

CURRICULUM VITAE

Notarization: I have read the following and certify that this curriculum vitae is a current and accurate statement of my professional record.

Signature: _____

Date: January 27, 2010

1 Personal Information

Ramani Duraiswami

Associate Professor with tenure

Department of Computer Science and Institute for Advanced Computer Studies

University of Maryland, College Park

Appointed: July 1, 2007.

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1.1 Education

- Ph.D. in Mechanical Engineering and Applied Mathematics
The Johns Hopkins University, January 1991
- Bachelor of Technology in Mechanical Engineering
Indian Institute of Technology, Bombay, India, June 1985

1.2 Employment

- Department of Computer Science and UMIACS, University of Maryland, Associate Professor, 2007 – present
- Department of Computer Science and UMIACS, University of Maryland, Assistant Professor, 2004 – 2007
- Fantalgo, LLC, College Park, MD, Partner, 2006 – present
- Institute for Advanced Computer Studies, University of Maryland, Associate Research Scientist, 2003–2004
- Institute for Advanced Computer Studies, University of Maryland, Assistant Research Scientist, 1998–2003

- Dynaflo Inc., Fulton, MD, Principal Research Scientist; also Head of the Applied Mathematics Division, 1997
- Dynaflo Inc., Fulton, MD, Senior Research Scientist 1994–1996
- Dynaflo Inc., Fulton, MD, Research Scientist 1990–1993
- The Johns Hopkins University, Baltimore, MD Research and Teaching Assistant 1985–1990

1.3 Courtesy Appointments and Affiliations

- Affiliate Associate Professor, Department of Electrical and Computer Engineering, University of Maryland, College Park, MD
- Member, Center for Automation Research, UMIACS, University of Maryland, College Park, MD
- Director, Perceptual Interfaces and Reality Laboratory, UMIACS, University of Maryland, College Park, MD
- Faculty Member, Program in Applied Mathematics and Scientific Computation, University of Maryland, College Park, MD
- Member, The Norbert Wiener Center for Harmonic Analysis and Applications, Department of Mathematics, University of Maryland, College Park, MD
- Member, Burgers Program for Fluid Mechanics, University of Maryland, College Park, MD

2 Research, Scholarly, and Creative Activities

(In the following, an * indicates a co-author who was a student or a postdoc advised, co-advised, or supervised by Dr. Duraiswami when the work was done. A † indicates a scientist who is supported by Dr. Duraiswami.)

Books

— Authored Books —

- [B1] Nail A. Gumerov[†] and Ramani Duraiswami. *Fast Multipole Methods for the Helmholtz Equation in Three Dimensions*. The Elsevier Electromagnetism Series. Elsevier Science, Amsterdam, 2005. ISBN: 0080443710.

— Edited Proceedings —

- [B2] Derek Brock, Ramani Duraiswami, and Alexander I. Rudnicky, editors. *Papers from the AAAI Fall Symposium*, number ISBN 978-1-57735-299-0. AAAI Press, Menlo Park, CA, 2006.
- [B3] David Doermann and Ramani Duraiswami, editors. *Proceedings of the Third International Conference on Mobile and Ubiquitous Multimedia (MUM2004)*, College Park, Maryland, U.S.A. October 27 - 29, 2004, volume 273 of *ACM International Conference Proceeding Series*. Association of Computer Machinery, 2004. ISBN:1-58113-981-0.

— Book Chapters —

- [B4] Vikas C. Raykar* and Ramani Duraiswami. The improved fast gauss transform with applications to machine learning. In L. Bottou, O. Chapelle, D. Decoste, and J. Weston, editors, *Large Scale Kernel Machines*, pages 175–202. MIT Press, 2007.
- [B5] Dmitry Zotkin*, Vikas Raykar*, Ramani Duraiswami, and Larry S. Davis. Multimodal tracking for smart videoconferencing and video surveillance. In Zhigang Zhu and Thomas S. Huang, editors, *Multimodal Surveillance*. Artech House Publisher, 2007.
- [B6] Dmitry N. Zotkin* and Ramani Duraiswami. *Handbook on Signal Processing Systems*, volume to appear, chapter Signal processing for audio HCI. Springer, 2010.
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Journal Articles

— Published Articles in Refereed Journals —

- [J1] Dmitry N. Zotkin[†], Ramani Duraiswami, and Nail A. Gumerov[†]. Plane-wave decomposition of acoustical scenes via spherical and cylindrical microphone arrays. *IEEE Transactions on Audio, Speech & Language Processing*, 18:2–18, 2010.
- [J2] Nail A. Gumerov[†], Adam E. O’Donovan, Ramani Duraiswami, and Dmitry N. Zotkin. Computation of the head-related transfer function via the fast multipole accelerated boundary element method and its spherical harmonic representation. *Journal of the Acoustical Society of America*, in press:xxx–xxx, 2010.
- [J3] Nail A. Gumerov[†] and Ramani Duraiswami. A broadband fast multipole accelerated boundary element method for the three dimensional Helmholtz equation. *Journal of the Acoustical Society of America*, 125:191–205, 2009. Version also published as University of Maryland Department of Computer Science Technical Report CS-TR-4904.
- [J4] F. Seydou, R. Duraiswami, N.A. Gumerov, and T. Seppanen. Computation of singular and hypersingular boundary integrals by Green’s identity and application to boundary value problems. *Engineering Analysis with Boundary Elements*, 33:1124–1131, 2009.
- [J5] Nail A. Gumerov and Ramani Duraiswami. Fast multipole methods on graphical processors. *Journal of Computational Physics*, 227:8290–8313, 2008. Also published as Fantalgo LLC, Technical Report 2007-2.
- [J6] Vikas C. Raykar*, Ramani Duraiswami, and Balaji Krishnapuram. A fast algorithm for learning a ranking function from large scale data sets. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 30:1158–1170, 2008.
- [J7] Fad Seydou, Ramani Duraiswami, and Tappio Seppanen. Numerical solution of electromagnetic scattering by multiple cylinders. *Applied Computational Electromagnetics Journal*, 23:1–8, 2008.
- [J8] Nail A. Gumerov[†] and Ramani Duraiswami. Fast radial basis function interpolation via preconditioned Krylov iteration. *SIAM Journal on Scientific Computing*, 29:1876–1899, 2007.

- [J9] Zhenyu Zhang*, Isaak D. Mayergoyz, Nail A. Gumerov[†], and Ramani Duraiswami. Numerical analysis of plasmon resonances in nanoparticles based on fast multipole method. *IEEE Transactions on Magnetism*, 43:1465–1468, April 2007.
- [J10] Zhiyun Li* and Ramani Duraiswami. Flexible and optimal design of spherical microphone arrays for beamforming. *IEEE Transactions on Speech and Audio Processing*, 15:702–714, 2007.
- [J11] Ramani Duraiswami, Dmitry N. Zotkin*, and Nail A. Gumerov[†]. Fast evaluation of the room transfer function using multipole expansion. *IEEE Transactions on Speech and Audio Processing*, 15:565–576, 2007.
- [J12] Nail A. Gumerov[†] and Ramani Duraiswami. A scalar potential formulation and translation theory for the time-harmonic Maxwell equations. *Journal of Computational Physics*, 225:206–236, 2007.
- [J13] Fadoulourahmane Seydou, Omar Ramahi, Ramani Duraiswami, and Tappio Seppanen. Numerical computation of the green’s function for two-dimensional finite-size photonic crystals of infinite length. *Optics Express*, 14:11362–11371, 2006.
- [J14] Dmitry N. Zotkin*, Ramani Duraiswami, Nail A. Gumerov[†], and Elena Grassi*. Rapid measurement of head related transfer functions. *The Journal of the Acoustical Society of America*, 120(4):2202–2215, Oct 2006.
- [J15] Nail A. Gumerov[†], Ali Zandifar*, Ramani Duraiswami, and Larry S. Davis. 3-D structure recovery and unwarping of surfaces applicable to planes. *International Journal of Computer Vision*, 66(3):261–281, Mar 2006.
- [J16] Nail A. Gumerov[†] and Ramani Duraiswami. Fast multipole method for the biharmonic equation in three dimensions. *Journal of Computational Physics*, 215(1):363–383, Jun 2006.
- [J17] Dmitry N. Zotkin*, Tai-Shi Chi, Shihab A. Shamma, and Ramani Duraiswami. Neuromimetic sound representation for percept detection and manipulation. *EURASIP Journal on Applied Signal Processing*, 2005(9):1350–1364, Jun 2005.
- [J18] Vikas C. Raykar*, Ramani Duraiswami, and B. Yegnanarayana. Extracting the frequencies of the pinna spectral notches in measured head related impulse responses. *The Journal of the Acoustical Society of America*, 118(1):364–374, 2005.
- [J19] Vikas C. Raykar*, Bayya Yegnanarayana, S.R. Mahadeva Prasanna, and Ramani Duraiswami. Speaker localization using excitation source information in speech. *IEEE Transactions on Speech and Audio Processing*, 13(5):751–761, Sep 2005.
- [J20] Bayya Yegnanarayana, S.R. Mahadeva Prasanna, Ramani Duraiswami, and Dmitry N. Zotkin*. Processing of reverberant speech for time-delay estimation. *IEEE Transactions on Speech and Audio Processing*, 13(6):1110–1118, Nov 2005.
- [J21] Nail A. Gumerov[†] and Ramani Duraiswami. Computation of scattering from clusters of spheres using the fast multipole method. *The Journal of the Acoustical Society of America*, 117(4):1744–1761, 2005.
- [J22] Philip David*, Daniel F. Dementhon, Ramani Duraiswami, and Hanan Samet. SoftPOSIT: Simultaneous pose and correspondence determination. *International Journal of Computer Vision*, 59(3):259–284, Sep 2004.

