2025 USASP Annual Scientific Meeting

Advancing Pain Research: Innovations to Enhance Care

April 29-May 2, 2025 | The Radisson Blu Aqua Hotel, Chicago, Illinois

Hybrid Event

Meeting Program

Tuesday, April 29, 2025

8:00am – 12:30pm
Board of Directors Meeting
Room: Mediterranean

8:00am – 4:15pm
Essential Updates in Pain Management Workshop for Primary Care Providers
Organizers: *Scott Fishman, MD* (University of California, Davis)
Co-Directors: *Naileshni Singh, MD & Chinar Sanghvi, MD* (University of California, Davis)
Room: Baltic/Bering

Updated Essentials of Primary Care Pain Management is a one-day course offered for physicians, NP/PAs, nurses, and other clinicians interested in education by expert faculty regarding the management of patients with complex pain conditions. The course will target pressing topics related to pain management with didactic presentations and in-person discussion and demonstration sessions. The learner objectives include understanding effective evaluation and diagnosis of the patient in pain as well as implementation of evidence-based treatment options for pain. This program will offer CMEs for eligible participants. Joint Accreditation Statement.

In support of improving patient care, this activity has been planned and implemented by Amedco LLC and UC Davis Health Center for Advancing Pain Relief. Amedco LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team. Amedco Joint Accreditation #4008163.

Physicians (ACCME) Credit Designation
Amedco LLC designates this enduring material for a maximum of 6.00 AMA PRA Category 1 CreditsTM. Physicians should claim only the credit commensurate with the extent of their participation in the activity. Participants will sign-in when they arrive and will be given the weblink and instructions to request their CMEs after the workshop is over.

12:00-4:30pm
Sickle Cell Disease SIG Inaugural Meeting
The new USASP Sickle Cell Disease (SCD) SIG invites you to participate in a half day preconference workshop on Tuesday, April 29 (from noon to 4:30pm). Please join us for talks from established SCD investigators spanning basic, clinical and translational topics, an early career blitz, networking opportunities and science speed dating. Registration is required. A box

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lunch will be provided.
Room: Aegean/Adriatic Room

12:30pm – 4:30pm
2025 Leadership Academy Workshop
Room: 221 Blu Bar and Lounge, Radisson Blu Aqua

12:00pm – 4:30pm
2025 USASP Early Career Forum (ECF)

12:00pm – 1:00pm
ECF: Lunch
Room: Atlantic A

ECF Block 1 (1:00-1:50 pm) & Block 2 (2:00-2:50pm)
"Choose Your Own Adventure" (Choose a session for Block 1 & Block 2)

(1) **Mock Study Section**
The Mock Study Section session will provide participants with a firsthand look at the NIH grant review process, guided by experienced reviewers.
Room: Pacific Ballroom

(2) **Industry & Non-academic roundtables**
This session will connect attendees with professionals who have successfully transitioned beyond academia, offering insights into various career pathways.
Room: Atlantic A

(3) **Power Skills Roundtables**
A Power Skills Development session will focus on essential professional competencies—including team management, budgeting, and effective communication—through small-group mentoring.
Room: Atlantic A

ECF Block 3**:** 3:00pm – 3:50pm (all attendees)
Mentor Roundtable Discussions
The Mentorship Roundtables session will facilitate guided discussions with mentors at various career stages, providing networking and learning opportunities tailored to both clinical and basic science researchers.
Room: Atlantic A

ECF Block 4: 4:00pm – 4:30pm (all attendees)
Rapid Fire Poster Session

Meeting Program

And finally, to wrap up the ECF this year, the Rapid-Fire Poster Pitch Session will offer trainees a platform to showcase their research in a concise, 2-minute format, fostering scientific exchange and professional connections ahead of the main conference.
Room: Atlantic A

1:00 pm-4:30 pm

Pre-Conference Workshop: Empowering Pain Research: Leveraging PCORI for Funding and Stakeholder

Organizers: Dr. Mark Bicket, MD, PhD, (University of Michigan), Dr. Erin Krebs, MD, MPH, FACP, (Minneapolis VA Health Care System/University)

Join Drs. Mark Bicket and Erin Krebs for a unique pre-conference workshop to help our members learn about the funding process from the Patient-Centered Outcomes Research Institute (PCORI). "Empowering Pain Research: Leveraging PCORI for Funding and Stakeholder Engagement" is crafted specifically to help researchers including but not limited to mid-career and senior researchers unlock the full potential of their work to make a bigger impact in the field of pain management. This not-to-be-missed, 3-hour intensive session diving into comparative effectiveness research is designed to provide attendees with key knowledge and actionable strategies for securing PCORI funding, engaging effectively with stakeholders, and enhancing patient-centered outcomes. Designed to include extensive audience participation, the sessions and discussion will include expert presentations, real-world case studies, advice from PCORI Program Officers, and practical tips in shifting your framework to patient-centered approaches that broaden your research portfolio. Early career investigators are welcome to attend.
Room: Caribbean/Caspian

4:30 pm-6:30 pm

President's/Welcome Reception

Room: Atlantic Foyer

All attendees are welcome to attend. We will be toasting to the inaugural USASP fellows. Come for light hors d'oeuvres, and a cash bar will be provided. Exhibitors will be present.

