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Methods of Measuring Surface – Ground Water Interaction in Streams

Presented by Dr. Laura Lautz
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The rapid exchange of surface and ground water in near-stream sediments (the 'hyporheic zone') impacts overall stream water chemistry, biogeochemical reactions and the distribution of benthic organisms in stream systems. Surface – ground water interaction transports oxygen-rich water into the subsurface, creating strong redox gradients in the streambed. It also increases water residence time and contact with microbial communities and geochemically active sediments. As a result, streams with more hyporheic interaction are sites of more rapid sorption of metals and cycling of nutrients.

Many techniques have been developed within the last several years to measure the degree of surface-ground water interaction and to assess the impact the interaction has on water chemistry and solute transport in streams. In this presentation, I will highlight the use of pore water sampling, temperature dynamics, tracer tests and modeling to measure surface-ground water exchange across the streambed. At the bedform scale, pore water sampling has revealed complex redox gradients in the streambed, driven by the presence of small, man-made dams, which enhance nutrient cycling. We have also used detailed temperature profiles to model the hydraulic conductivity of streambed sediments and flux rates between the stream and underlying aquifer around different geomorphic features. At larger scales, we have used in-stream tracer tests to get reach-average measurements of hyporheic exchange and have found more rapid nutrient uptake along streams where more interaction is taking place. Reach-scale ground water flow models have identified rapid exchange of surface water with near-stream aquifers around small dams and tight meanders. To measure surface-ground water exchange at the basin scale, future work includes remote sensing of temperature dynamics in streams.

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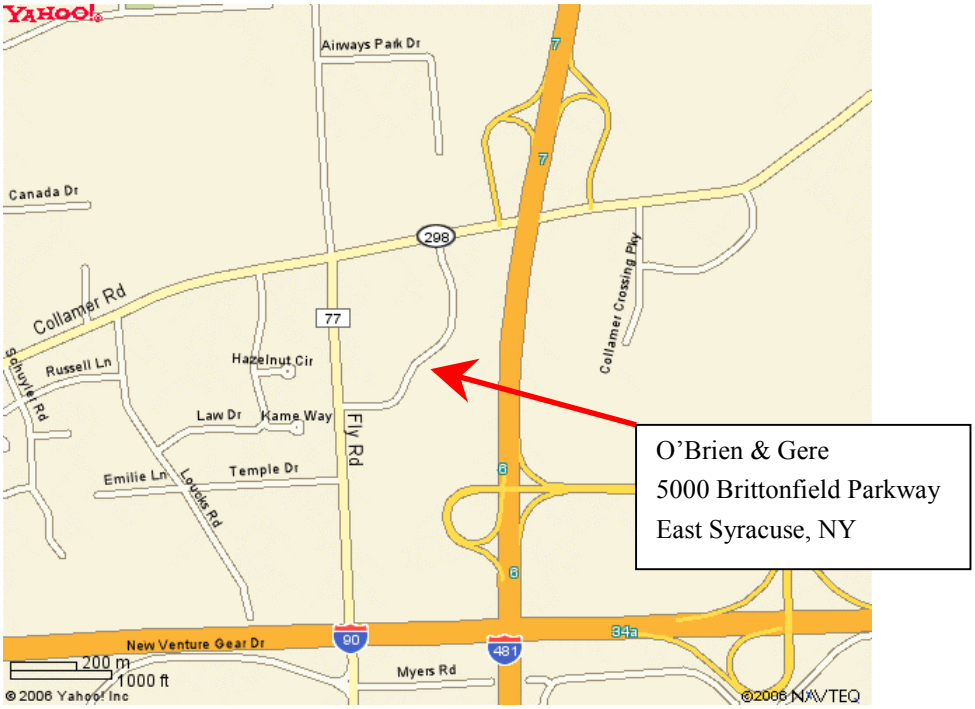
MEETING LOGISTICS: The meeting will take place on Thursday, October 19, 2006 at O'Brien & Gere, 5000 Brittonfield Parkway, East Syracuse, NY 13057.

A social hour will be held from 5:30 p.m. to 6:30 p.m. and will be followed by a dinner starting at 6:30 p.m. The main presentation by Dr. Lautz will begin at about 7:30 p.m.

The cost of dinner is $20 for members, $22 for non-members and $15 for student members. People may also attend the presentation only for a nominal fee of $3. Please RSVP by Monday, September 16th to Bonnie at Parratt-Wolff via e-mail at bolney@pwinc.com or (315) 437-1429.



From Syracuse I 690 East to I 481 North. Exit at Route 298, first exit after the Thruway. At the end of the off-ramp turn right. Take your first right onto Brittonfield Parkway. O'Brien & Gere is the third building on the left. Visitor parking is to the left of the front door. Come in the front door.