- [J23] Fadoulourahmane Seydou, Ramani Duraiswami, Nail A. Gumerov, and Tappio Seppanen. Tm electromagnetic scattering from 2D multilayered dielectric bodies -. *Applied Computational Electromagnetics Society Journal*, 19(2):100–107, Jul 2004.
- [J24] Dmitry N. Zotkin* and Ramani Duraiswami. Accelerated speech source localization via a hierarchical search of steered response power. *IEEE Transactions on Speech and Audio Processing*, 12(5):499–508, Sep 2004.
- [J25] Ali Zandifar*, Ramani Duraiswami, and Larry S. Davis. Video-based framework for analysis of presentations/posters. *International Journal on Document Analysis and Recognition*, 7:178–187, 2005.
- [J26] Dmitry N. Zotkin*, Ramani Duraiswami, and Larry S. Davis. Rendering localized spatial audio in a virtual auditory space. *IEEE Transactions on Multimedia*, 6(4):553– 564, Aug 2004.
- [J27] Ahmed Elgammal*, Ramani Duraiswami, and Larry S. Davis. Efficient kernel density estimation using the fast Gauss transform with applications to color modeling and tracking. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 25(11):1499– 1504, Nov 2003.
- [J28] Nail A. Gumerov[†] and Ramani Duraiswami. Recursions for the computation of multipole translation and rotation coefficients for the 3-D Helmholtz equation. *SIAM Journal on Scientific Computing*, 25(4):1344–1381, 2003.
- [J29] Dmitry N. Zotkin* and Ramani Duraiswami Larry S. Davis. Joint audio-visual tracking using particle filters. *Eurasip Journal on Applied Signal Processing*, 2002(11):1154–1164, Nov 2002.
- [J30] V. Ralph Algazi, Richard O. Duda, Ramani Duraiswami, Nail A. Gumerov[†], and Zhihui Tang*. Approximating the head-related transfer function using simple geometric models of the head and torso. *The Journal of the Acoustical Society of America*, 112(5):2053–2064, 2002.
- [J31] Ahmed Elgammal*, Ramani Duraiswami, David E. Harwood, and Larry S. Davis. Background and foreground modeling using nonparametric kernel density estimation for visual surveillance. *Proceedings of the IEEE*, 90(7):1151– 1163, Jul 2002.
- [J32] Nail A. Gumerov[†] and Ramani Duraiswami. Computation of scattering from N spheres using multipole reexpansion. *The Journal of the Acoustical Society of America*, 112(6):2688–2701, 2002.
- [J33] Ramani Duraiswami, Kaushik Sarkar, and Georges L. Chahine. Efficient 2D and 3D electrical impedance tomography using dual. *Engineering Analysis with Boundary Elements*, 22(1):13–31, Jul 1998.
- [J34] Ramani Duraiswami, Sankar Prabhukumar, and Georges L. Chahine. Bubble counting using an inverse acoustic scattering method. *The Journal of the Acoustical Society of America*, 104(5):2699–2717, 1998.
- [J35] Ramani Duraiswami, Georges L. Chahine, and Kaushik Sarkar. Boundary element techniques for efficient 2-D and 3-D electrical impedance tomography. *Chemical Engineering Science*, 52(13):2185–2196, Jul 1997.
- [J36] Kenneth M. Kalumuck, Ramani Duraiswami, and Georges L. Chahine. Bubble dynamics fluid-structure interaction simulation by coupling. *Journal of Fluids and Structures*, 9(8):861–883, Nov 1995.

- [J37] Ramani Duraiswami and Andrea Prosperetti. Linear pressure waves in fogs. *Journal of Fluid Mechanics*, 299:187–215, Sep 1995.
- [J38] Ramani Duraiswami and Andrea Prosperetti. Orthogonal mapping in 2 dimensions. *Journal of Computational Physics*, 98(2):254–268, Feb 1992.
- [J39] Georges L. Chahine and Ramani Duraiswami. Dynamic interactions in a multibubble cloud. *Journal of Fluids Engineering - Transactions of the ASME*, 114(4):680–686, Dec 1992.

— Accepted Articles in Refereed Journals —

- [J40] Wen Zhang, Thushara Abhayapala, Rodney Kennedy, and Ramani Duraiswami. New insights into head related transfer function: Spatial dimensionality and continuous representation. *The Journal of the Acoustical Society of America*, TBD, submitted.

Conference Publications

— Refereed Conference Publications —

- [C1] Adam E. O'Donovan*, Ramani Duraiswami, and Dmitry N. Zotkin[†]. Automatic matched filter recovery via the audio camera. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2010 (ICASSP '10)*, volume zz, pages xxx–yyy, 2010.
- [C2] Balaji Vasan Srinivasan*, Ramani Duraiswami, and Dmitry Zotkin. Kernelized Rényi distance for speaker recognition. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2010 (ICASSP '10)*, volume zz, pages xxx–yyy, 2010.
- [C3] Balaji Vasan Srinivasan* and Ramani Duraiswami. Efficient subset selection via the kernelized Renyi distance. In *Proceedings Twelfth IEEE International Conference on Computer Vision, 2009.*, pages 1081–1088, 2009.
- [C4] Dmitry N. Zotkin*, Ramani Duraiswami, and Nail A. Gumerov. Regularized HRTF fitting using spherical harmonics. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, pages 257–260, 2009.
- [C5] Dmitry N. Zotkin* and Ramani Duraiswami. Plane-wave decomposition of a sound scene using a cylindrical microphone array. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2009 (ICASSP '09)*, pages 85–88, 2009.
- [C6] Wen Zhang, Thushara Abhayapala, Rodney Kennedy, and Ramani Duraiswami. Modal expansion of hrtfs: Continuous representation in frequency-range-angle. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2009 (ICASSP '09)*, pages 285–288, 2009.
- [C7] Vlad I. Morariu, Balaji Vasan Srinivasan, Vikas C. Raykar, Ramani Duraiswami, and Larry S. Davis. Automatic online tuning for fast Gaussian summation. In *Advances in Neural Information Processing Systems (NIPS)*, 2008.
- [C8] Adam M. O'Donovan, Dmitry N. Zotkin, and Ramani Duraiswami. Spherical microphone array based immersive audio scene rendering. In *Proceedings of the 14th International Conference on Auditory Display*, Paris, France, 2008. inproceedings.

