



Dr. Joanna Zeiger

## Introducing Dr. Joanna Zeiger, new member of the ICR Governing Board

Joanna Zeiger, MS, PhD, raced as a professional triathlete from 1998-2010. She placed 4<sup>th</sup> in the triathlon at the 2000 Sydney Olympics and placed 5<sup>th</sup> in the Hawaii Ironman 5 weeks later and won the 2008 Ironman 70.3 World Championships in world record time. She is a seven-time Olympic trials qualifier in 3 sports – marathon (3), triathlon (3) and swimming (1). Joanna still pursues her passion for sports as a top Masters runner and does the occasional triathlon charity relay.

When she is not training, Dr. Zeiger works as a cannabis epidemiologist, one of the few in the United States. She brings over 10 years of cannabis experience, including 8 years at the Institute for Behavioral Genetics at CU Boulder where she studied drug use and abuse in adolescents and young adults and 3 years as Founder & CEO of [Canna Research Foundation](#), a nonprofit organization. CRF is a consortium of researchers whose goal is to understand the role of cannabis knowledge, attitudes, patterns of use, and benefits/adverse effects in various populations to better understand the efficacy and safety of medical cannabis. Dr. Zeiger has been the PI on studies regarding cannabis use in athletes as well as studies in patient and physician groups. She is also in the process of creating educational materials about cannabis for allergists (cannabis allergy is an up-and-coming by-product of increased cannabis use and/or occupational exposure due to legalization in many states).

Dr. Zeiger was on the ICR Scientific Advisory Counsel from 2018-2021 and was on the ICR Cannabis Research Conference planning committee for the 2021 virtual conference. By serving on the ICR Governing Board, Dr. Zeiger endeavors to help facilitate further cannabis research in Colorado, advocate to reduce the stigma surrounding cannabis, and support making Colorado a leader in all facets regarding cannabis.

Joanna's education took her to Brown University (BA), Northwestern University (MS), and Johns Hopkins Bloomberg School of Public Health (PhD). Joanna's book [\*The Champion Mindset: An Athlete's Guide to Mental Toughness\*](#) (St. Martin's Press) was published in February, 2017.

Dr. Zeiger's motto has always been, and always will be, Go Hard, Have Fun.

### In this Issue:

Dr. Joanna Zeiger – New ICR Governing Board Member

ICR Research — Trevor Regas, Biology MS candidate

JCR Highlights: Recently published articles

ICR Webinar Series: \*January - Dr. Staci Gruber,  
\*February—Dr. Yasmin Hurd

Cannabis Cultivation and Management Webinar Series  
February— Dr. Nirit Bernstein

Emerging Scientist Award

DEA Compliant Agencies for Research Testing needs

## Emphasis on cannabis research, focusing on environmental factors that influence morphological and chemical characteristics in cannabis



**Trevor Regas, Biology Master's Degree Candidate: Colorado State University Pueblo**

Within the rapidly evolving cannabis industry, cultivators alike are redesigning and implementing new cultivation practices to meet industry demands such as producing a high-quality product in a timely manner. Similarly, research scientists are exceedingly seeking more efficient propagation methods to carry out important cannabis related research that saves time and provides a more economic approach. To help facilitate these needs, our team experimented with a unique cannabis cloning system which allows for the rapid regeneration of desired cannabis genetics in a short time period, while balancing cost effectiveness. The aeroponic cloning system proved to be a stable tool for quick root formation with limited pathogen expo-

### **Trevor Regas, Biology-MS**

sure and is discussed in great detail in our recent publication, "Employing Aeroponic Systems for the Clonal Propagation of Cannabis" <https://www.jove.com/t/63117/employing-aeroponic-systems-for-the-clonal-propagation-of-cannabis> in the Journal of Visualized Experiments (JoVE), a protocol focused journal. Along with our publication, we had the privilege to extend our collaboration with JoVE to document our cannabis cloning procedure visually, using high-tech camera gear to film important steps. Working closely with the JoVE team was a fun and memorable experience that I'll reflect on for years to come. On a personal level, this was a very rewarding experience to be able to provide a written as well as recorded steps that can aid cultivators and research scientists to efficiently propagate cannabis plants. It's my hope that this information will be practiced in cannabis research labs as well as professional cultivation facilities. Our recent publication is just one fragment of a much larger area of study that requires persistent devotion so we as scientists and cultivators can become more proficient in our research and practices to fully exploit cannabis for its unique medicinal properties.

