight about the master program.

NOTE Confidence: 0.898966625

00:00:46.910 --> 00:00:51.575 I will touch on a few places where we've

NOTE Confidence: 0.898966625

00:00:51.575 --> 00:00:55.963 benefited by having a more diverse study

NOTE Confidence: 0.898966625

00:00:55.963 --> 00:00:58.306 sample and it's it's super important

NOTE Confidence: 0.898966625

00:00:58.306 --> 00:01:00.571 we going to talk about a paper briefly

NOTE Confidence: 0.898966625

00:01:00.571 --> 00:01:02.643 that we have under review at Nature

NOTE Confidence: 0.898966625

00:01:02.643 --> 00:01:04.824 where we point out that the brain shows.

NOTE Confidence: 0.814567625714286

00:01:07.610 --> 00:01:11.720 We have evidence from our analysis

NOTE Confidence: 0.814567625714286

00:01:11.720 --> 00:01:15.390 that when cognitive tasks were not

NOTE Confidence: 0.814567625714286

00:01:15.390 --> 00:01:17.774 designed for diverse populations,

NOTE Confidence: 0.814567625714286

00:01:17.780 --> 00:01:18.935 we can actually see that

NOTE Confidence: 0.814567625714286

00:01:18.935 --> 00:01:20.090 in the brain imaging data,

NOTE Confidence: 0.814567625714286

00:01:20.090 --> 00:01:23.146 so we can reveal some of these flaws

NOTE Confidence: 0.814567625714286

00:01:23.146 --> 00:01:26.600 and imaging studies as a result of

NOTE Confidence: 0.814567625714286

00:01:26.600 --> 00:01:29.846 not having the correct cognitive,

NOTE Confidence: 0.814567625714286

00:01:29.846 --> 00:01:31.737 culturally sensitive measures.

NOTE Confidence: 0.814567625714286

00:01:31.737 --> 00:01:33.672 So I'm representing both the

NOTE Confidence: 0.814567625714286

00:01:33.672 --> 00:01:35.560 pet center and the MRI.

NOTE Confidence: 0.814567625714286

00:01:35.560 --> 00:01:37.230 Center within the MRI center.

NOTE Confidence: 0.814567625714286

00:01:37.230 --> 00:01:38.590 I direct the MRI program.

NOTE Confidence: 0.814567625714286

00:01:38.590 --> 00:01:40.345 Doug Rothman directs the Mrs

NOTE Confidence: 0.814567625714286

00:01:40.345 --> 00:01:42.100 program and Rich Carson directs

NOTE Confidence: 0.814567625714286

00:01:42.165 --> 00:01:44.037 the pet program the MRI centers.

NOTE Confidence: 0.814567625714286

00:01:44.040 --> 00:01:46.270 Here in this annelyn center,

NOTE Confidence: 0.814567625714286

00:01:46.270 --> 00:01:49.412 and we've been in there since 2003.

NOTE Confidence: 0.814567625714286

00:01:49.412 --> 00:01:52.538 What am I?

NOTE Confidence: 0.814567625714286

00:01:52.540 --> 00:01:53.335 There we go.

NOTE Confidence: 0.814567625714286

00:01:53.335 --> 00:01:54.925 So within the MRI center I'll

NOTE Confidence: 0.814567625714286

00:01:54.925 --> 00:01:56.489 I'll talk about each group,

NOTE Confidence: 0.814567625714286

00:01:56.490 --> 00:01:58.149 kind of separately within the MRI center.

NOTE Confidence: 0.814567625714286

00:01:58.150 --> 00:01:59.806 We have 3 Siemens Prisma scanners.

NOTE Confidence: 0.814567625714286

00:01:59.810 --> 00:02:01.802 They do a lot mostly F MRI but

NOTE Confidence: 0.814567625714286

00:02:01.802 --> 00:02:04.007 they do a lot of other stuff too.

NOTE Confidence: 0.814567625714286

00:02:04.010 --> 00:02:06.936 We just recently acquired a 3T wide,

NOTE Confidence: 0.814567625714286

00:02:06.940 --> 00:02:08.680 Boris Siemens and this will really

NOTE Confidence: 0.814567625714286

00:02:08.680 --> 00:02:10.664 help people in an internal medicine

NOTE Confidence: 0.814567625714286

00:02:10.664 --> 00:02:12.574 who are doing obesity studies.

NOTE Confidence: 0.814567625714286

00:02:12.580 --> 00:02:14.892 And we also have a 4T Brooker system

NOTE Confidence: 0.814567625714286

00:02:14.892 --> 00:02:17.209 for Mr spectroscopy studies we have

NOTE Confidence: 0.814567625714286

00:02:17.209 --> 00:02:20.135 three what we call animal magnets for

NOTE Confidence: 0.814567625714286

00:02:20.135 --> 00:02:22.581 preclinical work at 14 nine point 411.7.

NOTE Confidence: 0.814567625714286

00:02:22.581 --> 00:02:24.136 Tesla and these higher field

NOTE Confidence: 0.814567625714286

00:02:24.136 --> 00:02:26.330 strains that allow us to go to

NOTE Confidence: 0.814567625714286

00:02:26.330 --> 00:02:27.514 higher and higher resolution,

NOTE Confidence: 0.814567625714286

00:02:27.520 --> 00:02:28.584 particularly important when imaging

NOTE Confidence: 0.814567625714286

00:02:28.584 --> 00:02:30.480 a really tiny brain like a mouse,

NOTE Confidence: 0.814567625714286

00:02:30.480 --> 00:02:33.048 brain, and so in.

