

## SCIENTIFIC PROGRAM

### SUNDAY, 3 June

#### 7:30 am- Registration

(Please come early to register so that everyone is ready for the start at 9:00 am. If everyone comes at 8:55am, there will be 287 people in line at the registration desk, and you will miss the announcements at 9:00 am).

#### 9:00 am Welcome and Announcements

Frank Porreca and Steve McMahon

#### 9:15-10:30 am Session 1: Descending controls Tony Dickenson/Kirsty Bannister, Co-chairs

Kirsty Bannister/Tony Dickenson (UCL, UK) - Regulation and disruption of descending controls in persistent pain  
Robbie Drake (University of Bristol, UK) - Medial prefrontal/periaqueductal grey interactions in acute and neuropathic pain  
Greg Scherrer (Stanford University, USA) - Descending circuits modulating pain unpleasantness  
Asaf Keller (University of Maryland, USA) - The enigma of serotonin and chronic pain  
Luke Henderson (University of Sydney, Australia) - Brainstem pain control circuitry in chronic pain

#### 10:30 - 11:15 am Coffee break

#### 11:15 - 12:30 pm Session 2: G-protein-coupled receptors Andrea Hohmann, Chair

Andrea Hohmann (Indiana University, USA) - Targeting cannabinoid CB2 mechanisms to suppress neuropathic pain  
Éva Borbély (University of Pécs, Hungary) - Somatostatin receptor subtype 4 is a novel drug target for the treatment of neuropathic pain and depression  
Sarah Flatters (King's College London, UK) - Mitochondrial dysfunction in chemotherapy-induced pain  
Daniela Salvemini (Saint Louis University, USA) - Central mechanisms of action of S1P in neuropathic pain states  
George Wilcox (University of Minnesota, USA) - Profound peripheral MOR-DOR synergy in multiple pain states

#### 12:30 - 2:00 pm Free for Lunch

#### 2:00 - 3:00 pm Session 1: "Which critter? Subject choice in preclinical pain research" Jeff Mogil, Chair

Jeff Mogil (McGill University, Canada) - The cult of black-6: rethinking subject choice in preclinical pain experiments  
Catherine Bushnell (NIH/NCCIH, USA) - Is pain HomoGenus? Pain research in human and non-human primates  
Michael Salter (University of Toronto, Canada) - The pain menagerie: cross-species transcriptome analysis  
Alfredo Ribeiro da Silva (McGill University, Canada) - Rats and mice: does the rodent species matter in pain research?

#### 3:00 - 3:45 pm Coffee break

#### 3:45 - 4:45 pm Session 4: Visceral pain Nick Spencer, Chair

Julie Christianson (University of Kansas Medical Center, USA) - The influence of stress on chronic pelvic pain  
Nathalie Vergnolle (University of Calgary, Canada) - Peripheral mediators of visceral pain in Irritable Bowel Syndrome  
Stuart Brierley (Flinders University, South Australia) - Ion channels and receptors contributing to chronic visceral pain  
Nick Spencer (Flinders University, South Australia) - Optogenetic control of visceral sensation

#### 4:45 - 5:30 pm Data Blitz #1

1. Simon Beggs (Great Ormond Street Institute of Child Health, London, UK) - Adult cortical plasticity following surgical injury in early life
2. Pei Ge (Ironwood Pharmaceuticals, USA) - Pharmacological effects of guanylate cyclase-C agonism in a rat model of endometriosis-induced vaginal hyperalgesia
3. Ursula Wesselmann (University of Alabama at Birmingham, USA) - Co-morbid pain conditions: challenges and opportunities in translational pain research and clinical practice
4. Emanuel Van den Broeke (Université catholique de Louvain, Belgium) - The role of the noradrenergic system in central sensitization
5. Maxime Algoet (Université catholique de Louvain, Belgium) - RIII reflex elicited by the preferential activation of nociceptors using concentric electrical stimulation of the skin
6. Lieve Filbrich (Université catholique de Louvain, Belgium) - Impaired visual perception in complex regional pain syndrome