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.

## Donate Here

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 above.



## 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](#)

Here are two recently published articles in the JCR that may be of interest:

- [A LC-MS/MS method with electrospray ionization and atmospheric pressure chemical ionization source for analysis of pesticides in hemp](#)
- [Effects of short-term environmental stresses on the onset of cannabinoid production in young immature flowers of industrial hemp \(\*Cannabis sativa\* L.\)](#)

## Upcoming Event:

**Mark your calendar for the next Cannabis Research Conference, August 8-10, 2022 in Corvallis, Oregon. More information coming!**



August 8-10, 2022  Oregon State University  Corvallis

HOSTED BY



Oregon State University  
Global Hemp  
Innovation Center



Institute of  
Cannabis Research  
COLORADO STATE UNIVERSITY-PUEBLO





**Institute of Cannabis Research**  
at Colorado State University Pueblo

**Cannabis  
Research  
Webinar  
Series**



**Jefferson**  
Thomas Jefferson University

**Lambert Center for  
the Study of Medicina  
Cannabis & Hemp**

**January Webinar:** The ICR and Lambert Center are pleased to host Dr. Staci Gruber for the webinar on January 13th at 1:00PM MT.



Dr. Staci Gruber

[Register Here](#)

**Title: "Medical cannabis use: what to keep in MIND"**

**Dr. Staci Gruber** is the Director of the Cognitive and Clinical Neuroimaging Core at McLean Hospital's Brain Imaging Center and an Associate Professor of Psychiatry at Harvard Medical School. Dr. Gruber's clinical research focuses on the application of neurocognitive models and brain imaging to better characterize risk factors for substance abuse and psychiatric conditions. She has been studying the impact of cannabis on the brain for over two decades using neurocognitive, clinical and diagnostic assessments and multimodal brain imaging techniques.

Her work examining the etiologic bases of neural models of dysfunction in cannabis-using adolescents and adults has been published in numerous peer reviewed journals and been the basis of national and international symposia, documentaries, news stories and press conferences, including features in the New York Times, NPR, and CNN's documentary series "WEED" with Dr. Sanjay Gupta. Her ongoing initiative to educate policymakers, judges, attorneys and the general public about the neurobiologic differences between adults and adolescents as well as additional factors that contribute to the impact of cannabis on the brain have had both local and national impact on policy formation. Dr. Gruber recently discussed these issues at the Senate Caucus on International Narcotics Control hearing entitled, "Marijuana and America's Health: Questions and Issues for Policy Makers."

Dr. Gruber also recognized the importance of examining the impact of medical cannabis use on the brain, as there are many inherent differences between recreational and medical cannabis users. Accordingly, in 2014, she launched Marijuana Investigations for Neuroscientific Discovery (MIND), the first ever program of its kind designed to clarify the specific effects of medical cannabis use. MIND utilizes valid, robust research models and supports numerous projects designed to address the impact of medical cannabis on a number of important variables including cognition, brain structure and function, clinical state, quality of life, pain, sleep, and other health-related measures. As the director of MIND, Dr. Gruber has generated major contributions to the field as the first investigator to assess medical cannabis patients longitudinally, first to acquire neuroimaging data in medical cannabis patients, and as Principal Investigator of the first ever clinical trial of a whole plant-derived, high cannabidiol (CBD) product which she specifically formulated to treat anxiety. Additional, novel clinical trials have been approved and are pending or currently underway.

