## INRC Schedule at a Glance

<table>
<thead>
<tr>
<th>Time/Date</th>
<th>Monday 6.16.15</th>
<th>Tuesday 6.17.15</th>
<th>Wednesday 6.18.15</th>
<th>Thursday 6.19.15</th>
<th>Friday 6.20.15</th>
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<tbody>
<tr>
<td>7:00</td>
<td>Registration</td>
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<td>8:00</td>
<td>8:00-9:00 CPDD/INRC Plenary 1 - Nora Volkow</td>
<td>8:00-9:45 INRC Plenary: John Williams &amp; related Hot topics</td>
<td>8:00-9:45 Session 5 - Vaccines to prevent Drug Abuse (Chair: Mary Jeanne Kreek and Chris Evans)</td>
<td>8:00-9:45 Session 6 - Opioid Tolerance and Hyperalgesia (Chair: Michael Morgan)</td>
<td>Depart Conference</td>
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<td>9:00</td>
<td>9:00-9:15 Break</td>
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<td>9:30</td>
<td>9:15 - 11:30 Session 1 - Addiction to Prescription Opioids (Chair: Fred Nyberg, INRC President)</td>
<td>10:00-12:00 Session 3 - Pain and Reward (Chair: Frank Porreca)</td>
<td>10:00-12:00 CPDD/INRC Plenary 3 - Cannabinoids (Chair: Todd Vanderah)</td>
<td>10:00-12:00 Session 7 - Non-Canonical Actions of Opioids (Chair: Michael Morgan)</td>
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<td>11:00</td>
<td>11:30-1:30 Lunch + Poster session (INRC, Evens)</td>
<td>12:00-2:00 Lunch + Poster session (INRC, Odds)</td>
<td>12:00-1:00 Lunch + Data Blitz (Chair: Susan Ingram)</td>
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<td>12:30</td>
<td>1:30-2:45 Founders Lecture - Gavril Pasternak</td>
<td>1:00-2:00 Early Career Event-Mock Study Section (Optional)</td>
<td>1:00-2:00 Young Investigator Plenary (Gregory Scherrer)</td>
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<td>14:00</td>
<td>2:45-3:00 Break</td>
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<td>15:00</td>
<td>3:00 - 5:00 Session 2 - Advances in Therapeutic Design (Chairs: Jay McLaughlin and Jane Aldrich)</td>
<td>2:00-4:00 CPDD/INRC Plenary 2 - Opioid Abuse (Chair: Sandra Comer)</td>
<td>4:00-4:15 Break</td>
<td>2:00-3:30 Young Investigator Session (Chair: Gregory Scherrer)</td>
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<td>16:00</td>
<td>Registration begins</td>
<td>4:15-5:15 Session 4 - Optogenetics and pain (Chair: Robert Gereau)</td>
<td>Free afternoon</td>
<td>3:30-4:00 Break</td>
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<tr>
<td>16:30</td>
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All INRC sessions to be held in the Grand Ballroom at the Biltmore Hotel, Phoenix, AZ
Monday, June 15:
15:00-20:00 Registration
18:00-20:00 Welcome Reception

Tuesday, June 16:
8:00-9:00 INRC/CPDD Plenary 1 Nora Volkow Director, National Institute on Drug Abuse (NIDA) *Arizona Biltmore Ballroom*
9:00 – 9:15 Break
9:15-10:15 Session 1 “Addiction to Prescription Opioids”, Chair: Fred Nyberg, Uppsala University
Thomas Clausen (University of Oslo) Prescription opioid-abuse and dependence in Scandinavian countries
Gabriele Fischer (Medical University of Vienna) Addiction and diversion of prescription opioids in Europe
Pauline Voon (St. Paul's Hospital, Vancouver, CAN) Nonmedical prescription opioid use in North America
10:15 – 11:00 Hot Topics
Naoko Kuzumaki (Hoshi University, Tokyo) Chronic pain and addiction
Rachel Enga (Virginia Commonwealth University) Precipitated oxycodone withdrawal reduces the startle reflex and bodyweight in C57BL/6J and control mice, but not in HIV-1 Tat-expressing mice
Darrow Khosh-Chashm (University of Texas - Houston) Impact of benzodiazepine use on retention and compliance, relapse, and safety in buprenorphine-maintained patients: A Literature Review
11:00-11:30 Discussion
11:30-13:30 Lunch & Even numbered posters (with CPDD) *Frank Lloyd Wright Ballroom*
13:30-14:45 Founders’ Lecture
Gavri Pasternak (Memorial Sloan-Kettering Cancer Center) 40 years on drugs: It's all in the telling of the tail
14:45-15:00 Break
15:00-16:00 Session 2 “Advances in Therapeutic Design”, Chairs: Jay McLoughlin, Torrey Pines Institute for Molecular Studies; Jane Aldrich, University of Florida
