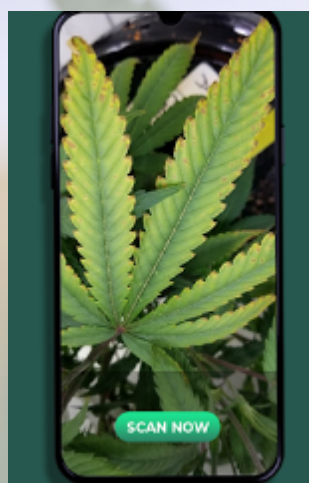# ICR PARTNERSHIPS

The GrowDoc App is revolutionizing the cannabis growing industry with its innovative AI diagnosing technology.

Traditionally, identifying and addressing issues in a cannabis grow can be a time-consuming and labor-intensive process. Growers often have to rely on their own expertise and resources to troubleshoot problems and make necessary adjustments.

The GrowDoc App's AI diagnosing technology aims to change all that. By using advanced algorithms and machine learning techniques, built with data from Cannabis research, the app is able to analyze an image of a symptomatic cannabis leaf and accurately identify any issues that may be affecting the plants. Whether it's a nutrient deficiency, pests, or some other issue, the AI is able to quickly pinpoint the problem and provide recommendations for resolution.

This technology has the potential to greatly streamline the cannabis growing process, saving growers time and resources while also helping to optimize their yields. And with its user-friendly interface and accessibility on mobile devices, GrowDoc is making this cutting-edge technology accessible to growers of all levels.

As a startup in the cannabis industry, GrowDoc has had to navigate a complex and rapidly changing landscape. In many states & across the globe, the legal status of cannabis is still in flux, with different regulations governing its cultivation, sale, and use. This can make it challenging for cannabis businesses to establish themselves and gain a foothold in the market.GrowDoc has managed to overcome these obstacles and establish itself as a leader in the cannabis tech space. And with its user-friendly interface and accessibility on mobile devices, it's well-positioned to continue growing and innovating in the years ahead.

GrowDoc is proud to work with Dr. Park and the ICR to further refine and improve its AI technology and build upon their robust dataset.

Currently, GrowDoc has just begun their seed round fundraising to grow the company and is developing its product to fit the needs of large-scale licensed growers across the globe.

As the cannabis industry continues to grow and evolve, it's clear that technology like the GrowDoc App's AI diagnosing will play a crucial role in helping growers succeed. Its impact is sure to be felt for years to come.

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- **March 9th** 1:00PM MST Dr. Adie Rae Wilson-Poe
- **April 13th,** 1:00PM MST Jessica S. Kruger, PhD

Cultivation Webinar Series:
- **March 15th,** 11:00AM MST Dr. Clinton Shock
- **April 19th,** 11:00AM MST Dr. David (Dedi) Meiri

A Deeper Look at Hemp
- Dr. Eun-Soo Kim

ICR PARTNERSHIP HIGHLIGHT
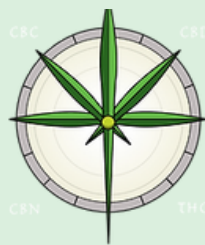
Introducing the CEO of GrowDoc

As the CEO of GrowDoc, Daniel Lirette has played a pivotal role in the company's rapid rise in the cannabis tech space.

Lirette founded GrowDoc in late 2019 with the goal of creating a user-friendly platform that would help cannabis growers diagnose their unhealthy cannabis plants with ease and provide a research-based resource for accurate information and images of cannabis plant problems. One of his key innovations is the AI diagnosing technology. This technology has helped GrowDoc App to stand out in the crowded cannabis tech space, and it has won the company numerous accolades and industry recognition.

Mr. Daniel Lirette

But Lirette's contributions to the company go beyond just the technical side of things. In 2020 he joined forces with co-founder & COO Kieran Oliver-Giasson. Together they have been instrumental in building a strong company culture and fostering a sense of community among GrowDoc's employees and customers.

With a background in computer science and a passion for cannabis, Lirette is uniquely qualified to lead GrowDoc App into the future. As the company continues to grow and evolve, it's clear that Lirette's vision and leadership will be key to its success. "

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JOURNAL OF CANNABIS RESEARCH

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 guidelines, please visit: Journal of Cannabis Research

Please see two recent articles here:

- [Chemical constituents of industrial hemp roots and their anti-inflammatory activities](#)
- [Systematic combinations of major cannabinoid and terpene contents in Cannabis flower and patient outcomes: a proof-of-concept assessment of the Vigil Index of Cannabis Chemovars](#)

The Institute of Cannabis Research is accepting donations to support future cannabis research. You, our friends, colleagues and supporters, have the ability to help us continue with cutting edge research by donating to the ICR Research Fund. Please consider contributing to this important research to enhance our understanding of the applications and impacts of cannabis. All donations contributed are tax deductible. Please consider a year-end donation or feel free to contact the Foundation Office to learn of donations through wills, trusts, and etc.