End of Sunday program

## MONDAY, 4 June

### 8:30-10:30 am Session 5: Amygdala Volker Neugebauer, Chair

Volker Neugebauer (Texas Tech University Health Science Center, USA) - Pain vulnerability and the amygdala  
Fusao Kato (Jikei University, Japan) - The active role of the central amygdala in the widespread hypersensitivity  
Josh Johansen (RIKEN Brain Sci. Inst., Japan) - Parallel brainstem-to-amygdala aversive signaling pathways trigger fear memory formation  
David Finn (National University of Ireland Galway, Ireland) - PPARs in the amygdala regulate fear-pain interactions  
Fan Wang (Duke University, USA) - New insights into affective pain circuits  
Rob Gereau (Washington University, USA) - Central amygdala neurons orchestrate sensory and affective components of pain and itch  
Yarimar Carrasquillo (NIH/NCCIH, USA) - Bidirectional control of pain in the central amygdala  
J. Nicholas Betley (University of Pennsylvania, USA) - A neural circuit for the suppression of pain during hunger

10:30 - 11:15 am Coffee break

### 11:15 - 12:30 pm Session 6: Migraine Greg Dussor, Chair

Phil Holland (Kings College London, UK) - Migraine: the prodrome and the postdrome  
Arn van den Maagdenberg (Leiden University Medical Center, Netherlands) - Lessons from migraine genetics  
Greg Dussor (University of Texas at Dallas, USA) - Female-specific meningeal nociception: potential mechanisms for sex differences in migraine  
David Dodick (Mayo Clinic, USA) - CGRP in migraine: a story of translation for the benefit of patients  
Cristina Tassorelli (Università degli Studi di Pavia, Italy) - Adaptive and maladaptive changes affecting the descending modulation of pain

12:30 - 2:00 pm Free for Lunch

### 2:00-3:00 pm Session 7: Cell-type specific sequencing data: what can we learn? Franziska Denk, Chair

Franziska Denk (King's College, London, UK) - Peripheral sensitization: new perspectives arising from purified transcriptional profiles  
Sara Buskbjerg Jager (Aarhus University, Denmark) - Clues on satellite glial cell function in neuropathic pain  
Aziz Moqrich (The Developmental Biology Institute of Marseille, France) - C-LTMRs biology: insights from cell-type specific RNA-seq  
Patrik Ernfors (Karolinska Institute, Sweden) - Encoding pain through defined cell types

### 3:00 -3:45 pm Data Blitz #2

1. Cyril Rivat (Institut des Neurosciences de Montpellier, France) - The Fms-like tyrosine kinase 3: a potential therapeutic target for the treatment of peripheral neuropathic pain
2. Stefania Ceruti (Università degli Studi di Milano, Italy) - A nutraceutical approach as adjuvant therapy for the prevention and treatment of trigeminal pain: role of microglia
3. Timea Aczél (University of Pécs, Hungary) - Temporal changes of gene expression in trigeminal ganglia, trigeminal nucleus caudalis and peripheral blood mononuclear cells in a rodent orofacial pain model
4. Clément Verkest (Institut de Pharmacologie Moléculaire et Cellulaire, Valbonne, France) - Analgesic effects of systemic inhibitors of acid-sensing ion channels in a rodent model of migraine
5. Mike Nahorski (Cambridge Institute for Medical Research, UK) - Tough Mums - an insight into the genetics of labour pain

3:45-4:30 pm Coffee break

### 4:30 - 5:45 pm Session 8: Nociceptors Stephen McMahon, Chair

Paolo Cesare (Natural and Medical Sciences Institute, Univ. of Tübingen, Germany) - Use of microelectrode arrays to study nociceptors  
Greg Weir (University of Oxford, UK) - Chemogenic silencing of nociceptors.  
Ohannes Melemedjian (University of Maryland, USA) - Metabolic reprogramming of sensory neurons in the transition of acute pain to chronic pain  
Venetia Zachariou (Mount Sinai School of Medicine, USA) - Cellular mechanisms of sex-specific modulation of chronic pain  
Alexander Binshtok (Hebrew University, Jerusalem, Israel) - Pain at its source: signal transduction and propagation at mice corneal nociceptive peripheral terminals in vivo

End of Monday program

## TUESDAY, 5 June

### 8:30-9:30 am Session 9: Reward circuits and pain

Petra Schweinhardt, Chair

Petra Schweinhardt (McGill University, Canada) - Psychosocial factors play an important role in chronic pain – but which role exactly?  
Susanne Becker (University of Heidelberg, Germany) - The pleasure of pain relief: human perception, behavior and underlying mechanisms

Herta Flor (University of Heidelberg, Germany) - Aversive and appetitive learning and the chronicity process

Alex Makryannis (Northeastern University, USA) - Structure of the CB1 cannabinoid receptor

### 9:30 – 10:15 am Session 10: Brain imaging of chronic pain: the good, the bad, and the ugly! Karen Davis, Chair

Karen Davis (Univ. Toronto, Canada) - Predicting pain and its relief using brain imaging: moving towards personalized pain management

Lauren Atlas (NIH/NCCIH, USA) - How instructions and learning shape pain and pain-related responses

Markus Ploner (Technische Universität München, Germany) - Can we assess chronic pain by using EEG?