- [C9] Yuancheng Luo and Ramani Duraiswami. Canny edge detection on nvidia cuda. In *Proceedings of the Workshop on Computer Vision on GPUS, CVPR 2008*, pages 1–8, 2008. Source code: <http://www.wam.umd.edu/~yluo1/canny.htm>.
- [C10] Adam O’Donovan*, Ramani Duraiswami, and Dmitry N. Zotkin*. Imaging concert hall acoustics using visual and audio cameras. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2008 (ICASSP ’08)*, pages 5284 – 5287, 2008.
- [C11] Nargess Memarsadeghi, Vikas C. Raykar, Ramani Duraiswami, and David M. Mount. Efficient Kriging via fast matrix-vector products. In *Proceedings of the IEEE Aerospace Conference, Big Sky, MT*, volume I, pages 1–7, 2008.
- [C12] Dmitry N. Zotkin*, Ramani Duraiswami, and Nail A. Gumerov†. Sound field decomposition using spherical microphone arrays. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2008 (ICASSP ’08)*, pages 277–280, 2008.
- [C13] Aniruddha Kembhavi, Ryan Farrell, Yuancheng Luo, David Jacobs, Ramani Duraiswami, and Larry Davis. Tracking Down Under: Following the satin bowerbird. In *Proceedings IEEE 2008 Workshop on Application of Computer Vision WACV ’08*, volume 1, pages 1–8. IEEE, 2008.
- [C14] Nail A. Gumerov, Ramani Duraiswami, and William D. Dorland. Middleware for programming NVIDIA GPUs from Fortran 9X,. In *Proceedings of Supercomputing 2007, Reno, NV*, November 2007.
- [C15] Dmitry N. Zotkin*, Ramani Duraiswami, and Nail A. Gumerov†. Room acoustics: Compact representation for multi-source binaural playbackx. In *Proceedings of the 19th International Congress on Acoustics, Madrid, 2-7 September 2007*, pages RBA 11–007, 2007.
- [C16] Dmitry N. Zotkin*, Ramani Duraiswami, and Nail A. Gumerov†. Efficient conversion of X.Y surround sound content to binaural head-tracked form for HRTF-enabled playback. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2007 (ICASSP ’07)*, volume 1, pages 21–24, 2007.
- [C17] Adam O’Donovan*, Ramani Duraiswami, and Nail A. Gumerov. Real time capture of audio images and their use with video. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 2007*, pages 10–13, 2007.
- [C18] Adam O’Donovan*, Ramani Duraiswami, and Jan Neumann. Microphone arrays as generalized cameras for integrated audio visual processing. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, 2007. CVPR ’07*, pages 1–8, 2007.
- [C19] Adam O’Donovan*, Ramani Duraiswami, and Jan Neumann. Sensing the world with arrays of microphones and cameras. In *Proceedings of the 19th International Congress on Acoustics, Madrid, 2-7 September 2007*, pages ELE–03–006, 2007.
- [C20] Nail A. Gumerov† and Ramani Duraiswami. High frequency acoustic simulations via FMM accelerated BEM. In *Proceedings of the 19th International Congress on Acoustics, Madrid, 2-7 September 2007*, pages COM 02–008, 2007.
- [C21] Nail A. Gumerov†, Ramani Duraiswami, and Dmitry Zotkin*. Fast multipole accelerated boundary elements for numerical computation of the head related transfer function. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2007 (ICASSP ’07)*, volume I, pages 165–168, 2007.

- [C22] Zhiyun Li* and Ramani Duraiswami. Fast time-domain spherical microphone array beamforming. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 2007*, pages 155–158, 2007.
- [C23] Vikas C. Raykar*, Ramani Duraiswami, and Balaji Krishnapuram. A fast algorithm for learning large scale preference relations. In *Proceedings of the Eleventh International Conference on Artificial Intelligence and Statistics*, pages 385–392, 2007.
- [C24] Zhiyun Li* and Ramani Duraiswami. Headphone-based reproduction of 3D auditory scenes captured by spherical/hemispherical microphone arrays. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005 (ICASSP '06)*, volume 5, pages 337–340, 2006.
- [C25] Zhenyu Zhang*, Isaak D. Mayergoyz, Nail A. Gumerov, and Ramani Duraiswami. Numerical analysis of plasmon resonances based on fast multipole method. In *Proceedings 12th Biennial IEEE Conference on Electromagnetic Field Computation*, pages 459–465, 2006.
- [C26] Vikas C. Raykar* and Ramani Duraiswami. Fast optimal bandwidth selection for kernel density estimation. In J. Ghosh, D. Lambert, D. Skillicorn, and J. Srivastava, editors, *Proceedings of the sixth SIAM International Conference on Data Mining*, pages 524–528, 2006.
- [C27] Nail A. Gumerov[†] and Ramani Duraiswami. FMM accelerated BEM for 3D Laplace & Helmholtz equations. In *Proceedings of BETEQ 2006*, 2006.
- [C28] Arkady Yerukhimovich*, Ramani Duraiswami, Nail A. Gumerov[†], and Dmitry N. Zotkin*. Frequency independent flexible spherical beamforming via RBF fitting. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005 (ICASSP '06)*, volume 5, pages 45–48, 2006.
- [C29] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Efficient mean-shift tracking via a new similarity measure. In *Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, (CVPR 2005)*, volume 1, pages 176–183, 2005.
- [C30] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Fast multiple object tracking via a hierarchical particle filter. In *Proceedings Tenth IEEE International Conference on Computer Vision (ICCV 2005)*, volume 1, pages 212–219, 2005.
- [C31] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Efficient kernel machines using the improved fast Gauss transform. In *Advances in Neural Information Processing Systems*, volume 16, 2005.
- [C32] Bohyung Han*, Changjiang Yang*, Ramani Duraiswami, and Larry Davis. Bayesian filtering and integral image for visual tracking. In *Proceedings Workshop on Image Analysis for Multimedia Interactive Services (WIAMIS), Montreux, Switzerland, 2005*.
- [C33] Zhiyun Li* and Ramani Duraiswami. A robust and self-reconfigurable design of spherical microphone array for multi-resolution beamforming. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005 (ICASSP '05)*, volume 4, pages 1137–1140, 2005.
- [C34] Zhiyun Li* and Ramani Duraiswami. Hemispherical microphone arrays for sound capture and beamforming. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 2005*, pages 106–109, 2005.

- [C35] Ramani Duraiswami and Vikas C. Raykar*. The manifolds of spatial hearing. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005 (ICASSP '05)*, volume 3, pages 285–288, 2005.
- [C36] Ramani Duraiswami, Zhiyun Li*, Dmitry N. Zotkin*, Elena Grassi*, and Nail A. Gumerov†. Plane-wave decomposition analysis for spherical microphone arrays. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics, 2005*, pages 150–153, 2005.
- [C37] Ramani Duraiswami, Dmitry N. Zotkin*, Zhiyun Li*, Elena Grassi*, Nail A. Gumerov†, and Larry S. Davis. High order spatial audio capture and its binaural head-tracked playback over headphones with HRTF cues. In *Audio Engineering Society Convention Paper 6540*, pages 1–20. Audio Engineering Society, 2005.
- [C38] Vikas C. Raykar* and Ramani Duraiswami. Approximate expressions for the mean and the covariance of the maximum likelihood estimator for acoustic source localization. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2005 (ICASSP '05)*, volume 3, pages 73–76, 2005.
- [C39] Nail A. Gumerov†, Ali Zandifar*, Ramani Duraiswami, and Larry S. Davis. Structure of applicable surfaces from single views. In *Proceedings European Conference of Computer Vision, 2004, vol 3*, volume 3023 of *Lecture Notes in Computer Science*, pages 482–496, 2004.
- [C40] Ramani Duraiswami, Dmitry N. Zotkin*, and Nail A. Gumerov†. Interpolation and range extrapolation of HRTFs. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2004 (ICASSP '04)*, volume 4, pages 45–48. IEEE, May 2004.
- [C41] Vikas C. Raykar* and Ramani Duraiswami. Automatic position calibration of multiple microphones. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2004 (ICASSP '04)*, volume 4, pages 69–72, 2004.
- [C42] Zhiyun Li*, Ramani Duraiswami, and Nail A. Gumerov†. Capture and recreation of higher order 3d sound fields via reciprocity. In Stephen Barrass and Paul Vickers, editors, *Proceedings International Conference on Auditory Display*. International Community for Auditory Display (ICAD), 2004. ISBN 1-74108-048-7.
- [C43] Zhiyun Li*, Ramani Duraiswami, Elena Grassi*, and Larry S. Davis. Flexible layout and optimal cancellation of the orthonormality error for spherical microphone arrays. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2004 (ICASSP '04)*, volume 4, pages 41–44, 2004.
- [C44] Fadoulourahmane Seydou, O. Ramahi, Ramani Duraiswami, and T. Seppänen. Computation of green's function for finite-size photonic crystals by boundary element method. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2004*, volume 4, pages 4320–4323, 2004.
- [C45] Zhiyun Li*, Ramani Duraiswami, and Larry S. Davis. Recording and reproducing high order surround auditory scenes for mixed and augmented reality. In *Proceedings Third IEEE and ACM International Symposium on Mixed and Augmented Reality, 2004 (ISMAR 2004)*, pages 240–249, 2004.
- [C46] Zhiyun Li*, Ramani Duraiswami, Elena Grassi*, and Larry S. Davis. A spherical microphone array system for traffic scene analysis. In *The 7th International IEEE Conference on Proceedings Intelligent Transportation Systems*, pages 338–342, 2004.

