Emergence in Chemical Systems 4.0 Conference

Tuesday, June 23

Emergence

	Session Leader:	**Steen Rasmussen**	
9:00 – 9:15	Conference Opening: Dr. Helena Wisniewski, Vice Provost for Research and Dean for Graduate School		
9:15 – 10:15	Mark Bedau	Pragmatic pluralism about emergence	Reed College/Portland State, USA
10:15 – 10:45	Ramanarayanan Krishnamurthy	Heterogeneity to Homogeneity: The Emergence of RNA	Scripps Research Institute, USA
10:45 – 11:15	**Coffee Break**		
11:15 – 12:15	Jonathan Pascalie and René Doursat	Morphogenetic Engineering in Synthetic Biology: Programming the emergence of collective shapes in simulated colonies of microorganisms.	Complex Systems Institute, France
12:15 – 1:15	**Lunch**		
1:15 – 2:15	Andrew Pohorille	Emergence of Protein Function	NASA, USA

Origin of Life

	Session Leader:	**Gonen Ashkenasy**	
2:15 – 2:45	Sandra Pizzarello and M. Bose	The cosmic trail of reduced Nitrogen towards Earth	Arizona State University, USA
2:45 – 3:15	Nicolle Zellner	Rethinking Solar System Bombardment:New Views on the Timing and Delivery of Lunar Impactors	Albion College, USA
3:15 – 3:45	**Coffee Break**		
3:45 – 4:00	Irene Chen	Noise and evolution in the RNA World	UC Santa Barbara, USA
4:00 – 4:15	Charles Liotta	The Mechanistic Origin of the ‘pH Dichotomy’ in the Reaction of Dihydroxyfumarate with Glyoxylate	Georgia Tech, USA
4:15 – 4:30	Tom Froese	Motility at the origin of life and the evolution of the genome	Universidad Nacional Autónoma de México, Mexico
4:30 – 4:45	Helen Hansma	Muscovite Mica, Mechanical Energy, Potassium, Crowding, and Life's Origins	University of California at Santa Barbara, USA
4:45 – 5:00	Sheng-sheng Yu	Ester-Mediated Amide Bond Formation and the Prebiotic Origin of Peptides	Georgia Tech, USA
5:00 – 5:15	Christine He	Overcoming Strand Inhibition with Viscous Environments	Georgia Tech, USA
10:00 pm – 1:00 am	**Midnight Sun Barbeque**	**Alaska Airlines Center, Varsity Sports Grill, Mezzanine**	

Wednesday, June 24			
Protocell			
	Session Leader:	**Andrew Pohorille**	
9:00 – 10:00	Steen Rasmussen	Novel chemical protocells generated and controlled by solvated electronic microchips	University of Southern Denmark, Denmark
10:00 – 10:30	Atsushi Kamimura	Reproduction of protocells: interplay of different timescale in a catalytic reaction network	University of Tokyo, Japan
10:30 – 11:00	**Coffee Break**		
Self-Construction			
	Session Leader:	**Jim Pantaleone**	
11:00 – 12:00	Robert Pascal	The Conditions for Self-Organization in Chemical Systems	Université de Montpellier, France
12:00 – 12:30	Agnieszka Mensfelt	Evolution of morphologies - modeling Foraminifera in Framsticks	Poznan Univeristy of Technology, Poland
12:30 – 1:30	**Lunch**		
1:30 – 2:30	Gonen Ashkenasy	Emerging Oscillations and Bifurcation in Synthetic Replication Networks	Ben-Gurion University of the Negev, Israel
Systems Chemistry			
	Session Leader:	**Irene Chen**	
2:30 – 3:00	David Baum	Selection before the protocell	University of Wisconsin, USA
3:00 – 3:30	**Coffee Break**		
3:30 – 4:00	R. Dean Astumian	Enhanced Diffusion, Chemotaxis, and Pumping by Active Enzymes: Progress toward an Organizing Principle of Molecular Machines	The University of Maine, USA
4:00 – 4:30	Stephan Weiss	Coupled Belousov-Zhabotinsky reactors	University of Michigan, USA
4:30 – 5:00	Yuagsheng Cao	The free energy cost of accurate biochemical oscillations	Peking University, China
6:00	**Banquet**	**Anchorage Museum, Bus from Gorsuch Commons**	
Thursday, June 25			
Systems Chemistry			
	Session Leader:	**Ágota Tóth**	
9:00 – 10:00	Ricard Solé	Terraforming ecosystems with synthetic biological designs	ICREA-Complex Systems Lab UPF-IBE, Spain
10:00 – 10:30	Christoph Kuhn	Weigh the anchor and rock on the wave of lego and perfringo: How the offspring of the first replicating oligomer sustain the RNA-world and open the world of protein synthesis	University Hospital Bern, Switzerland
10:30 – 11:00	**Coffee Break**		
11:00 - 11:30	Jerzy Maselko	The First Life	University of Alaska Anchorage, USA