### 10:15 - 11:00 am Coffee break

### 11:15 – 12:30 pm Session 11: Developing pain pathways - Why do they matter?

Maria Fitzgerald, Chair

Maria Fitzgerald (University College London, UK) - Developmental plasticity of pain

Mike Jankowski (Cincinnati Children's Hospital, USA) - Changing properties of juvenile nociceptors

Stephanie Koch (Salk Institute, USA and University College London, UK) - Molecular dissection of developing spinal sensory circuits

Lorenzo Fabrizi (University College London, UK) - Pain activity in the infant brain

Ruth Grunau (University of British Columbia, Canada) - Impact of early pain on brain and stress regulation

### 12:30 - 2:00 pm Free for Lunch

### 2:00-3:15 pm Session 12: Cell specific technologies for chronic pain mechanism and target identification. Ted Price, Chair

Ted Price (University of Texas at Dallas, USA) - Utilizing TRAP mice to identify new targets and the cell type specific translational landscape of chronic pain

Ru-Rong Ji (Duke University, USA) - A human neuropathic pain model in a dish: Studies on human DRG neurons

Yawar Qadri (Duke University, USA) - A cellular census of the murine lumbar spinal cord

David J. Clark (Stanford University, USA) - Analysis of immune system activation after fracture using mass cytometry

Jinny Kim (Korea Institute of Science & Technology, Seoul, Korea) - mGRASP for mapping synaptic

### 3:15-4:00 pm Coffee break

### 4:00 -4:30 pm Data Blitz #3

1. Nikita Ruparel (University of Texas Health Science Center at San Antonio, USA) – Regulation of TRPV1 activities by a serotonin-mediated sexually dimorphic mechanism

2. Benedict Kolber (Duquesne University, Pittsburgh, USA) - Effects of a Cameroonian natural product extract with 5-HT3 receptor affinity in mouse and human DRG

3. Mariacristina Mazzitelli (Texas Tech University Health Sciences Center, Lubbock, USA) - Group II mGluRs in amygdala regulate behaviors and spinal nociceptive processing in an arthritis pain model

4. Enza Palazzo (University of Campania “L. Vanvitelli”, Naples, Italy) - The dual role of metabotropic glutamate receptor 7 in the dorsal striatum modulation of pain

### 4:30 - 5:45 pm Session 13: Sodium/calcium channels

John Wood, Chair

John Wood (University College London, UK) - Sodium as a second messenger

Geoff Woods (Cambridge University, UK) - New pain phenotypes and genotypes

Slobodan Todorovic (University of Colorado, Denver, USA) - Cav3.2 channels as new targets for perioperative pain therapies

Gerald Zamponi (University of Calgary, Canada) - Modulating Cav alpha2-delta interactions with N-type calcium channels as a strategy for pain treatment

Emmanuel Bourinet (Inst. de Génomique Fonctionnelle, France) – T-type calcium channels on nociceptive and emotional aspects of pain

End of Tuesday program

## WEDNESDAY, 6 June

### 8:30-10:15 am Session 14: Cortex Rohini Kuner, Chair

Rohini Kuner (University of Heidelberg, Germany) - Contributions of interneurons to pain-related cortical activity rhythms  
Min Zhuo (University of Toronto, Canada) - Inhibiting cortical pre-LTP by oxytocin  
Ipek Yalcin (University of Strasbourg, France) - Role of anterior cingulate cortex in the comorbidity of chronic pain and mood disorders  
Jing Wang (New York University, USA) - A cortical gain control mechanism for pain  
Thomas Nevian (University of Bern, Switzerland) - Network dynamics in the anterior cingulate cortex in chronic pain  
Philippe Séguéla (McGill University, Canada) - Altered neuromodulation in neuropathic prefrontal cortex  
Carl Saab (Brown University, USA) - The spine-brain continuum: patching together the spinothalamic mosaic