Wednesday, April 30, 2025

8:30am – 9:00am

President's Welcome

Plenary Presentation: Growing Pains: What I Learned From Growing Up With Chronic Pain

Speaker: Cameron Young

Meeting Program

Room: Atlantic A

9:00am – 10:00am

Plenary Presentation: Enhancing Access to Pain Relief through Innovative Patient-Centered Formats, Technologies, and Trial Designs

Speaker: Beth Darnall, PhD, Stanford University

Room: Atlantic A

10:15am – 11:30am

Poster Session A

Room: Atlantic B

11:30am – 11:45am

Break

Symposia Block 1

11:45am – 1:15pm

Scholars Research Panel: Rita Allen Foundation Scholars Award in Pain and USASP-MAYDAY Clinical/Translational Research Scholars

Kate Sadler, PhD[1], Jie Chen, PhD[2], Hadas Nahman Averbuch, PhD, Adam Dourson,

The University of Texas at Dallas[1], Florida State University[2], Washington University, St. Louis3

The **Sadler Lab** studies how the microbiome – or the collection of microorganisms that live in and on the surface of the body – contributes to acute and chronic pain states. Dr. Sadler and her team use a combination of electrophysiological, microbiological, and behavioral approaches to deconstruct the complex bi-directional signaling that occurs between microbes and peripheral sensory neurons. In this presentation, Dr. Sadler will describe the molecular and cellular mechanisms through which specific bacteria and host metabolites drive chronic sickle cell disease pain. She will also present new findings that illustrate how standard-of-care treatments alter chronic sickle cell pain by changing the gut microbiome.

One of the goals of the **Chen lab** is to understand how the gut microbiota regulates pain sensation in patients with chronic pain. Our previous study in young adults with irritable bowel syndrome (IBS) found that IBS participants had differentiated sensory profiles than healthy young adults (YAs), and the gut microbiota composition and functions profiles were associated with the differentiated sensory profiles. Our project also found that older adults (OAs) exhibited distinct pain sensations, with higher heat and pressure pain thresholds but lower cold detection

and pain thresholds than YAs, alongside significant differences in gut microbiota diversity and composition. The correlation between altered peripheral sensation and gut microbiota in OAs suggests potential biomarkers for aging-related pain processing. Our ongoing projects aim to understand how mindfulness-based meditation relieves pain by regulating the gut microbiome, further exploring the gut-brain axis in chronic pain management.

Endometriosis is a prevalent chronic painful condition in which endometrial-like tissue grows in lesions outside the uterus. Patient individual variability in endometriosis pain is large, but the factors contributing to it are unclear. In this workshop, **Drs. Nahman-Averbuch and Dourson** will present hormonal peripheral and central mechanisms related to patient endometriosis pain.

Room: Atlantic A

11:45am – 1:15pm

Sleep, Circadian Rhythms, and Chronic Pain Across the Lifespan: Insights for Chronic Pain Management

Chung Jung Mun, PhD[1], See Wan Tham, MBBS, MS[2], Yohannes Woldeamanuel, MD[3], Patrick Finan, PhD[4]

Arizona State University[1], University of Washington School of Medicine[2], Mayo Clinic Arizona[3], University of Virginia School of Medicine[4]

Emerging research highlights that disturbances in sleep (e.g., insomnia) and circadian rhythms (e.g., fragmented or irregular rhythms) are important risk factors for the development, persistence, and exacerbation of chronic pain. While sleep and circadian rhythms are neurobiologically intertwined, each plays a distinct role in pain processing. However, co-assessment of these factors remains limited within pain research, leaving a gap in understanding how sleep and circadian disruptions independently and interactively impact chronic pain outcomes, particularly across different stages of life. This multidisciplinary panel of clinician-scientists will present cutting-edge research on the role of sleep and circadian disturbances in chronic pain among adolescents and adults, as well as preliminary findings from an innovative behavioral intervention targeting both sleep and circadian disturbances for chronic pain management. Dr. Mun, a pain psychologist and researcher, will discuss findings from a study exploring the effects of sleep and circadian rest-activity rhythm disruptions on daily pain severity in 140 women with temporomandibular disorders. Dr. Tham, a pediatric pain physician and researcher, will present data on sleep deficiency and the variability of sleep-wake rhythm parameters between adolescents with chronic abdominal pain and those who are pain-free. Dr. Woldeamanuel, a neurologist and headache researcher, will share research findings on

personalized circadian-based interventions (including sleep) for migraine and explore the underlying mechanisms. Together, this symposium aims to deepen the understanding of how disturbances in sleep and circadian rhythms are associated with chronic pain across the lifespan and to explore novel therapeutic strategies targeting these factors.
Room: Caribbean/Caspian

11:45am – 1:15pm
Cancer Pain: What Can We Learn From Reverse Translation?
Judith Paice, PhD[1],Nicole Scheff, PhD[2],Matthew Sapio, PhD[3]
Northwestern University[1], University of Pittsburgh[2], National Institute of Health[3]

Cancer pain is a dynamic issue impacting patients at diagnosis and through survivorship. The way we view and treat cancer pain may impact prognosis and response to therapeutic strategies. This symposium will focus on insights from clinical and basic science research from investigators spanning all career stages who are working to understand the dynamic issue of cancer pain from the patient perspective all the way down to the tumor microenvironment. First, Dr. Paice will present an overview of the types of pain syndromes most common and the use of opioids as the current standard of care in this patient population. Dr. Scheff will discuss pretreatment pain as a potential biomarker in cancer to indicate perineural invasion, immune evasion, and metastasis using both clinical samples and data collected from preclinical models. Dr. Sapio will discuss the impact of pain on cancer treatments, particularly radiation, and the therapeutic strategy of starting TRPV1 fibers to reduce pain and improve radiation response.

