

November 2023 e-Newsletter Volume 20

2024 CRC CONFERENCE

Save the Date!!!

The 2024 Cannabis Research **Conference Dates are Announced!!** August 7-9, 2024, Ft. Collins, Colorado







HOSTED BY





This Issue

- 2024 CRC Conference Dates Announced CR Governing Board Member Dr. Melissa
- Reynolds ICR Research Spotlight -Dr. Sanghyuck Park
- JCR Highlights Recently published articles Events of Interest
- SOCO Alliance Lunch and Learn

Upcoming Webinars:

- Cannabis Research-Dr. Emily Bates Nov 9th, 1:00pm MT Cannabis Research- Dr. Jane Metrik Dec 14th, 1:00pm MT
- Cannabis Cultivation Nov 15, 11:00am MT Dr.Céline C.S. Nicole-de Groot and Dr. Sabrina Carvalho
- A Deeper Look at Hemp -Dr. Eunsoo Kim



Scan for more information about the ICR

Vol. 20

ICR GOVERNING BOARD



Welcome To Our New Board Member Dr. Melissa Reynolds

Dr. Melissa M. Reynolds currently serves as the Faculty Director of the University Campus Core Research Facilities, the Director of the Panacea Life Sciences Cannabinoid Research Center, and Professor and Boettcher Investigator in the Departments of Chemistry and Biomedical Engineering at Colorado State University in Fort Collins, CO. As the Faculty Director of Campus Core Research Facilities, she provides administrative leadership and vision to the core ecosystem comprised of twenty-three facilities spanning seven colleges and the graduate school.

Professor Reynolds is also the Director of the newly established Panacea Life Sciences Cannabinoid Research Center, a state-of-the-art analytical research lab. This multifunctional, collaborative space is designed for next-generation

Dr. Melissa Reynolds

methodologies from the benchtop, intermediate, and production scales. The space was built in partnership with Panacea Life Sciences and serves as the campus's premier analytical facility for cannabinoid research, terpene, flavonoid, pesticide, residual solvent testing, and more.

As a professor and Boettcher investigator in the Departments of Chemistry and Biomedical Engineering, Dr. Reynolds's research interests are broadly defined within the areas of the development and synthesis of new biomedical materials, applied and fundamental studies of Metal-Organic Frameworks (MOFs), and analytical methods development. Her interest in biomedical materials development includes the synthesis of prodrugs to simultaneously detect and kill bacteria, glucose biosensing, fabrication of biomass-sourced and biodegradable nitric oxide-releasing polymers, the creation of new pediatric cancer therapeutics, and the creation of new materials to improve extracorporeal membrane oxygenation. Her work with applied areas of MOF research includes research includes the development of next-generation glucose biosensing, fluorescence-based sensing of heavy metals, incorporating MOFs into biocompatible (continued)

medical devices, and MOF-based high-performance liquid chromatography (HPLC) separations. Fundamental areas of MOF research include thermal/materials analysis of MOF catalysts, the development of flow catalysis systems with MOFs, and kinetic/mechanistic investigations into MOF biocatalysis.

Some of Dr. Reynolds's current projects are related to the analytical method development and generation of liquid chromatography-mass spectrometry (LC-MS) separation and detection methods to analyze the safety and biocompatibility of biodegradable medical devices, fast and easy LC-MS-based detection methods for fungal infection biomarkers, and MOF based HPLC separations.

Dr. Reynolds has published more than 110 peer-reviewed scientific articles in a diverse assay of prestigious journals, including the Journal of the American Chemical Society, the Journal of Neuroscience, Frontiers in Physics, Langmuir, the Journal of Chemical Education, and the Journal of Cannabis Research, to name a few. She has filed more than 30 patents, and her work has been highlighted in publications including Newsweek, Northern Colorado Business Report, Research Colorado, Bizwest Media, and the Boettcher Foundation. Dr. Reynolds has received over \$15M in external grant support and is a frequent reviewer for internal, national, and international funding agencies, including the National Science Foundation, the National Institutes of Health, the Department of Energy, and the Department of Defense.

Dr. Reynolds has successfully mentored dozens of undergraduate students, graduate students, and postdoctoral fellows and is the recipient of the 2011 Colorado Bioscience Association's Educator of the Year. Professor Reynolds received her B.S. in Chemistry from Washington State University and her Ph.D. in Chemistry from the University of Michigan.

e-Newsletter

Vol. 20

ICR RESEARCH

News from Dr. SangHyuck Park, ICR's Senior Scientist

Following the successful 7th Annual Cannabis Research Conference held in Denver from August 3-5, ICR has initiated discussions for a potential international partnership with JunBuk National University in South Korea and the School of Veterinary Medicine and Animal Science at São Paulo State University in Botucatu, São Paulo, Brazil. An MOU is set to be signed in the near future, enabling the exchange of knowledge on recent trends in cannabis research in medicine and advancing our understanding of cannabinoid use.

