

H.A.N.D.

HIGH-TECH AND NEUROLOGICAL-DISORDERS WINTER 2021 QUARTER RECAP



Educating, Empowering, Promoting, Innovating

This Winter quarter, our team:

- Heard from extraordinary **speakers** Dr. Daniel MacArthur, Dr. Kristin MacArthur, Dr. Hsiao, and Dr. Basso
- Hosted **seminars and journal clubs** focusing on recent research breakthroughs for neurological disorders
- Presented neuroscience **curriculum** to middle schoolers
- Continued prototype development of the **iStopShaking** patent through individual project proposals



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Education

SEMINAR & RESEARCH

Hosting journal club discussions to prepare for guest speakers.

Chose research papers pertaining to each week's topic, prepared questions for discussion and guest speakers, and formulated an efficient structure for journal club meetings.

Treatment: Areas of Focus

Clearance Proteins

Mitochondria

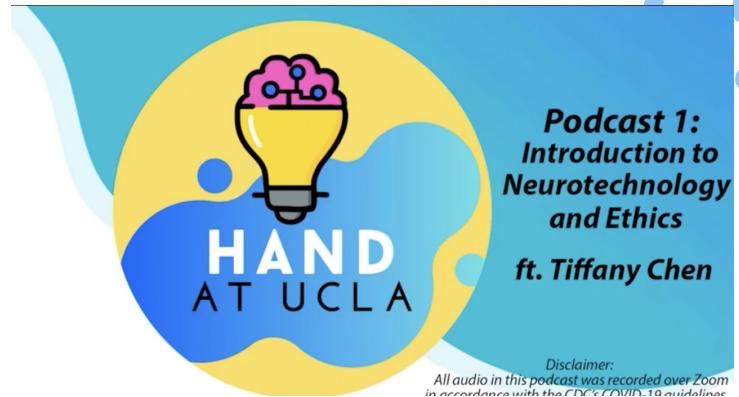
Neuroinflammation



SOCIAL MEDIA & NEWSLETTERS

Divide and Conquer! Everyone split up responsibilities to ensure everything was completed.

Created infographics concerning neurological disorders individuals are confronted with daily. Produced informative Instagram stories with either supplemental information on the topic of the week or fun quizzes to test your knowledge.



PODCASTS

Focused on highlighting development in neurological studies.

Completed their first podcast about high-tech solutions and clinical research. Are now interviewing professors and researchers to put together two more segments on Parkinson's treatments and neurobionics.

Our Mission

High-tech and Neurological Disorders (HAND) at UCLA works to increase awareness and education of neurological diseases, including movement disorders such as Parkinson's disease. An innovation aspect includes creating an undergraduate prototype team to aid in the building of the device. The club also plans to fundraise and provide patient support for adults suffering with these diseases, such as essential tremors, dystonia, and Huntington's disease. We plan on collaborating with the UCLA Movement Disorders Program, the UCLA Brain Research Institute, and academia at the David Geffen School of Medicine to learn more about treatment options and research opportunities related to these diseases.



Outreach

AWARENESS CAMPAIGN TEAM

Spreading awareness through aesthetically pleasing infographics.

So far, the Awareness Campaign Team has covered the National Epilepsy Awareness month (NEAM) and educated peers on epilepsy symptoms and seizure first aid. This is just one of their many campaigns to come!

Gut-Brain Link

By Giorgio Conta and Justin Quan
December 6th, 2020

If you've ever felt butterflies in your stomach when you feel nervous, you may not know it, but those signals are coming from what some refer to as your second brain. There exists a dense network of neurons in your gut that are hidden within the walls of your digestive tract, and these neurons have a strong influence on your mood, emotions, and how you think and process your thoughts. This relatively recent discovery gives a whole new meaning to "going with your gut". Although this network of neurons in the gut may be colloquially referred to as the second brain, scientists refer to it as the enteric nervous system (ENS), and as the years go by scientists are discovering more and more about the ENS. Based on what we know now, the ENS is composed of two thin layers lining the gastrointestinal tract, which runs from your esophagus to rectum, and comprises hundreds of millions of nerve cells. Although the brain has billions of nerve cells, scientists have determined that the ENS has a significant effect on yourself, especially concerning your emotions and mood. For this and many other reasons, scientists are finding ways in which the ENS, or at least the environment in which the ENS

Spinal Cord Stimulation

By Max Orr, Alex Wu, and Daniel Hong
December 6th, 2020

Spinal Cord Stimulation Overview

What is Spinal Cord Stimulation (SCS)? SCS is a means of alleviating chronic pain in patients by stimulating spinal cord nerve fibers. These electrical impulses help inhibit pain signals that are sent to the brain. This form of treatment, previously questioned by many pain specialists about its safety and efficacy, has recently begun to make a comeback in being an effective alternative treatment after exhausting other noninvasive forms of treatment. The patient will generally have a surgically implanted device, consisting of a battery pack and electrodes, that delivers electrical impulses to the spinal nerves blocking pain signals.

HIGH SCHOOL PROGRAM TEAM

Encouraging students to explore applications of technology and science.

The High School Program Team has been developing a curriculum for elementary to high school students to increase literacy about science and neurotechnology. Lessons plans involve adapting to remote learning and incorporating engaging virtual activities.