Room: Baltic/Bering

11:45am – 1:15pm
Innovative Targets for Headache Treatment
Adriana Della Pietra, PhD[1], Gregory Dussor, PhD[2], Mark Burish, MD, PhD[3], Andrew Russo, PhD[1]
University of Iowa[1], The University of Texas at Dallas[2], University of Texas Health Houston[3]

Over 50% of migraine, post-traumatic headache, cluster headache, and other headache patients remain undertreated, signaling a critical need for alternative therapeutic strategies. This symposium will explore the latest advances in novel treatments for headache disorders, focusing on innovative mechanisms involving glymphatic function, circadian rhythms, neuroimmunology, and neuromodulation. Dr. Adriana Della Pietra will present preclinical

research on how glymphatic system dysfunction contributes to headache, particularly post-traumatic headache, and discuss the therapeutic potential of targeting the noradrenergic system to restore glymphatic clearance and alleviate pain. Dr. Gregory Dussor will expand on the preclinical perspective by exploring the role of protease-activated receptor 2 (PAR2) and the work in his laboratory on this receptor in behavioral models and electrophysiology in human sensory neurons. This receptor is activated by proteases released by various immune cells. Importantly, this work helps provide important mechanistic information that bridges to ongoing work in the clinic as PAR2 monoclonal antibodies move into human trials for migraine. Dr. Mark Burish will conclude the session by providing clinical insights into the management of cluster headaches and migraine through the regulation of circadian rhythms at the cellular, systems, and behavioral levels. His recent work identifying circadian characteristics within the trigeminal ganglion suggests a potential link to the daily cycles of headaches, offering a novel perspective on how circadian regulation could influence headache disorders. Together, the speakers will provide a comprehensive overview of novel treatments for headaches, offering new therapeutic targets to improve patient outcomes.
Room: Pacific Ballroom

1:15pm – 2:15pm
Lunch

2:15pm – 3:30pm
Poster Session B
Room: Atlantic B

3:30pm – 3:45pm
Beverage Break
Room: Atlantic Foyer

<u>Symposia Block 2</u>

3:45pm – 5:15pm
Music for Pain: Towards a Mechanistic Understanding
Mathieu Roy, PhD[1], Julian Thayer, PhD[2], Joke Bradt, PhD[3]
McGill University[1], Irvine and The Ohio State University[2], Drexel University[3]

Music and music-based interventions (MBIs) are receiving increasing attention as promising approaches for pain management because of their favorable effects on pain, low cost, and absence of negative side-effects and complications common to pharmacological and

surgical/procedural treatments. Yet, the mechanisms underlying music's pain-reducing effects remain largely unknown. This is problematic because without a clear model of underlying mechanisms, researchers and clinicians alike can only rely on trial and error to maximize MBI's full therapeutic potential. In this symposium, we will 1) share findings from a series of laboratory studies aimed at uncovering the key elements of music responsible for its hypoalgesic effects including the role of arousal, valence, distraction, and reward circuitry activation; 2) present a recently developed dynamical systems model of musically-induced emotions and describe the neurovisceral underpinnings of this model, including the link between the auditory nerve and the amygdala, and the interaction of medial prefrontal cortex and brainstem pain network outputs to the cardiovascular system via the vagus nerve; and 3) present an overview of evidence to date of underlying mechanisms for music's hypoalgesia effects, based on a recently completed scoping review. Finally, we will introduce attendees to three research networks, funded by the National Institutes of Health and the National Endowment for the Arts, aimed at promoting and supporting multidisciplinary research to enhance mechanistic understanding of music for pain management. These networks will play a crucial role in advancing mechanistic understanding of the hypoalgesic effects of music and, ultimately, improving patient care and well-being.
Room: Atlantic A

3:45pm – 5:15pm

Bridging the Gap Between Acute and Chronic Pain: The Role of Perioperative Transitional Pain Services

Faye Rim, MD[1], Maxwell Slepian, PhD[2], Patricia Lavand'homme, MD, PhD[3], Alexandra Sideris, PhD[1]

Hospital for Special Surgery/Weill Cornell Medicine[1], University Health Network/University of Toronto[2], University Catholic of Louvain[3]

Chronic postsurgical pain (CPSP) is a major concern after surgery, with a median incidence ranging from 20-30%. While most patients recover after their procedure, a subset does not follow the typical trajectory leaving them vulnerable to the development of CPSP and overly reliant on opioids. Patients with CPSP may suffer from poor quality of life and use a disproportionate amount of healthcare resources. Research efforts over the past two decades have identified patient and clinical risk factors contributing to CPSP, and interventions have focused on perioperative preventative strategies including the creation of Transitional Pain Services (TPSs). This symposium brings together diverse clinical and research perspectives from practitioners who created, oversee, and study TPSs across various health care systems, including those in the United States, Canada, and Europe. The speakers will outline the role of TPSs as multidisciplinary services that offer personalized, mechanism-based interventions for surgical patients at increased risk for severe acute pain, persistent post-surgical pain, and prolonged or aberrant opioid use. Speakers will highlight experiences from their hospitals,

including the need for a TPS, the structure and staffing models, pharmacological and non-pharmacological approaches and treatments administered to patients, their impact on patient recovery and outcomes, as well as challenges with implementation and continued buy-in for a TPS program.
Room: Caribbean/Caspian

3:45pm – 5:15pm
Research Insights into Mechanisms of Discogenic Low Back Pain
Rebecca Wachs, PhD[1], Dmitriy Sheyn, PhD[2], Joseph Lesnak, DPT, PhD[3]
Arizona State University[1], Cedars-Sinai Medical Center[2], University of Texas at Dallas[3]

Low back pain (LBP) is the leading cause of disability worldwide, and 40% of those with LBP have discogenic pain which arises from degeneration of the intervertebral disc (IVD). While much research has been done looking at mechanisms of disc degeneration, little known about how disc degeneration leads to LBP. A greater understanding of these mechanisms can lead to better treatment strategies from those suffering from discogenic LBP. This symposium will look at advances in both preclinical and clinical research of discogenic pain to better understand how IVD degeneration leads to LBP symptoms. Dr. Rebecca Wachs will discuss alterations in dorsal root ganglia (DRG) that occur in preclinical models of LBP to lead to increased hyperalgesia. Dr. Wachs' talk will focus on changes seen in ion channels and cytokines to produce hyperalgesia. Dr. Dmitriy Sheyn will present on research with both porcine models and human tissue to uncover discogenic pain mechanisms. Dr. Sheyn's talk will also highlight what these findings mean for the development of treatments such as stem cell therapies. Finally, Dr. Joseph Lesnak will present on human tissue models of discogenic LBP produced from disc samples from individuals with low back pain and cultured human DRG neurons. Dr. Lesnak's work will highlight how factors released from degenerated discs can activate and sensitize human DRG neurons. The audience will gain valuable insight into current research efforts to understand how IVD degeneration can lead to LBP.
Room: Baltic/Bering