Chris McCurdy (University of Mississippi) Sigma receptor antagonists in peripheral pain: Potential for improved diagnosis and pharmacotherapy with significantly reduced CNS liabilities
Andy Coop (University of Maryland) UMB425: A unique opioid analog with lower tolerance
Jessica Anand (University of Michigan) Development of bifunctional MOR agonist/DOR antagonist peptides: Successes and failures
Jane Aldrich (University of Florida) Analogs of the novel macrocyclic tetrapeptide CJ-15,208 exhibit diverse opioid activity profiles
16:30 – 16:30 Hot Topics
Todd Hillhouse (University of Michigan) Enhancement of opioid-mediated antinociception by the mu-opioid receptor positive allosteric modulator, BMS-986122
Achla Gupta (Mt. Sinai Hospital) Collybolides are highly selective and potent agonists of kappa opioid receptors
James Zadina (Tulane University) An endomorphin analog providing prolonged antinociception with substantial reduction of multiple adverse side effects relative to morphine
16:30 - 17:00 Discussion

Wednesday, June 17:
8:00 - 08:40 INRC Plenary 1 - John Williams (Vollum Institute)
What is all the confusion about opioid actions on dopamine neurons?
8:45 – 9:05 Elyssa Margolis (UCSF) Opioid actions in the VTA are diverse and depend on projection target
9:05 – 9:30 MOP in the VTA
Adrianne R. Wilson-Poe (Columbia University) Inflammatory pain regulates opioid function in the mesolimbic pathway
Michael Bruchas (Washington University-St. Louis) Spatiotemporal control of opioid signaling and behavior
9:30 – 9:45 Discussion
9:45 - 10:00 Break
10:00 - 11:45 Session 3 “Pain and Reward”, Chair: Frank Porreca, University of Arizona
Howard Fields (UCSF) How the nucleus accumbens enables the approach or avoid decision
Frank Porreca Endogenous opioids and reward of pain relief
Catherine Cahill (UC-Irvine) Neuropathic pain modulates dopaminergic circuitry: role for microglial activation
Siri Leknes (Oslo University Hospital) Endogenous opioids in human pain and reward
11:45 - 12:00 Discussion
12:00 - 14:00 Lunch & Odd-numbered posters (with CPDD) *Frank Lloyd Wright Ballroom*
14:00 - 16:00 INRC/CPDD Plenary 2 “Novel Strategies for Reducing Opioid Abuse”, Chair: Sandra Comer, Columbia University *Arizona Biltmore Ballroom*
Kathy Cunningham (University of Texas Medical Branch, Galveston) Prospects for serotonin therapeutics in addictive disorders
Marco Pravettoni (University of Minnesota) Development of vaccines for opioid abuse
Jermaine Jones (Columbia University) Assessing the ability of gial inhibitors to alter the abuse liability of opioids using laboratory models in humans
Theodore Cicero (Washington University, St. Louis) Epidemiology on the impact of opioid abuse-deterrent medications on opioid abuse in the community
16:00 - 16:15 Break
16:15 - 17:00 Session 4 “Optogenetics in Pain”, Chair: Robert W. Gereau IV, Washington University-St. Louis
Robert W. Gereau IV (Washington University-St. Louis) Fully-implantable wireless optoelectronic systems for interrogation of spinal and peripheral pain circuitry
Anthony Pickering (University of Bristol) Opto- and chemo-genetic activation of brainstem POMC neurons reveals opioid-mediated analgesic and cardiorespiratory roles
Zhizhong Z. Pan (The University of Texas MD Anderson) Dissecting the brain’s pain circuits
17:00 - 17:15 Discussion

All INRC sessions to be held in the Grand Ballroom at the Biltmore Hotel, Phoenix, AZ
Thursday, June 18:
8:00-10:00 INRC posters still up “Frank Lloyd Wright Ballroom
8:00 - 9:00 Session 5 “Vaccines to Prevent Drug Abuse”, Chairs: Mary Jeanne Kreek, The Rockefeller University and Christopher Evans, UCLA
Brian Reed (Rockefeller University)
Application of a novel small molecule vaccine platform to oxycodone immunization
Gary Matyas (Walter Reed Army Institute of Research)
Development and optimization of a heroin vaccine
Paul Bremer (Scripps Research Institute)
Design of haptenes and conjugate vaccines for heroin addiction
Joel Schlosburg (Scripps Research Institute)
Selectivity, capacity, durability: putting a heroin vaccine through its paces and clearing the major hurdles towards clinical viability