### 10:15 - 11:00 am Coffee break

### 11:00 – 12:15 pm Session 15: Studying pain mechanisms in (wo)man Nadine Attal, Chair

Didier Bouhassira (The Assistance publique – Hôpitaux de Paris, France) - Thermal grill illusion in patients with different chronic pain syndromes  
Nadine Attal (University Versailles Saint-Quentin, France) - rTMS-induced analgesia  
Martin Schmelz (University of Heidelberg, Germany) - Modulation of maximum discharge frequencies in C-nociceptors in UV-B inflammation  
Thomas Graven-Nielsen (Aalborg University, Denmark) - Factors influencing endogenous mechanisms of pain modulation  
Steve McMahon (King's College London, UK) - Conditioned pain modulation

### 12:30 - 2:00 pm Free for Lunch

### 2:00 - 2:45 pm Session 16: Emerging therapies Iain Chessell, Chair

Pete Thornton (AstraZeneca, Cambridge, UK) - Antagonising PAR2 with monoclonal antibody; novel strategy for chronic pain treatment  
Michael McIntosh (University of Utah, USA) - alpha9 nicotinic acetylcholine receptors and the treatment of pain  
Michael Oshinsky (NIH/NINDS, USA) - Peripheral nerve stimulation for the treatment of headache

### 2:45 - 3:45 pm Session 17: Deciphering pain: from new techniques to computation Yves de Koninck, Chair

Michael Bruchas (Washington University in St. Louis, USA) - Visualizing and dissecting opioid-regulated neuronal ensembles  
Yves de Koninck (Laval University, Canada) - Untangling sensory afferents coding  
Steve Prescott (University of Toronto, Canada) - Subversion of drug effects through compensatory plasticity  
Wani Woo (Sungkyunkwan University, South Korea) - An fMRI signature of tonic pain based on whole-brain functional connectivity

### 3:45- 4:30pm Coffee break

### 4:30 - 5:30 pm Session 18: Auto-immune mechanisms Bradley Kerr/Brad Taylor, Co-chairs

Gila Moalem-Taylor (The University of New South Wales, Australia) - Immunomodulation of pain in an animal model of multiple sclerosis  
Brad Taylor (University of Pittsburgh, USA) - Sphingosine-1-phosphate receptor-1 agonists for central neuropathic pain  
Bradley Kerr (University of Alberta, Canada) - DRG inflammation and ER stress as mediators of MS-associated pain states  
Marzia Malcangio (King's College London, UK) - Dissociation of pain from inflammation in models of rheumatoid arthritis

### 5:30 - 6:00 pm Data Blitz #4

1. Cédric Lenoir (Université catholique de Louvain, Belgium) - HD-tDCS combined with EEG and functional MRI to characterize the involvement of S1 in nociception
2. Giulia Liberati (Université catholique de Louvain, Belgium) - Frequency tagging insular activity related to thermonociception: evidence from intra-cerebral recordings
3. André Mouraux (Université catholique de Louvain, Belgium) - The induction of secondary hyperalgesia can be modulated by spatial attention

End of Wednesday program

## THURSDAY, 7 June

### 8:30-9:30 am Session 19: Non-opioid neuropeptides and pain Marc Landry, Chair

Marc Landry (University of Bordeaux, France) – Relaxin-3 peptidergic control of descending pathways  
Stefan Lechner (University of Heidelberg, Germany) – The role of NPY2R-expressing nociceptors in pain signaling  
Guang Yang (New York University, USA) – Role of cortical inhibition in chronic pain  
Wendy Imlach (Monash University, Australia) – Endosomal signaling of the receptor for CGRP mediates pain transmission

### 9:30- 10:15 am Data Blitz #5

1. Elisabetta Coppi (University of Florence, Italy) – Selective adenosine A3 receptor stimulation inhibits voltage-dependent Ca<sup>2+</sup> currents in rat dorsal root ganglion neurons
2. Lorenzo Di Cesare Mannelli (Univ. Florence, Italy) – Visceral pain management: preclinical effect of adenosine A3 receptor stimulation
3. Silvia Squillace (Saint Louis University, USA; Sapienza University of Rome, Italy) – A3 adenosine receptor (A3AR) agonists reverse CCI-induced neuropathic pain through a CD4+ T cells-derived IL-10 pathway
4. Shivani Ruparel (University of Texas Health Science Center at San Antonio, USA) – A novel single-fiber electrophysiology method to study tumor-nerve interactions at the site of tumor development
5. Z. David Luo (University of California, Irvine, USA) - Using CLARITY to study sensory neuron type-specific morphological changes in animal models