3:45pm – 5:15pm
Angling Toward Analgesics from Diverse Perspectives and Approaches
Bryan Roth, MD, PhD[1], Rebecca Seal, PhD[2]
University of North Carolina, Chapel Hill[1], University of Pittsburgh[2]

An overwhelming imperative in the pain field is to identify better analgesics. This symposium presents an integrated vision of how to understand and control nociception. We aim to convey

Meeting Program

advances in basic, translational and clinical pain research with the sense of excitement that comes from therapeutic discovery. The presentations address fundamentals of analgesia-related protein structures, discovery of novel ligands for such receptors, and identification of key nociceptive circuits. These findings are extended to translational and clinical investigations. Dr. Roth is the developer of chemogenetics and presents a multilayered investigation of transmembrane GPCRs subserving analgesia using CryoEM and ultra-high throughput in silico screening. Dr. Roth has identified new lead candidates having analgesic actions. Dr. Seal presents a transcriptomic cellular atlas of the dorsal horn across species from mice to humans as a translational framework for the development of novel pain therapeutics that target specific cell types of the dorsal horn. These targets are discussed with respect to studies from her laboratory that have illuminated the neural circuitry that mediates mechanical allodynia. Dr. Iadarola presents molecular investigations of two classes of nociceptive dorsal root ganglion neurons subserving tissue damage versus bio-warning signals and clinical interventions that inactivate these critical afferent populations to treat intractable pain. This symposium synthesizes multiple discovery research approaches to analgesia based on both broad and fundamental perspectives.
Room: Pacific Ballroom

5:15-5:30: Transition

5:30pm – 7:00pm
IDEA Committee Meeting
Room: Baltic/Bering Room

5:30pm – 7:00pm
SIG Meetings
Room: Various Locations

Thursday, May 1, 2025

8:30am – 9:00am
Gold-Haythornthwaite Lifetime Achievement Award Presentation
Presenter: John Farrar, MD, PhD
Awardee Presentation
Room: Atlantic A

9:00am – 10:00am

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Plenary Presentation: Breaking Boundaries of Pain Management: Harnessing the Value and Power of Virtual Reality
Speaker: Luana Colloca, MD, PhD, University of Maryland, Baltimore

Virtual Reality (VR) is transforming the way we understand and interact with pain, offering new avenues for research, clinical applications, and patient care. In this plenary, Dr. Luana Colloca will explore the intersection of VR and pain science, discussing how immersive technology reshapes sensory processing, enhances treatment responsiveness, and opens novel pathways for non-pharmacological interventions. Drawing from experimental studies and clinical trials, this lecture will highlight the mechanisms behind VR's efficacy and its potential to redefine patient outcomes.
Room: Atlantic A

10:15am – 11:30am
Poster Session C
Room: Atlantic B

11:30am-11:45am
Break

Symposia Block 3

11:45am – 1:15pm
Pain Research Enters the Age of Big Data
Katherine Martucci, PhD[1], Yenisel Cruz-Almeida, MSPH, PhD[2], Tor Wager, PhD[3], Michael Falcon, OTD, MHA[4]
Duke University[1], University of Florida[2], Dartmouth College[3], Hawaii Pacific University[4]

Pain research has entered the era of big data, finally allowing researchers to discern the etiology behind complex and mysterious pain conditions. Multimodal data from thousands of patients will give researchers tools to finally address the complex, multifaceted questions around the biology of chronic pain. Multimodal datasets can include self-reported (e.g., pain intensity and interference) and experimental pain (e.g., quantitative sensory testing) as well as neurobiological factors (e.g., brain imaging for brain structure, function and biochemistry), and blood for immune function, genetic, epigenetic, and omics profiling. Combining many data types, researchers can interrogate the mechanisms driving pain at multiple levels of analysis, group individuals based on their underlying pathophysiology, and identify new biological targets for treatment. Complex data profiles may also help determine who is at high risk for developing chronic pain conditions, and how to build resilience against chronic pain. Collecting and

analyzing these large, complex datasets requires large consortia of researchers with a wide diversity of expertise and a commitment to make data publicly available. Attendees will learn about the benefits and challenges of working in large consortia, and how to make use of the data being collected. Talks will cover large studies including the UK BioBank; the Acute to Chronic Pain Signatures consortium; the Multidisciplinary Approach to the Study of Chronic Pelvic Pain (MAPP) Research Network; and the Restoring Joint Health and Function to Reduce Pain (RE-JOIN) Consortium. Moderator Michael Falcon, a person with lived experience of chronic pain, will provide his perspective and modify the discussion.
Room: Caribbean/Caspian

11:45am – 1:15pm
Interdisciplinary Strategies to Decode Mechanisms of Musculoskeletal Pain
Hang Lin, PhD[1], Rachel Miller, PhD[2], Allan Basbaum, PhD[3], Nadeen Chahine, PhD[4], Kelsey Collins, PhD[5]
University of Pittsburgh[1], Rush University[2], University of California San Francisco[3], Columbia University[4]

