

# Charlotte W. Kotas, PhD, EIT

[kotascw@ornl.gov](mailto:kotascw@ornl.gov)

865.241.6597

## ***Professional Experience***

### **Oak Ridge National Laboratory (Oak Ridge, TN)**

- Staff Research Scientist 1/2013–Present
  - Work with Center for Engineering Science Advanced Research to develop algorithms that leverage the massively parallel potential of the NVIDIA Tesla GPU architecture. This project focused on an array signal processor for the Office of Naval Research (ONR) that had real time performance requirements. The code was written in PGI FORTRAN and CUDA FORTRAN, with versions developed for both Windows and Linux that incorporated networking, threading, and shared memory.
  - Developing test algorithms for dimensionality reduction of tree-like networks (graphs) in MATLAB.
- Research Associate Postdoctoral (through ORAU) 1/2010–1/2013
  - Work with Center for Engineering Science Advanced Research to develop algorithms that leverage the massively parallel potential of the NVIDIA Tesla GPU architecture.
  - GPU parallelization of Brainlike processor for ONR.
  - GPU parallelization of SAIC's U-SED processor for ONR, delivering unclassified version for real-time test.
  - Developing test algorithms for dimensionality reduction of tree-like networks (graphs) in MATLAB.

### **Georgia Institute of Technology (Atlanta, GA)**

- Postdoctoral Fellow 1/2009–1/2010
  - Assist in development of a vertical sensor array to be deployed in 5500 meters of water.
- Graduate Research Assistant 8/2001–12/2008
  - Design and construction of fluid mechanics experimental apparatus; Supervised undergraduate researchers; Presentation of results at national and international conferences.

### **Lexmark (Lexington, KY)**

- Student Intern, Engineering 5/2000–8/2000
  - Work with the laser print head group to help improve print quality. Duties included measurement of laser spot quality and assisting in a printer prototype build.

### **National Aeronautics and Space Administration (NASA) (Hampton, VA)**

- Student Intern, Engineering 1/1998–8/1999
  - Cooperative education experience amounting to 3 semesters (1 year) with the Structural Mechanics Branch, the Metals and Thermal Structures Branch, and the Aeroelasticity Branch.

## ***Professional Skills***

- Significant experience with fluid dynamics, acoustics, signal processing, and numerical analysis
- Familiar with Windows, Linux, MS Office Suite, LaTeX, Endnote
- Programming in MATLAB, LabVIEW, C, FORTRAN, CUDA C, CUDA FORTRAN

## ***Certifications***

Engineer in Training (EIT), as Charlotte Elizabeth Walker (Tennessee, 2001)

## ***Education***

### **Georgia Institute of Technology (Atlanta, GA)**

- Ph. D., Mechanical Engineering 8/2001–12/2008

- Thesis title: Acoustically Induced Fluid Flows in a Model Fish Ear
- Research involved the experimental study of fluid motion using flow visualization and particle image velocimetry to support new biologically inspired underwater sensor designs; Includes test fixture design, instrumentation and data analysis
- Master of Science, Mechanical Engineering 8/2001–12/2003

### University of Tennessee (Knoxville, TN)

- Bachelor of Science, Mechanical Engineering 8/1996–5/2001
  - University Honors Program, President of Pi Tau Sigma, Member of Tau Beta Pi

### Honors and Awards

- GE Faculty for the Future Fellowship (2007)
- Best Student Paper Award in Animal Bioacoustics at the 151st Meeting of the Acoustical Society of America (2006)
- Gallery of Fluid Motion Poster Award at the 58th Annual Meeting of the American Physical Society Division of Fluid Dynamics (2005)
- Achievement Rewards for College Scientists (ARCS) Fellowship (2002-2007)
- Georgia Tech Institute Fellowship (2001-2005)
- National Science Foundation Graduate Fellowship (2001-2004)
- Bicentennial Scholarship (1996-2000)
- National Merit Scholarship Finalist (1996)

