

Physical modeling and software synthesis for self-reconfigurable sensors in river environments

S. Martinez, A. Kwok, A. Bayen, A. Tinka, J. Sprinkle, H. Al-Helal

- **The application: management of tidally forced rivers – a source of drinking water for millions of Americans, important to keep clean**
- This project integrates:
 - **Algorithm development** for the **motion control** and dynamic **deployment** of mobile semi-passive sensors in river environments
 - **Modeling techniques and assimilation of data** generated by passive and semi-passive drifters
 - **Software tools** for design, verification, and **code synthesis** for implementation.
- The approach:
 - Dynamic sensors, capable of motion relative to a flowing medium, but not “more powerful” than the medium itself
 - Distributed control for coverage of the fast-flowing environment
 - Quadratic programming to assimilate data from moving sensors using shallow water equations
 - Model-based techniques to automate software synthesis for embedded controllers
 - Prototype development and in-field testing of drogues