- [C47] Ali Zandifar*, Sernam Lim*, Ramani Duraiswami, Nail A. Gumerov[†], and Larry S. Davis. Multi-level fast multipole method for thin plate spline evaluation. In *Proceedings International Conference on Image Processing (ICIP '04)*, volume 3, pages 1683–1686, 2004.
- [C48] Haixia Zhao*, Catherine Plaisant, Ben Shneiderman, and Ramani Duraiswami. Sonification of geo-referenced data for auditory information seeking: Design principle and pilot study. In Stephen Barras and Paul Vickers, editors, *Proceedings International Conference on Auditory Display*. International Community for Auditory Display (ICAD), 2004. ISBN 1-74108-048-7.
- [C49] Changjiang Yang*, Ramani Duraiswami, Nail A. Gumerov[†], and Larry S. Davis. Improved fast Gauss transform and efficient kernel density estimation. In *Proceedings Ninth IEEE International Conference on Computer Vision, 2003.*, volume 1, pages 664– 671, 2003.
- [C50] Ahmed Elgammal, Ramani Duraiswami, and Larry S. Davis. Probabilistic tracking in joint feature-spatial spaces. In *Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2003 (CVPR'03)*, volume 1, pages 781–788, 2003.
- [C51] Phillip David*, Daniel F. DeMenthon, Ramani Duraiswami, and Hanan Samet. Simultaneous pose and correspondence determination using line features. In *Proceedings IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2003*, volume 2, pages 424–431, 2003.
- [C52] Vikas Raykar*, Ramani Duraiswami, Larry Davis, and Bayya Yegnanarayana. Extracting significant features from the HRTF. In *Proceedings of the International Conference on Auditory Display, Boston*, pages 115–118, 2003.
- [C53] Nima Mesgarani*, Shihab Shamma, Ken W. Grant, and Ramani Duraiswami. Augmented intelligibility in simultaneous multi-talker environments. In *Proceedings of the International Conference on Auditory Display, Boston.*, pages 71–74, 2003.
- [C54] Ankur Mohan*, Ramani Duraiswami, Dmitry N. Zotkin*, Daniel F. DeMenthon, and Larry S. Davis. Using computer vision to generate customized spatial audio. In *Proceedings IEEE International Conference on Multimedia and Expo (ICME)*, volume 3, pages 57–60, 2003.
- [C55] Fadoulourahmane Seydou, Ramani Duraiswami, and Tappio Seppanen. Three dimensional acoustic scattering from an m multilayered domain via an integral equation approach. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 1, pages 669– 672, 2003.
- [C56] Fadoulourahmane Seydou, Ramani Duraiswami, and Tappio Seppanen. Electromagnetic scattering from a multilayered cylindrical waveguide. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 3, pages 332– 335, 2003.
- [C57] Fadoulourahmane Seydou, Ramani Duraiswami, and Tappio Seppanen. A 2D profile reconstruction in a multilayered waveguide structure. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 1, pages 531– 534, 2003.
- [C58] Fadoulourahmane Seydou, Ramani Duraiswami, and Tappio Seppanen. A boundary element method for electromagnetic scattering by multiple cylinders. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 3, pages 516– 519, Jun 2003.
- [C59] Fadoulourahmane Seydou, Tappio Seppanen, and Ramani Duraiswami. A simplified Newton method for the inverse orthotropic problem. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 1, pages 535– 538, 2003.

- [C60] Fadoulourahmane Seydou, Ramani Duraiswami, and Tappio Seppanen. Integral equation solution of electromagnetic scattering from a multilayered cylindrical waveguide. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2003*, volume 3, pages 524–527, 2003.
- [C61] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Mean-shift analysis using quasi-Newton methods. In *Proceedings. 2003 IEEE International Conference on Image Processing*, volume 2, pages 447–450, 2003.
- [C62] Phillip David*, Daniel F. DeMenthon, Ramani Duraiswami, and Hanan Samet. SoftPOSIT: Simultaneous pose and correspondence determination. In *Proceedings European Conference on Computer Vision - ECCV 2002 PT III*, volume 2352 of *Lecture Notes in Computer Science*, pages 698–714. Springer-Verlag, 2002.
- [C63] Dmitry Zotkin*, Ramani Duraiswami, and Larry S. Davis. Customizable auditory displays. In *Proceedings International Community of Auditory Displays*, pages 167–176, 2002.
- [C64] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Near-optimal regularization parameters for applications in computer vision. In *Proceedings 16th International Conference on Pattern Recognition, 2002.*, volume 2, pages 569–573, 2002.
- [C65] Changjiang Yang*, Ramani Duraiswami, and Larry S. Davis. Super-resolution using preconditioned conjugate gradient method. In Wei Sui, editor, *Proceedings, Second International Conference on Image and Graphics*, pages 591–598. SPIE, 2002.
- [C66] Dmitry N. Zotkin*, Shihab A. Shamma, Powen Ru, Ramani Duraiswami, and Larry S. Davis. Pitch and timbre manipulations using cortical representation of sound. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2003 (ICASSP '03)*, volume 5, pages 517–520, 2003.
- [C67] Dmitry N. Zotkin*, Shihab A. Shamma, Powen Ru, Ramani Duraiswami, and Larry S. Davis. Pitch and timbre manipulations using cortical representation of sound. In *Proceedings IEEE International Conference on Multimedia and Expo (ICME)*, volume 3, pages 381–384, 2003.
- [C68] Dmitry N. Zotkin*, Jane Wang*, Ramani Duraiswami, and Larry Davis. HRTF personalization using anthropometric measurements. In *Proceedings IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, pages 157–160, 2003.
- [C69] Ali Zandifar*, Ramani Duraiswami, Antoine Chahine*, and Larry S. Davis. A video based interface to textual information for the visually impaired. In *Proceedings Fourth IEEE International Conference on Multimodal Interfaces*, pages 325–330, 2002.
- [C70] Nail A. Gumerov[†] and Ramani Duraiswami. Multiple scattering from N spheres. In *Proceedings IEEE Antennas and Propagation Society International Symposium, 2002*, volume 2, pages 90–93, 2002.
- [C71] Nail A. Gumerov[†], Ramani Duraiswami, and Zhihui Tang*. Numerical study of the influence of the torso on the HRTF. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2002 (ICASSP '02)*, volume 2, pages 1965–1968, 2002.
- [C72] Dmitry N. Zotkin*, Ramani Duraiswami, and Larry S. Davis. Creation of virtual auditory spaces. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2002 (ICASSP '02)*, volume 2, pages 2113–2116, 2002.

- [C73] Dmitry N. Zotkin*, Ramani Duraiswami, Larry S. Davis, Ankur Mohan*, and Vikas C. Raykar*. Virtual audio system customization using visual matching of ear parameters. In *Proceedings 16th International Conference on Pattern Recognition (ICPR02)*, volume 3, pages 1003–1006, 2002.
- [C74] Ahmed Elgammal*, Ramani Duraiswami, and Larry S. Davis. Efficient non-parametric adaptive color modeling using fast Gauss transform. In *Proceedings IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2001)*, volume 2, pages 563–570, 2001.
- [C75] Ramani Duraiswami, Dmitry N. Zotkin*, and Larry S. Davis. Active speech source localization by a dual coarse-to-fine search. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2001 (ICASSP '01)*, volume 5, pages 3309–3312, 2001.
- [C76] Ramani Duraiswami, Nail A. Gumerov[†], Dmitry N. Zotkin*, and Larry S. Davis. Efficient evaluation of reverberant sound fields. In *Proceedings IEEE Workshop on the Applications of Signal Processing to Audio and Acoustics, 2001*, pages 203–206, 2001.
- [C77] Motilal Agarwal*, David Harwood, Ramani Duraiswami, Larry Davis, and Paul Luther. Three dimensional ultrastructure from transmission electron microscope tilt series. In *Proceedings of the Third Indian Conference on Vision, Graphics and Image Processing*, pages 47–53, 2001.
- [C78] Dmitry N. Zotkin*, Ramani Duraiswami, and Larry S. Davis. Multimodal 3-D tracking and event detection via the particle filter. In *Proceedings Detection and Recognition of Events in Video, 2001. Proceedings. IEEE Workshop on*, pages 20–27, 2001.
- [C79] Dmitry N. Zotkin*, Ramani Duraiswami, Harsh Nanda*, and Larry S. Davis. Multimodal tracking for smart videoconferencing. In *Proceedings IEEE International Conference on Multimedia and Expo (ICME)*, pages 36–39, 2001.
- [C80] Kaushik Ghose*, Dmitry N. Zotkin*, Ramani Duraiswami, and Cynthia F. Moss. Multimodal localization of a flying bat. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2001 (ICASSP '01)*, volume 5, pages 3057–3060, 2001.
- [C81] Nail A. Gumerov[†] and Ramani Duraiswami. Modeling the effect of a nearby boundary on the HRTF. In *Proceedings IEEE International Conference on Acoustics, Speech, and Signal Processing, 2001 (ICASSP '01)*, volume 5, pages 3337–3340, 2001.
- [C82] Ismail Haritaoglu, Alex Cozzi, David Koons, Myron Flickner, Dmitry N. Zotkin*, Ramani Duraiswami, and Yaser Yacoob. Attentive toys. In *Proceedings IEEE International Conference on Multimedia and Expo, 2001 (ICME 2001)*, pages 917–920, 2001.
- [C83] Vasanth Philomin*, Ramani Duraiswami, and Larry S. Davis. Quasi-random sampling for condensation. In D. Vernon, editor, *Proceedings of the European Conference on Computer Vision, 2000, Dublin, Ireland*, volume 1843/2000 of *Lecture Notes in Computer Science*, pages 134–149. Springer-Verlag GmbH, 2000.
- [C84] Vasant Philomin*, Ramani Duraiswami, and Larry S. Davis. Pedestrian tracking from a moving vehicle. In *Proceedings of the IEEE Intelligent Vehicles Symposium*, pages 350–355, 2000.
- [C85] Dmitry N. Zotkin*, Ramani Duraiswami, Vasant Philomin*, and Larry S. Davis. Smart videoconferencing. In *Proceedings IEEE International Conference on Multimedia and Expo, ICME*, volume 3, pages 1597–1600, 2000.

