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Dr. Maureen Leehey, Professor of Neurology, University of Colorado, Anschutz Medical Campus

Meet Dr. Maureen Leehey, Member, ICR Governing Board and Section Head of UC Movement Disorders

Dr. Maureen Leehey is a board-certified neurologist since 1987, Professor of Neurology at the University of Colorado (UC), Section Head of UC Movement Disorders, and since 2014 has been a pioneering researcher in cannabis. Shortly after dispensaries opened in Colorado, Dr. Leehey recognized the need for research on how cannabis affects individuals, when her clinic patients, especially those with Parkinson's disease, started experimenting with it. Many reported benefits that resulted in improved quality of life, but others reported adverse effects that were sometimes severe. Dr. Leehey has managed thousands of persons with Parkinson's disease over the last ~30 years, and is passionate about wanting to find out the true effects of cannabis products on the disorder, well as in other neurological and psychiatric disorders. In 2015 she received a \$1 million grant from the state of Colorado (CDPHE) to study the effects of cannabis in Parkinson's. Dr. Leehey has been actively involved in several Colorado cannabis research organizations including the Scientific Advisory Committee for Colorado Cannabis Research Consortium and the Governing Board of the Institute for Cannabis Research (ICR). Recently, she completed an open label study of high dose purified CBD and is currently conducting a randomized controlled study on the effectiveness of a high CBD/low THC formulation from the National Institute of Drug Abuse in Parkinson's disease.

Dr. Leehey enjoys serving on the ICR Governing Board because it's focus is to facilitate cannabis research, which will provide the knowledge needed to most effectively utilize cannabis products in persons with Parkinson's and other neurological and psychiatric disorders.



Health Benefits of Dietary Hemp Seed PI: Dr. Annette Gabaldon

Our research lab in the Biology Department at CSU Pueblo has been investigating the health benefits of dietary hempseed. The seeds are rich in macronutrients and contain phytochemicals that may affect a variety of physiological processes. As hempseed is becoming increasingly used as a dietary supplement, both in animal feed and for human consumption, more basic research is needed to understand whether or not there are any physiological influences. With ICR grant support, we have been able to enhance our undergraduate and graduate student research training opportunities in biomedical science. Many of the students are pre-med or pre-vet, in-

cluding a recent graduate, Mr. Derrick Williams, M.S., who just began medical school at Harvard University this Fall 2020. Another recent graduate, Mr. Juan Rodriguez, M.S., is in his second year of Dental School, while a third student, Mrs. Whitney Lujan, M.S. is teaching in the K-12 Pueblo public schools while beginning the master's program in Education at CSU Pueblo. Some of the highlights from current graduate student projects are described below.

Ms. Kayana Casias, M.S. candidate, is fermenting whole hempseed to determine if the fermentation media contains secondary metabolites that are cytotoxic to cultured human colorectal adenocarcinoma cancer cells (Caco-2). The resident intestinal bacteria produce short chain fatty acids (SCFAs), such as butyrate, acetate, and propionate, through fermentation in the colon. These metabolites help establish a healthy colon pH and serve as an energy source for healthy colonocytes. These same SCFAs, notably butyrate, when tested on cultured colon cancer cells, are highly cytotoxic. One mechanism shows that the cancer cells readily uptake butyrate but cannot metabolize it, so that intracellular concentrations rise to toxic levels. So, it is feasible that butyrate or other SCFAs from fermented whole hempseed would produce a similar effect. Kayana is fermenting whole hempseed anaerobically for 48 hours using mouse fecal slurry as the inoculum to ensure a diverse population of bacteria. Cultured Caco-2 cells will be treated with sterile filtered fermentation samples and cytotoxicity assays will be performed. Similar studies have been performed by others on edible nuts and seeds, but there is no research for hempseed.