NOTE Confidence: 0.814567625714286

00:02:33.048 --> 00:02:34.632 These preclinical models we've

NOTE Confidence: 0.814567625714286

00:02:34.632 --> 00:02:36.420 also developed in conjunction

NOTE Confidence: 0.814567625714286

00:02:36.420 --> 00:02:38.516 with folks in neuroscience,

NOTE Confidence: 0.814567625714286

00:02:38.520 --> 00:02:39.442 optical imaging,

NOTE Confidence: 0.814567625714286

00:02:39.442 --> 00:02:42.208 so we can do simultaneous kind

NOTE Confidence: 0.814567625714286

00:02:42.208 --> 00:02:44.080 of mesoscopic optical imaging

NOTE Confidence: 0.814567625714286

00:02:44.080 --> 00:02:46.642 and MRI within the MRI center.

NOTE Confidence: 0.814567625714286

00:02:46.642 --> 00:02:49.180 We have all the computing infrastructure,

NOTE Confidence: 0.814567625714286

00:02:49.180 --> 00:02:52.216 data transfer and support mechanisms needed,

NOTE Confidence: 0.814567625714286

00:02:52.220 --> 00:02:54.208 and so we think we have a.

NOTE Confidence: 0.814567625714286

00:02:54.210 --> 00:02:56.338 A system and a set up such that

NOTE Confidence: 0.814567625714286

00:02:56.338 --> 00:02:58.087 people that want to incorporate

NOTE Confidence: 0.814567625714286

00:02:58.087 --> 00:03:00.007 imaging into their research should

NOTE Confidence: 0.814567625714286

00:03:00.007 --> 00:03:02.510 be able to thrive specifically now,

NOTE Confidence: 0.814567625714286

00:03:02.510 --> 00:03:05.710 under Doug Rothman's direction there,

NOTE Confidence: 0.814567625714286

00:03:05.710 --> 00:03:08.122 there's a very active Mr Spectroscopy

NOTE Confidence: 0.814567625714286

00:03:08.122 --> 00:03:11.095 program where there are 10 faculty and

NOTE Confidence: 0.814567625714286

00:03:11.095 --> 00:03:13.687 research scientists who develop new methods,

NOTE Confidence: 0.814567625714286

00:03:13.690 --> 00:03:16.826 and I'm going to highlight a couple of

NOTE Confidence: 0.814567625714286

00:03:16.826 --> 00:03:18.837 recent developments that are important

NOTE Confidence: 0.814567625714286

00:03:18.837 --> 00:03:21.810 and other people are starting to adapt in.

NOTE Confidence: 0.814567625714286

00:03:21.810 --> 00:03:23.746 In all of these centers in the MRI,

NOTE Confidence: 0.814567625714286

00:03:23.750 --> 00:03:24.450 the Mrs.

NOTE Confidence: 0.814567625714286

00:03:24.450 --> 00:03:25.850 And the pet center.

NOTE Confidence: 0.814567625714286

00:03:25.850 --> 00:03:28.130 We develop new tools and then

NOTE Confidence: 0.814567625714286

00:03:28.130 --> 00:03:30.941 we we have outreach to look for

NOTE Confidence: 0.814567625714286

00:03:30.941 --> 00:03:33.199 clinicians and scientists to apply

NOTE Confidence: 0.814567625714286

00:03:33.199 --> 00:03:35.614 those tools to clinical populations,

NOTE Confidence: 0.814567625714286

00:03:35.620 --> 00:03:37.350 which is our ultimate goal.

NOTE Confidence: 0.814567625714286

00:03:37.350 --> 00:03:39.690 So in the Mrs Group.

NOTE Confidence: 0.814567625714286

00:03:39.690 --> 00:03:41.608 They mostly do their work at 4T

NOTE Confidence: 0.814567625714286

00:03:41.608 --> 00:03:43.810 on the the human broker system.

NOTE Confidence: 0.814567625714286

00:03:43.810 --> 00:03:45.586 There's also some preclinical work done,

NOTE Confidence: 0.814567625714286

00:03:45.590 --> 00:03:47.886 but right now we're in the process

NOTE Confidence: 0.814567625714286

00:03:47.886 --> 00:03:49.864 of translating some of those things

NOTE Confidence: 0.814567625714286

00:03:49.864 --> 00:03:51.724 to the more common 3T systems,

NOTE Confidence: 0.814567625714286

00:03:51.730 --> 00:03:52.980 which we actually have both

NOTE Confidence: 0.814567625714286

00:03:52.980 --> 00:03:54.610 clinically and in the MRI center,

NOTE Confidence: 0.814567625714286

00:03:54.610 --> 00:03:57.370 and so those that will make some of

NOTE Confidence: 0.814567625714286

00:03:57.370 --> 00:03:59.630 these spectroscopic methods more accessible.

NOTE Confidence: 0.814567625714286

00:03:59.630 --> 00:04:01.886 The Doug's lab has a metabolic

NOTE Confidence: 0.814567625714286

00:04:01.886 --> 00:04:04.075 modeling core and a biochemistry

NOTE Confidence: 0.814567625714286

00:04:04.075 --> 00:04:07.085 core for tissue sample preparation.