- [C86] Dmitry N. Zotkin*, Ramani Duraiswami, Larry S. Davis, and Ismail Haritaoglu*. An audio-video front-end for multimedia applications. In *Proceedings 2000 IEEE International Conference on Systems, Man, and Cybernetics*, volume 2, pages 786–791, 2000.
- [C87] Larry S. Davis, Vasant Philomin*, and Ramani Duraiswami. Tracking humans from a moving platform. In *Proceedings 15th International Conference on Pattern Recognition, 2000. Proceedings.*, volume 4, pages 171–178, 2000.
- [C88] Nail A. Gumerov and Ramani Duraiswami. Modeling of particle motion in viscous swirl flow between two porous cylinders. In *Proceedings of 1998 ASME International Fluids Engineering Division Summer Meeting*, volume FEDSM98-5110, pages 1–8. ASME, 1998.
- [C89] Ramani Duraiswami, Nail A. Gumerov, and Georges L. Chahine. Solution of electrical impedance tomography equations using boundary element methods. In *Proceedings 12th International Conference on Boundary Element Technology, Knoxville, TN, Apr 1997*.
- [C90] S. Prabhukumar, Ramani Duraiswami, and Georges L. Chahine. Bubble size measurement using inverse acoustic scattering: Theory and experiments. In *Proceedings ASME Cavitation and Multiphase Flow Forum*, 1996.
- [C91] Georges L. Chahine, S. Prabhukumar, and Ramani Duraiswami. Bubble dynamics near a cylinder: Three dimensional boundary element simulation of the ONR Snay-Goertner bubble benchmark experiments. In *Proceedings 67th Shock and Vibration Symposium, Monterey, CA, Nov 1996*.
- [C92] Kausik Sarkar, Georges L. Chahine, and Ramani Duraiswami. Numerical simulation of separated cavitation behind a sphere. In *Proceedings ASME Cavitation and Multiphase Flow Forum*, 1996.
- [C93] Kausik Sarkar, Ramani Duraiswami, and Georges L. Chahine. Three dimensional numerical simulation of bubble-vortical flow interaction. In J. Katz and Y. Matsumoto, editors, *Proceedings ASME Cavitation and Multiphase Flow Forum*, volume FED vol. 210, pages 135–143. ASME, Aug 1995.
- [C94] Georges L. Chahine, Ramani Duraiswami, C.J. Lambrecht, H. Mair, and Gregory S. Harris. Spark-generated bubbles as small-scale models of underwater explosions and for validation of simulation tools. In *Proceedings 66th Shock and Vibration Symposium, Biloxi, MS, Nov 1995*.
- [C95] Kenneth M. Kalumuck, Georges L. Chahine, and Ramani Duraiswami. Analysis of the response of a deformable structure to underwater explosion bubble loading using a fully coupled fluid-structure interaction procedure. In *Proceedings 66th Shock and Vibration Symposium, Biloxi, MS, Nov 1995*.
- [C96] T. Ohearn, J. Torczynski, S. Ceccio, A.L. Tassin, Ramani Duraiswami, Georges L. Chahine, and K. Sarkar. Development of an electrical impedance tomography system for an air-water vertical bubble column. In *Proceedings ASME IMECE Forum on Measurement Techniques in Multiphase Flows*, Nov 1995.
- [C97] Antoine Chahine, Georges L. Chahine, Ramani Duraiswami, F.T.M. Nieuwstadt, and J.Y. Billard. Potential flow instruction and analysis on personal computers. In *Proceedings ASME Forum on Instructional Fluid Dynamics, Hilton Island, South Carolina, Aug 1995*.
- [C98] Georges L. Chahine, K. Kalumuck, and Ramani Duraiswami. Fluid-structure interaction simulation of bubble dynamics by coupling fluid BEM and structural FEM codes. In *Proceedings 4th ASME International Symposium on Bubble Noise and Cavitation Erosion in Fluid Systems*. ASME, 1993.

- [C99] Ramani Duraiswami. Bubble density measurement using an inverse acoustic scattering technique. In O. Furuya, editor, *Proceedings ASME Cavitation and Multiphase Flow Forum, Washington DC*, volume FED 153, pages 67–74. ASME, 1993.
- [C100] Georges L. Chahine, Kenneth M. Kalumuck, and Ramani Duraiswami. *Boundary Elements 15: Vol. 2 Stress Analysis*, volume 2, chapter Coupling of a Fluids BEM Code with a Structures FEM code for Fluid Structure Interaction. Elsevier Applied Science, 1993.
- [C101] Georges L. Chahine, Ramani Duraiswami, and Mathieu Rebut. Analytical and numerical study of large bubble/bubble and bubble/flow interactions. In *Proceedings of the 19th ONR Symposium on Naval Hydrodynamics*, pages 1–20. National Research Council, 1992.
- [C102] Ramani Duraiswami and Georges L. Chahine. Analytical study of the interaction a gas bubble and a line vortex. In O. Furuya, editor, *Proceedings ASME Cavitation and Multiphase Flow Forum*, volume FED-135, pages 69–76. ASME, 1992.
- [C103] Georges L. Chahine, Ramani Duraiswami, and A.N Lakshminarasimha. Dynamical interactions in a bubble cloud. In O. Furuya, editor, *Proceedings ASME Cavitation and Multiphase Flow Forum*, pages 49–54, New York, Jun 1991. ASME.

— Conference Publications, Abstracts or Extended Abstracts Only —

- [C104] Nail A. Gumerov[†] and Ramani Duraiswami. Wideband fast multipole accelerated boundary element methods for the three-dimensional Helmholtz equation. (Abstract). *Journal of the Acoustical Society of America*, 125:2566, 2009. Presentation, Abstract only.
- [C105] Adam O’Donovan*, Ramani Duraiswami, Nail A. Gumerov, and Dmitry N. Zotkin[†]. Imaging room acoustics with the audio camera. (Abstract). *Journal of the Acoustical Society of America*, 125:2566, 2009. Presentation, Abstract only.
- [C106] Nail A. Gumerov and Ramani Duraiswami. Fast multipole methods on graphics processors. Presented at AstroGPU, as an oral presentation, November 2007.
- [C107] Nail A. Gumerov, Ramani Duraiswami, and William Dorland. Middleware for gpu programming. Presented at AstroGPU, 2007.
- [C108] Vikas C. Raykar* and Ramani Duraiswami. Fast large scale Gaussian process regression using approximate matrix-vector products. In *Proceedings of the Learning Workshop, San Juan, Puerto Rico*, 2007.
- [C109] Dmitry Zotkin*, Vikas Raykar*, Ramani Duraiswami, and Larry S. Davis. Multimodal tracking for smart videoconferencing and video surveillance. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition Workshop on Multimodal Surveillance*, pages 1–2, 2007.
- [C110] Vikas C. Raykar* and Ramani Duraiswami. On the manifolds of spatial hearing. Presented at the NIPS 2006 workshop on Novel Applications of Dimensionality Reduction, December 2006.
- [C111] Nail A. Gumerov, Ramani Duraiswami, and Dmitry N. Zotkin. Head-related transfer functions via the fast multipole accelerated boundary element method. *Journal of the Acoustical Society of America*, 120:3342, 2006. Abstract Only.
- [C112] Nail A. Gumerov and Ramani Duraiswami. Efficient computation of 3-d acoustical scattering from multiple arbitrarily shaped objects using the boundary element method/fast multipole method (bem/fmm). *Journal of the Acoustical Society of America*, 120:3282, 2006. Abstract Only.

