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教育背景

1985.9-1990.7 清华大学水利系流体机械专业 本科

1992.9-1994.7 清华大学水利系 流体机械及流体工程 硕士

1995.10-1999.3 日本横滨国立大学生工学专攻 博士

1990.8-1992.8 清华大学水利系 助教

1994.8-1995.9 航天部第一研究院第十一所 工程师

1999.10-2003.12 日本横滨国立大学生工学学科 文部教官助手

2004.1-现在 清华大学热能工程系 副教授

中国水利学会泵及泵站专业委员会委员

中国机械工程协会高级会员

流体机械及工程：主要从事流体机械流动理论、流体诱发结构振动和控制以及计算流体力学研究

主要开展的研究方向为：

流体机械流动理论、流动分析和流动诊断；

流体机械涡动力学、涡方法及其应用

流体机械设计及优化；

流体机械的多相流动及多场耦合。

负责或参加了国家科技攻关项目一项、国家863计划项目一项，国家支撑计划项目二项，自然科学基金项目三项、国防基金预研项目一项，清华大学自主科研计划一项。另外，与国内外企业、设计单位开展合作项目三十余项。

基于涡动力学理论的水力机械流动分析和优化设计，教育部科技进步二等奖，2013年，排名第1。



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教材：流体力学，北京大学出版社，2013年8月。

代表性论文：

Zhiyi Yu, Baoshan Zhu, Shuliang Cao. Interphase force analysis for air-water bubbly flow in a multiphase rotodynamic pump. *Engineering Computations*, 32(7): 2166-2180, 2015.

Lei Tan, Baoshan Zhu, Yuchuan Wang, Shuliang Cao, Shaobo Gui. Numerical study on characteristics of unsteady flow in a centrifugal pump volute at partial load condition. *Engineering Computations*, 32(6) : 1549-1566, 2015.

Yuchuan Wang, Lei Tan, Baoshan Zhu, Shuliang Cao, Binbin Wang. Numerical investigation of influence of inlet guide vanes on unsteady flow in a centrifugal pump. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, 229(18):3425-3416, 2015.

Baoshan Zhu*, Xuhe Wang, Lei Tan, Dongyue Zhou, Yue Zhao, Shuliang Cao. Optimization design of a reversible pump-turbine runner with high efficiency and stability. *Renewable Energy*, 81: 366-376, 2015.

Tan Lei, Zhu Bao Shan, Cao Shu Liang, Wang Yu Chuan and Wang Bin Bin. Numerical simulation of unsteady cavitation flow in a centrifugal pump at off-design conditions. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, 228(11):1994-2006, 2014.

TAN Lei, ZHU Baoshan*, CAO shuliang, WANG YuMing. Influence of Blade Wrap angle on Centrifugal Pump Performance by Numerical and Experimental Study, *Chinese Journal of Mechanical Engineering*, 27(1):949-952, 2014.

Lei Tan, Baoshan Zhu, Yuchuan Wang, Shuliang Cao, Kaihong Liang. Turbulent flow simulation using large eddy simulation combined with characteristic-based split scheme. *Computers & Fluids*, 94:161-172, 2014.

Zhiyi Yu, Baoshan Zhu, Shuliang Cao, and Ying Liu. Effect of Virtual Mass Force on the Mixed Transport Process in a Multiphase Rotodynamic Pump. *Advances in Mechanical Engineering*, Vol. 2014, Article ID 958352, 7 pages, 2014.

Lei Tan, Baoshan Zhu, Shuliang Cao, Yuchuan Wang and Binbin Wang. Influence of Prewhirl Regulation by Inlet Guide Vanes on Cavitation Performance of a Centrifugal Pump. *Energies*, 7(2) :1050-1065, 2014.

Ki-Deok Ro, Baoshan Zhu. Numerical calculation of unsteady flow fields: feasibility of applying the Weis-Fogh mechanism to water turbines. *ASME Journal of Fluid Engineering*, 135: 101103-1 ~ 6, 2013.

TAN Lei, ZHU Baoshan*, CAO shuliang, WANG YuMing. Cavitation flow simulation for a centrifugal pump at a low flow rate, *Chinese Science Bulletin*, 58(8): 949-952, 2013.

Wang Hong, Zhu Baoshan, Lin Jianshu, Ye Changliu. A Thermohydrodynamic Analysis of Dry Gas Seals for High-Temperature Gas-Cooled Reactor. *ASME Journal of Tribology*, 135: 021701-1 ~ 9, 2013.

Baoshan Zhu, Ki-Deok Ro. Solution of three-dimensional viscous flows using integral velocity-vorticity formulation. *Engineering Analysis with Boundary Elements*, 36:1942-1951, 2012.

Tan Lei, Cao ShuLiang, Wang YuMing, Zhu Baoshan. Direct and inverse iterative design method for centrifugal pump impellers. *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy*, 226(6): 764-775, 2012

Qingsheng Wei, Baoshan Zhu, Young-Do Choi. Internal flow characteristics in the draft tube of a Francis turbine. *Journal of the Korean Society of Marine Engineering*. 36(5):618-626, 2012.

Baoshan Zhu, Hong Wang, Longbu Wang and Shuliang Cao. Three-dimensional vortex simulation of unsteady flow in hydraulic turbines. *International Journal for Numerical Methods in Fluids*, 69:1679-1700, 2012.