NOTE Confidence: 0.814567625714286

00:04:07.090 --> 00:04:08.908 Here's 3 examples of kind of

NOTE Confidence: 0.814567625714286

00:04:08.908 --> 00:04:10.120 innovative work that's been.

NOTE Confidence: 0.814567625714286

00:04:10.120 --> 00:04:13.438 Under under way for some time now

NOTE Confidence: 0.814567625714286

00:04:13.438 --> 00:04:15.889 in Proton spectroscopy you can

NOTE Confidence: 0.814567625714286

00:04:15.889 --> 00:04:18.244 do a motor cortex spectroscopy.

NOTE Confidence: 0.814567625714286

00:04:18.250 --> 00:04:22.128 Let's say from this region here or

NOTE Confidence: 0.81630911225

00:04:22.130 --> 00:04:24.794 posterior cingulate, and you can get

NOTE Confidence: 0.81630911225

00:04:24.794 --> 00:04:27.373 the proton Spectra and from editing

NOTE Confidence: 0.81630911225

00:04:27.373 --> 00:04:30.306 that you can get quantifiable measures

NOTE Confidence: 0.81630911225

00:04:30.306 --> 00:04:33.996 of lactate, glutamate and GABA.

NOTE Confidence: 0.81630911225

00:04:34.000 --> 00:04:37.060 And by doing this you can really look at the

NOTE Confidence: 0.81630911225

00:04:37.130 --> 00:04:40.190 metabolic consequences of activation and or.

NOTE Confidence: 0.81630911225

00:04:40.190 --> 00:04:42.028 Just you know, even brain, resting state,

NOTE Confidence: 0.81630911225

00:04:42.028 --> 00:04:44.576 and so this provides sort of quantitative

NOTE Confidence: 0.81630911225

00:04:44.576 --> 00:04:46.294 insight into the local biochemistry

NOTE Confidence: 0.81630911225

00:04:46.294 --> 00:04:48.238 that's going on in the brain.

NOTE Confidence: 0.81630911225

00:04:48.240 --> 00:04:50.924 You can do this dynamically, so there's C.

NOTE Confidence: 0.81630911225

00:04:50.924 --> 00:04:52.556 13 and fusion studies.

NOTE Confidence: 0.81630911225

00:04:52.560 --> 00:04:54.184 These are almost analogous

NOTE Confidence: 0.81630911225

00:04:54.184 --> 00:04:56.620 to FDG pet in some ways,

NOTE Confidence: 0.81630911225

00:04:56.620 --> 00:04:58.204 and that you can look at

NOTE Confidence: 0.81630911225

00:04:58.204 --> 00:04:59.260 the uptake of glucose.

NOTE Confidence: 0.81630911225

00:04:59.260 --> 00:05:01.180 You can measure glutamate

NOTE Confidence: 0.81630911225

00:05:01.180 --> 00:05:02.620 and glutamine quantitatively,

NOTE Confidence: 0.81630911225

00:05:02.620 --> 00:05:04.965 and here's a study where they're looking

NOTE Confidence: 0.81630911225

00:05:04.965 --> 00:05:07.560 at the effects of ketamine on the brain

NOTE Confidence: 0.81630911225

00:05:07.560 --> 00:05:09.884 and how that changes compared to a placebo,

NOTE Confidence: 0.81630911225

00:05:09.884 --> 00:05:10.436 and also.

NOTE Confidence: 0.81630911225

00:05:10.440 --> 00:05:12.624 How that changes as a function of

NOTE Confidence: 0.81630911225

00:05:12.624 --> 00:05:14.463 dose here and finally something

NOTE Confidence: 0.81630911225

00:05:14.463 --> 00:05:16.971 that's having a large impact is

NOTE Confidence: 0.81630911225

00:05:16.971 --> 00:05:19.266 again looking at the sorry this is.

NOTE Confidence: 0.81630911225

00:05:19.270 --> 00:05:22.784 This is also analogous to FDG PEN,

NOTE Confidence: 0.81630911225

00:05:22.790 --> 00:05:26.339 but you can do this with deuterium

NOTE Confidence: 0.81630911225

00:05:26.339 --> 00:05:28.796 NMR and this is the looking at the

NOTE Confidence: 0.81630911225

00:05:28.796 --> 00:05:30.604 Warburg effect in cancer and that's

NOTE Confidence: 0.81630911225

00:05:30.604 --> 00:05:34.818 the process where there's active.

NOTE Confidence: 0.81630911225

00:05:34.820 --> 00:05:37.977 Glucose metabolism in in the tumor region,

NOTE Confidence: 0.81630911225

00:05:37.980 --> 00:05:39.642 but it produces excess lactate and

NOTE Confidence: 0.81630911225

00:05:39.642 --> 00:05:41.650 they can directly get an image of this

NOTE Confidence: 0.81630911225

00:05:41.650 --> 00:05:43.282 lactate and you can see it provides

NOTE Confidence: 0.81630911225

00:05:43.282 --> 00:05:45.094 slightly different contrast to what you

NOTE Confidence: 0.81630911225

00:05:45.094 --> 00:05:48.328 would get in a conventional anatomic Mr.

