

Diffusion Fundamentals IV

August 21-24, 2011, Rensselaer Polytechnic Institute, Troy, NY

*All lectures are in the Center for Biotechnology and Interdisciplinary Studies (CBIS), Rensselaer.
All posters remain on display in the CBIS Atrium, Monday-Wednesday for continuous viewing.*

Each day there will be shuttle buses between the Hilton Garden Inn, Troy NY, and CBIS in the morning, from 7-9am. There will also be shuttle buses after the last scientific event of the day, except for Monday, when the Shuttle will run to the dinner location in Troy and return to the Hilton later in the evening

Sunday, 21 August

- 2:30-3:15pm Shuttle bus from Hilton Garden Inn, Troy NY, to CBIS, Rensselaer
- 3:15 Welcoming message by Marc-Olivier Coppens – CBIS Auditorium
- Opening Lecture** (Chair: Jörg Kärger, University of Leipzig)
3:30pm **James Wei**, Princeton University, “Diffusion in tight mazes”
- Session 1: Diffusion in the Brain** (Chair: Charles Nicholson, New York University)
4:30pm **Joseph Ackerman**, Washington University in St. Louis, “Diffusion sensitive MR in biological systems: Insights, puzzles, pitfalls”
5:05 **Sabina Hrabetova**, SUNY Downstate Medical Center, “Extracellular diffusion in brain: Distinct diffusion regimes at different spatial scales”
5:40 *Session 1 close*
6:00 Welcoming reception and dinner – Hilton Garden Inn

We are very grateful for generous support and sponsorship by



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Monday, 22 August

8:20-8:45am *Introductions by RPI Leadership, CBIS Auditorium*

Session 2: Diffusion in Physiology and Medicine

(Chair: William Price, *University of Western Sydney*)

8:45 am James Baish, *Bucknell University*, “Diffusion in tumors and normal tissues”
9:20 Peter Pfeifer, *University of Missouri, Columbia*, “Diffusion-reaction in space-filling networks: oxygen transport in the lung”
10:05 *Session 2 close*
10:05-10:30 *Coffee break*
Poster presenters: Please hang posters (CBIS Atrium)

Session 3: Transport Phenomena in Nano-Biotechnology

(Chair: Alex Neimark, *Rutgers University*)

10:30 am Murugappan Muthukumar, *University of Massachusetts, Amherst*,
“Macromolecular transport through nanopores”
11:05 John Kasianowicz, *National Institute for Science and Technology, Gaithersburg*,
“Single molecule transport in nanometer-scale pores: A tool for polymer science and practical applications”
11:40 *Session 3 close*
11:40-2:10pm *Lunch buffet (Bruggeman Room, CBIS)*
POSTER SESSION 1 (CBIS Atrium)

Session 4: Membrane Diffusion Fundamentals - Experiments and Theory

(Chair: Douglas Ruthven, *University of Maine*)

2:10 pm Georges Belfort, *Rensselaer Polytechnic Institute*, “Diffusion in synthetic and natural membranes: Critical for success”
2:45 Andrew Zydney, *Pennsylvania State University*, “Diffusional contributions and electrostatic exclusion effects on transport through ultrafiltration membranes”
3:20 *Session 4 close*

Session 5: Diffusion in Nanomaterials: Synthesis, Characterization and Applications, I

(Chair: Mladen Eic, *University of New Brunswick*)

3:20pm Theo Tsotsis, *University of Southern California*, “Preparation, characterization, and modeling of nanoporous silicon carbide membranes”
3:55 Rustem Valiullin, *University of Leipzig*, “Diffusion of fluids in mesoporous host materials”
4:30 *Session 5 close*
4:30-5:00 *Tea break*

Session 6: Theoretical Fundamentals of Confinement Effects on Diffusion, I

(Chair: Matthias Thommes, *Quantachrome Instruments*)

- 5:00pm Tom Truskett, *University of Texas at Austin*, “Entropy scaling, structure, and dynamics of confined fluids”
- 5:35 Peter Monson, *University of Massachusetts, Amherst*, “Dynamic mean field theory for fluids in mesoporous materials”
- 6:10 Yunfeng Shi, *Rensselaer Polytechnic Institute*, “Molecular simulations on gas diffusion in nanoporous carbon”
- 6:45 *Session 6 close*
- 7:00 *Tour of EMPAC (Experimental Media and Performing Arts Center)*
- 8:00 *Dinner Event*

Tuesday, 23 August

Session 7: Theoretical Fundamentals of Confinement Effects on Diffusion, II

(Chair: Keith Gubbins, *North Carolina State University*)

- 8:15am Joel L. Plawsky, *Rensselaer Polytechnic Institute*, “Drift, diffusion and dielectric breakdown”
- 8:50 Pierre Levitz, *Ecole Polytechnique, Paris*, “Molecular intermittent dynamics in interfacial confinement”
- 9:25 Thomas Franosch, *University of Erlangen-Nürnberg*, “Complex transport in strongly disordered materials”
- 10:00 *Session 7 close*
- 10:00-10:15 *Coffee break*

Session 8: Transport in the Geosciences

(Chair: Edward Corcoran, *ExxonMobil Research*)

- 10:15am E. Bruce Watson, *Rensselaer Polytechnic Institute*, “Diffusion in solid-Earth systems”
- 10:50 Jens Feder, *University of Oslo, Norway*, “Diffusion, dissolution and dispersion”
- 11:25 *Session 8 close*

11:30-1:30pm *Lunch (Russell Sage Dining Hall) –*

POSTER SESSION 2 (CBIS Atrium)

Shuttle bus available between CBIS, Rensselaer and Hilton Garden Inn, Troy

1:30pm **(sharp!)** Departure by Yankee Trails bus, from CBIS, for excursion

1:30-10:00pm *Excursion to the Berkshires, along the Mohawk Trail.*

Visit to MASS MoCA in North Adams, MA, followed by dinner, and a short walk in Williamstown, MA. Musical theatre production of Ten Cents a Dance at Williamstown Theatre Festival in Williamstown, MA.

Wednesday, 24 August

Session 9: Diffusion in Nanomaterials: Synthesis, Characterization and Applications, II (Chair: Nick Kanellopoulos, *NCSR Demokritos, Athens*)

- 8:45am Bernhard Blümich, *RWTH Aachen*, “Diffusion and relaxation probed by mobile NMR”
- 9:20 Don MacElroy, *University College Dublin*, “Molecular simulation of the fabrication and permselective characterisation of thin nanoporous silica films”
- 9:55 Sergey Vasenkov, *University of Florida*, “Structure-transport relationship in organized soft matter systems by diffusion NMR”
- 10:30 *Session 9 close*
- 10:30-11:50 *Coffee break –*
POSTER SESSION 3 (*CBIS Atrium*)

Closing Lecture

- 11:50am Frank Cichos, *University of Leipzig*, “From hot Brownian motion to self-propelled particles”, and introduction to *Diffusion Fundamentals V*
- 12:25pm Closing remarks: Marc-Olivier Coppens, *Rensselaer Polytechnic Institute*
- 12:30 *Conference closes*
- 12:30-1:30 *Lunch buffet (Bruggeman Room, CBIS)*
Poster presenters: Please remove posters