### Professional Societies

Acoustical Society of America, American Physical Society

### Publications

- C. W. Kotas, E. Ponce, H. Williams, J. Barhen. *Coherent Spatio-Temporal Sensor Fusion on a Hybrid Multicore Processor System*. IEEE International Conference on Information Fusion, Singapore, July 9 - 12, 2012. (Conference proceedings)
- J. Barhen, T. Humble, P. Mitra, N. Imam, B. Schleck, C. Kotas, M. Traweck. *Concurrent FFT computing on multicore processors*. Concurrency and Computation: Practice and Experience 24: 29-44 (2012)
- C. W. Kotas, J. Barhen. *Singular value decomposition utilizing parallel algorithms on graphical processors*. OCEANS '11 MTS/IEEE Kona September 19-22, 2011. (Conference proceedings).
- C. W. Kotas, P. H. Rogers, M. Yoda. *Acoustically induced streaming flows near a model cod otolith and their potential implications for fish hearing*. Journal of the Acoustical Society of America. 130(2):1049-59 (2011)
- J. Barhen, T. Humble, P. Mitra, C. Kotas, N. Imam, B. Schleck. *FFT-based spatio-temporal noise covariance matrix inversion on hybrid multicore processor systems*. Workshop on Hybrid Multi-core Computing, HiPC 2010, Goa India, December 19, 2010.
- J. Barhen, N. Imam, C. Kotas. *Massively parallel FFT algorithm for the NVIDIA Tesla GPU*. IEEE OES Passive 2010 Conference.
- C. W. Kotas, M. Yoda, P. H. Rogers. *Steady streaming flows near spheroids oscillated at multiple frequencies*. Experiments in Fluids 45(2): 295-307, DOI: 10.1007/s00348-008-0479-3 (2008)
- C. W. Kotas, M. Yoda, P. H. Rogers. *Visualization of steady streaming near oscillating spheroids*. Experiments in Fluids 42(1):111-121, DOI: 10.1007/s00348-006-0224-8 (2007)
- C. W. Kotas, M. Yoda, P. H. Rogers. *Visualization of steady streaming at moderate Reynolds numbers*. Physics of Fluids 18: 091102, DOI:10.1063/1.2335902 (2006)
- R. M. Bennett and C. E. Walker. *Computational Test Cases for a Clipped Delta Wing with Pitching and Trailing-Edge Control Surface Oscillations*. NASA/TM-1999-209104 (1999)
- R. M. Bennett and C. E. Walker. *Computational Test Cases for a Rectangular Supercritical Wing Undergoing Pitching*. NASA/TM-1999-209130 (1999)

## ***Presentations***

- C. W. Kotas, J. Barhen. *Singular value decomposition utilizing parallel algorithms on graphical processors*. OCEANS '11 MTS/IEEE Kona September 19-22, 2011.
- C. W. Kotas, P. H. Rogers, M. Yoda. *Visualizing unsteady fluid flows inside the fish ear*. Poster presentation, 158th Meeting of the Acoustical Society of America, San Antonio, TX (2009)
- C. W. Kotas, P. H. Rogers, M. Yoda. *Possible role of steady streaming flows in fish hearing*. Poster presentation, *Ibid*.
- C. W. Kotas, P. H. Rogers, M. Yoda. *Steady streaming near model cod otoliths*. Acoustics '08, Paris, France (2008)
- C. W. Kotas, P. H. Rogers, M. Yoda. *Effects of otolith geometry on steady streaming flows in the fish ear*. 154th Meeting of the Acoustical Society of America, New Orleans, LA (2007)
- C. W. Kotas, P. H. Rogers, M. Yoda. *Groovy flow patterns in the fish ear*. 60th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Salt Lake City, UT (2007)
- C. W. Kotas, M. Yoda, P. H. Rogers. *Visualizing Sound in the Fish Ear*. Poster presentation, Underwater Sensors Networks Workshop, Atlanta, GA (2007)
- C. Kotas, P. H. Rogers, M. Yoda. *Flows near model otoliths and their implications for fish hearing*. 4th Joint Meeting of the Acoustical Society of America and the Acoustical Society of Japan, Honolulu, HI (2006)
- C. Kotas, P. H. Rogers, M. Yoda. *Flows around oscillating grooved spheroids*. 59th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Tampa, FL (2006)
- C. Kotas, P. H. Rogers, M. Yoda. *Are acoustically induced flows relevant to fish hearing?* 151st Meeting of the Acoustical Society of America, Providence, RI (2006)
- C. W. Kotas, M. Yoda, P. H. Rogers. *Acoustically induced flows in the fish ear*. International Symposium for Biologically Inspired Design and Engineering, Atlanta, GA (2006) [Invited presentation]
- C. W. Kotas, M. Yoda, P. H. Rogers. *Visualizations of steady streaming flows: Could fish ears be “auditory retinas”?* Poster presentation, *Ibid*.
- C. Kotas, P. H. Rogers, M. Yoda. *Flows around oscillating bodies at low Reynolds numbers*. 58th Annual Meeting of the American Physical Society Division of Fluid Dynamics, Chicago, IL (2005)
- C. Kotas, M. Yoda, P. H. Rogers. *Visualization of steady streaming at moderate Reynolds numbers*. Poster presentation, *Ibid*
- C. Kotas, P. H. Rogers, M. Yoda. *Design of an oscillating flow test chamber for modeling the fish ear*. 149th Meeting of the Acoustical Society of America, Vancouver, Canada (2005)
- C. Kotas, M. Yoda, P. H. Rogers. *Low Reynolds number steady streaming around a cylinder at various orientations*. 56th Annual Meeting of the American Physical Society Division of Fluid Dynamics, East Rutherford, NJ (2003)