NOTE Confidence: 0.81630911225

00:05:48.328 --> 00:05:48.910 Image,

NOTE Confidence: 0.81630911225

00:05:48.910 --> 00:05:50.686 and Zachary Corbin is going to

NOTE Confidence: 0.81630911225

00:05:50.686 --> 00:05:52.479 discuss this in detail in the

NOTE Confidence: 0.81630911225

00:05:52.479 --> 00:05:53.839 third talk in this session.

NOTE Confidence: 0.793663333333333

00:05:55.900 --> 00:05:57.598 Moving on to the MRI resources,

NOTE Confidence: 0.793663333333333

00:05:57.600 --> 00:05:58.938 that's the part that I direct.

NOTE Confidence: 0.793663333333333

00:05:58.940 --> 00:06:01.845 We have programs in cardiac Mr real

NOTE Confidence: 0.793663333333333

00:06:01.845 --> 00:06:03.772 time feedback, cancer imaging,

NOTE Confidence: 0.793663333333333

00:06:03.772 --> 00:06:05.956 preclinical imaging and hardware

NOTE Confidence: 0.793663333333333

00:06:05.956 --> 00:06:08.140 and engineering development and

NOTE Confidence: 0.793663333333333

00:06:08.216 --> 00:06:10.554 just onto a back to the reverends

NOTE Confidence: 0.793663333333333

00:06:10.554 --> 00:06:12.474 and and tisha's comments in

NOTE Confidence: 0.793663333333333

00:06:12.474 --> 00:06:13.650 terms of Community development,

NOTE Confidence: 0.793663333333333

00:06:13.650 --> 00:06:14.742 one of the hard I'm not going

NOTE Confidence: 0.793663333333333

00:06:14.742 --> 00:06:15.539 to talk about it here,

NOTE Confidence: 0.793663333333333

00:06:15.540 --> 00:06:17.742 but one of the hardware engineering

NOTE Confidence: 0.793663333333333

00:06:17.742 --> 00:06:19.842 things that we're working on is

NOTE Confidence: 0.793663333333333

00:06:19.842 --> 00:06:21.540 developing low cost MRI scans that

NOTE Confidence: 0.793663333333333

00:06:21.540 --> 00:06:23.643 can be MRI scanners that can be

NOTE Confidence: 0.793663333333333

00:06:23.643 --> 00:06:25.648 put in the Community and used.

NOTE Confidence: 0.793663333333333

00:06:25.648 --> 00:06:28.816 Much more made, much more accessible,

NOTE Confidence: 0.793663333333333

00:06:28.820 --> 00:06:31.195 and that's kind of analogous

NOTE Confidence: 0.793663333333333

00:06:31.195 --> 00:06:33.570 to how ultrasound is used.

NOTE Confidence: 0.793663333333333

00:06:33.570 --> 00:06:35.705 80% of the world right now doesn't

NOTE Confidence: 0.793663333333333

00:06:35.705 --> 00:06:37.069 actually have access to MRI,

NOTE Confidence: 0.793663333333333

00:06:37.070 --> 00:06:39.110 and so we hope to be able to

NOTE Confidence: 0.793663333333333

00:06:39.110 --> 00:06:41.188 change that with some of the

NOTE Confidence: 0.793663333333333

00:06:41.188 --> 00:06:42.688 developments we're working on.

NOTE Confidence: 0.793663333333333

00:06:42.690 --> 00:06:44.460 One of the main things

NOTE Confidence: 0.793663333333333

00:06:44.460 --> 00:06:46.560 that we've got a lot of.

NOTE Confidence: 0.793663333333333

00:06:46.560 --> 00:06:49.635 Headway on is developing methods

NOTE Confidence: 0.793663333333333

00:06:49.635 --> 00:06:52.095 to link brain organization.

NOTE Confidence: 0.793663333333333

00:06:52.100 --> 00:06:53.985 This is primarily talking about

NOTE Confidence: 0.793663333333333

00:06:53.985 --> 00:06:55.870 functional organization to behavior and

NOTE Confidence: 0.793663333333333

00:06:55.929 --> 00:06:57.896 we can develop models that link brain

NOTE Confidence: 0.793663333333333

00:06:57.896 --> 00:06:59.740 to behavior and using these models

NOTE Confidence: 0.793663333333333

00:06:59.740 --> 00:07:01.618 we end up identifying the systems,

NOTE Confidence: 0.793663333333333

00:07:01.620 --> 00:07:03.660 supporting behavior and so this

NOTE Confidence: 0.793663333333333

00:07:03.660 --> 00:07:05.700 has important implications in say,

NOTE Confidence: 0.793663333333333

00:07:05.700 --> 00:07:07.760 psychiatric or neurologic studies

NOTE Confidence: 0.793663333333333

00:07:07.760 --> 00:07:11.442 where you want to see what the

NOTE Confidence: 0.793663333333333

00:07:11.442 --> 00:07:14.478 what the systems are that are

NOTE Confidence: 0.793663333333333

00:07:14.478 --> 00:07:16.808 contributing to symptoms, let's say.

NOTE Confidence: 0.793663333333333

00:07:16.808 --> 00:07:20.040 And so in the Ardoch formalism of NIH,

NOTE Confidence: 0.793663333333333

00:07:20.040 --> 00:07:20.874 there's a cognitive.