Musculoskeletal diseases are the largest contributors to chronic pain and leading indications for opioid prescription. Clinically, substantial discordance exists between pain and radiographic evidence of structural damage in musculoskeletal diseases, which challenges the assumption that pain represents existing structural damage. Although musculoskeletal pain is the primary driver for patient care-seeking behavior in conditions like osteoarthritis, low back pain, and fracture, the current understanding of the mechanisms of musculoskeletal pain is limited. This workshop will focus on interdisciplinary, preclinical, and in vitro strategies to decode mechanisms of musculoskeletal pain. Hang Lin, PhD will demonstrate a joint-on-a-chip human induced pluripotent stem cell system to interrogate musculoskeletal pain and screen drugs in vitro. Then, Rachel Miller will give her perspective on translational preclinical models to understand pain in osteoarthritis, and share how the NIH CCOMP P30 can support work in this space. Third, Allan Basbaum, PhD, will present new tools and techniques to understand fracture pain. This session will be moderated by Nadeen Chahine, PhD and Kelsey Collins, PhD, who are working on low back pain and knee joint pain, respectively. Presenters are encouraged to address the role of age, sex differences, and multi-morbidity in their presentations to help solve the whole animal and whole person health problem of musculoskeletal pain across musculoskeletal diseases. The session will conclude with a moderated panel discussion with audience questions and a focus on developing an interdisciplinary strategy to decode mechanisms that are conserved or diverge across musculoskeletal diseases to pave the way toward novel non-opioid therapeutics.
Room: Pacific Ballroom

Meeting Program

11:45am – 1:15pm

Othering: Effects of Stigma and Discrimination on Pain

Calia Torres, PhD[1], Ellen Terry, PhD[2], Bright Eze, PhD[2], Samantha Meints, PhD[3]

University of Alabama at Birmingham[1], University of Florida[2], Harvard Medical School[3]

Othering, a social process of marginalization, is associated with healthcare disparities and reinforces inequities and bias. In this symposium, three speakers from diverse racial, ethnic and geographic backgrounds will discuss two forms of othering, stigma and discrimination, and their impact on pain and treatment outcomes. We will explore intersectional health-related stigma (IHRS) and discrimination among diverse populations of patients with chronic pain; how the impact of othering on pain differs across race, ethnicity, and sex/gender; and identify correlates and potential mechanisms by which othering impacts pain. Importantly, we will discuss interventions by which we can minimize othering and its impact on pain. Dr. Meints will share cross-sectional and longitudinal results examining the relationship between IHRS and pain across three populations: women with chronic pelvic pain, adults with chronic low back pain (CLBP), and individuals undergoing spine surgery. She will also explore the intersection of racial discrimination and pain stigma across Black and White adults with CLBP. Dr. Terry will discuss the associations between discrimination and clinical pain, disability and functional performance among Black and White adults with knee osteoarthritis. She will provide data suggesting discrimination might differentially affect structural brain components across race/ethnicity and sex. Dr. Torres will provide the results of two studies examining racial discrimination, pain stigma, and pain management practices among racialized individuals living with chronic pain. She will highlight heterogeneity in negative experiences across racialized groups and implications for future research and intervention development, including the potential for building on ethnic identity to address discrimination.

Room: Baltic/Bering

11:45am – 1:15pm

Advances in Nociplastic Pain: Assessment, Treatment, and Neurobiological Mechanisms

Joel Fishbein, PhD[1], Yoni Ashar, PhD[2], Laura Simons, PhD[3]

VA San Diego University of California San Diego[1], University of Colorado Anschutz Medical Campus[2], Stanford University School of Medicine[3]

Nociplastic pain—pain that arises from altered nociception despite no tissue or somatosensory disease or lesion—offers a common mechanism to help explain diverse pain conditions (e.g., low back pain, tension headache, and fibromyalgia). Given the relatively new recognition of nociplastic pain as a distinct entity, research on effective assessments, targeted treatments, and

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neurobiological underpinnings is critical. In this symposium, we will present innovations in the assessment, treatment, and neurobiological mechanisms of nociplastic pain. Joel Fishbein, PhD, will present findings on a new brief self-report questionnaire to assess nociplastic pain, the Nociplastic Pain Questionnaire, collaboratively developed by researchers, clinicians, and patients. Factor analytic results (N = 378) indicate three core clinical domains of nociplastic pain: 1) influence of thoughts/emotions on pain, 2) allodynia/hyperalgesia, and 3) variable pain location/timing. Laura Simons, PhD, will present evidence supporting graded exposure therapy for nociplastic pain. She will describe how graded exposure therapy, by reintroducing avoided movements or activities, can significantly reduce avoidance behaviors, modulate central pain sensitivity, and improve overall function in those with nociplastic pain. Dr. Yoni Ashar will describe new findings on the neurobiological mechanisms of nociplastic pain and its treatment. He will present data linking nociplastic pain to multisensory sensitization via heightened unpleasantness and insula responses to aversive auditory stimuli, as well as longitudinal mediation analyses investigating gray matter volume change as a mediator of Pain Reprocessing Therapy. Moderator Luana Colloca, MD, PhD will bring expertise in the neurobiological bases of pain and its modulation to synthesize research findings and guide discussion.
Room: Atlantic A

1:15pm – 2:15pm
Lunch
Room: Atlantic A, Caribbean/Caspian & Pacific Ballroom

1:15pm – 2:15pm
Journal of Pain Editorial Board Meeting
Room: Aegean/Adriatic Room

1:15pm – 2:15pm
Education and Professional Development Committee Meeting
Room: Mediterranean

2:15pm – 3:30pm
Poster Session D
Room: Atlantic B

3:30pm – 3:45pm
Beverage Break
Room: Atlantic Foyer

Meeting Program

Symposia Block 4

3:45pm – 5:15pm

Brain Mechanisms for the Transition from Acute to Chronic Pain

Paul Geha, MD[1], Siobhan Schabrun, PhD[2], Paulo Branco, PhD[3], A. Vania Apkarian, PhD[3]

