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Cinnamon Bidwell, Assistant Professor, Institute of Cognitive Science and Psychology and Neuroscience Co-Director, [CU Change](#), Director, [CU Research and Education Addressing Cannabis and Health \(REACH\) Center](#), PhD, Clinical Psychology & Behavior Genetics, University of Colorado Boulder

Meet the Chair of the ICR Governing Board, Dr. Cinnamon Bidwell

Dr. Cinnamon Bidwell's primary research focus is translational studies investigating the effects of abused drugs and how these effects impact psychological and physical health acutely and chronically. For over a decade, she has been conducting studies of drug dependence, neurobehavior, behavioral genetics, and co-occurring psychiatric disorders. She has expertise in human laboratory studies on cannabis, cannabinoids, alcohol, and nicotine. Dr Bidwell maintains an active interdisciplinary laboratory and multiple research projects in the underlying factors that contribute to successful clinical treatment of psychiatric and substance use conditions. Her current research investigates the direct neurobiological, physiological, and behavioral effects of cannabis and cannabinoids as they pertain to both their abuse potential and potential therapeutic effects. She is actively involved in teaching and training in psychology, neuroscience, and cognitive science at the University of Colorado Boulder.

Dr. Bidwell has published over 60 scientific publications and book chapters on the neurobiology of substance abuse and its overlap with psychiatric disorders. She has received Early Career awards from premier professional societies including the American Psychological Association and the College on Problems of Drug Dependence, and is regularly invited to speak at national and international scientific meetings. Dr. Bidwell's research is funded by the National Institute on Drug Abuse, National Institute on Alcohol Abuse and Alcoholism, the National Center for Complementary and Integrative Health, and the state of Colorado Department of Public Health and Environment.

Dr. Bidwell joined the Governing Board in 2019 as Chair and one of the three representatives from the academic research community. As Chair, Dr. Bidwell seeks to provide vision and leadership that will allow the ICR to achieve its goals of facilitating excellent and innovative cannabis research and education across the state of Colorado. In her role, Dr. Bidwell collaborates with the ICR Director, staff, the full complement of board members, as well as the scientific, industry, and policy leaders around the state.



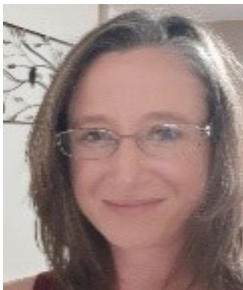
Cannabis Use Survey Instrument Development and Implementation

PI: Dr. Karen Yescavage, Professor of Psychology

Dr. Karen Yescavage is the Principal Investigator conducting a research study on cannabis use (THC and/or CBD) to try to manage psychological pain due to things like stress, anger, anxiety, and PTSD. The purpose is to assess how cannabis impacts (for better and/or worse) negative thoughts and emotions. The title of this project is Cannabis Use and Psychological Pain. If you are 18 years of age or older, we would like you to take an anonymous online survey. It will take approximately 20 minutes for you to complete this survey. Your participation in this research is voluntary. If you decide to participate, you may withdraw your consent and stop participation at any time without penalty. Take the Cannabis Use and Psychological Pain Survey: [Take the Cannabis Use and Psychological Pain Survey](#)

Our lab has met weekly for the past year and a half to review the literature as it pertains to cannabis use and mental health. Students each selected an area of interest to review and together we are writing a manuscript for psychology instructors to help them provide up-to-date empirical data on the impact of cannabis use on individuals with schizophrenia, bipolar, anxiety, PTSD, CUD and those with suicidal ideation. Two of our lab members served in the military and have a particular interest in veterans suffering from PTSD and CUD. We are in the final stages of editing and plan to send it off to the *Teaching of Psychology* journal for consideration by the end of 2020.