### 10:15 - 11:00 am Coffee break

### 11:00 – 12:00 pm Session 20: Neuroimmune mechanisms Michaela Kress, Chair

Michaela Kress (Medical University Innsbruck, Austria) - Interleukin-6/gp130 dependent neuroimmune interactions associated with maladaptive pain  
John Dawes (University of Oxford, UK) - The role of autoantibodies in regulating pain sensitivity  
David Andersson (King's College, London, UK) - Passive transfer of Complex Regional Pain Syndrome (CRPS)  
Camilla Svensson (Karolinska Institute, Sweden) - Monoclonal antibodies derived from patients' B-cells reveal differential pain mechanisms in rheumatoid arthritis

### 12:00- 12:30 pm Data Blitz #6

1. Guangchen Ji (Texas Tech University Health Sciences Center, Lubbock, USA) – Fear extinction learning ability predicts pain behaviors
2. Kati Thieme (Philipps-University of Marburg, Germany) – Central changes in evoked potentials after operant pain therapy combined with baroreflex training in fibromyalgia patients
3. Krisztina Pohóczky (University of Pécs, Hungary) - Distribution of somatostatin sst4 receptors in pain-related brain areas of the mouse
4. Brett Graham (University of Newcastle, Australia) - Optogenetic analysis of spinal sensory processing circuits

### 12:30 - 2:00 pm Free for Lunch

### 2:00 pm – 3:00 pm Session 21: Kappa opioid receptors Jose Moron-Concepcion, Chair

Jose Moron-Concepcion (Washington University, USA) - Pain-induced negative affect is mediated via recruitment of the nucleus accumbens kappa opioid system  
Elyssa Margolis (University of California San Francisco, USA) - Electrophysiological characterization of novel selective and reversible kappa opioid receptor antagonists in VTA neurons  
Edita Navratilova (University of Arizona, USA) – KOR antagonists in pain modulation  
Thomas Kash (University of N. Carolina, USA) - Extended amygdala Dynorphin/KOR signaling regulates alcohol consumption and stress-coping

### 3:00 - 4:00 pm Data Blitz #7

1. Niels Eijkelkamp (University Medical Center Utrecht, The Netherlands) – Mitochondrial dysfunction during inflammatory pain
2. Luke Grundy (Flinders University, Australia) - TTX-Sensitive voltage-gated sodium channels regulate bladder afferent responses to distension
3. Xavier Gasull (Universitat de Barcelona, Spain) - Role of the background TRESK channel in pain sensation
4. Emerson Krock (Karolinska Institutet, Sweden) – Long term arthritis-induced pain behaviour is regulated by lysophosphatidic acid/Alpha2Delta1 signaling in the collagen antibody-induced arthritis model
5. Margot Maurer (University of Heidelberg, Germany) - Interactions between nociceptive and non-nociceptive systems within the spinal trigeminal nucleus
6. Rainer Haberberger (Flinders University, Australia) - Sensory neuron-like 50B11 cells, a promising component for a pain biosensor?
7. Olivia Eller-Smith (University of Kansas, USA) - The potential role of metabolic syndrome in stress induced pain disorders
8. Kai Kummer (Medical University of Innsbruck, Austria) - Dysregulation of gene expression in a mouse model of Fabry disease; implications of new pathways

### 4:00 - 4:45 pm Coffee break

## THURSDAY, 7 June (continued)

### 4:45 - 5:45 pm      Session 22      Musculoskeletal pain      Laura Stone, Chair

Laura Stone (McGill University, Canada) - Intervertebral disc degeneration and low back pain

Tamara King (University of New England, USA) – Exercise effects on joint pain: impact of gender, site, and free will

Jason McDougall (Dalhousie University, Canada) - Protease activated receptor involvement in joint neuropathic pain

Mary Barbe (Temple University, Philadelphia, USA) Effectiveness of anti-fibrosis drugs in preventing fibrosis and related sensorimotor declines induced by short-term repetition high force tasks

### End of Thursday program

## FRIDAY, 8 June

### 8:30-9:30 am      Session 23: Pain transducers      Cheryl Stucky, Chair

Cheryl Stucky (Medical College of Wisconsin, USA) - Mechanotransduction in skin: keratinocytes to sensory neuron communication

Alex Chesler (NIH/NCCIH, USA) - The role of Piezo2 in touch and pain

Håkan Olausson (University of Gothenburg, Sweden) - The physiology of human A-beta high-threshold mechanoreceptors

Reza Sharif-Naeini (McGill University, Canada) - Mechanosensitive ion channels in nociceptors drive mechanical allodynia in osteoarthritis pain