**February Webinar:** The ICR and Lambert Center are pleased to host Dr. Yasmin Hurd for the webinar on February 10th at 1:00PM MT. (Link to this webinar will be provided via our webpage soon)



Dr. Yasmin Hurd

**Title: "Cannabis and Neurodevelopmental Vulnerability: What do we really know"**

**Dr. Yasmin Hurd** is the Ward-Coleman Chair of Translational Neuroscience and the Director of the Addiction Institute, where Hurd is the only Black tenure-track basic science professor at Mount Sinai. Hurd holds appointments as faculty of Neuroscience, Psychiatry, Pharmacology and Systems Therapeutics at the Icahn School of Medicine at Mount Sinai in New York City and is globally recognized for her translational research on the underlying neurobiology of substance use disorders and comorbid psychiatric disorders. Hurd's research on the transgenerational effects of early cannabis exposure on the developing brain and behavior and on the therapeutic properties of marijuana has garnered substantial media attention.

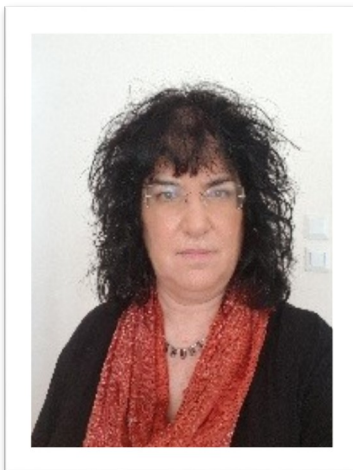
Hurd's career began when she returned to her alma mater, Karolinska Institute as a faculty member and professor for 13 years before beginning her career at Mount Sinai. At Mount Sinai, Hurd is currently the Ward-Coleman Chair of Translational Neuroscience and the Director of the Addiction Institute of Mount Sinai within the Behavioral Health System.

She is also the former director of the medical school's combined MD/PhD Medical Scientist Training Program. Hurd served on advisory boards including the Clinical Neuroendocrinology Branch, National Institute of Mental Health (NIMH), National Institute of Drug Abuse (NIDA) Board of Scientific Counselors and the Center for Scientific Review (CSR) advisory Council.

Hurd is a professor at the Icahn School of Medicine at Mount Sinai Hospital in New York City, where she studies addiction in people and animal models. Her animal research has revealed that drugs like marijuana can have profound effects on the developing and fetal adolescent brain, including effects that can even extend to the future generations of drug-users. She is also a member of the National Academy of Medicine, American Society for Neuroscience, New York Academy of Sciences, and the College on Problems of Drug Dependence. Hurd's work has been cited more than 13,000 times, and she has an H-Index of 69. Her work on the neurobiology of addiction, especially with regard to the effects of heroin and the developmental changes caused by cannabis, have been profiled in a variety of popular news and documentary sources.

## Introducing the Cannabis Cultivation and Management Webinar Series

**February Webinar:** The ICR Hemp Farmers Association is pleased to announce a new series of webinars to begin on February 16th, presented by the co-host, Dr. Nirit Bernstein, February 16th at 11:00AM MT. (Link to this webinar will be provided via our webpage soon)



Dr. Nirit Bernstein

Dr. Nirit Bernstein is a leader in Medical cannabis research, and irrigation with recycled water in Israel. She is a principle research scientist at the Agricultural Research Organization, Volcani Center, Israel. She has a Ph.D. in Plant Physiology from the University of California, Davis USA, and a B.Sc. in Agricultural Sciences from the Hebrew University of Jerusalem, Israel. Her research focuses on production and physiology of medicinal cannabis by manipulation of environmental treatments; optimization of agrotechniques for environmentally stressed plants; mineral nutrition of plants, and plant stress physiology.

Bernstein has published over 60 academic publications, 10 book chapters and inviter reviews, and is a member of the Editorial Board of five international scientific Journals. She also serves as the Chief Editor of scientific manuscripts in Hebrew for the Ministry of Agriculture in Israel, she was a project leader of 60 national and international research projects, and she teaches 2 graduate level courses at the Hebrew University of Jerusalem. Bernstein has been attracting a lot of attention in Israel because she was the first agricultural researcher to be licensed to study Medical cannabis in Israel.