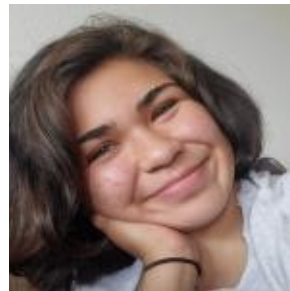
Due to Covid, we've had to shift our in-person lab meetings to meet via zoom. We've used breakout rooms to pair up and help each other work on a section dedicated to a different mental health diagnosis. That these students have continued to show up week after week for lab has been incredible. Needless to say, we are all exhausted from the strain of the pandemic, social isolation, and taking (and teaching) classes online. So, after several months of hard work, I surprised the lab with an impromptu Pictionary game. Instead of working, we collaborated to guess each other's sad, pathetic, but hilarious drawings. I sent words to each of them through private chat and they used the shared whiteboard to draw their words. Weary faces lit up and laughter could be heard across the crackling internet connection. It seems we not only collaborate well together as budding researchers, but through play. We've bonded as a lab, keeping an eye out for each other when any of us is feeling particularly low; I can certainly attest that meeting with them has kept me going through these challenging times. I'm very proud of them all, most especially my trusted lab coordinator Lara Gribble who goes the extra mile to check in on everyone, coordinate zoom meetings, and keep us all on task.



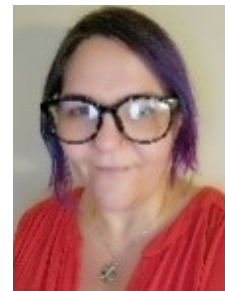
Lara Gribble



Catherine Sebring



Emily Herburger



Francis Martin



Jeremy Bryon Peterson



Wendy Alfonso



Michael Kennedy



Oregon State University
College of Agricultural
Sciences

HARNESSING THE **FUTURE** OF HEMP

Oregon State University to host First National Symposium on Hemp

CORVALLIS, Ore. – Oregon State University’s Global Hemp Innovation Center and the Board on Agriculture and Natural Resources, a major program unit of the National Academies of Sciences, Engineering, and Medicine, will host the first-ever National Hemp Symposium on Feb. 9 and 10th.

Before the hemp season of 2019, Oregon State’s College of Agricultural Sciences launched the Global Hemp Innovation Center, the largest, most comprehensive hemp research center in the nation. The launch coincided with hemp being removed from the federal list of controlled substances and its great potential to become a major agricultural commodity.

“We are at a critical time for the newly emerging American hemp industry that depends on research for science-based decision-making to accelerate progress towards stable production and dependable markets,” said Jay Noller, director of the Global Hemp Innovation Center. “This symposium will offer a deep dive into some of these most pressing challenges and opportunities facing the hemp industry as the future is truly limited only by our imagination.”

The symposium will include presentations from leaders across world economic sectors on what the industry sees as the future and how hemp may fit into their visions. Hemp has the potential to impact a variety of industries, including agriculture, health, energy, manufacturing, food and beverage, transportation, and construction.

Registration is now open for the conference, which also includes a hemp film festival. Names of conference speakers are expected to be announced in coming weeks. For more information about this virtual conference and to register to attend visit: <https://nationalhempsymposium.org/>



Journal of Cannabis Research The Official Publication of the Institute 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 guidelines, please visit: [Journal of Cannabis Research](#)

Here are two recently JCR published articles that are authored by Colorado State University-Pueblo researchers who are supported by the ICR:

[Substance use during pregnancy: impact on Colorado community hospital](#)

[Comparison of cannabidiol to citalopram in targeting fear memory in female mice](#)



**Guest Contributor: George Hodgin, CEO,
Biopharmaceutical Research Company**

Pharmaceutical cannabis: Achieving a consistent product from a highly variable plant “Growing like a weed.”

You’ve no doubt heard this phrase before, in reference to the undesirable, relentless pest plants that overtake our gardens. Perhaps not surprisingly, this phrase is also commonly applied to the cannabis plant.

Nearly anyone can successfully cultivate a cannabis plant to harvest, regardless of skill level. Many cultivars are able to adapt to such a wide range of conditions that it would almost seem like the plant is cultivating itself, with no need for human intervention.

So, what’s stopping the budding home grower from producing a pharmaceutical-grade cannabis product that is well characterized and homogenous and suitable for research. The variable that always comes to mind is quality; of the genetics being cultivated, and the facility that houses and produces them. Low-quality genetics will always produce low-quality products, whether they are grown by an amateur home grower or Ed Rosenthal himself.

Equally important, if not more so, is consistency. Just like every other pharmaceutical or research-grade material, a cannabis product must maintain the same concentration of active pharmaceutical ingredients or chemicals from batch to batch. Plant phenotypes must be selected carefully for their ability to adapt and thrive in the production environment, while also maximizing the yields of these active ingredients.