NOTE Confidence: 0.793663333333333

00:07:20.874 --> 00:07:21.986 There are cognitive constructs

NOTE Confidence: 0.793663333333333

00:07:21.986 --> 00:07:23.210 that are well defined,

NOTE Confidence: 0.793663333333333

00:07:23.210 --> 00:07:25.850 and you can model cognitive constructs,

NOTE Confidence: 0.793663333333333

00:07:25.850 --> 00:07:28.209 and you can also model symptom scores,

NOTE Confidence: 0.793663333333333

00:07:28.210 --> 00:07:31.333 and by doing this we can collect fMRI data.

NOTE Confidence: 0.793663333333333

00:07:31.340 --> 00:07:32.747 We build a map of all the

NOTE Confidence: 0.793663333333333

00:07:32.747 --> 00:07:33.670 connections in the brain,

NOTE Confidence: 0.793663333333333

00:07:33.670 --> 00:07:35.960 and these connections for or

NOTE Confidence: 0.793663333333333

00:07:35.960 --> 00:07:38.438 something like a 268 note Atlas.

NOTE Confidence: 0.793663333333333

00:07:38.438 --> 00:07:39.960 These there's 35,000 connections.

NOTE Confidence: 0.793663333333333

00:07:39.960 --> 00:07:42.330 There's a lot of information in

NOTE Confidence: 0.793663333333333

00:07:42.330 --> 00:07:44.208 these connections about the subject,

NOTE Confidence: 0.793663333333333

00:07:44.210 --> 00:07:45.790 the individual or the patient,

NOTE Confidence: 0.793663333333333

00:07:45.790 --> 00:07:47.155 and we're just learning how to read.

NOTE Confidence: 0.793663333333333

00:07:47.160 --> 00:07:49.197 That now so we can stack these

NOTE Confidence: 0.793663333333333

00:07:49.197 --> 00:07:51.345 across groups of individuals and the

NOTE Confidence: 0.793663333333333

00:07:51.345 --> 00:07:53.360 more diverse this population is,

NOTE Confidence: 0.793663333333333

00:07:53.360 --> 00:07:55.184 the better these models are that

NOTE Confidence: 0.793663333333333

00:07:55.184 --> 00:07:56.096 we can build,

NOTE Confidence: 0.793663333333333

00:07:56.100 --> 00:07:58.872 and we can then correlate or

NOTE Confidence: 0.793663333333333

00:07:58.872 --> 00:08:01.469 relate some sort of behavioral

NOTE Confidence: 0.793663333333333

00:08:01.469 --> 00:08:04.860 trait or symptom scored for each

NOTE Confidence: 0.793663333333333

00:08:04.860 --> 00:08:07.260 individual to identify the systems

NOTE Confidence: 0.793663333333333

00:08:07.260 --> 00:08:09.858 which is identified here that vary

NOTE Confidence: 0.793663333333333

00:08:09.858 --> 00:08:12.614 as a function of performance on

NOTE Confidence: 0.793663333333333

00:08:12.614 --> 00:08:15.416 a task or some symptom score,

NOTE Confidence: 0.793663333333333

00:08:15.420 --> 00:08:17.340 and these are actually predictive models,

NOTE Confidence: 0.793663333333333

00:08:17.340 --> 00:08:18.688 so these are not.

NOTE Confidence: 0.793663333333333

00:08:18.688 --> 00:08:20.710 The associations were able to predict

NOTE Confidence: 0.793663333333333

00:08:20.777 --> 00:08:22.952 left out individuals or independent

NOTE Confidence: 0.793663333333333

00:08:22.952 --> 00:08:25.127 groups and predict their behavioral

NOTE Confidence: 0.793663333333333

00:08:25.197 --> 00:08:27.097 scores from their imaging data,

NOTE Confidence: 0.793663333333333

00:08:27.100 --> 00:08:29.102 and so this is we can look

NOTE Confidence: 0.793663333333333

00:08:29.102 --> 00:08:31.437 at a range of traits we have.

NOTE Confidence: 0.793663333333333

00:08:31.440 --> 00:08:33.680 We're we're establishing a library right now.

NOTE Confidence: 0.793663333333333

00:08:33.680 --> 00:08:36.160 16 measures, cognitive constructs,

NOTE Confidence: 0.793663333333333

00:08:36.160 --> 00:08:40.340 and then probably another 16 symptom scores,

NOTE Confidence: 0.793663333333333

00:08:40.340 --> 00:08:41.320 and we can, you know,

NOTE Confidence: 0.793663333333333

00:08:41.320 --> 00:08:42.700 we get those for each individual.

NOTE Confidence: 0.793663333333333

00:08:42.700 --> 00:08:45.206 We can build these models and these

NOTE Confidence: 0.793663333333333

00:08:45.206 --> 00:08:47.683 models then tell us the systems that

NOTE Confidence: 0.793663333333333

00:08:47.683 --> 00:08:49.498 are responsible for supporting that.

NOTE Confidence: 0.793663333333333

00:08:49.500 --> 00:08:51.966 Behavior or that spectrum of behaviors,

NOTE Confidence: 0.793663333333333

00:08:51.970 --> 00:08:53.782 and we want to develop normative

NOTE Confidence: 0.793663333333333

00:08:53.782 --> 00:08:54.688 Spectra for that,

NOTE Confidence: 0.793663333333333

00:08:54.690 --> 00:08:56.814 and then see where patients individual

NOTE Confidence: 0.793663333333333

00:08:56.814 --> 00:08:58.830 patients lay on that spectrum.