9:00 – 9:30 Hot Topics
Rashmi Jalah (Walter Reed Army Institute of Research)
Development of a combination Heroin-HIV Vaccine
Oscar Torres (Walter Reed Army Institute of Research)
Comparison of equilibrium dialysis (ED) combined with ultra high performance liquid chromatography/tandem mass spectrometry (UPLC/MS/MS) and competitive ELISA for the determination of dissociation constants of 6-acetylmorphine (6AM) and morphine to polyclonal antibodies
Lee W. Hutson (University of North Carolina at Chapel Hill)
Interleukin-1 signaling in the basolateral amygdala mediates heroin-conditioned immuno-suppression
9:30 – 9:45 Discussion
9:45 – 10:00 Break
10:00-12:00 INRC/CPDD Plenary 3 “Cannabinoid Mechanisms and Interventions”, Chair: Todd W. Vanderah, University of Arizona
*Arizona Biltmore Ballroom
Alexandros Makriyannis (Northeastern University)
Therapeutic interventions through the modulation of CB1/CB2 cannabinoid receptor function
Aron Lichtman (Virginia Commonwealth University)
Inhibition of the 2-AG biosynthetic enzyme diacylglycerol lipase beta: Antinociception through a cannabinoid receptor independent pathway
Todd W. Vanderah (University of Arizona)
Synergistic actions of opioid/cannabinoid agents for discrete pain etiologies
Andrea Hohmann (Indiana University)
The therapeutic promise of nonpsychoactive cannabinoid analgesics
12:00 - 13:00 Data Blitz + Lunch Chair: Susan L. Ingram, Oregon Health and Science University
13:00 – 14:00 Optional Early Career Event- Mock Study Section Chair: José Moron-Concepción, Columbia University
Friday, June 19:
8:00 - 9:15 Session 6 “Opioid Tolerance and Hyperalgesia-Real Consequences, Treatment, Mechanisms”, Chair: Michael M. Morgan, Washington State University-Vancouver
Michael M. Morgan (Washington State University-Vancouver)
Why are there so many mechanisms of opioid tolerance?
Bradley K. Taylor (University of Kentucky)
Endogenous opioid dependence
Lori Eisdon (Georgia State University)
Role of glia in opioid tolerance
Jürgen Sandkühler (Medical University of Vienna)
CNS mechanisms leading to opioid-induced Hyperalgesia
9:15 – 9:45 Discussion
9:45 – 10:00 Break
10:00 - 11:00 Session 7 “Non-canonical Actions of Opioids”, Chair: Michael M. Morgan, Washington State University-Vancouver
Eamonn Kelly (University of Bristol)
GRKs, arrestins and bias at the mu opioid receptor
Lakshmi Devi (Mt. Sinai Hospital)
Regulation of opioid receptor function by post-endocytic peptide processing
Michael Lacagnina (Duke University)
Neuromimetic signaling and opioids: impact of early-life experience on glial function and addiction-related behaviors
Wendy Walwyn (UCLA)
A role for constitutively active mu opioid receptors in the recovery from chronic pain
11:00 – 11:30 Hot Topics
John Streicher (University of New England)
Heat shock protein 90 regulates mu opioid receptor signaling in vitro and in mouse periaqueductal grey
Jin Xu (Memorial Sloan-Kettering Cancer Center)
Truncated six transmembrane mu opioid receptors mediate opioid analgesia
11:30 – 12:00 Discussion
12:00 -13:00 Lunch
13:00 - 14:00 Young Investigator Plenary (Chair: Gregory Scherrer)
Sarah Ross (University of Pittsburgh)
Dynorphin is released from spinal B5-1 interneurons and functions as an inhibitory neuromodulator of itch
Steeve Bourane (The Salk Institute for Biological Studies)
Identification of functional populations of interneurons in dorsal spinal cord
14:45 - 15:15 Hot Topics
Edita Navratilova (The University of Arizona)
Distinguishing brain circuits mediating pain relief and addictive effects of systemic morphine
Gina Marrone (Memorial Sloan-Kettering Cancer Center)
U50,488H requires truncated 6 transmembrane variants of the mu opioid receptor for analgesia but not side effects
Erica Levitt (Oregon Health and Science University)
Mu opioid receptors hyperpolarize respiratory-controlling Kölliker-Fuse neurons
15:15 - 15:30 Discussion
15:30 – 15:45 Break
15:45-17:00 Business Meeting (INRC President, Fred Nyberg)
17:00- 18:30 Break
18:30 - end Closing Banquet
Saturday, June 20: Depart Conference