University of Rochester[1], University of Western Ontario[2], Northwestern University[3]

Chronic pain exacts a significant burden on individuals, healthcare, and society. Chronic pain has no cure, and once entrenched, it is often irreversible. Thus, focusing on prevention is critically important. Doing so requires a better understanding of the mechanisms underpinning the transition from acute to chronic pain, identifying modifiable risk factors, and developing tools that can identify individuals at risk for developing chronic pain.In this symposium, we will explore the brain's role in the transition from acute to chronic pain, highlighting findings from studies in humans using neuroscience tools including structural and functional MRI, electroencephalography, and transcranial magnetic stimulation. We will specifically discuss longitudinal studies that followed patients over time after pain onset—within days of whiplash injury, weeks of experimentally induced temporomandibular disorder and months after the onset of back pain—and attempt to identify brain properties that hold predictive value for the later development of chronic pain. We will discuss 1) how brain properties influence the risk of developing and maintaining chronic pain, and their predictive value for long-term outcomes; 2) whether these properties represent predispositions or reflect maladaptive adaptations to injury; 3) their possible underlying mechanisms; and 4) how longitudinal studies may identify potential novel targets and interventions to prevent the transition from acute to chronic pain. Together, this symposium will shed light on the role of nociceptive, somatosensory, and emotional learning circuitry in the development of chronic pain, and highlight potential new directions for research in the field, as well as new translational opportunities.

Room: Baltic/Bering

3:45pm – 5:15pm

Mechanisms of DRG and Spinal Cord Stimulation for Pain Control

Andrei Sdrulla, MD, PhD[1], Kerry Bradley, PhD[2], Michael Gold, PhD[3]

Oregon Health and Science University[1], Nervo Corp[2], University of Pittsburgh[3]

Supporters of neuromodulation approaches, such as spinal cord stimulation and dorsal root ganglion (DRG) stimulation for the treatment of chronic pain point to results from successful trials documenting large effect sizes and lasting effects. Critics of these approaches point out

that the trials have been supported by the neuromodulation industry and are not run blind. This landscape may be changing with both interest from NIH in the mechanisms underlying these therapeutic approaches and the advent of neuromodulation approaches that lend themselves to blinded control trials. These issues will be addressed in this symposium, with Kerry Bradley, Vice President, Scientific Affairs for Nervo Corporation providing a summary of the clinical and preclinical work that's been published, as well as insights from his team on how to address the lingering concerns with this technology. Michael Gold will summarize the mechanisms thought to underlie the therapeutic efficacy of DRG stimulation for the treatment of chronic pain, as well as recent data from his laboratory suggesting that satellite glial cells within the DRG may play a significant role in the mechanisms underlying this stimulation approach. Finally, Andei Sdrulla, will discuss recent results from his laboratory characterizing the modulatory effects of SCS on dorsal horn interneurons and output projection neurons studied with an intersectional genetics approach to drive the expression of the genetically encoded calcium indicator GCaMP6s in molecularly defined spinal populations.

Room: Atlantic A

3:45pm – 5:15pm

Transdisciplinary Perspectives and Emerging Evidence to Enhance Care in Painful Diabetic Neuropathy (PDN)

Paola Pacifico, MD, PhD[1], Melissa Elafros, MD, PhD[2], Jijun Xu, MD, PhD[3], Eva Feldman, MD, PhD[4]

Northwestern University[1], University of Michigan[2], Cleveland Clinic[3], Case Western Reserve University[4]

Painful diabetic neuropathy (PDN) presents significant challenges due to research gaps, such as a limited understanding of its mechanisms, a lack of disease-modifying therapeutics, and unpredictable symptomatic treatment responses. Additionally, clinical gaps exist in the assessment, diagnosis, and management of PDN, including a lack of familiarity with emerging evidence among frontline healthcare providers. This symposium aims to bridge these gaps by offering a transdisciplinary overview of PDN, covering the latest molecular findings, clinical approaches to diagnosis and treatment, and advances in interventional and neuromodulatory therapies. Participants will leave with an enhanced understanding of PDN's underlying mechanisms and be better equipped to utilize and describe the limitations of evidence-based treatments for patient care. Audience engagement will be encouraged through an interactive Q&A session, fostering a dynamic exchange between attendees and presenters. This symposium is unique as it incorporates both foundational and innovative perspectives,

integrating translational research with cutting-edge interventional techniques to improve the care of PDN patients.
Room: Caribbean/Caspian

3:45pm – 5:15pm
Minor Cannabinoids for the Treatment of Chronic Pain: From Mouse to Man
Andrea Jones, PhD[1], John Streicher, PhD[2], Ziva Cooper, PhD[3], Nicholas Gilpin, PhD[4]
Louisiana State University Health Sciences Center[1], University of Arizona[2], University of California, Los Angeles[3]

Cannabinoid drugs are legal for medicinal and recreational use in most states, but their use has vastly outpaced our understanding of their effects on pain outcomes, and health more generally. **Dr. Jones** will discuss data describing the effects of inhalation of vaporized cannabichromene (CBC) and cannabigerol (CBG), both alone and in combination with cannabidiol (CBD), on nociceptive, behavioral and physiological outcomes in a rat model of chronic inflammatory pain (CFA). Her data suggest that CBC and CBG vapor inhalation attenuate hypersensitivity in CFA-treated rats, and alter locomotion, body weight and body temperature, and that these effects are modulated by sex and time. **Dr. Streicher** will discuss data showing that the terpenes geraniol, linalool, beta-caryophyllene, beta-pinene, and alpha-humulene provide comparable pain relief to morphine in inflammatory and neuropathic pain models via adenosine A2a receptor actions in spinal cord. His lab has observed that these terpenes are not associated with addiction-like side effects, but instead attenuate opioid reward while simultaneously enhancing opioid pain relief. **Dr. Cooper** will discuss data from an ongoing Phase I double-blind, placebo-controlled study focused on understanding the analgesic, abuse-related, and delta-9-tetrahydrocannabinol (THC)-sparing effects of ecologically relevant doses of the terpenes beta-caryophyllene (BCP) and myrcene. Her lab's data show that low doses of BCP and myrcene impact clinically relevant endpoints related to cannabis- and THC-induced analgesia and abuse liability. Overall, these studies suggest that minor cannabinoids and terpenes could be safe, effective and high-compliance treatments for multiple chronic pain conditions, either alone or in combination with opioid drugs.
Room: Pacific Ballroom