NOTE Confidence: 0.793663333333333

00:08:58.830 --> 00:09:00.660 So the networks defined here

NOTE Confidence: 0.793663333333333

00:09:00.660 --> 00:09:02.490 reveal the systems and assessing

NOTE Confidence: 0.744195291333333

00:09:02.550 --> 00:09:04.050 then who the models fail,

NOTE Confidence: 0.744195291333333

00:09:04.050 --> 00:09:06.094 for whom the models fail is actually

NOTE Confidence: 0.744195291333333

00:09:06.094 --> 00:09:08.529 a way to kind of subtype people.

NOTE Confidence: 0.744195291333333

00:09:08.530 --> 00:09:11.410 So who has different functional

NOTE Confidence: 0.744195291333333

00:09:11.410 --> 00:09:13.340 organization brain behavior relationships

NOTE Confidence: 0.744195291333333

00:09:13.340 --> 00:09:16.982 such that the model doesn't fit them and

NOTE Confidence: 0.744195291333333

00:09:16.982 --> 00:09:18.986 we've had tremendous success with this?

NOTE Confidence: 0.744195291333333

00:09:18.986 --> 00:09:19.994 A bunch of nature.

NOTE Confidence: 0.744195291333333

00:09:20.000 --> 00:09:23.627 Papers in the last five or seven years we've

NOTE Confidence: 0.744195291333333

00:09:23.627 --> 00:09:26.981 got a lot of diverse labs involved here,

NOTE Confidence: 0.744195291333333

00:09:26.981 --> 00:09:29.494 so Michael Prayers Lab just

NOTE Confidence: 0.744195291333333

00:09:29.494 --> 00:09:31.430 Carden and Mike Higley,

NOTE Confidence: 0.744195291333333

00:09:31.430 --> 00:09:34.790 Marvin Chun over in psychology we've had,

NOTE Confidence: 0.744195291333333

00:09:34.790 --> 00:09:36.650 we've made great progress with this,

NOTE Confidence: 0.744195291333333

00:09:36.650 --> 00:09:37.910 and we actually have a nature

NOTE Confidence: 0.744195291333333

00:09:37.910 --> 00:09:38.750 paper pending right now,

NOTE Confidence: 0.744195291333333

00:09:38.750 --> 00:09:41.018 which is on the subtyping and for

NOTE Confidence: 0.744195291333333

00:09:41.018 --> 00:09:43.609 whom the model fails sort of analysis.

NOTE Confidence: 0.744195291333333

00:09:43.610 --> 00:09:45.630 Over in the pet Center,

NOTE Confidence: 0.744195291333333

00:09:45.630 --> 00:09:46.770 Pet center is very large.

NOTE Confidence: 0.744195291333333

00:09:46.770 --> 00:09:48.165 There's three cameras,

NOTE Confidence: 0.744195291333333

00:09:48.165 --> 00:09:50.025 pet cameras over there.

NOTE Confidence: 0.744195291333333

00:09:50.030 --> 00:09:51.182 This is a cyclotron,

NOTE Confidence: 0.744195291333333

00:09:51.182 --> 00:09:52.910 so with the cyclotron does is,

NOTE Confidence: 0.744195291333333

00:09:52.910 --> 00:09:54.362 it accelerates atoms?

NOTE Confidence: 0.744195291333333

00:09:54.362 --> 00:09:57.750 Very high energy and then smashes them

NOTE Confidence: 0.744195291333333

00:09:57.838 --> 00:10:01.066 into a target and creates radioisotopes.

NOTE Confidence: 0.744195291333333

00:10:01.070 --> 00:10:03.821 And this is a chemistry module that

NOTE Confidence: 0.744195291333333

00:10:03.821 --> 00:10:06.708 then puts those radioisotopes onto a

NOTE Confidence: 0.744195291333333

00:10:06.708 --> 00:10:09.180 ligand that can be injected in an individual.

NOTE Confidence: 0.744195291333333

00:10:09.180 --> 00:10:10.964 And then you can see where it goes

NOTE Confidence: 0.744195291333333

00:10:10.964 --> 00:10:12.587 and you get images like this.

NOTE Confidence: 0.744195291333333

00:10:12.590 --> 00:10:14.030 This is the uptake of radio.

NOTE Confidence: 0.744195291333333

00:10:14.030 --> 00:10:16.184 Racers and this is like mapping

NOTE Confidence: 0.744195291333333

00:10:16.184 --> 00:10:18.060 glutamate receptors in the brain,

NOTE Confidence: 0.744195291333333

00:10:18.060 --> 00:10:19.162 for example,

NOTE Confidence: 0.744195291333333

00:10:19.162 --> 00:10:22.468 and the the pet center develops

NOTE Confidence: 0.744195291333333

00:10:22.468 --> 00:10:25.116 these these ligands and each

NOTE Confidence: 0.744195291333333

00:10:25.116 --> 00:10:27.212 they're constantly developing new

NOTE Confidence: 0.744195291333333

00:10:27.212 --> 00:10:29.911 and novel targets that researchers

NOTE Confidence: 0.744195291333333

00:10:29.911 --> 00:10:33.037 within the university can then use

NOTE Confidence: 0.744195291333333

00:10:33.040 --> 00:10:35.116 so they have 12 hot cells.

