ANA I. SIRVIENTE, PH.D.

Chief Technology Officer, Great Lakes Observing System
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AREAS OF SPECIALIZATION

Program Management; Systems Design/Certification; Scientific Testing & Evaluation; Quality Assurance & Quality Control; Freshwater systems; Sustainability; Water Stewardship; Climate Resilience; Experimental and Numerical Hydrodynamics.

EDUCATION

Ph.D. Mechanical Engineering; University of Iowa, IIHR-Hydroscience & Engineering, IA. 1996.
M.S. Mechanical Engineering; University of Iowa, IIHR- Hydroscience & Engineering, IA. 1991.
B.E. Naval Engineering; Polytechnic University of Madrid; E.T.S. of Naval Engineering, Madrid, Spain. 1990.

WORK EXPERIENCE

- 2020-Present: Chief Technology Officer, Great Lakes Observing System (GLOS), Ann Arbor, MI.
- 2016-2020: Technical Manager, Sustainability/Water Systems Departments, NSF International, Ann Arbor, MI
- 2013-2016: Program Development Director, Council of Great Lakes Industries (CGLI), Ann Arbor, MI
- 1997-2006: Assistant Professor, College of Engineering, University of Michigan (UofM), Ann Arbor, MI
- 1996-1997: Post-doctoral Fellow, University of Iowa, IIHR Hydroscience & Engineering, Iowa City, IA.

SELECTED RELEVANT PROFESSIONAL EXPERIENCE AND OTHER INFORMATION

- 2020 Member of Great Lakes Smart Ship Coalition *Technology Development and Applications Working Group*
- 2020 Member of NOAA's Great Lakes Regional Collaboration Team-*Science Collaboration Subcommittee*
- 2018-2020: Member - Finance Committee of the Board of Directors, *Council of the Great Lakes Region*
- 2016-2020 Led NSF International Global Marine Services Program and the U.S. Coast Guard approved Independent Laboratory for the testing of Ballast Water Management Systems (BWMS).
    - Awarded and led over $10 Million worth of industry contracts
    - Led: 1) ballast water quality, chemistry, microbiology, and toxicology assessments, 2) BWMS design assessment and engineering testing/evaluation of electrical and electronic components, and 3) mathematical and/or computational fluid dynamics simulations of BWMS scaled up/down models
- 2016 A2LA – Assessment of Laboratory Competence; *ISO 17025 Training and Certification* (NSF)
- 2014-2016 Organized and led the *CGLI's Climate, Adaptation and Resilience Initiative Work Group*
- 2014-2016 Member of the *Great Lakes Governors and Premiers Maritime Advisory Committee* for the development of the Great Lakes' Maritime Transportation Strategy
- 2015-2016 Member of the UofM *Great Lakes Water Levels Integrated Assessment Advisory Committee*
- 2004 Departmental *Award for Outstanding Accomplishment* at the University of Michigan
- 2002 *Elizabeth Crosby Research Award* by NSF-Advance at the University of Michigan
- 2001 *Alfred P. Sloan Foundation Fellowship* by the Alfred P. Sloan Foundation
- 2000 *Faculty Career Development Award* by the University of Michigan
- 1997 -2006 Awarded and led over $4 Million worth of research grants from foundations, and federal agencies like the *Office of Naval Research* (ONR), and *Defense Advanced Research Projects* (DARPA), among others.

SELECTED PUBLICATIONS/REPORTS/PRESENTATIONS

Sirviente, A.I. (2019), NSF International Independent Laboratory Test Report for USCG Type Approval of Miura Co. Ltd. Ballast Water Management System," Report Number 12/01/1000

Sirviente, A.I. (2017), Ballast Water Management Systems Independent Laboratory Testing and Limitations-Panel, Ballast Water Management and Technology North America Conference, September 26-28

Sirviente, A.I. (2015), "Overview of Ballast Water Discharge Regulations in the Great Lakes Region," Council of Great Lakes Industries White Paper

