Nonlinear dynamics and stochastic methods: from neuroscience to other biological applications

March 10-12, 2014
University of Pittsburgh - Pittsburgh, PA

Conference Schedule

Venue: O’Hara Student Center (3900 O’Hara Street, Pittsburgh, PA 15260)

Monday March 10th
8:30 AM  Breakfast
9:00 AM  Opening remarks

Session 1: Reduced neuronal models. Competition models  (Chair: Jonathan Rubin)
9:10 – 9:55 AM  John Rinzel (New York University)
Biased competition for context-dependent perceptual choice

9:55 – 10:40 AM  David Terman (Ohio State University)
What do small toy models tell us about large complicated networks?

10:40 – 11:00 AM  Coffee break

Session 2: Pattern formation in cell biology (Chair: Angela Reynolds)
11:00 – 11:45 AM  Leah Edelstein-Keshet (University of British Columbia)
From actin assembly to cell motility, with a little help from my friend

11:45 AM – 12:30 PM  Lance Davidson (University of Pittsburgh, Bioengineering)
Engines of cell shape change: actomyosin dynamics within the cell cortex

~ Lunch break ~

Session 3: Mathematical methods and applications to biology (Chair: Boris Gutkin)
2:30 –3:15 PM  Cheng Ly (Virginia Commonwealth University)
Networks of heterogeneous neural oscillators

3:15 – 4:00 PM  Sharon Crook (Arizona State University)
A continuum model approach for exploring the role of neuronal structure

4:00 – 4:45 PM  Pranay Goel (Indian Institute of Science, Education and Research, Pune- India)
Using the Dual Oscillator Model (DOM) to study bursting in pancreatic islets
Tuesday March 11th

9:00 AM  
Breakfast

Session 4: Geometrical methods. Systems with multiple timescales (Chair: Rodica Curtu)

9:20 – 10:05 AM  
Jonathan Rubin (University of Pittsburgh)
...and Out Come the Boundary Conditions

10:05 – 10:50 AM  
Paul Bressloff (University of Utah)
Breakdown of fast-slow analysis in an excitable neuron with channel noise

10:50 – 11:10 AM  
Coffee break

Session 5: Role of variability in shaping the output of the neural system (Chair: Zack Kilpatrick)

11:10 – 11:55 AM  
Carson Chow (National Institutes of Health)
How many neurons code a percept?

11:55 AM – 12:40 PM  
Remus Osan (Georgia State University)
Targeting performances for stochastic models of neural growth with uniform branching and pruning

~ Lunch break ~

Session 6: Experimental methods, data analysis and modeling techniques (Chair: Brent Doiron)

2:30 – 3:15 PM  
Roberto Fernandez Galan (Case Western Reserve University)
Stochastic neural dynamics and information processing in the autistic brain

3:15 – 4:00 PM  
Daniel Simons (University of Pittsburgh, Neurobiology)
Receptive field transformations in feedforward thalamocortical circuits

4:00 – 4:45 PM  
Jonathan Drover (Cornell Medical College)
A mean-field model suggests a novel EEG analysis technique to index thalamocortical dynamics

6:00 – 8:30 PM  
Banquet
(Frick Fine Arts Bldg)
**Wednesday March 12th**

9:00 AM  Breakfast

**Session 7: Brain rhythms and cognition (Chair: Remus Osan)**

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<thead>
<tr>
<th>Time</th>
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<th>Topic</th>
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<tr>
<td>9:20 – 10:05 AM</td>
<td>Nancy Kopell (Boston University)</td>
<td>Brain rhythms: multiple roles of inhibition</td>
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<tr>
<td>10:05 – 10:50 AM</td>
<td>Boris Gutkin (Ecole Normale Superieure, Paris - France)</td>
<td>Working with Gamma, Theta, Alpha oscillations (and noise correlations) to make working memory work</td>
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10:50 – 11:10 AM  Coffee break

**Session 8: Pattern formation in neural systems (Chair: Carson Chow)**

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<tr>
<td>11:10 – 11:55 AM</td>
<td>Zachary Kilpatrick (University of Houston)</td>
<td>Getting the most out of bumps</td>
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<tr>
<td>11:55 AM – 12:40 PM</td>
<td>Jack Cowan (University of Chicago)</td>
<td>Geometric Visual Hallucinations: what they tell us about the architecture of the brain</td>
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12:40 – 12:55 PM  Closing remarks

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