NOTE Confidence: 0.744195291333333

00:10:35.120 --> 00:10:37.070 They have three of these whole

NOTE Confidence: 0.744195291333333

00:10:37.070 --> 00:10:39.085 whole well one head system and

NOTE Confidence: 0.744195291333333

00:10:39.085 --> 00:10:40.944 two whole body pet scanners,

NOTE Confidence: 0.744195291333333

00:10:40.944 --> 00:10:44.038 and then they have 3 little micro.

NOTE Confidence: 0.744195291333333

00:10:44.040 --> 00:10:44.416 Pets,

NOTE Confidence: 0.744195291333333

00:10:44.416 --> 00:10:47.424 pet scanners and a pet CT scanner for

NOTE Confidence: 0.744195291333333

00:10:47.424 --> 00:10:49.208 preclinical studies and you'll see

NOTE Confidence: 0.744195291333333

00:10:49.208 --> 00:10:51.970 in a minute how those come into play.

NOTE Confidence: 0.744195291333333

00:10:51.970 --> 00:10:54.346 So right now there are 62

NOTE Confidence: 0.744195291333333

00:10:54.346 --> 00:10:55.930 different radio tracers available.

NOTE Confidence: 0.744195291333333

00:10:55.930 --> 00:10:57.495 There's 160 radio tracers used

NOTE Confidence: 0.744195291333333

00:10:57.495 --> 00:10:59.817 in animals and a number of these

NOTE Confidence: 0.744195291333333

00:10:59.817 --> 00:11:01.905 ones that are being developed in

NOTE Confidence: 0.744195291333333

00:11:01.905 --> 00:11:03.530 animals ultimately do get translated

NOTE Confidence: 0.744195291333333

00:11:03.530 --> 00:11:04.690 to use in humans.

NOTE Confidence: 0.744195291333333

00:11:04.690 --> 00:11:06.880 There's 70 NIH grants using the

NOTE Confidence: 0.744195291333333

00:11:06.880 --> 00:11:09.609 Pet center and 50 human protocols.

NOTE Confidence: 0.744195291333333

00:11:09.610 --> 00:11:12.472 They're ongoing 3 areas of developmental

NOTE Confidence: 0.744195291333333

00:11:12.472 --> 00:11:15.199 briefly touch on before I wrap up.

NOTE Confidence: 0.744195291333333

00:11:15.200 --> 00:11:17.846 Is a synaptic density imaging this

NOTE Confidence: 0.744195291333333

00:11:17.846 --> 00:11:21.549 is a way that they can target the.

NOTE Confidence: 0.744195291333333

00:11:21.550 --> 00:11:24.614 The synapses in the brain and get maps.

NOTE Confidence: 0.744195291333333

00:11:24.620 --> 00:11:27.189 It's almost like a Gray matter map,

NOTE Confidence: 0.744195291333333

00:11:27.190 --> 00:11:28.890 reflecting, reflecting synaptic density,

NOTE Confidence: 0.744195291333333

00:11:28.890 --> 00:11:31.440 and they've already so that Yale

NOTE Confidence: 0.744195291333333

00:11:31.499 --> 00:11:33.244 wasn't necessarily the first to

NOTE Confidence: 0.744195291333333

00:11:33.244 --> 00:11:35.318 develop this for their first to

NOTE Confidence: 0.744195291333333

00:11:35.318 --> 00:11:36.920 have a really good ligand for

NOTE Confidence: 0.744195291333333

00:11:36.920 --> 00:11:38.520 this and make it practical.

NOTE Confidence: 0.744195291333333

00:11:38.520 --> 00:11:41.285 And so they've been able to make

NOTE Confidence: 0.744195291333333

00:11:41.285 --> 00:11:43.496 tremendous headway in in developing

NOTE Confidence: 0.744195291333333

00:11:43.496 --> 00:11:46.112 this and looking at specific diseases.

NOTE Confidence: 0.744195291333333

00:11:46.120 --> 00:11:48.564 So in epilepsy, Alzheimer's,

NOTE Confidence: 0.744195291333333

00:11:48.564 --> 00:11:51.619 and all sorts of psychiatric.

NOTE Confidence: 0.744195291333333

00:11:51.620 --> 00:11:54.566 Illness so there's over 20 grants

NOTE Confidence: 0.744195291333333

00:11:54.566 --> 00:11:57.240 on this already, and you know,

NOTE Confidence: 0.744195291333333

00:11:57.240 --> 00:11:58.440 40 L publications.

NOTE Confidence: 0.744195291333333

00:11:58.440 --> 00:12:00.260 But Yale is kind of a leader

NOTE Confidence: 0.744195291333333

00:12:00.260 --> 00:12:02.208 in this and the next talk,

NOTE Confidence: 0.744195291333333

00:12:02.208 --> 00:12:03.279 actually by Doctor.

NOTE Confidence: 0.744195291333333

00:12:03.280 --> 00:12:05.051 You know Esther Liz is going to

NOTE Confidence: 0.744195291333333

00:12:05.051 --> 00:12:06.751 actually link some of those SP2

NOTE Confidence: 0.744195291333333

00:12:06.751 --> 00:12:07.935 imaging to the connectivity.

NOTE Confidence: 0.744195291333333

00:12:07.940 --> 00:12:09.240 Imaging that I was talking

NOTE Confidence: 0.744195291333333

00:12:09.240 --> 00:12:10.280 about earlier with fMRI.