In a second ICR supported project, we are investigating the influence of dietary hempseed on growth parameters in young female C57BL6 mice. Three groups of 5-week old mice were fed a base diet supplemented with whole hempseed at concentrations (*w:w*) of 0%, 5%, or 15% up to age 30 weeks. We monitored age- and diet-related changes in feeding efficiency, body composition (DEXA monthly scanning) and arterial blood pressure. The most significant influence of the hempseed diet was on feeding efficiency, which was reduced in mice fed the 15% HS diet, meaning that they gained less body mass per gram amount of food eaten as compared to other groups. Ms. Hailey Streff, M.S. candidate, performed these studies and will now investigate the microbial diversity in fecal samples that were collected bi-weekly throughout the study to determine if there are any dietary influences on the gut microbiome. She will also perform histology studies of digestive tract samples to determine if the reduced feeding efficiency of 15%



Front left to right, Dr. Annette Gabaldon, Kayana Casias; Back left to right, Hailey Streff, Zachary Giltner, Chandler Sparks

HS mice is related to anatomical alterations that affect nutrient absorption, such as intestinal villi surface area. Mr. Chandler Sparks, M.S. candidate, is developing studies to investigate the influence of the hempseed diet on mechanical strength of femur and vertebral skeletal bones in the mice. While the DEXA data do not show a dietary influence on bone mineral density (BMD) for the whole skeleton, this does not preclude the possibility of influences on BMD at the level of single bones, and we know nothing about how the diet may have influenced bone mechanical strength. For these studies, Chandler will test femur bone tensile strength using a 3-point bending tester designed and constructed by the Engineering Dept. at CSU Pueblo, and he will modify the tester for compression testing of vertebral bones.

Exhibitor and Sponsor Opportunities Available at Upcoming Virtual Cannabis

Research Conference

Colorado State University Pueblo's Institute of Cannabis Research, in partnership with Oregon State University's Global Hemp Innovation Center, invites you to attend the 2021 Virtual Cannabis Research Conference on August 3-5, 2021. Spots are open for exhibitors and sponsors.

With an avatar-based virtual reality platform, exhibitors and sponsors will receive a true interactive existence where you can:

- Contact attendees and attendees can contact you (chat, telephone, video), in real-time,
- Receive conference attendee opt-in contact list,
- Schedule one-on-one meetings or do the meetings on the spot!
- Attendees will be able to view your product demonstrations, brochures, and
- Select and custom design your own small, medium, or large exhibit booth, and more.

Plus! Receive the full Conference Attendees Opt-In Contact List

Click here (or, visit http://go/crc-exhibithall) and view the Demo / Walkthrough of the Virtual Exhibit Hall.

The multi-disciplinary, three-day conference attracts hundreds of attendees from across the country and overseas. The comprehensive conference explores new cannabis knowledge and innovations that improve lives and contribute to science, medicine, and society.

As a Sponsor and Exhibitor at the 2021 Virtual Cannabis Research Conference, you will have the opportunity to engage with global cannabis innovators exploring cannabis research frontiers – and connect with the best and brightest minds in the industry, including those who come from the following sectors:

- Medical,
- University Researchers,
- Private Industry,
- Public Policy Officials,
- Laboratory Instrumentation
- Equipment,
- Data Analysis Software, and many more!
- You may sponsor or attend the:
- Nearly 100 Sessions,
- An Interactive Poster Hall,
- Live presentations with live Q & A,

Live & Recorded Concurrent sessions,

There is no better time, place, or way to connect with cannabis experts actively conducting and planning new research ventures.

Join the cannabis research community, and let's explore new cannabis research frontiers!

For more information, please visit <u>CannabisResearch-</u> <u>Conference.net</u>.

2021 VIRTUAL CANNABIS RESEARCH CONFERENCE

AUGUST 3-5, 2021 😤 COLORADO STATE UNIVERSITY 🏵 PUEBLO

HOSTED BY





The Cannabis Research Conference 2021 is currently accepting abstracts for presentations. The abstract submission deadline is April 12th.

Click here to access the conference Website.





Guest Contributor: Morgan Marion, CIG on behalf of Colorado Department of Transportation

CDOT impaired driving prevention efforts extend across two statewide campaigns

The Colorado Department of Transportation (CDOT) leads a variety of initiatives to help keep people safe on Colorado roads. Two of these traffic safety campaigns — *The Heat Is On* and *Drive High, Get a DUI* — aim to prevent impaired driving and save lives. With impaired driving from alcohol, marijuana or other drugs accounting for roughly 33% of all traffic fatalities in the state, these campaigns play a vital role in changing the way people think about driving impaired.