- [C113] Ramani Duraiswami, Zhiyun Li*, Dmitry N. Zotkin*, and Elena Grassi*. Spherical and hemispherical microphone arrays for capture and analysis of sound fields. *The Journal of the Acoustical Society of America*, 120:3225–3225, 2006. Abstract only.
- [C114] Ramani Duraiswami, Dmitry N. Zotkin*, and Adam O’Donovan*. Capture and rendering of spatial sound over headphones. *The Journal of the Acoustical Society of America*, 120:3094–3094, 2006. Abstract only.
- [C115] Ramani Duraiswami and Nail A. Gumerov. Iterative methods for use with the fast multipole method. In *Abstracts of the Ninth Copper Mountain Conference on Iterative Methods*, Apr 2006. Abstract Only.
- [C116] Vikas C. Raykar*, Ramani Duraiswami, and B. Yegnanarayana. A study of the pinna anthropometry and the spectral notch frequencies. *The Journal of the Acoustical Society of America*, 116(4):2625–2625, 2004. Abstract only.
- [C117] Vikas C. Raykar*, Ramani Duraiswami, and B. Yegnanarayana. Extracting the frequencies of the pinna spectral notches from measured head-related impulse responses. *The Journal of the Acoustical Society of America*, 116(4):2625–2625, 2004. Abstract only.
- [C118] Nail A. Gumerov[†] and Ramani Duraiswami. Efficient computation of acoustical scattering from N spheres via the fast multipole method accelerated flexible generalized minimal residual method. *The Journal of the Acoustical Society of America*, 116(4):2528–2528, 2004. Abstract only.
- [C119] Nail A. Gumerov[†] and Ramani Duraiswami. Acoustical scattering from N spheres using a multi-level fast multipole method. *The Journal of the Acoustical Society of America*, 113(4):2334–2334, 2003. Abstract only.
- [C120] Fadoulourahmane Seydou, Nail A. Gumerov[†], and Ramani Duraiswami. Two methods for solving a 3D acoustic inverse scattering problem. *The Journal of the Acoustical Society of America*, 113(4):2191–2191, 2003. Abstract only.
- [C121] Fadoulourahmane Seydou, Ramani Duraiswami, and Nail A. Gumerov. Analysis of particular phononic structures using single integral equations. *The Journal of the Acoustical Society of America*, 113(4):2284–2284, 2003. Abstract only.
- [C122] Nail A. Gumerov[†], Ramani Duraiswami, Dmitry N. Zotkin*, and Larry S. Davis. A multipole method for computation of acoustics of a convex polyhedral room. *The Journal of the Acoustical Society of America*, 112(5):2396–2396, 2002. Abstract only.
- [C123] Nail A. Gumerov[†], Zhihui Tang*, Ramani Duraiswami, Richard O. Duda, V. Ralph Algazi, and S. T. Raveendra. Modeling the effect of torso on the head-related transfer function via the boundary-element method. *The Journal of the Acoustical Society of America*, 109(5):2487–2487, 2001. Abstract only.
- [C124] Ramani Duraiswami, Larry Davis, Shihab A. Shamma, Howard C. Elman, Richard O. Duda, V. Ralph Algazi, Qing-Ho Liu, and S. T. Raveendra. Individualized HRTFs using computer vision and computational acoustics. *The Journal of the Acoustical Society of America*, 108(5):2597–2597, 2000. Abstract only.
- [C125] Ramani Duraiswami, Dmitry Zotkin*, Eugene A. Borovikov*, and Larry S. Davis. Active source location and beamforming. *The Journal of the Acoustical Society of America*, 107(5):2790–2790, 2000. Abstract only.

- [C126] Ramani Duraiswami, Dmitry Zotkin*, and Larry Davis. Exact solutions for the problem of source location from measured time differences of arrival. *The Journal of the Acoustical Society of America*, 106(4):2277–2277, 1999. Abstract only.
- [C127] Dmitry Zotkin*, Ramani Duraiswami, Ismail Hariatoglu*, Larry Davis, and Takahiro Otsuka*. A real-time audio–video front-end for multimedia applications. *The Journal of the Acoustical Society of America*, 106(4):2271–2271, 1999. Abstract only.
- [C128] Ramani Duraiswami, Sankar Prabhukumar, and Georges L. Chahine. Acoustic measurement of bubble size distributions: Theory and experiments. *The Journal of the Acoustical Society of America*, 100(4):2804–2805, 1996. Abstract only.
- [C129] Ramani Duraiswami, S. Prabhukumar, and Georges L. Chahine. Bubble size distribution measurement using an inverse acoustic scattering technique: Theory and experiments. *The Journal of the Acoustical Society of America*, 97(5):3296–3296, 1995. Abstract only.

Theses and Otherwise Unpublished Institutional Reports

— Theses —

- [T1] Ramani Duraiswami. *I. Sound Propagation in Fogs, II. Orthogonal Mapping in Two Dimensions*. PhD thesis, The Johns Hopkins University, 1991.

— Classified Governmental Technical Reports —

- [T2] Georges L. Chahine and Ramani Duraiswami. Boundary element method for calculating 2-D and 3-D underwater explosion bubble behavior in free water and near structures (Confidential). Technical Report NSWC/DD/93/44, Naval Surface Warfare Center, Dahlgren Division, 1992.
- [T3] Georges L. Chahine, Ramani Duraiswami, and Kenneth M. Kalumuck. Boundary element method for calculating 2-D and 3-D underwater explosion bubble loading on nearby structures including fluid structure interaction effects. (Confidential). Technical Report NSWC/DD/93/46, Naval Surface Warfare Center, Dahlgren Division, 1993.

— University of Maryland Technical Reports not otherwise published —

- [T4] Vikas Chandrakant Raykar, Ramani Duraiswami, and Balaji Krishnapuram. Fast weighted summation of erfc functions. Technical Report CS-TR-4848 and UMIACS-TR-2007-03, Department of Computer Science and UMIACS, University of Maryland, 2007.
- [T5] Nail A. Gumerov[†] and Ramani Duraiswami. Comparison of the efficiency of translation operators used in the fast multipole method for the 3D Laplace equation. Technical Report CS-TR-4701 and UMIACS-TR 2005-09, University of Maryland Department of Computer Science and Institute for Advanced Computer Studies, Nov 2005.
- [T6] Vikas C. Raykar* and Ramani Duraiswami. Very fast optimal bandwidth selection for univariate kernel density estimation. Technical Report CS-TR-4774, Department of Computer science, University of Maryland, College Park, 2005.

- [T7] Vikas C. Raykar*, Changjiang Yang*, Ramani Duraiswami, and Nail A. Gumerov†. Fast computation of sums of Gaussians in high dimensions. Technical Report CS-TR-4767, Department of Computer Science, University of Maryland, College Park, 2005.
- [T8] Zihui Tang*, Ramani Duraiswami, and Nail A. Gumerov†. Fast algorithms to compute matrix-vector products for pascal matrices. Technical Report CS-TR-4563 and UMIACS-TR-2004-08, University of Maryland Computer Science Department and Insitute for Advanced Computer Studies, Mar 2004.
- [T9] Nail A. Gumerov†, Ramani Duraiswami, and Y.A. Borovikov*. Data structures, optimal choice of parameters, and complexity results for generalized fast multipole methods in d dimensions. CS/UMIACS UMIACS-TR-2003-28, CS-TR-4458, University of Maryland, Department of Computer Science and UMIACS, 2004.
- [T10] Changjiang Yang*, Ramani Duraiswami, and Nail A. Gumerov†. Improved fast Gauss transform. Technical Report CS-TR-4495 and UMIACS-TR-2003-64, University of Maryland Computer Science Department and Insitute for Advanced Computer Studies, Aug 2003.
- [T11] Kexue Liu*, Ramani Duraiswami, and Larry S. Davis. A simple and optimal energy surface reconstruction algorithm from volumetric data. Technical Report CS-TR-4441 and UMIACS-TR-2003-11, Department of Computer Science, University of Maryland, College Park, Feb 2003.
- [T12] Ross G. Cutler, Ramani Duraiswami, HENCH J. QIAN, and Larry S. Davis. Design and implementation of the university of maryland keck laboratory for the analysis of visual movement. Technical Report CS-TR-4329 and UMIACS-TR-2002-11, University of Maryland Department of Computer Science and Institute for Advanced Computer Studies, Feb 2002.