5:30pm – 7:00pm
SIG Meetings
Room: Various Locations

2025 USASP Annual Scientific Meeting

Advancing Pain Research: Innovations to Enhance Care

April 29-May 2, 2025 | The Radisson Blu Aqua Hotel, Chicago, Illinois

Hybrid Event

Meeting Program

Friday, May 2, 2025

8:30am – 9:00am

Announcement of Poster Awards & G.F. Gebhart Journal of Pain Young Investigators Award

Room: Atlantic A

9:00am – 10:00am

Plenary Presentation: Insights into Neuropathic Pain Mechanisms from Studies of Human Dorsal Root Ganglion and Spinal Cord

Speaker: Theodore Price, PhD, (University of Texas at Dallas)

Dr. Price's plenary will focus on his lab's work profiling the human dorsal root ganglion (DRG) and spinal cord using tissues recovered from organ donors and during rare surgeries. He will begin the lecture by covering the state-of-the-art in what is known about different cell types in the human DRG, how they differ from other species, and how they change in people with chronic pain diseases. A major emphasis will be on diabetic neuropathy where his lab has assembled considerable evidence of neurodegeneration in the DRG. He will also discuss his lab's work on the human spinal cord, focusing on single cell sequencing of dorsal horn cells and downregulation of KCC2 in chronic pain states in humans. He will close by discussing how to discover a new generation of pain therapeutics targeting human dorsal horn neurons.

Room: Atlantic A

10:00am – 10:15am

Transition/Break

<u>Symposia Block 5</u>

10:15am – 11:45am

Innovations in Neural Biobehavioral Phenotypes to Enhance Pain Care Across the Lifespan

Christine Sieberg, PhD, EdM, MA[1], Irina Strigo, PhD[2], Benedict Alter, MD, PhD[3]

Massachusetts General Hospital and Harvard Medical School[1], University of California, San Francisco[2], University of Pittsburgh[3]

Preclinical research has identified mechanisms thought to underly pain, but measuring these mechanisms in patients has proved challenging. Phenotyping refers to comprehensive measurement of multiple mechanisms in patients. Recent work has shown heterogeneity across patients, such that different phenotypes exist within given pain syndromes. This raises the

possibility that a patient with a specific phenotype may respond better to a treatment if that treatment targets the relevant mechanism, potentially leading to personalized pain management. This interdisciplinary symposium will highlight cutting edge research addressing knowledge gaps in phenotyping and present evidence that treatments have a greater chance of success if matched to the relevant brain biobehavioral phenotype. Dr. Benedict Alter will review phenotyping approaches and present recent findings of pain modulatory phenotypes in osteoarthritis in older adults. Dr. Christine Sieberg will discuss stress biomarker, behavioral, and neuroimaging phenotyping related to chronic post-surgical pain across the lifespan. Dr. Irina Strigo will present evidence for brain-based pain processing phenotypes and their relevance to endogenous pain modulation profiles and for treating chronic low back pain. Speakers will cover techniques used in biobehavioral phenotyping including advanced functional brain imaging, quantitative sensory testing, hair steroid hormones, and state-of-the-art psychosocial assessments. The clinical relevance of the phenotyping will be highlighted, presenting clinical trial data demonstrating associations between phenotypes and outcomes. Discussion topics will probe ways that basic, translational, and clinical researchers can synchronize phenotyping efforts such that mechanisms of pain can be measured in patients to classify phenotypes and enhance clinical care through personalized pain management.
Room: Atlantic A

10:15am – 11:45am

Targeting Peripheral Opioid Receptors: Advancing Precision Medicine with Reduced Side Effects

Luca Posa, PhD[1], Stephanie Puig, PhD[2], Ream Al-Hasani, PhD[3]
Weill Cornell Medicine[1],UMass Chan Medical School[2], Washington University in St. Louis School of Medicine[3]

This symposium will explore the potential of targeting peripheral opioid receptors (ORs) as a promising strategy for effective pain relief while minimizing central side effects such as respiratory depression and addiction. Unlike traditional opioids that act on ORs in the brain and spinal cord, peripherally restricted opioids provide localized pain relief at the site of injury or inflammation, reducing the risk of adverse effects. The symposium will present recent advances in the development of selective peripheral opioids. Dr. Luca Posa will discuss advances in the design of photochromic peripherally restricted opioids, such as **light-activated "opto-opioids**" that allow precise spatial and temporal control of opioid receptor activation. Dr. Stephanie Puig will present her work on the **role of keratinocytes in peripheral opioid signaling and induction of peripheral opioid tolerance** via epithelia-neural communication via growth factors, offering new insights into managing long-term opioid use at the periphery. Finally, Dr.

