



## 美国 Iowa 大学 Frederick Stern 教授系列学术报告 I

**报告题目:** Integrated High-Fidelity Validation Experiments and LES for a Surface-Piercing Truncated Cylinder for Sub and Critical Reynolds and Froude Numbers

**时 间:** 2019 年 5 月 7 日 (星期二), 下午 13:30

**地 点:** 上海交大闵行校区木兰船建大楼 A1008 会议室

**报 告 人:** Prof. Frederick Stern, George D. Ashton Professor of Hydroscience and Engineering, University of Iowa, USA

### 报告内容简介:

Integrated high-fidelity validation towing tank experiments and LES are presented for a surface-piercing truncated cylinder for sub- and critical Reynolds and Froude numbers, as a unit problem case study. The physics of interest are the effects of air-water interface on turbulence anisotropy and vortex shedding, 3D separation, transition to turbulence and the drag crisis; the effects of the truncated bottom; and ultimately bubble/droplet size distributions. The integrated experiments and LES was successful in using preliminary LES to guide the experiments especially for local flow surface pressure and flow field measurements. Experimental pacesetting issues were the difficulty of the PIV experiments; nonetheless, the data already collected is useful and valuable as the benchmark for LES validation. The largest hurdle in achieving the desired outcomes, however, was the LES since the current grid design and sizes required large computational resources. The experiments once completed will provide sufficient validation data for sub- and critical Re for many physics of interest. Experiments for spray droplet and air bubble size distribution measurements are still required. The LES at the current grid resolutions is able to fully-resolve the sub-critical but not the critical Re flow. Finer grids for critical Re are still required. Code development for overset grids, conservative convection schemes, and air/water interface LES models are also required. Future experiments and LES should focus on these issues along with extensions for VIV using towing tank PMM for pure sway motion.

### 报告人介绍:

Prof. Frederick Stern is internationally recognized expert in ship hydrodynamics: computational methods, modeling, wave basin, towing-tank and flume experiments; experimental/computational uncertainty analysis/quantification; and deterministic/stochastic shape optimization. He has authored, co-authored, or edited: 7 international conference proceedings/books; 6 book chapters; 5 committee reports and 12 Quality Manual Procedures for the 21st–25th International Towing Tank Conference; 22 NATO AVT final report chapters; 178 journal articles; 4 moderate review journal articles; 2 online archive articles; 249 conference proceeding papers, and 51 reports. Prof. Frederick Stern is chair of the Steering Committee of the International Workshop on CFD in Ship Hydrodynamics since 2015 and is also a permanent member of the SNH-ONR Paper Selection Committee since 2005.

**欢迎大家参加!**

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