— Dynaflo, Inc. Technical Reports —

- [T13] Ramani Duraiswami. A pseudospectral mapping technique for the accurate solution of viscous flows in complex geometries. Technical report, Dynaflo, Inc., 1993.
- [T14] Gregory Zilman, Ramani Duraiswami, and Georges L. Chahine. Optimal ship design and simulator development using systems identification techniques. Technical Report 94006-1, Dynaflo, Inc., 1994.
- [T15] Ramani Duraiswami, Antoine Chahine, and Georges L. Chahine. Development of a desktop ship simulator using systems identification techniques. Technical Report 95016-1, Dynaflo, Inc., 1997.

Patent Applications

- [P1] Ramani Duraiswami and Nail A. Gumerov†. Method for measurement of head related transfer functions,us patent application 20040091119. US Patent Application 20040091119, 2003.
- [P2] Nail A. Gumerov† and Ramani Duraiswami. A method for unwarping paper. UMD Invention Disclosure, 2003.

2.1 Talks, Abstracts, Tutorials, and Other Professional Papers Presented

2.1.1 Invited Talks

- Invited Talk on “Computational Estimation of Scattering Coefficients,” meeting of the Acoustical Society of America, Baltimore, 2010.
- Invited Talk on “Spatial Audio,” IWPASH 2009 (International Workshop on the Principles and Applications of Spatial Hearing), Sendai Japan, November 2009.
- Colloquium on “Spatial Audio Research,” Korea University, Seoul, South Korea, November, 2009.
- Colloquium on “Spatial Audio Research,” Samsung Research, Samsung Science City, Suwon, South Korea, November, 2009.
- Colloquium on “Computational Acoustics,” Korea Advanced Institute of Science and Technology, Daejeon, South Korea, November, 2009.
- Talk entitled “Audio Cameras for Audio-Visual Scene Analysis” at Microsoft Research, Seattle, Washington, June 2009
- Invited Talk on “Imaging room acoustics with the audio camera”, Acoustical Society of America, Portland, OR, May 2009.
- Colloquium on Spatial Audio, IEEE Signal Processing Society, Washington DC chapter, College Park, MD, May 2009.
- Talks at DARPA ISAT meetings on “Recreating Auditory Reality”, February 2008, July 2008, November 2008.
- Invited Colloquium at the National Aeronautical and Space Agency, Goddard, “Fast Multipole Methods on Graphics Processors,” November 2007.
- Invited Colloquium at the Naval Research Laboratory, Washington DC, “Fast Multipole Methods for High Frequency Acoustics, January 2007.
- Invited talk at the Acoustical Society of America meeting in Honolulu, Hawaii, November 2006 on “Capture of spatial sound for head-tracked playback.”
- Invited talk at the Acoustical Society of America meeting in Honolulu, Hawaii, November 2006 on “Measurement of room acoustics”
- Keynote on “Similarities and differences in the perception of space via vision and audio,” the 2006 IEEE International Workshop on Multimedia Signal Processing (MMSP06)
- University of Toronto, “Fast algorithms for statistics and machine learning using the improved fast Gauss transform,” March 2006
- University of Maryland, “Fast algorithms for statistics and machine learning using the improved fast Gauss transform,” Norbert Wiener Center, February 2006
- University of California, Santa Barbara, “Fast algorithms for statistics and machine learning using the improved fast Gauss transform,” Department of Electrical and Computer Engineering; February 2006

- University of California, Santa Barbara, “Capturing and Rendering Three Dimensional Auditory Scenes,” IGERT Seminar; February 2006
- Microsoft Research, “Capturing and Rendering Three Dimensional Auditory Scenes,” August 2005
- University of Maryland, “Boundary Integral Methods without Singular Integration,” Mathematics, May 2005
- Carnegie Mellon University, “Capturing and Rendering Perceptually Valid Three Dimensional Audio,” Electrical Engineering, September 2004
- Naval Research Laboratory, “Capturing and Rendering Perceptually Valid Three Dimensional Audio,” Artificial Intelligence Seminar, November, 2004
- Army Research Lab, Aberdeen, MD, “An Introduction to Fast Multipole Methods,” 2005
- Department of Computer Science, University of Maryland, “Creating Perceptually Valid Spatial Audio,” College Park, April 1, 2004
- Purdue University, Colloquium on Interdisciplinary Cognitive and Perceptual Technologies, “Engineering Perceptually Valid Spatial Audio Systems,” March 8, 2004
- IIT Bombay, “Audio research in Computer Science,” April 2003
- Georgia Tech., Computer Science, Sep. 2002
- Microsoft Research, July 2002
- IBM Almaden Research Center, “Creating Perceptually Valid Three Dimensional Audio,” July 2002
- Stanford University, “Creating Rendering Perceptually Valid Three Dimensional Audio,” CCRMA, July 2002
- Boston University, “Creating and Rendering Perceptually Valid Three Dimensional Audio,” April 2002
- Massachusetts Institute of Technology, April 2002
- Invited talk at the Third international workshop on Microphone Array Systems, “Microphone Array Research at the University of Maryland,” October 6, 2000, Harvard University, Cambridge, MA
- Invited colloquium on “Inverse Problems,” Department of Mathematics, Louisiana State University, Baton Rouge, March 3, 1998
- Invited talk at the special session on “Bubble measurement in the oceans,” Joint meeting of the Acoustic Societies of America and Japan, Honolulu, HI, Dec 2–6, 1996

2.1.2 Community Service Talks

Talks at the following high schools on why students should consider a career in computer science and possibly attend the University of Maryland

- Glenelg High School, Howard County Maryland, December 13, 2008
- Mount Hebron High School, January 10, 2009

- Howard High School, Columbia, MD January 24, 2009
- Talk to about 35 high school teachers of computer science at the High School Programming Contest, College Park, MD, March 08, 2009

2.2 Research Software

1. GPUMML: GPUS for Machine Learning. A software library for performing machine learning on GPUs, released under LGPL. <http://www.umiacs.umd.edu/~balajiv/GPUMML.htm>
2. Flagon: A software library encapsulating several scientific computing functions, and middleware, for programming NVIDIA graphical processors from high level languages, released under LGPL, <http://sourceforge.net/projects/flagon/>
3. Commercial software for the FMM accelerated boundary element method for the Helmholtz equation, licensed to the ESI-Group <http://www.esi-group.com> for marketing.
4. Canny edge detection on NVIDIA CUDA developed by Yuancheng Luo* under my supervision released under LGPL at <http://terpconnect.umd.edu/~yluo1/canny.htm>
5. Figtree: A software package combining the improved fast Gauss transform, and tree methods for summation of Gaussians in high dimensions. Vlad Morariu, Vikas Raykar, and Ramani Duraiswami, released under LGPL, January 2008. <http://sourceforge.net/projects/figtree/>
6. A library “DevObject” for programming graphical processors from higher level languages such as Fortran 90 and C++: Nail A. Gumerov and Ramani Duraiswami, released under LGPL, November 2007.
7. The Improved Fast Gauss Transform (2005): Vikas Raykar* and Ramani Duraiswami, available online at http://www.cs.umd.edu/users/vikas/code/IFGT/IFGT_code.htm
8. Fast optimal bandwidth estimation univariate kernel density estimation (2006): Vikas Raykar* and Ramani Duraiswami, Available online at http://www.cs.umd.edu/users/vikas/code/optimal_bw/optimal_bw_code.htm
9. Fast Multipole Method software for the Helmholtz equation in three dimensions (2005): Nail A. Gumerov[†] and Ramani Duraiswami, Licensed by the University of Maryland Office of Technology Commercialization to Fantalgo, LLC.
10. Fast Multipole Method software for the Laplace equation in three dimensions (2005): Nail A. Gumerov[†] and Ramani Duraiswami, Licensed by the University of Maryland Office of Technology Commercialization to Fantalgo, LLC.
11. Fast Multipole Method software for the Biharmonic equation in three dimensions (2005): Nail A. Gumerov[†] and Ramani Duraiswami, Available for license from the University of Maryland Office of Technology Commercialization
12. Java Animation for the Fast Multipole Method (2005) Developed as part of Yang Wang’s thesis under my supervision. Available under LGPL online at <http://www.umiacs.umd.edu/users/wpwy/fmm/>
13. Several proprietary commercial research software packages were developed or co-developed by me in my previous jobs for underwater explosion analysis, free-surface flow analysis, ship maneuvering, electrical impedance tomography, and for acoustical tomography

2.3 Major Experimental Facilities Built

I have developed or co-developed the following laboratories, either to complement ongoing research, or as a main objective (the Keck laboratory). Each laboratory involved a significant mixture of integrated sensing, data acquisition and computing.