### 9:30 - 10:30 am Data Blitz #8

1. Brian Roome (Institut de recherches cliniques de Montreal, Canada) - "Genetic analysis of nociceptive projection neuron development and function, Part I"

2. Farin Bourojeni (Institut de recherches cliniques de Montreal, Canada) - "Genetic analysis of nociceptive projection neuron development and function, Part II"

3. Eric Bellefroid (ULB Neuroscience Institute, Université Libre de Bruxelles, Belgium) - Prdm12 in nociceptor development

4. David Hughes (University of Glasgow, Scotland) – The role of RorB islet cells in mechanical pain processing

5. Cornelia de Moor (University of Nottingham, UK) – Cordycepin as a lead compound for the treatment of osteoarthritis

6. Masar Radhi (University of Nottingham, UK) - The mechanism of action of cordycepin in macrophages

### 10:30- 11:15 am Coffee break

### 11:15 – 12:30 pm Data Blitz #9

1. Freija ter Heegde (UCL and Royal Veterinary College, UK) - Mechanical loading of the knee joint; a novel, non-invasive mouse model of osteoarthritic pain

2. Kate Sadler (Medical College of Wisconsin, USA)– Lipid signaling in Sickle Cell Disease pain

3. Saad Nagi (Linköping University, Sweden) – Mechanical pain perception and the role of A-beta afferents

4. Francesco Ferrini (University of Torino, Italy) - Functional impact of uneven chloride homeostasis across the spinal dorsal horn

5. Jennifer Xie (New York Institute of Technology, Jonesboro, Arkansas, USA) - Meteorin for neuropathic pain - a replication study

6. Miodrag Mitric (Medical University of Innsbruck, Austria) - Cholinergic processing of neuropathic pain in the prefrontal cortex

7. Annabelle Réaux-Le Goazigo (Institut de la Vision, INSERM, France) - Dual enkephalinase inhibitor (DENKI) PL265: a novel topical treatment to alleviate corneal inflammation and ocular pain

8. Rie Bager Hansen (Københavns Universitet, Denmark) - Innervation of human bone – a study of painful metastatic bone disease

### 12:30 - 2:00 pm Free for Lunch

### 2:00 - 3:00 pm      Session 24: Spinal circuits      Rebecca Seal, Chair

Rebecca Seal (Univ. of Pittsburgh, USA) - Insights into dorsal horn persistent pain circuitry as a function of injury-type

Andrew Todd (University of Glasgow, Scotland) - Neuronal circuits for pain and itch processing in the spinal dorsal horn

Qiufu Ma (Harvard University, USA) - Mapping spinal circuits and revisit pain measurement in mice

Martyn Goulding (Salk Institute, USA) - Functional mapping of sensory pathways in the dorsal spinal cord

## FRIDAY, 8 June (continued)

### 3:00 – 3:45 pm Data Blitz #10

1. Melissa O'Brien (Dalhousie University, Halifax, NS, Canada) - Sex-specific blockade of NaV1.8 in a rodent model of joint neuropathy
2. Sophie Pezet (Laboratory of Brain Plasticity, CNRS UMR 8249, ESPCI, Paris, France) Alterations of brain network function in chronic inflammatory pain, revealed by ultrafast functional ultrasound imaging
3. Miguel Thibaut (Laboratory of Brain Plasticity, CNRS UMR 8249, ESPCI, Paris, France) - New insights on corneal pain from functional neuroimaging of trigeminal ganglion
4. Nicolas Massaly (Washington University in Saint Louis, USA) - Pain recruits the dynorphin-kappa opioid system in the nucleus accumbens, altering fentanyl self-administration

### 3:45- 4:30 pm Coffee break

### 4:30 - 5:30 pm Session 25: Spinal Itch circuits and spinal itch control Uli Zeilhofer, Chair

Xinzhong Dong (Johns Hopkins University, USA) - Spinal circuits of itch

Martina Pagani (University of Zurich, Switzerland) - Spinal itch gating by synaptically released GRP

Allan Basbaum (University of California San Francisco, USA) - GABAergic control of acute and chronic itch: transplants and drugs

Uli Zeilhofer (University of Zurich, Switzerland) - GABAergic interneurons and GABA-A receptors controlling the spinal relay of itch

## END OF CONFERENCE

Note restaurant location for Conference dinners. Dinners start at 8:00 pm.  
If you have a group, don't be late, or open seats will be scattered.