[**Donate Here**](#)

ICR RESEARCH

Institute of Cannabis Research
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Our funded FY23 Research Studies have been announced. Funded projects focus on topics related to cannabis research, including biology, chemistry, physiology, and agronomy; medical and clinical research; and public health and harm reduction/societal impacts. These projects have an anticipated start date of October 1st. Please find the link to all of the FY23 awardees here:
https://www.csupueblo.edu/institute-of-cannabis-research/research/research-studies/index.html

Duncan Mackie, PhD, Director of Pharmacology & Experimental Therapeutics, MedPharm Holdings and
Cinnamon Bidwell, PhD, Institute of Cognitive Science Faculty, Assistant Professor, University of Colorado Boulder

Isolation and Pharmacological Evaluation of Phytocannabinoids for Alzheimer's Disease

Dr. Duncan Mackie and Dr. Cinnamon Bidwell

Our research group has a longstanding interest in the activity of cannabinoids for the treatment of inflammatory neurological diseases such as Alzheimer's disease. The purpose of this proposal is to further develop methods of isolation to purify unique cannabinoids and characterize the effects of cannabinoids and cannabinoid mixtures on immune function via microglia activation states. Microglia are macrophages located in the central nervous system (CNS) and are the main immune defense in the CNS. During neurodegenerative disorders, microglia actively secrete inflammatory factors. This abundance of inflammatory signaling contributes to the neuronal damage observed in Alzheimer's disease. To resolve the pro-inflammatory condition, microglia switch activation states and are able to inhibit the inflammatory response. Our hypothesis is that purified cannabinoids will attenuate the activation of microglia by shifting the microglia into the inhibitory state and thus reducing microglial inflammatory signaling. Ultimately, this work will provide the mechanistic basis for the development of cannabis-derived therapeutics for the treatment of neurological diseases with an inflammatory component.

UPCOMING WEBINARS

Institute of Cannabis Research at Colorado State University Pueblo | Cannabis Research Webinar Series | Jefferson Thomas Jefferson University | Lambert Center for the Study of Medicinal Cannabis & Hemp

March Webinar: The ICR and Lambert Center are pleased to host Dr. Adie Rae Wilson-Poe for the webinar on March 9th at 1:00PM MST Register Here:
Title: "The Unintended Negative Impact of Adult-Use Cannabis Legalization on the Wellbeing of Medical Cannabis Patients"

Dr. Wilson-Poe received her BS in Psychology and her PhD in Neuroscience from Washington State University, where she focused on the pain-relieving properties of opioids and cannabinoids. Adie followed up on this training by taking a post-doctoral position at Sydney University in Australia, where she was awarded a National Research Service Award from the National Institute on Drug Abuse (NIDA) to study the synaptic physiology of cannabinoids and opioids.

Dr. Wilson-Poe continued her post-doctoral training at Columbia University, where she broadened her expertise to include the dynamic interaction between drug abuse and chronic pain. As a junior faculty member at Washington University in St. Louis, Adie was awarded a prestigious Pathway to Independence Award from NIDA, which integrates all previous facets of her work.

Adie joined Legacy Research Institute in June of 2019, and she currently utilizes translational and clinical research approaches to further characterize the analgesic and harm-reducing properties of cannabis, in the context of opioid use.

Dr. Adie Rae Wilson-Poe

April 13th Webinar: The ICR and Lambert Center are pleased to host Dr. Jessica S. Kruger, for the webinar on April 13th at 1:00PM MST Register Here:
Title: "The Alphabet Soup of Alternative Cannabinoids"

Jessica S. Kruger, PhD, MCHES, is a health educator whose research focuses on consumption and addictive behaviors, health behavior decision-making and pedagogy in public health. She collaborates with a wide variety of community-based organizations and advises students at the Lighthouse Free Medical Clinic and the Seneca-Babcock Community Center, both in the Western New York area. Kruger is the vice-chair of the board of directors for the Society of Student-Run Clinics and focuses on increasing the interprofessional collaboration in free clinics around the U.S. She also serves as a member of the leadership team of Interprofessional Education and Collaborative Practice at UB.

