

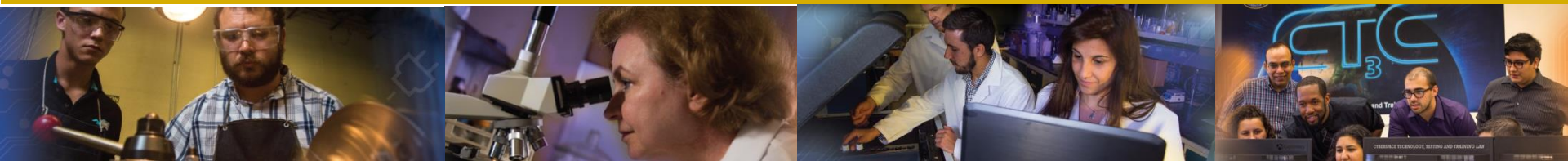


In-Situ Data Collection, Sampling, and Water Quality Monitoring in Tim's Branch Watershed

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Summer 2017 Internship at SRNL



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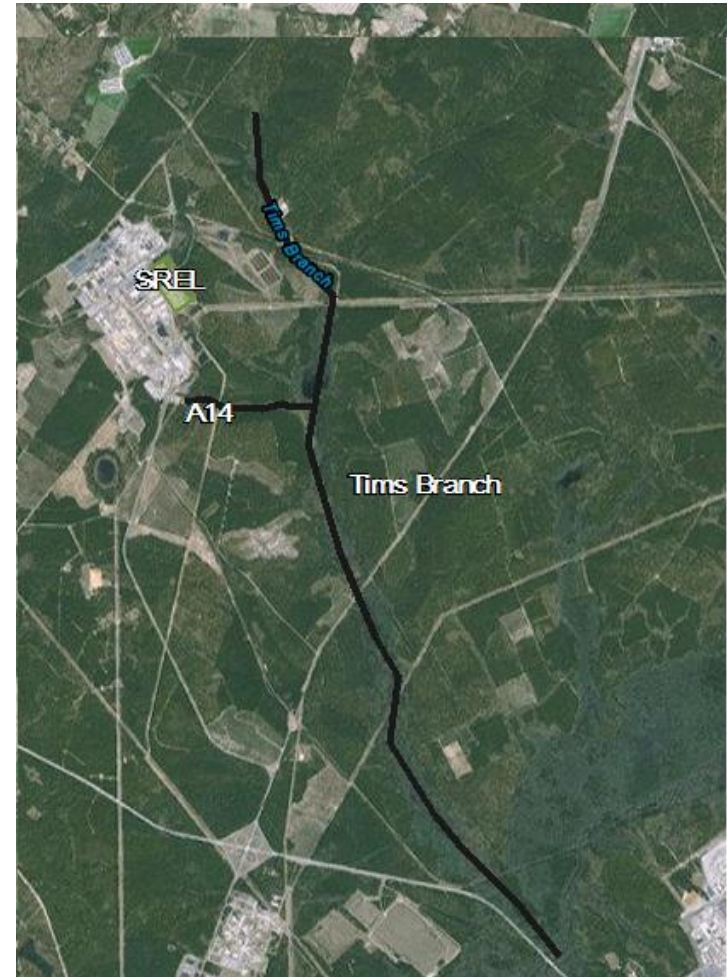
Dr. Brian Looney - SRNL



Project Background

FIUApplied Research
Center

- **Study Location:** Tims Branch Watershed, Savannah River Site, Aiken, SC
- Heavy metal & radionuclide discharges into Tims Branch from nuclear processing activities in SRS A/M Area (e.g. 43,500 kg of uranium released from M-area into Tims Branch).
- Surface water modeling is needed to understand the fate and transport of major contaminants of concern (e.g., U, Hg, Ni and other heavy metals & radionuclides).
- Current sampling methods have not been effective enough for comprehensive modeling purposes.





Objectives

The main focus of this summer internship is to conduct field work and collect data within the Tims Branch watershed, which includes:

- Cross-sectional profiling of Tims Branch
- Collecting water and biofilm samples
- Field measurement of water quality and flow characteristics
- Laboratory chemical analysis of water and biofilm samples
- Implementation of a long-term monitoring station for water quality and flow discharge



Analytical Methods

Parameter	Method
Total suspended solids	ASTM D5907 - 13
Biofilm	Following Betancourt's method from 2011
Cross-sections	Field measurements with tape measure
Flow characteristics	Field measurements with flow tracker
Long-term sampling	Placing an automated sampler (ISCO) below Steed Pond area (major area of uranium contamination)



Preliminary Results



- Water samples have been analyzed for heavy metals via ICP-MS.
- Biofilm samples have been dried and are ready for analysis via XRF.
- Cross section profiles, water quality and flow measurements have been taken.
- The site use permit for the ISCO system has been approved.





Summary

- It seems that Tims Branch is too dynamic of a system to rely on annual sampling alone. This stresses the need for an automated sampling system to be put into place.
- Data collected at the sampling locations from this summer will be added to the SRS geodatabase and used to generate GIS data for incorporation into the hydrological model.



Future Work

- What remains to be done during the internship?
 - Placing the ISCO onsite to sample water after storm events
 - Analysis of biofilm samples for tin
 - Total suspended solids measurements
- Will any of the work be continued by the Fellow upon return to FIU?
 - Incorporation of analysis data into geodatabase and conversion to GIS data for incorporation into the hydrological model
 - Cross-section profiles and water quality data will be implemented in the MIKE11 surface water model
 - Follow up communication with SREL regarding data retrieved by the ISCO system
- How will the site/lab further the work?
 - SREL researchers will provide support based on budget and availability of personnel by periodically collecting water samples for analysis, particularly after storm events



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