- Qun Zhang, Baoshan Zhu. An integrated coupling framework for highly nonlinear fluid-structure problems. *Computers & Fluids*, 60:36-48, 2012.
- Ki-Deok Ro, Baoshan Zhu, Michihisa Tsutahara. Unsteady flow field numerical calculations of a ship's rotating Weis-Fogh-type propulsion mechanism with the advanced vortex method. *Journal of Mechanical Science and Technology*, 26(2):437-446, 2012.
- Ki-Deok Ro, and Baoshan Zhu. Drag reduction from fences on a square prism near plane wall. *Journal of Mechanical Science and Technology*, 25(12):3063-3068, 2011.
- Hong Wang, Baoshan Zhu. Numerical Prediction of Impact Force in Cavitating Flows. *ASME Journal of Fluids Engineering*, 132(10),101301-1 ~ 9,2010.
- Baoshan Zhu, Jun Lei, Shuliang Cao. Numerical simulation of vortex shedding and lock-in characteristics for a thin cambered blade. *ASME Journal of Fluids Engineering*, 129:1297-1305, 2007.
- Kideok Ro, Baoshan Zhu, Hokeun Kang. Numerical analysis of unsteady viscous flow through a Weis-Fogh-type ship propulsion mechanism using the advanced vortex method. *ASME Journal of Fluids Engineering*, 128:481-487, 2006.
- Baoshan Zhu. Finite volume solution on the Navier-Stokes equations in velocity-vorticity formulation. *International Journal for Numerical Methods in Fluids*, 48:607-629, 2005.
- Baoshan Zhu, Kyoji Kamemoto. Numerical simulation of unsteady interaction of centrifugal impeller with its diffuser using Lagrangian discrete vortex method. *Acta Mech Sinica*, 21:40-46, 2005.
- Baoshan Zhu, Kyoji Kamemoto. Probability of self-oscillation induced by vortex shedding from a thin cambered blade. *Experimental Thermal and Fluid Science*, 29:129-135,2004.
- Baoshan Zhu, Kyoji Kamemoto. A Lagrangian vortex method for flows over a moving bluff body. *Computational Fluid Dynamics JOURNAL*, 2003. vol.11 no.4, pp.363-369.
- Baoshan Zhu, Kyoji Kamemoto. Simulation of unsteady interaction of centrifugal impeller with its diffuser using advanced vortex method. *JSME International Journal series B*, 43(3), pp371-378, 2000.
- Baoshan Zhu, Kyoji Kamemoto, Hiroaki Matsumoto. Numerical simulation of the two-dimensional unsteady interaction of a centrifugal impeller with its volute casing by vortex method, *JSME Journal series B*, 65(630): 211-217, 1999.
- Baoshan Zhu, Kyoji Kamemoto and Hiroaki Matsumoto. Computation of unsteady viscous flow through centrifugal impeller rotating in volute casing by direct vortex method. *Computational Fluid Dynamics JOURNAL*, 7(3) :313-323,1998.
- Baoshan Zhu, Kyoji Kamemoto and Hiroaki Matsumoto. Direct simulation of unsteady flow through a centrifugal pump impeller using fast vortex method. *Computational Fluid Dynamics JOURNAL*, 7(1):15-25,1998.
- 翟杰、祝宝山、曹树良.求解势流的正则化快速多极子边界元法.清华大学学报(自然科学版),第55卷第7期, 797-802, 2015年7月.
- 王旭鹤、祝宝山、樊红刚、谭磊、陈元林、王焕茂.水泵水轮机转轮三维反问题设计与特性研究.农业机械学报,第45卷第12期,93-98,2014年12月.
- 王旭鹤、祝宝山、曹树良、谭磊.可逆式水泵水轮机转轮的三维反问题优化设计.农业工程学报,第30卷第13期,78-85,2014年7月.

- 李凯、祝宝山、王宏.高温气冷堆主氦风机叶轮过盈配合有限元分析.核动力工程, 第35卷第1期, 142-146, 2014年2月.
- 周东岳、祝宝山、上官永红、曹树良.基于流固耦合的混流式水轮机转轮应力特性分析, 水力发电学报, 第31卷第4期, 216-220, 2012年8月.
- 王龙步、祝宝山、王宏、曹树良.水力机械非定常流动的三维涡方法计算.力学学报,第44卷第三期, 2012 (5) : 520-527.
- 祝宝山、王旭鹤、龟本乔司、曹树良.流体机械非定常流动的涡方法数值模拟, 水力发电学报, 第30卷第5期, 178-185, 2011年10月. (EI:20114814563401)
- 张鹏远、祝宝山、张乐福.混流式水轮机转轮去叶道涡压力脉动数值研究.大电机技术, 2009年第6期, 35-39.
- 陶海坤、祝宝山、曹树良、陆力.钟型进水流道吸水室的后壁距研究.流体机械, 36(3): 15-18, 2008.
- 金鑫、祝宝山、曹树良.三角翼周围非定常流动的三维涡方法数值模拟.清华大学学报(自然科学报), 48(2): 256-259, 2008.
- 祝宝山.非定常流动的快速拉格朗日涡方法数值模拟.力学学报, 40(1):9-18,2008.
- 陶海坤、祝宝山,曹树良等.钟型进水流道吸水室后壁的优化设计.江苏大学学报, 28 (3) : 228-231, 2007.
- 祝宝山,雷俊, 曹树良.二维有涡流动的数值模拟方法.清华大学学报(自然科学报), 47(2):219-223, 2007.
- 康伟,祝宝山,曹树良.离心泵螺旋型压水室内流场的大涡模拟.农业机械学报, 37(7):62-65, 2006.
- 祝宝山,龟本乔司,曹树良.叶片表面旋涡脱落诱发自激振动的可能性.机械工程学报, 42(1):35-39,2006