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

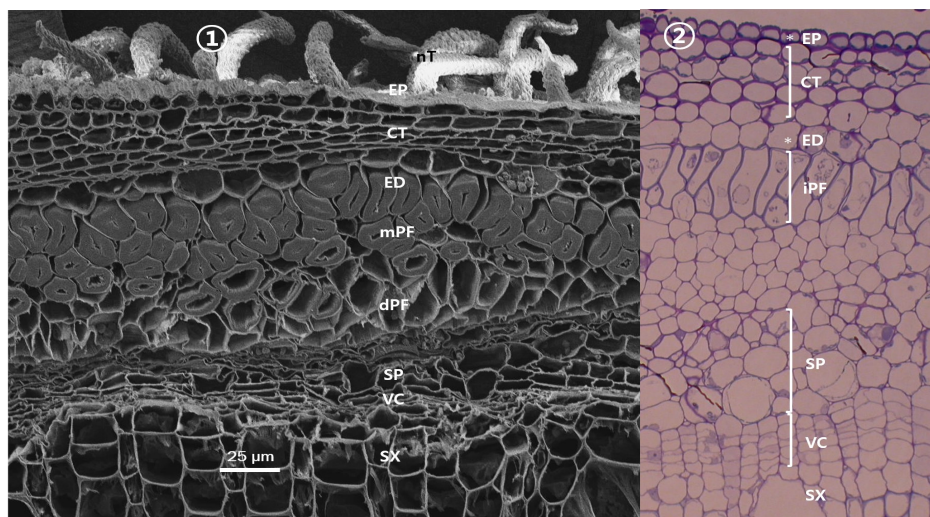


Figure 1

Figure 2

### Morphology of Cannabis Fibers

Fig.1. A scanning electron microscopy image of nearly mature stem of Cannabis distinctively reveals both immature developing phloem fibers (dPF) in the outer zone of the secondary phloem (SP), and mature phloem fibers (mPF) subjacent to the endodermis (ED). Numerous non-glandular trichomes (nT) are frequently distributed on epidermal cells.

Fig.2. A light microscopical image at early stem developmental stage shows the initials of phloem fiber (iPF) which are differentiated in the cortical region (CT). They actively divide so that this zone becomes a multilayered region of phloem fibers. As the stem matures, the activity of the vascular cambium (VC) results in the formation of the secondary xylem (SX).

## The Institute of Cannabis Research Emerging Scientist Award

A key component of the ICR's mission is to support unbiased cannabis research, and an important goal of the Institute of Cannabis Research (ICR) is to see the development of student researchers through its funding of cannabis research throughout Colorado. In this current fiscal year the ICR was able to set aside almost \$30,000 to support a new student research fellowship program called the ICR Emerging Scientist Award. The ICR has been able to support seven emerging scientists with awards over the period of January 2022-May 2022 from the following Colorado universities: University of Colorado Boulder, University of Colorado Anschutz Medical Center, and Colorado State University Ft. Collins.

What this means for the development of up and coming scientists in the field of cannabis research:

*"The Emerging Scientist Award is critical for my development as an independent scientist within my lab. Not only did this award fund a new computer set up for big data analysis, but it's funding my attendance at a major conference within my field. This funding is expediting my research and helping me understand how CBD consumption during pregnancy affects baby's brain development. I am grateful for the support of the Institute of Cannabis Research and the wonderful researchers who are affiliated with it! "*

Karli Swenson, Recipient, University of Colorado | Anschutz Medical Campus

*"Receiving the Emerging Scientist Award from ICR is very exciting for me. As a first-generation college student, receiving outside support to develop my research skills means a lot to me. I plan to use this award to help conduct meaningful research on how cannabis affects pain management for surgical patients. I will also use this opportunity to advance my knowledge of how to properly investigate scientific questions which will help prepare me to lead future research projects during my career. Thank you for this award and opportunity!"*