Meeting Program

Ream Al-Hasani will present the **role of peripheral KOR in the modulation of cold hypersensitivity and cold pain** and how this has implications for attenuating disease-induced neuropathies. Additionally, the symposium will explore how targeting peripheral ORs can treat different pain conditions, from acute to chronic pain and present data from preclinical studies supporting the efficacy and safety of this approach. This research seeks to redefine opioid therapy providing safer, more targeted pain management. Attendees will gain valuable insights into the future of opioid therapy and the potential of peripheral opioid receptor modulation as a viable alternative to traditional pain treatments.
Room: Caribbean/Caspian

10:15am – 11:45am
Overcoming AI Challenges for Pain Detection
Susan Horner, PhD[1], Zheyan Zhan, PhD[2], Diego Klabjan, PhD[2], Renee CB Manworren, PhD[3]
Ann & Robert H. Lurie Children's Hospital of Chicago[1], Northwestern University[2], University of Texas at Arlington[3]

Early-life pain is associated with abnormal structural and functional brain development, resulting in adverse neurodevelopmental consequences, including cognitive and memory impairments, emotional dysregulation, and global pain sensitivity. Therefore, timely and accurate detection of pain is crucial for hospitalized infants. Artificial intelligence (AI)-powered approaches that analyze clinical data and facial action videos offer promise for continuous pain monitoring. Given their role and subject matter expertise, nurses were essential in designing and developing our preliminary pain detection machine learning (ML) model. Using the Neonatal Facial Coding System, the only observational pain assessment tool that includes facial actions associated with brain-based evidence of pain, and the iCopevid needle pain dataset, our ML model has 97.7% precision, 98% accuracy, and 98.5% recall. Since a Pain Recognition Automated Monitoring System (PRAMS) is unnecessary for needle pain, we are retraining our model to detect more complex and clinically relevant post-surgical pain. Consequently, post-surgical videos include images in which infants' faces are partially obscured by their own hands or medical equipment, like NG & ET Tubes. To address this challenge, we incorporate a diffusion-based inpainting technique to reconstruct obscured facial regions in video frames, thereby enhancing our AI model's ability to detect and interpret pain-related facial actions by restoring missing details. Furthermore, we will employ hybrid federated learning, a distributed ML approach that enables collaborative model training across multiple hospitals while maintaining HIPAA-compliant data protection. Our approach is a significant advancement in pain assessment, with the potential to transform clinical practice and improve early-life pain outcomes.
Room: Baltic/Bering

Meeting Program

10:15am – 11:45am

Treating Pain Takes "Guts": Targeting the Gut Microbiome to Facilitate Pain Care Innovation

Erin Young, MA, PhD, Arkady Khourtosky, DVM, PhD, Kristen Smith-Edwards, PhD
University of Kansas Medical Center, McGill University, Mayo Clinic

The vast community of "bugs" (bacteria, viruses, and fungi) colonizing the gastrointestinal tract, collectively referred to as the gut microbiome, has been shown to differ between patients with and without chronic pain. The specific nature of the reported dysbiosis (differences in microbial colonization) varies significantly between studies and the type of chronic pain condition being examined. As a result, historically, the majority of the studies have focused on characterization and observation of dysbiosis, but in the last few years, the mechanisms by which differential colonization may increase pain sensitivity or facilitate the transition from acute to chronic pain states has garnered more attention. The speakers will present novel findings from three painful conditions (fibromyalgia, visceral hypersensitivity, and pain due to neurogenic bowel), each characterized by alterations in the bacterial colonization of the gut. Presentations will prioritize describing methods for determination of location specific bacterial abundance within the gut and establishing mechanisms by which gut microbes may drive changes in host cell structure and function. Further, each speaker will unpack specific mechanisms of communication between gut bacteria and host cells with a focus on microbiome-neuronal interactions, highlighting the new models and state-of-the-art approaches utilized to move beyond characterization and directly test their hypotheses. Identification of pathogenic changes in the gut thought to contribute to chronic pain development or persistence will provide context for the presentations and discussion of the varied definitions of pain-relevant dysbiosis. The translation potential of precision microbiome manipulations will be outlined along with caveats and considerations going forward.

Room: Pacific Ballroom

12:00-1:30pm

Lunch Panel Discussion: Learn About Engaging People with Lived Experience (PWLE) of Pain into Your Research

Room: Atlantic A

The PWLE Committee, chaired by Chris Veasley and Rob Edwards, has organized this lunch session, titled Engaging People With Lived Experience (PWLE) in pain research, to educate and guide our community in how we can integrate PWLE of pain into our research teams. Engaging individuals and groups with lived experience can be extraordinarily beneficial, both personally

and professionally, but most researchers have not received any guidance or training in how to initiate this engagement (as we are learning from a USASP membership survey). This interactive and panel-based session is designed to provide an introduction to the engagement process, and to direct attendees to helpful resources. Following a brief review of current recommendations for PWLE engagement, panel discussions with both researchers and PWLE will highlight the “lessons learned” from partnerships in which people with pain have become full members of the interdisciplinary team. Attendees will learn strategies to manage common engagement obstacles, including how to develop relationships with PWLE and how to seek funding for this work. Come with your questions and help the USASP start developing systems that facilitate these relationships.

**This program is included in your full meeting registration*

2:00pm – 5:00pm

Workshop: How to talk to the Press about your Research and Translating Research into Policy: An Introduction

This 3 hour workshop will introduce you to the ways in which you can better explain your research to the press and policy-makers and give you an opportunity to practice doing so. You will be given tips about speaking to journalists and communicating science into language they and the public can understand. Once you’ve learned these basic concepts, you’ll be given time to write a one page memo to your Congressman as to why they should know about your research and how it might, with their help, lead to public policy changes *or* write a one page draft blog post about your research for a lay audience. You’ll then be given an opportunity to share your one-pager with a partner or the group. This will be followed by a brief primer on how to influence policy at the federal and state levels. The last hour will be devoted to a panel presentation of USASP members who have been successful influencing pain policy at the state and federal levels and how they did it.

Room: Pacific Ballroom

**This workshop is included in your full meeting registration*