As an initial outcome, ICR scholar Dr. Kim will be visiting the Pharmacy Department at JunBuk National University to deliver a series of lectures on the origin, history, and agricultural significance of cannabis on November 22 and 23. During this visit, discussions will also revolve around potential research collaboration and national grant applications to South Korea.

Furthermore, Dr. Park, a senior scientist, is planning to travel to South Korea to present an invited talk at the 2023 Korea Hemp Industry and Academic Joint Conference & K-Hemp Expo, focusing on "Research Trends and Legality of Cannabis in the US."



Dr. SangHyuck Park



Dr. Eunsoo Kim





November 2023

e-Newsletter

Vol. 20

ICR RESEARCH (CON'T)

Dr. Park's research team, with Ms. Carolina Corredor, Visiting Scholar for the ICR and Doctoral Candidate, as the first author, recently published a research article titled "Beneficial Properties of Soil Bacteria from Cannabis Sativa L.: Seed Germination, Phosphorus Solubilization, and Mycelial Growth Inhibition of Fusarium Sp" in the September 2023 issue of Rhizosphere. This link to this paper can be found here:

https://www.sciencedirect.com/science/article/pii/S2452219823001192

During the summer, ICR hosted Laura Livelli from the University of Colorado – Colorado Springs as an intern from July to August. She worked on investigating the therapeutic effects of cannabidiol as a burn treatment and actively participated in the ICR-hosted cannabis research conference alongside ICR researchers.



Visiting Scholar for the ICR and Doctoral Candidate Carolina Corredor-Perilla



Journal of Cannabis Research

The Journal of Cannabis Research (JCR) is the official publication 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 ab<u>out the aims and scope of</u> <u>the jo</u>urnal as well as submission guidelines, please visit: <u>Journal of Cannabis Research</u> Please see two recent article here:

- <u>The safety of lookalikes: a new THC beverage enhancer and a non-THC counterpart</u> <u>https://jcannabisresearch.biomedcentral.com/articles/10.1186/s42238-023-00188-7</u>
- <u>Topical cannabidiol is well tolerated in individuals with a history of elite physical performance</u> <u>and chronic lower extremity pain:</u> <u>https://jcannabisresearch.biomedcentral.com/articles/10.1186/s42238-023-00179-8</u>



e-Newsletter

Vol. 20

EVENTS OF INTEREST

Black Hills Energy Indoor Ag Program



When signing up with our program through Black Hills Energy, your cannabis business will receive a free on-site assessment with your local Energy Advisor. Your report will include calculated energy usage, environmental measurements, suggested operation hours, and suggestions to help optimize your facility for optimal growing conditions.

Black Hills Energy Indoor Ag Program comes at no cost and is tailored to help cannabis businesses become more energy efficient while providing up to 50% in rebates for new energy efficient equipment and installation.

To learn more about this program or sign up please reach out to Karli Smokoff with Franklin Energy at <u>ksmokoff@franklinenergy.com</u> or by phone at 970-648-4243

The SoCO Cannabis Alliance invites you to a dynamic Lunch and Learn on November 8th, 2023 from 10am to 1pm, at the Pueblo Convention Center in Pueblo, Colorado. This event is designed to foster learning and collaboration, bringing together industry experts and enthusiasts to network and explore essential topics that are trending in the Southern Colorado Cannabis Industry.

We are thrilled to have speakers from various fields who will share their insights and expertise:

• Nathan Ortiz – Adjunct Professor/ Curriculum Writer at Community College of Denver

Has a degree in Tropical Plants and Soil Science – Plant Production and Management from UH Mānoa, with a background in commercial aquaponics and hydroponics as well a cannabis cultivation. Nathan is the owner of HI Standards Consulting and is currently teaching Cannabis Botany and Horticulture at the Community College of Denver.

• Dr. Jeff Smith – Strategic Partnership and Outreach Specialist / Professor of Biology at CSU Pueblo

Is a neuroscientist who earned his PhD at the University of New Mexico School of Medicine. I also hold bachelor's degrees in both biology and chemistry. I did my postdoctoral work at several institutions including the University of Minnesota School of medicine Duluth where I was an assistant professor, at the University of British Columbia, and at the University of Melbourne Australia where I conducted research on the etiology and treatment of Alzheimer's disease. I have been at CSU Pueblo for 17 years where I teach and have active research in the biochemical mechanisms that underlie learning and memory including scientific publications on how cannabinoids can affect that.

• Dr. Sang Hyuck Park – ICR Senior Scientist / Research Liaison at CSU Pueblo

With extensive research experience in plant biology and genetics, Dr. Sang-Hyuck Park provides leadership with multi-tier ICR cannabis research projects. This research primarily involves cannabis genetics and chemistry and more recently, he has been focused on uncovering genetic regulations underlying agronomically important traits including cannabinoid/terpene biosynthesis.