The Heat Is On campaign focuses on education and enforcement for all forms of impaired driving from alcohol to marijuana to prescription drugs. The campaign runs throughout the year with 16 high-visibility enforcement periods centered on national holidays and large public events. Enforcement periods usually include sobriety checkpoints, additional law enforcement on duty and increased statewide messaging dedicated to impaired driving awareness.

In addition to enforcement periods, *The Heat Is On* routinely participates in partnerships with other organizations also dedicated to DUI prevention such as BACtrack®, Lyft and many others. This past holiday season, the campaign launched a ride credit promotion called Gift of Lyft, which distributed 357 \$10 Lyft ride credits to Coloradans who signed an online pledge to never drive impaired. Ride credits were available to residents of either Denver, Colorado Springs or Thornton — areas where DUI fatalities were the highest in 2019.

The Heat Is On enforcement periods are in full swing for 2021, with major campaign pushes planned for the summer months when impaired driving typically spikes. For more information, visit <u>HeatIsOnColorado.com</u>

Since Colorado became the first state to legalize recreational marijuana in 2014, CDOT has remained on the forefront of marijuana-impaired driving education and awareness campaigns. CDOT partners with dispensaries, health care organizations, nonprofits, universities and neighborhood groups to create a dialog about the laws and dangers of driving high.

Last year, CDOT launched its new PSA and *Drive High, Get a DUI* web page, <u>DriveHighDUI.com</u>, which features current data and trends, information on DUI laws and officer training, and practical resources to help inform not only Coloradans but marijuana consumers and industry professionals nationwide. More recently, CDOT released a new fact sheet and tear-off pad to help spread the latest insights on marijuana-impaired driving in Colorado. For digital copies of the fact sheet and tear-off pad, visit <u>https://www.dropbox.com/sh/8mju6oj8hlmtu39/AAB30E9n_hJIMVbP-9MjcR7Va?dl=0</u>

CDOT's 2021 Drive High, Get a DUI campaign will officially launch in April.

ICR Webinar Series

March Webinar: Thursday, March 11, 1 PM MST: Monthly Webinar -Phytocannabinoids, Terpenes, and Neuropathic Pain, Dr. Sara Jane Ward

The ICR is pleased to host Dr. Sara Jane Ward for our March Webinar. Dr. Ward is Assistant Professor in the Center for Substance Abuse Research and Department of Pharmacology at the Lewis Katz School of Medicine at Temple University. She earned her PhD in neuroscience at Wake Forest University, studying the neurobiology of cocaine and heroin addiction and their interactive effects. She conducted her own NIHfunded research under a postdoctoral fellowship at the University of North Carolina at Chapel Hill and Temple University, where she began to study the role of cannabinoids in learning and memory and reward processing. Dr. Ward is currently working on several projects to elucidate the therapeutic potential of non-psychoactive cannabinoids using animal models of CNS injury and disease. She has received funding from both the National Institutes of Health and Department of Defense investigating the efficacy of cannabidiol for the treatment of peripheral and central neuropathic pain. Other projects ongoing in her laboratory



investigate the efficacy of cannabidiol and synthetic cannabinoids on a range of nervous system targets including stroke, traumatic brain injury, dental pain and substance use disorders.

Register Here

April Webinar: Thursday, April 8th at 1:00pm MST, "Cannabinoids and Endocannabinoids in Human Breast Milk", Dr. Cristina Sempio.

Dr. Sempio is Research Instructor in the Department of Anesthesiology at the University of Colorado Anschutz Medical Campus. She earned her PhD in forensic sciences at University of Verona (Italy), developing cutting-edge analytical methods for the screening and quantification of drugs of abuse in different biological matrices. After an internship at the National Institute on Drug Abuse under the supervision of Dr. Huestis, she joined the University of Colorado Anschutz Medical Campus as postdoctoral fellow. Dr. Sempio is currently collaborating on several CDPHE and NIH grants to elucidate the therapeutic potential of cannabinoids and their influence on the endocannabinoids system. Dr. Sempio supervises and manages the iC42 Clinical Research and Development's clinical toxicology laboratory and is responsible for all industry collaborations and analytics for cannabis and hemp-based drug developments. Other projects ongoing in her laboratory investigate the effect of cannabinoids administration on endocannabinoids and lipid mediators. The link for this webinar will be posted to our webpage once it's available.