Dr. Jessica Kruger

UPCOMING WEBINARS

Institute of Cannabis Research
COLORADO STATE UNIVERSITY PUEBLO

CANNABIS CULTIVATION
Webinar Series

VOLCANI INSTITUTE CELEBRATING 100 YEARS

March Webinar: The ICR Hemp Farmers Association is pleased to host Dr. Clinton Shock on Wednesday, March 15th, at 11:00AM MST <u>Register Here:</u>
**Title: "Cost competitive hemp production for cannabinoids"**

Dr. Clinton C. Shock, PhD in Plant Physiology, University of California, Davis; Professor Emeritus Oregon State University; Certified Professional Horticulturalist
Clint has enthusiasm for plants and seeks to use science and education to solve horticultural, environmental,economic, and social problems. His research has developed economically viable options that are voluntarily implemented by growers. As Director of an Oregon State University experiment station from 1984 to 2018 he headed cooperative efforts to improve growers' yields and profitability while simultaneously correcting environmental problems. His work resulted in drip irrigation technology options for onion growers and improved groundwater quality in the Treasure Valley of Oregon and Idaho.Clint has studied thewater use requirements of many crops and crop yield and quality responses to carefully managed irrigation. He has supported professionally several watershed councils since their inception.These councils have designed, funded, and implemented over a hundred diverse watershed restoration projects. Clint has envisioned and generated win-win solutions to problems such as credit and market access for poor growers in the Brazil, revegetation in the Amazon, "sugar end" of potato in the Pacific Northwest of the US, and groundwater contamination and irrigation induced erosion in the Treasure Valley. In China Clint helps drip irrigation research. Currently Clint is conducting horticultural research and breeding on medicinal crops.
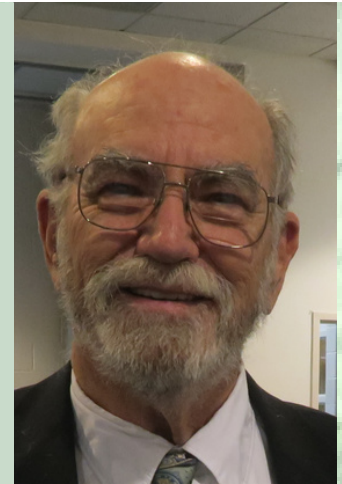
Dr. Clint Shock

April Webinar: The ICR Hemp Farmers Association is pleased to host Dr. David (Dedi) Meiri on Wednesday, April 19th, at 11:00AM MST <u>Register Here:</u>
Title: "TBD"
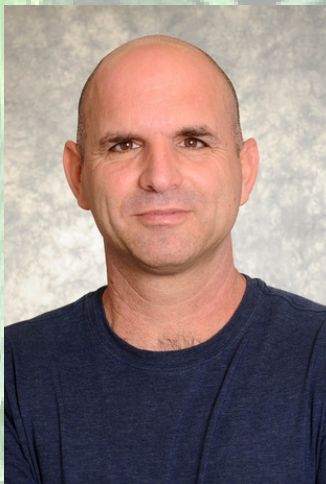
Associate Professor David (Dedi) Meiri heads the Laboratory of Cancer Biology and Cannabinoid Research at the Faculty of Biology, Technion – Israel Institute of Technology, where he is also a member of the Technion Integrated Cancer Center (TICC).
Dr. Meiri comes from a highly diverse scientific background. He holds an M.Sc. in biochemistry and a Ph.D. in plant biotechnology from Tel Aviv University. He conducted his post-doctoral fellowship at the Ontario Cancer Institute where he focused on the role of the GEF-H1 protein in tumor invasion and metastasis, receiving in a short time worldwide recognition as an expert in the fields of G-protein coupled receptors and small GTPases.
Presently, Dr. Meiri's lab investigates the vast therapeutic potential of cannabinoids and other bioactive components in various species of cannabis, as well as endogenous cannabinoids from the human body. On top of the research on cannabis, the lab is also studying secondary metabolites from algae and psychedelic mushrooms. The lab's current research interest is how these naturally occurring metabolites affect various types of cancer, inflammatory diseases and disorders of the nervous system such as epilepsy, Alzheimer's and others. The lab consists of a highly trained team of skilled professionals and students, working in synergy to achieve the highest level of results, to better understand the complexity and diversity of cannabis and other natural components, and realize their full therapeutic potential for human health.
Dr. Meiri is also highly involved in governmental regulations and is a residing member in several Israeli Ministry of Health committees that seek to advance the fundamental understanding of optimal cannabis usage and curtailing adverse effects.

Dr. David (Dedi) Meiri

The scanning election microscopy technique enables the deeper investigation of cannabis tissues (e.g., flower formation, trichome, pollen, and root development) and the in-situ observation of dynamic developmental processes. The technique will be essential to better understand the cannabis growth and development, as well as cannabinoid production.

A Deeper Look at Hemp - Scanning electron microscopy images presented by Dr. Eunsoo Kim, Visiting Scientist

This scanning electron micrograph shows two large oil bodies (OB) and a small oil body (arrow) in Cannabis cotyledonary cells. Oil bodies are spherical in shape and varied from 0.5 µm to 6.5 µm in diameter. CW: cell wall