



## ***PROMOTING INNOVATION IN FISH PASSAGE & PROTECTION***

### **BIOENGINEERING SYMPOSIUM 2009 AMERICAN FISHERIES SOCIETY ANNUAL MEETING AUGUST 31-SEPTEMBER 1, NASHVILLE, TN**

**ORGANIZERS & CHAIR:** Theodore Castro-Santos\*, USGS, S.O. Conte Anadromous Fish Research Center; [tcastrosantos@usgs.gov](mailto:tcastrosantos@usgs.gov); 413-863-3838 and Paul Kemp, The Leverhulme International Network

**SPONSORS:** AFS Bioengineering Section and the Leverhulme International Network

**DESCRIPTION:** 2009 marks the 100<sup>th</sup> anniversary of the development of the Denil fishway. The past century has seen a dramatic increase in awareness of the importance of fish passage as a management tool, yet fish passage and fish protection continue to pose serious challenges to the bioengineer. In recent years a number of studies have been published suggesting that performance of existing structures and methods may not be as effective as managers had hoped. Furthermore, an increasing appreciation for biodiversity and the need to protect a range of organisms (not just target species) has led to serious challenges to existing paradigms. The Bioengineering Section of the American Fisheries Society will host a symposium that will serve as a benchmark for establishing the current 'state of the art' in fish passage and protection, but more importantly to set the stage for future progress, with each author being tasked to identify areas in need of improvement and identifying research needs and solutions for these problems. Unlike other symposia, where authors present their own findings, this symposium will be a series of review papers with the aim of presenting a holistic perspective of the field. Careful attention will be paid to fundamental physical and biological principles, and the symposium will conclude with a series of talks focusing on basic research and what the fields of biomechanics, physiology, and behavior can offer to the bioengineering community. In support of this last goal, The Leverhulme Network (an international fellowship of scientists studying fish responses to hydraulic phenomena) will co-sponsor, attend, and contribute to this symposium. These topics are of sufficient breadth, depth, and applied importance to be of significant interest to a broad sector of the AFS membership.

**PRESENTERS, PRESENTATION TITLES AND TIME**

	<b>Presenter's name</b>	<b>Title</b>	<b>Day</b>	<b>Time</b>
1	Ted Castro-Santos	Introduction: Fish passage and protection 100 years after Denil	Monday	13:20
<b>Upstream Fish Passage</b>				
2	David Roscoe	History of fishway design and development		13:40
3	Katy Haralampides	Fishway Hydraulics		14:00
4	Margaret Lang	Fish Passage at Road Crossing & Culverts		14:20
5	Vince Neary	Effect of vegetation on turbulent boundary layer flows and implications for lotic organisms		14:40
6	Rob McLaughlin	Tradeoffs and Unintended Consequences		15:20
7	Chris Bunt	Fishway Evaluations: Sufficiency, Performance, and Future Needs		14:40
<b>Downstream Fish Passage</b>				
8	John Ferguson	Historic Overview		16:00
9	David Scruton	Attraction vs. Exclusion: Complementary Strategies for improving downstream passage		16:20
10	Doug Dixon	Fish Friendly Turbines: Their design and development and a roadmap for future development		16:40
11	Andrew Goodwin, James Anderson, Dave Smith, and Paul Kemp	Coupling behavior and hydraulics for improved downstream passage: data needs for improved predictive models	Tuesday	8:00
12	Noah Adams and John Beeman	Downstream passage evaluations: sufficiency, performance, and future needs		8:20
<b>Screening Technologies and Criteria</b>				
13	John Young	Water withdrawals and the fate of entrained fish: Present status and future trends		8:40
14	John Black	Screen designs: State of the art, techniques, and tradeoffs		9:00

15	Ulrike Muller	Sufficiency of biological basis for design criteria: biomechanics and scaling effects	9:20
16	William Dey	Screening evaluations: Sufficiency, Performance, and future needs	9:40
<b>Biological Basis of Bioengineering</b>			
17	Pingguo He	Swimming performance and the design of commercial fishing gear	10:20
18	Peake, Lang, and Castro-Santos	Swimming performance: limitations of available data and suggestions for next steps	10:40
19	Paul Kemp et al.	Behavioral responses to velocity gradients: what we can do with what we know and priorities for future research	11:00
20	Eva Enders, James Liao, and Hans Tritico	Effects of Turbulence on Swimming Performance	11:20
21	Paul Webb	Biomechanics, and Fish Protection: The challenge of biological diversity	11:40