Finding the phenotype, you’re looking for is a game of numbers. The more seeds you plant, the more likely you are to achieve the final product you are looking for. This often results in hundreds or thousands of plants being propagated, flowered, tested, and tracked closely for months to find just a few suitable individuals (if you’re lucky!). To cultivate and discover these high-quality genetics, while avoiding issues of pest and disease that plague high-density cannabis grows, you need a facility of equal quality that is capable of protecting this large number of plants from the outside environment.

An indoor cultivation operation is a must when considering the quality and consistency requirements of a pharmaceutical-grade product. cGMP compliant procedures significantly reduce the risk of product contamination by pests, mold, or bacteria that is common in many cannabis production operations. While pharmaceutical cannabis does not necessarily have to be grown to organic certification standards, pesticides are strictly off-limits for all products of this grade to protect the health of patients.

Once the desired phenotype is identified, the cleanroom environment allows an operation to quickly scale up and produce thousands of healthy, genetically identical clones. This lays the foundation for the clean and consistent production of cannabis flower on a commercial scale.

Even with plants that are genetically identical, product inconsistencies can still arise quickly and easily in any cultivation space if some key elements are not monitored closely. Issues with water flow and clogged drip lines can cause a small number of plants to experience drought stress, which can significantly diminish quality and concentration of active ingredients for the plants in question. Likewise, a single defective light, or an area with inadequate or excessive airflow, will alter the quality and yield of product grown in the affected area.

These variables must be closely controlled through extensive monitoring and data collection, along with the use of automation. Automated irrigation needs to occur on a regular schedule, with irrigation flow and volume monitored daily for irregularities. Lighting and ventilation measurements must be recorded throughout the room during the production cycle to ensure a consistent environment from plant to plant.

Cultivation strategies must be implemented to guarantee uniform product quality in each batch, using targeted pruning and biomass removal to prevent the variation in product that can even occur within a single plant if growth is not closely controlled. (Continued on page 5)

Through the process of becoming a pharmaceutical, cultivating a simple plant becomes a surprisingly complex task, and this has become the focus of our work at BRC. Our federally compliant facility houses multiple isolated cultivation rooms in a cGMP environment and is capable of producing cannabis genetics that meet a wide range of product specifications. We, like many other facilities across the country, are awaiting DEA approval to put our facility to use producing federally legal cannabis to support clinical research. Ultimately, we expect that BRC and other entities across the country will be producing pharmaceutical cannabis under a DEA license, which will be available to meet the needs of researchers.

While waiting for DEA permission to commercialize federally legal cannabis for clinical research, we work with several international partners to assist researchers in importing a variety of federally compliant cannabis study materials. In working with several university researchers, we've assisted them in obtaining DEA-compliant cannabis products from sources other than NIDA. Importing study materials is one way that we and others access a product for research that the NIDA Drug Supply doesn't offer.

For one study, a researcher needed a high THC study material to examine the effects of high THC smoked plant material in animal models. Unfortunately, NIDA didn't have the potency this researcher desired- so we helped them import the product under DEA permitting.

In a second example, an investigator's protocol required a specific profile of cannabinoid oil that wasn't available from the NIDA supply. We worked with the investigator to facilitate the sourcing and importation of the specialty oil and all of the regulatory clearances.

These examples illustrate that when there is a will, there is a way for researchers to work within the regulatory system to access cannabis study products so long as strict compliance is followed throughout. The future of cannabis research, while bumpy at times, is bright indeed.

The views and opinions expressed in this article are those of the author and do not necessarily reflect the official policy or position of the ICR or of CSU Pueblo.

ICR Webinar Series

January Webinar: Due to unforeseen circumstances, the January 2021 ICR Webinar will be postponed to a future date. Information will be disseminated when this webinar has been re-scheduled.

February Webinar: The ICR is pleased to host Dr. Ashley Brooks-Russel for our February Webinar, on Thursday, February 11 at 1:00pm MST, entitled 'Cannabis impaired driving and questions about tolerance'. Please watch for more information on this and other webinars on the following link: <https://www.csupueblo.edu/institute-of-cannabis-research/webinar.html>



Dr. Brooks-Russell is an assistant professor and Director of the Program for Injury Prevention, Education and Research Program at the Colorado School of Public Health, CU Anschutz. She completed her PhD in Health Behavior at the University of North Carolina at Chapel Hill and a postdoctoral fellowship at the National Institute of Child Health and Human Development (NIH). Her recent work has focused on cannabis use and the association of policy changes with changes in cannabis use and related outcomes.