NOTE Confidence: 0.744195291333333

00:12:10.280 --> 00:12:12.120 So we're doing multimodal

NOTE Confidence: 0.744195291333333

00:12:12.120 --> 00:12:14.547 studies as well in the pipeline.

NOTE Confidence: 0.744195291333333

00:12:14.547 --> 00:12:16.990 Right now there's some novel tracers that

NOTE Confidence: 0.8151565775

00:12:17.053 --> 00:12:18.859 are coming out for human work,

NOTE Confidence: 0.8151565775

00:12:18.860 --> 00:12:20.030 so these are brand new.

NOTE Confidence: 0.8151565775

00:12:20.030 --> 00:12:23.376 They they haven't really been used yet.

NOTE Confidence: 0.8151565775

00:12:23.380 --> 00:12:27.204 Kappa Kappa receptors musical

NOTE Confidence: 0.8151565775

00:12:27.204 --> 00:12:29.804 security golden genic receptors

NOTE Confidence: 0.8151565775

00:12:29.804 --> 00:12:32.544 and there's also some tracers.

NOTE Confidence: 0.9198546

00:12:34.560 --> 00:12:35.139 I missed one.

NOTE Confidence: 0.899995114444444

00:12:37.590 --> 00:12:40.746 There's also some tracers in preclinical

NOTE Confidence: 0.899995114444444

00:12:40.746 --> 00:12:43.522 studies right now being developed in in

NOTE Confidence: 0.899995114444444

00:12:43.522 --> 00:12:45.687 animal models and those will be hopefully

NOTE Confidence: 0.899995114444444

00:12:45.687 --> 00:12:49.870 be ready for human use in a few years.

NOTE Confidence: 0.899995114444444

00:12:49.870 --> 00:12:51.465 Finally, there's a new pet

NOTE Confidence: 0.899995114444444

00:12:51.465 --> 00:12:53.475 scanner coming which is going to

NOTE Confidence: 0.899995114444444

00:12:53.475 --> 00:12:54.887 have much higher resolution,

NOTE Confidence: 0.899995114444444

00:12:54.890 --> 00:12:56.857 and it's going to have spatial resolution

NOTE Confidence: 0.899995114444444

00:12:56.857 --> 00:12:59.236 of the order of two millimeters voxel size,

NOTE Confidence: 0.899995114444444

00:12:59.236 --> 00:13:01.590 and that's comparable to what we get in F,

NOTE Confidence: 0.899995114444444

00:13:01.590 --> 00:13:03.918 MRI, and so when we're linking

NOTE Confidence: 0.899995114444444

00:13:03.918 --> 00:13:06.789 functional MRI and PET studies together,

NOTE Confidence: 0.899995114444444

00:13:06.790 --> 00:13:08.558 we'll have comparable resolution,

NOTE Confidence: 0.899995114444444

00:13:08.558 --> 00:13:11.605 which is great, and so this is being

NOTE Confidence: 0.899995114444444

00:13:11.605 --> 00:13:12.977 developed in collaboration with

NOTE Confidence: 0.899995114444444

00:13:12.977 --> 00:13:15.068 Rich Carson's group here at Yale,

NOTE Confidence: 0.899995114444444

00:13:15.070 --> 00:13:17.050 UC Davis in United Imaging,

NOTE Confidence: 0.899995114444444

00:13:17.050 --> 00:13:19.183 and that'll again give us kind of the latest,

NOTE Confidence: 0.899995114444444

00:13:19.190 --> 00:13:20.554 greatest technology.

NOTE Confidence: 0.899995114444444

00:13:20.554 --> 00:13:22.600 For doing research,

NOTE Confidence: 0.899995114444444

00:13:22.600 --> 00:13:24.920 these are the faculty and the MRI center.

NOTE Confidence: 0.899995114444444

00:13:24.920 --> 00:13:26.908 That kind of developed these methods and

NOTE Confidence: 0.899995114444444

00:13:26.908 --> 00:13:29.177 and support a lot of the infrastructure.

NOTE Confidence: 0.899995114444444

00:13:29.180 --> 00:13:30.950 And then I didn't download

NOTE Confidence: 0.899995114444444

00:13:30.950 --> 00:13:32.720 just the faculty for PET.

NOTE Confidence: 0.899995114444444

00:13:32.720 --> 00:13:34.478 But here's all the people and

NOTE Confidence: 0.899995114444444

00:13:34.478 --> 00:13:36.689 the Pet Center faculty and staff,

NOTE Confidence: 0.899995114444444

00:13:36.689 --> 00:13:39.347 and so there's a large cohort

NOTE Confidence: 0.899995114444444

00:13:39.347 --> 00:13:41.770 of people that come together to,

NOTE Confidence: 0.899995114444444

00:13:41.770 --> 00:13:42.390 you know,

NOTE Confidence: 0.899995114444444

00:13:42.390 --> 00:13:43.754 develop these new methods,

NOTE Confidence: 0.899995114444444

00:13:43.754 --> 00:13:46.283 and then we're always looking for partners

NOTE Confidence: 0.899995114444444

00:13:46.283 --> 00:13:48.815 and outreach and applying these clinically.

NOTE Confidence: 0.899995114444444

00:13:48.820 --> 00:13:50.998 So thank you.