Emma Lamping , Recipient, University of Colorado School of Medicine

*"This emerging scientist award supports my PhD research on Cannabis at CU Boulder. This award will contribute to my ongoing research projects and doctoral dissertation by allowing me to establish mathematical models to understand the interaction between cannabinoid genes and validates the importance of mathematical models in the understanding of gene interactions. Being validated as an emerging scientist by the Institute of Cannabis Research is incredibly empowering and lends credence to the value I place on my work.*

*Additionally, this award is extremely meaningful as a person of color given historic and current racial injustices associated with Cannabis; in particular, the racially disproportionate rates of arrests and incarceration for Cannabis possession present a material and symbolic barrier for academics of color interested in studying Cannabis. To receive validation from the ICR on my research in this area is larger than myself and effectively represents a step towards racial equity.*

Leonardo R. Orozco, Recipient, University of Colorado



## New DEA Licensed Cannabis Sources Available for Researchers

For decades, the University of Mississippi National Institute on Drug Abuse has been the only approved supplier of high total THC cannabis, or marijuana, for licensed researchers in the U.S. The Drug Enforcement Administration (DEA) has recently provided memorandums of agreement with four organizations noted below to produce cannabis for researchers in the US. This is the first time any organization outside of the NIDA facility at the University of Mississippi has been awarded this designation. According to a recent DEA news release, this licensing allows these institutions to collaborate with the DEA to increase opportunities for medical and scientific research by registering additional entities authorized to produce marijuana for research purposes.

**Groff North America (GNA),** <https://groffna.com/>; 1-717-844-6175

Groff NA is a physician-owned hemp-cannabis company located in Red Lion, Pennsylvania, centered around utilizing hemp for the benefit of people and the planet. At GNA Hemplex, their processing and refinement division specializes in science-based custom cannabinoid formulations designed to meet consumer and market needs for research. Through a combination of technology and human capital, GNA has developed innovative and proven products to support our customers in the advancement of the hemp-cannabis research.

**Scottsdale Research Institute (SRI)** <https://www.linkedin.com/company/scottsdale-research-institute/about/>

Scottsdale Research Institute is a Phoenix-based clinical trials site that is dedicated to advancing the state of medical care through rigorous research. SRI strives to conduct high quality, controlled scientific studies intended to ascertain the general medical safety and efficacy of cannabis and cannabis products and examine various forms of cannabis administration. SRI is currently conducting the only federally authorized study of medical cannabis for Post-Traumatic Stress Disorder (PTSD) for military veterans in the United States. SRI is focused on growing marijuana for their clinical studies but can supply flower and other products at cost to researchers and institutions looking to run their own studies.

**Biopharmaceutical Research Company (BRC)** <https://www.biopharmaresearchco.com/products-services; Sales@biophamrresearchco.com>

BRC is a DEA-registered specialty pharmaceutical manufacturing firm focused on the production of botanically-derived cannabinoid products for dosage manufacturers, drug developers, and academic researchers. BRC is in compliance with all federal mandates and retains 6 Schedule I registrations with the DEA to include: Import, Export, Researcher, Distributor, Manufacture (Bulk), and Analytical Lab. This allows for the transfer and sale of high THC cannabinoid products across state lines and internationally for research purposes with other DEA registrants or federally approved entities. BRC seeks to provide products to academic researchers that mirror those that are found in the adult recreational cannabis markets as well as highly purified pharmaceutical grade extracts for novel drug developers.

**Bright Green Corporation, Grants, NM** <https://brightgreen.us/contact/> (833) 658-1799

Bright Green Corporation has an agreement with the U.S. Drug Enforcement Administration to construct and operate a federally licensed agricultural center to grow, distribute, and sell medical cannabis, marihuana, or its chemical constituents. The agreement allows Bright Green to supply licensed researchers in the United States and internationally, while also supplying cannabis and derivatives for medical therapies developed from this research. With their research and development center and affiliations with university research facilities, the New Mexico facility will deliver controlled production 24/7/365. In addition, automation throughout the facility will ensure all reliable processes and product consistency.