11:30 – 12:30	Peter Strazewski	How to feed an inanimate evolvable chemical system, supplied with synthetic macromolecules of predictable proper-ties, so as to let it self-evolve into increased complexity and life-like behaviour	Université Claude Bernard Lyon 1, France
12:30 – 1:30	**Lunch**		
1:30 – 2:00	Tom Lenaerts	The bits and bytes of protein domain communication	Université Libre de Bruxelles, Belgium
2:00 – 2:30	Kepa Ruiz Mirazo	Emergent chemical behavior in variable-volume protocells	University of the Basque Country, Spain
2:30 – 3:00	**Coffee Break**		
3:00 – 3:30	Lidia Yamamoto	Emergence in Artificial Chemistries	Memorial University of Newfoundland, Canada
3:30 – 4:00	Punit Parmananda	Collective dynamics of chemo-mechanical oscillators	Indian Institute of Technology, India
Friday, June 26			
Hydrodynamics and the Formation of Precipitation Structures			
	Session Leader:	**Robert Pascal**	
9:00 – 9:30	Jim Pantaleone	Growing a chemical garden at the surface	University of Alaska Anchorage, USA
9:30 – 10:00	Ágota Tóth	Morphology control by flow-driven precipitation	University of Szeged, Hungary
10:00 – 10:30	Dezso Horváth	Diffusive fingering in a precipitation reaction driven by autocatalysis	University of Szeged, Hungary
10:30 – 11:00	**Coffee Break**		
Chemical Networks			
	Session Leader:	**Mark Bedau**	
11:00 – 11:30	Renate Wackerbauer and Jacopo Lafranceschina	Chaotic transients in a network of Morris-Lecar neurons	University of Alaska Fairbanks, USA
Short Talks **(Especially for young conference attendees to present their research)**			
11:30 – 11:45	Tamás Bánsági Jr.	The urea-urease reaction: dynamic behavior and applications	University of Sheffield, UK
11:45 – 12:00	Victor Yashin	Achieving synchronization with active hybrid materials: Coupling self-ossilating gels and piezoelectric films	University of Pittsburgh, USA
12:00 – 1:00	**Lunch**		
1:00 – 1:15	Kazuhito Tabata	Hybrid Cell - Single Cell Bacterium Fused Microdevice	The University of Tokyo, Japan
1:15 – 1:30	Geoff Cooper	Bridging the gap between polyoxometalate microtubes and classical chemical gardens	University of Glasgow, UK
1:30 – 1:45	Elizaveta Guseva	Origins of biopolymers: mechanisms of sequence selection	Stony Brook University, USA
1:45 – 2:00	Andrew Surman	Automated fluidic platforms for prebiotic evolution	University of Glasgow, UK
2:00 – 2:30	**Coffee Break**		
2:30 -	**Business Meeting**		

Saturday, June 27		
9:00 am	**Major Marine Glacier and Whale Watching Cruise Tour**	**Bus from Gorsuch Commons**

- **Presentations - Arts 150**

	Presentation	Q & A
1 hr.	**50 min**	**10 min**
30 min.	**25 min**	**5 min**
15 min	**12 min**	**3 min**

- **Lunch – CPISB Atrium**

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