Kim, K. and Sirviente, A.I., (2006), "Wall versus Centerline Polymer Injection in Turbulent Channel Flows," *Flow, Turbulence and Combustion,* Vol. 78, pp. 69-89.
Kim, K. and Sirviente, A.I., (2005), "Turbulence Structure of Polymer Turbulent Channel Flow with and without Macromolecular Polymer Structures," *Experiments in Fluids*, Vol. 38(6), pp. 739-749.
Kim, K. Sirviente, A.I. and Beck, R.F., (2005), "The Complementary RANS Equations for the Simulation of Viscous Flows," *International Journal of Numerical Methods in Fluids*, Vol. 48(2), pp. 199-229.
Sun Chee Fore, R., Swzalek, J. and Sirviente, A.I. (2005), "The Effects of Polymer Solution Preparation and Injection on Drag Reduction," *Journal of Fluids Engineering*, Vol. 127(3), pp. 536-549.
Lu, M.H. and Sirviente, A.I., (2005), "Numerical Study of the Momentumless Wake of an Axisymmetric Body," Proceedings *43rd AIAA Aerospace Sciences Meeting and Exhibit*, Reno, NV, AIAA paper 2005-1109.
Kim, K., Islam, M., Shen, X., Sirviente, A.I. and Solomon, M., (2004), "Effect of Macromolecular Polymer Structures on Drag Reduction in a Turbulent Channel Flow," *Physics of Fluids*, Vol. 16(11), pp. 4150-4162.
Kotinis, M., Parsons, M.G., Lamb, T. and Sirviente, A.I. (2004), "Development and Investigation of the Ballast-Free Ship Concept," *Society of Naval Architecture and Marine Engineering (SNAME) Transactions*, Vol. 112, (also presented at the *2004 SNAME Maritime Technology Conference & Expo,* Washington D.C.).
Song, Ch. and Sirviente, A.I., (2004), "A Numerical Study of Breaking Waves" *Physics of Fluids,* Vol. 16(7), pp. 2649-2667.
Kim, K., and Sirviente, A.I., (2004), "High Concentration Polymer Channel Flow," *Proceedings of 2004 IASME/WSEAS International Conference on Fluid Mechanics*, Corfu, Greece, August 17-19.
Kim, K., Sirviente, A.I., and Beck, R.F., (2004), "Complementary RANS Equations for Viscous Flow Computations," *Proceedings of the Twenty-Fifth Symposium on Naval Hydrodynamics*, St. John's, Newfoundland.
Szwalek, J.L., Sun Chee Fore, R., Kim, K. and Sirviente, A.I., (2004), "Mechanical Degradation Effects on Macro-Molecular Polymer Structures," *Proceedings of the 2004 ASME Heat Transfer/Fluids Engineering Summer Conference*, Charlotte, North Carolina, July 11-15.
Sirviente, A.I., (2004), "Shear Stress Measurements Needs for Polymer Drag Reduction," Workshop on Shear Stress Sensing Techniques and Measurements Results, Caltech, February 5th-6th, 2004. (invited presentation)
Kim, K., Beck, R.F. and Sirviente, A.I., (2003), "A Viscous-Inviscid Interaction Study using Complimentary RANS Equations," *Proceedings of the Eighth International Conference on Numerical Ship Hydrodynamics*, Busan, Korea.
Shen, X., Kim, K., Miller, J., Sun Chee Fore and Sirviente (2003), "Experimental Study of Polymer Drag Reduction in a Turbulent Channel Flow," *Proceedings of ASME 2003 Fluids Engineering Division Summer Meeting; Symposium on Microbubble and Polymer Friction Drag Reduction;* Honolulu, Hawaii.
Song, Ch. and Sirviente, A.I., (2002), "Deep Water Plunging Breakers: A Numerical Study," *Bulletin of the American Physical Society*, *Division of Fluid Dynamics*, Vol. 47; Dallas, Texas, November 24-26.
Sun Chee Fore, R., Miller, J., Tacina, K and Sirviente, A.I. (2002), "Effect of Degradation on Polymer Drag Reduction in a Turbulent Channel Flow," *Bulletin of the American Physical Society*, *Division of Fluid Dynamics*, Vol. 47; Dallas, Texas, November 24-26.
Sirviente, A.I. and Patel, V.C. (2001), "Turbulence Structure of the Wake of a Self- Propelled Body with and without Swirl," *American Institute of Aeronautics and Astronautics Journal,* Vol. 39(12), pp. 2411-2414.
Sirviente, A.I. and Patel, V.C. (2000), "Wake of a Self-Propelled Body. Part I: Momentumless Wake," *American Institute of Aeronautics and Astronautics Journal*, Vol. 38(4), pp. 613-619.
Sirviente, A.I. and Patel, V.C. (2000), "Wake of a Self-Propelled body. Part II: Momentumless Wake with Swirl," *American Institute of Aeronautics and Astronautics Journal*, Vol. 38(4), pp. 620-627.
Sirviente, A.I. and Patel, V.C. (1999), "Experiments in the Turbulent Near Wake of an Axisymmetric Body," *American Institute of Aeronautics and Astronautics Journal*, Vol. 37(12), pp. 1670-1673.
Sirviente, A.I. and Patel, V.C., (1996), "Experiments in the Swirling Wake of a Self-Propelled Axisymmetric Body," *Proceedings of the 21st Symposium on Naval Hydrodynamics*, Trondheim, June 24-28.
Sirviente, A.I. and Patel, V.C., (1996), "Similarity Analysis of Axisymmetric Free Shear Layer with Swirl," *Bulletin of the American Physical Society, Division of Fluid Dynamics*, Vol. 41; Syracuse, New York, November 24-26.
Parthasarathy, R., Sirviente, A.I. and Patel, V.C., (1994), "LDV Measurements in Separated Flow on an Elliptic Wing Mounted at an Angle of Attack on a Wall," *Journal of Fluids Engineering*, Vol. 116, pp. 258-264; (a version of this paper was also published in *Proceedings of the ASME Fluids Engineering Conference*, Washington D.C., June 20-24, 1993).