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The Farm Bill, MORE and Medical Marijuana Research Acts

Nicole Quartiero, MS, CRA

Cannabis research is innately challenging based on the nature of its federal stature as a Schedule 1 drug. Over the past decade, there has been a growing interest in developing therapies and other consumer products derived from cannabis and its components. The FDA among other federal agencies seem to recognize the potential opportunities that cannabis or cannabis-derived compounds could offer and acknowledges the significant societal interest in these possibilities.

As a result of the 2014 and 2018 Farm Bill it is somewhat easier to do research on hemp. The 2014 Farm Bill authorized limited research with low THC cannabis provided it was allowed and controlled by state law. Many, but not all, states put regulations that are very supportive of research into practice. The 2018 Farm Bill expanded anyone's ability to grow and work with hemp. It changed certain federal authorities relating to the production and marketing of hemp. The 2018 Farm Bill was set to expire in October 2020 when states would hold the responsibility for managing hemp programs; however, Congress extended the hemp pilot program through September 2021 as the global pandemic has made it difficult for states to finalize plans and submit them to the USDA for approval (Chmiel 2020). In spite of these challenges, the USDA issued its final rule in mid-January 2021 which will take effect on March 22, 2021. It will be interesting to see how these changes impact hemp cultivation and research.

With respect to marijuana, it does appear that the federal climate around cannabis and cannabis-related research is moving in a different direction that could likely make conducting this research easier in the future. This fall, Congress voted to pass the Marijuana Opportunity Reinvestment and Expungement Act of 2019 (the "MORE Act"). The bill states, "Not later than 180 days after the date of the enactment...the Attorney General shall finalize a rule-making ...removing marihuana and tetrahydrocannabinol from the schedules of controlled substances" (<u>https://www.congress.gov/bill/116th-congress/house-bill/3884</u>). The MORE Act, in essence, would federally legalize marijuana if passed.

In addition to the MORE act, the concerns expressed by researchers with respect to their ability to obtain the product that marijuana consumers actually use may be addressed in the near future as a result of the Medical Marijuana Research Act. Just days after the MORE Act was introduced, the U.S. House of Representatives approved a second bill to promote cannabis research, the Medical Marijuana Research Act. This bill mandates that the DEA license additional growers and not put a limit on the number of other entities that can be registered to cultivate marijuana for research purposes. Additionally, it would require the U.S. Department of Health and Human Services (HHS) to submit a report to Congress within five years after enactment to summarize the results of federal cannabis studies and recommend whether they warrant marijuana's rescheduling under federal law (should the MORE bill not pass the Senate). It also mandates that HHS and the attorney general create a process that would allow scientists to access cannabis from legal dispensaries and manufacturers within their state as well as establish a simplified registration process for researchers interested in studying cannabis. The field of cannabis research will surely grow with the passage of either of these laws (Jaeger 2020).

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- Filing Trademark Applications for Hemp After 2018 (Dec.) Farm Bill. <u>https://www.ny-trademark-lawyer.com/filing-trademark-applications-for-hemp-after-2018-dec-farm-bill.html</u>

The Institute of Cannabis Research is now accepting donations to support future cannabis research. You, our friends, colleagues and supporters, have the ability to help us continue to support cutting edge research by donating to the ICR Research Fund. We hope you will consider contributing to this important opportunity to enhance our understanding of the applications and impacts of cannabis. All donations contributed are tax deductible. Please consider a year-end donation. To donate or to get more information please click on the donate button:



Journal of Cannabis Research

The *Journal of Cannabis Research* (JCR) is the official publication of the Institute of Cannabis Research. It is the only broadly multidisciplinary journal of cannabis research, encompassing not only clinical and scientific research, but also research into social, business, economic, legal, environmental, and ethical impacts of cannabis use and the changing legal status of cannabis. To learn more about the aims and scope of the journal as well as submission guide-lines, please visit: The Journal of Cannabis Research

Recently Published Articles:

Reasons for cannabidiol use: a cross-sectional study of CBD users, focusing on self-perceived stress, anxiety, and sleep problems

Cannabis use is not associated with increased balance disturbances in HIV-infected individuals