Neuroscience Resources
Provided below are useful links to neuroscience/pre-health opportunities for undergraduates

UCLA Undergraduate Neuroscience:
<http://www.neurosci.ucla.edu/>

UCLA Graduate Neuroscience:
<http://www.neuroscience.ucla.edu/>

UCLA Psychology Department:
<http://www.psych.ucla.edu/>

(Seminars to Attend):
<http://www.lns.ucla.edu/>

Club Opportunities:

- UMMA Volunteer Project: <https://ummapr.weebly.com/>
- PULSE Shadowing: <https://www.pulse-shadows.weebly.com/pulse>
- UCLA Student Stroke Team: <https://www.strokeprogram.org/>
- LSU Student Association: <http://lsusci.org/>
- CogSci Student Association: <https://www.uclacogsci.com/>
- InteRAcT: <http://interaact.ucla.org/>
- BSG: <http://brainsgroupogenesis.com/>

EVENTS TEAM

Curating weekly blog posts and researching potential guest speakers.

Recent blog posts covered the Gut-Brain Link and Spinal Cord Stimulation, providing detailed overview on the subjects for students interested in learning more. [Click here to read recent blogs!](#)





Public Relations

MEETING RECAPS

Creation of weekly recap Instagram posts

The meeting recap subcommittee utilized Canva to design weekly meeting recap posts (posted on our Instagram). They also summarized the main points from discussions with Neurological disorder specialists.



SPOTLIGHTS

Creation of member spotlights.

The spotlights subcommittee created templates, questions, and information to include in member spotlight posts. Check these member spotlight posts on our Instagram to learn more about our wonderful members!

OUTREACH & EDUCATION

Finalizing instagram post designs.

The outreach and education subcommittee worked closely with the outreach and education teams to review and finalize their Instagram posts. This quarter, the major projects have been highlighting the innovation team's progress, as well as promoting general education on various neurological diseases.



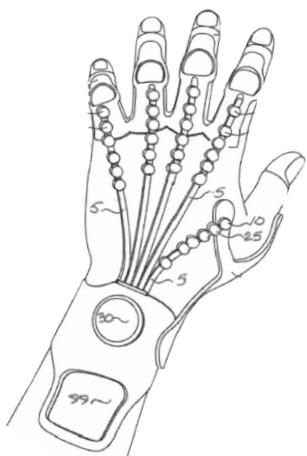


Innovation Team

OUR GOAL

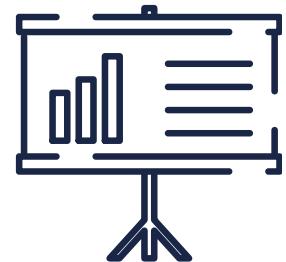
Turn the patent into a feasible prototype idea.

We studied the details of the patent and collected feedback from our advisors about the device's mechanisms. Now, our team is working hard to bring these ideas to life.



ACTION STEPS

How we're working towards that goal.



This quarter, we had interactive workshops where members learned about the patent mechanics, materials, and user interface/coding. We also hosted workshops to teach members how to pitch a project, and this culminated in the main highlight: the versatile **member project proposals**

NEXT QUARTER

Spring quarter plans: 3D Modeling, UI Design, Funding, Physical Building



Creating a Project Proposal

Learning how to pitch the iStopShaking device to willing partner organizations, while implementing varying tremor-reducing ideas.



Project Proposals

SOME HIGHLIGHTS:

DESIGN & MATERIALS

To create an accessible and affordable device.

- Gyroscopes and accelerometers, in addition to other mechanisms to counter tremors related to PD and ET
- Materials: thin optical fibers, synthetic fabrics, graphene, and steel disk weights



USER INTERFACE/UX

To make the device friendly to use and easy-to-use.

- Accessible and simple data portrayals, using voice AI and customizable interface
- Music therapy add-ons
- Improving access among developing countries/communities

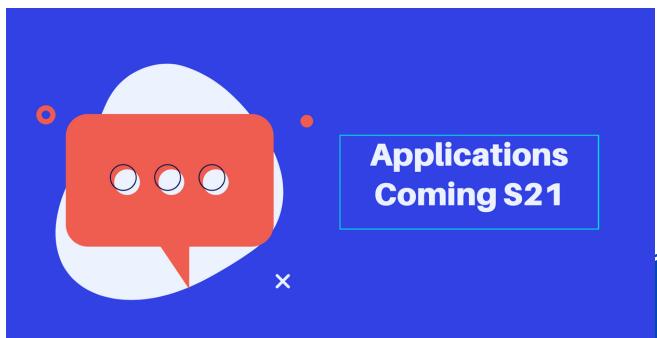


PHYSICAL MECHANISMS

Ways to make the device even more effective and reliable.

- Tuned mass damper
- Transcutaneous electrical nerve stimulation and electrodes
- Non-Newtonian fluids
- Cooling mechanisms
- Pneumatic tubes
- Magnetorheological fluids

IT Applications are live!





Brain Injury Awareness Month

MARCH IS BRAIN INJURY AWARENESS MONTH

WHAT IS AN ACQUIRED BRAIN INJURY?

Acquired brain injuries are brain injuries occurring after birth that are not hereditary, congenital, degenerative, or induced by birth trauma.

There are two main types:
Traumatic and Non-traumatic

There are more than 5.3 million children and adults in the United States who are living with a permanent brain injury-related disability.
(1 in every 60 people)



At least 2.8 million Americans sustain a traumatic brain injury each year

Visit <https://www.biausa.org/public-affairs/public-awareness/brain-injury-awareness> to learn more about Brain Injury Awareness Month



HAND AT UCLA

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