Empowering Our Community with educational seminars to networking events, we're working hard to provide opportunities for learning and connection.





e-Newsletter

Vol. 20

UPCOMING WEBINARS



Institute of Cannabis Research

Cannabis Research Webinar Series



Lambert Center for the Study of Medicinal Cannabis & Hemp

November Webinar: The ICR and Lambert Center are pleased to host Dr. Emily Bates for the webinar on Nov 9th at 1:00PM MST <u>Register Here</u>

Title: "Is CBD safe to take during pregnancy? Postnatal consequences of CBD exposure during gestation"



Dr. Emily Bates

Dr. Emily Bates earned her PhD at Harvard Medical School and completed postdoctoral training at UCSF. She is an associate professor at University of Colorado Anschutz Medical campus.

Dr. Bates lab focuses on how ion channels impact embryonic and fetal development. Ion channels are the targets of medications for migraine, epilepsy, nausea, cardiac arrythmias, and depression. Regulation of ion channels is also altered by components of cannabis such as THC and cannabidiol (CBD). Many of the ion channels CBD affects are expressed in the developing brain, suggesting that maternal CBD consumption during pregnancy could alter offspring brain development.

Funding from the Institute of Cannabis Research enabled Dr. Bates and her student, Karli Swenson, to perform important experiments to discover that oral CBD consumption during pregnancy increases the perception of pain, decreases cognitive ability, and decreases activity of the cortex in mouse offspring.

December Webinar: The ICR and Lambert Center are pleased to host Dr. Jane Metrik for the webinar on December 14th at 1:00PM MST <u>Register Here:</u> Title: Cannabis and Alcohol Co-Use and Comorbidity

Jane Metrik, Ph.D., is Professor in the Departments of Behavioral and Social Sciences and Psychiatry and Human Behavior at Brown University based at the Center for Alcohol and Addiction Studies. She holds a joint appointment at the Providence VA Medical Center, as a research scientist and as a licensed clinical psychologist. Trained in the Joint Doctoral Program in Clinical Psychology at the University of California, San Diego/San Diego State University, Dr. Metrik completed Brown's clinical psychology internship and postdoctoral fellowship at CAAS before joining faculty in 2007. She directs an NIH-funded program of research focused on cannabis behavioral pharmacology, ecological momentary assessment studies, and clinical trials examining mechanisms that influence the



etiology and maintenance of cannabis use disorder and comorbidity with alcohol use and psychiatric disorders. She also directs a program of research funded by the Department of Veterans Affairs focused on treatment of comorbid substance use disorders and mood disorders and cannabinoid-based pain treatment in Veterans. Dr. Metrik is a core faculty member at Brown University where she trains postdoctoral fellows at the Center for Alcohol and Addiction Studies as well as postdoctoral fellows and psychology residents in the Clinical Psychology Training Consortium. November 2023

e-Newsletter

Vol. 20

UPCOMING WEBINARS

Institute of Cannabis Research

Cannabis Plant Science and Cultivation Webinar Series DON UNITIVITE CELEBRATING IN FARS

November Webinar: The ICR Hemp Farmers Association is pleased to host Dr. Celine Nicole and Dr. Sabrina Carvalho on November 15th at 11:00AM MST <u>Register Here</u> <u>Title:</u> "Light Intensity, Spectrum, and Intercanopy Lighting for Cannabis"

Dr. Céline C.S. Nicole-de Groot is a senior researcher at Philips since 2001. She has expertise in physics, plant sciences, chemistry, thermodynamics, light, data analysis and sensing technology. The last 14 years, she has accumulated expertise in technology and light for greenhouse and indoor horticulture. Specialized on quality and nutrition content of food, growth and pre- or post-harvest quality of various horticultural crops under LED lighting. Crop expertise extends from vegetables, fruits, floriculture and medicinal cannabis (optimizing yield and compounds for medicine). She is conducting since 2015 research on nutritional food compounds and quality and since 2018 on medicinal Cannabis as well. She is Research Program Lead for the indoor farming research in the Netherlands and is also contact for open innovation programs (University, Public/Private programs). She is supervizing and co-promoting University students (PhDs, Msc, Bsc) at Wageningen University&Research, HAS and other institutes.

Dr. Sabrina Carvalho is a senior plant specialist for the cannabis sector at Philips Horticulture LED solutions since 2019. She is the Cannabis R&D Program Lead at the global market. She has expertise in plant biology and ecology, plant secondary compounds, spectroscopy and light. Her experience has been applied from open field precision agriculture to vertical farming start-ups. The last 10 years, she has accumulated expertise in precision agriculture and indoor horticulture, specialized on Cannabis cultivation (optimizing yield and compounds for medicine) under LED lighting.



Dr.Céline C.S. Nicole-de Groot



Dr. Sabrina Carvalho

November 2023

e-Newsletter

Vol. 20

A DEEPER LOOK AT HEMP

The Internal Structure of Cannabis Stems

The transverse section of the Cannabis stem shows the distribution of vascular, ground, and dermal systems. The latter comprises a single-layered epidermis, but the ground system comprises the cortex and the pith. Large phloem fibers mark the outer limit of the vascular system. A vascular cambium separates the phloem from the secondary xylem called hurd or shive. (LM, fast green-safranin)