1. Perceptual Interfaces and Reality Laboratory, University of Maryland. (Component laboratories for doing computer vision, microphone arrays, audio rendering, head-related transfer function measurements, auditory scene capture) 2001-present. This laboratory is often used as a demonstration for visitors and potential donors by the college.
2. Keck Laboratory for the Analysis of Visual Motion, University of Maryland. A multi-perspective imaging laboratory, containing 64 digital, progressive-scan cameras organized as sixteen short baseline stereo rigs. (with Ross Cutler, Larry Davis)
3. UMD distributed multi-camera surveillance facility. A network of 10 outdoor and indoor cameras that can be used for wide area surveillance, and features an innovative multi-cast client-server architecture. (with A. Chahine, A. Elgammal*, V. Krueger, R. Chellappa, L. Davis)

2.3.1 Tutorials

- Ramani Duraiswami, An Introduction to the Fast Multipole Method and the Fast Gauss Transform, Presented as a tutorial at the NIPS Workshop on Fast N-body Learning, Whistler, BC, 2004
- Nail Gumerov[†] and Ramani Duraiswami, Tutorial on Fast Multipole Methods, Fast Multipole Method, Tree-Code and Related Approximate Algorithms. Trading Exactness for Efficiency. CSCAMM Program Spring 2004 Dates: April 19-30, 2004

2.3.2 System Demonstrations

- C. Yang*, R. Duraiswami, A. Elgammal and L. Davis. On-Line Kernel-Based Tracking in Joint Feature-Spatial Spaces. Demonstration presented at IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2004
- D. Zotkin* and R. Duraiswami, Creating Localized Spatial Audio. Demonstrations presented at Boston University, ICAD Kyoto, Maryland day, and at Microsoft Research

2.4 Contracts and Grants

2.4.1 Projects at the University of Maryland

1. 12/09–12/11: Auditory Cortical Approaches for Robust Speaker Identification, \$ 1,941,535. I-ARPA. (Co-PI, Shihab Shamma PI), my share approximately \$ 450,000).
2. 02/09–01/10: Portable interactive audio scene analysis system, \$ 90,000 Maryland MIPS and Lakenheath Electronic Design (PI).
3. 05/08–04/13: Remote Multi-Modal Biometrics for Maritime Domain (ONR, MURI), \$7.5M. (Co-PI, Rama Chellappa, PI), my share approximately: \$520K.
4. 09/09–08/10: Algorithms, Scientific Computing, and Numerical Studies in Classical and Quantum General Relativity (NSF), \$100K. (Co-PI, Manuel Tigliu, PI), my share approximately \$33K.

5. 01/07–05/10: Creating Auditory Virtual Environments, \$2,100,000 DARPA. (Co-PI, Larry Davis PI), my share \$610,000.
6. 02/08 - 02/13: Center for the Study of Plasma Microturbulence, (Co-PI, Bill Dorland, PI), my share \$500,000.
7. 09/07 - 09/08: Chesapeake Bay Forecasting System, Internal Maryland effort via the President's office, Raghu Murtugudde, PI (my share \$50,000)
8. 02/08 - 01/09: Flexible and High Performance Biometric Systems, PI, Maryland Industrial Partnerships and Signal Processing, Inc., \$90,000.
9. 09/02–09/08: ITR/AITS: Customizable Auditory User Interfaces for the Visually Impaired and the Sighted, \$1,800,000, NSF award 0205271. (PI)
10. 05/05-05/08: MRI: High Performance and Visualization Cluster for Research in Coupled Computational Steering and Visualization for Large Scale Applications. NSF Major Research Instrumentation \$1.6M). (Co-PI, PI: Amitabh Varshney)
11. 01/06 – 12/06: Commercialization of UMD Fast Multipole Method Software (PI), \$50,000. Maryland Technology Development Corporation.
12. 01/06 – 11/06: Evaluation of Sound Source Localization Algorithms (PI), \$55,000. Microsoft.
13. 03/06-12/07: Development of Virtual Environments for Visually Impaired Users (PI), \$130,000, VA Atlanta.
14. 05/06-05/08 : Gifts and License Income from Offspring media, as income from intellectual property derived from [P1] \$40,000/year.
15. 09/02–09/05: ITR/SF&IT: Fast Multipole Translation Algorithms for Solution of the 3D Helmholtz Equation, \$450,000, NSF award 0219681. (Co-PI)
16. 09/00–09/05: ITR: Personalized Spatial Audio via Scientific Computing and Computer Vision, \$2,999,995 NSF award 0086075. (Co-PI)
17. 04/00–04/04 Textual Information Access for the Visually Impaired, \$700,000, NSF award 9987944. (Co-PI):
18. 04/02–04/03: Customizable Auditory Displays, \$175,000, ONR/DARPA Award N000140210571. (PI)

2.4.2 Projects at Fantalgo, LLC

1. 01/07-07/07: Fast Multipole Methods on Graphics Processors, 100,000. NASA (Co-PI, PI: Nail Gumerov)
2. 04/09-10/09: Simulating particle dynamics on Graphics Processors, \$30,000. JHU-APL.

2.4.3 Projects at Dynaflo, Inc.

1. 10/97-5/98 Development of a high-fidelity surf-zone model for USMC simulators, \$70,000, ONR (PI)
2. 8/96-8/98: Dual Reciprocity Boundary Element Based Algorithms for Efficient 2D and 3D Electrical Impedance Tomography, \$300,000, NSF. (PI)
3. 10/95-10/97: Optimal Ship Design and Simulator Development using Systems Identification Techniques, \$300,000, NSF. (PI)
4. 2/95 - 8/95: Dual Reciprocity Boundary Element Based Algorithms for Efficient 2D and 3D Electrical Impedance Tomography, \$75,000. (PI)
5. 4/94 - 10/94: Optimal Ship Design and Simulator Development using Systems Identification Techniques, \$75,000, NSF. (PI)
6. 1/94 - 1/96: Bubble Nuclei Measurement via an Inverse Acoustic Scattering Technique, \$250,000, NSF. (PI)
7. 1/93 - 7/93: A Pseudospectral Mapping Technique for the Accurate Solution of Viscous Flows in Complex Geometries, \$50,000, NASA. (PI)
8. 2/92 - 9/92: Bubble Nuclei Measurement via an Inverse Acoustic Scattering Technique, \$50,000, NSF. (PI)

2.5 Fellowships, Prizes and Awards

- University of Maryland, Invention of the Year Finalist, 2003
- University of Maryland, Invention of the Year Finalist, 2006
- University of Maryland, Invention of the Year, 2008
- University of Maryland, Top 100 Rainmakers, 2002-2007
- American Society of Mechanical Engineers' Robert Knapp award for the best paper in analytical and laboratory research in 1992-1993. (with G.L. Chahine)
- Honorable-mention prize for the best student paper at Society of Industrial and Applied Mathematics annual general meeting, San Diego, California, (1989)
- Johns Hopkins University Tuition Fellowship and graduate assistantship (1985-1990)
- Travel scholarship from Mathematical Sciences Institute, Cornell University, to attend workshop on theoretical aspects of multi-phase flows (1988)
- National Merit Scholarship awarded by the Indian Government (1979)

2.6 Editorial Boards and Reviewing Activities for Learned Publications

- 2003-2009 Associate Editor ACM Transactions on Applied Perception
- Member, Audio & Electroacoustics Technical Committee, IEEE Signal Processing Society
- Reviewer, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Speech and Audio Processing, Journal of the Acoustical Society of America, Computer Vision and Image Understanding, International Journal of Multiphase Flow, ASME Journal of Fluids Engineering, Journal of Computational Physics
- Ad-hoc reviewer for IEEE WASPAA, 2001-2007, ECCV 2002-2004, CVPR 2001-2008, Event Detection 2003-2004, ICAD 2004-2006, ICCV 2003, ICASSP 2006-2008, CVPR 2006-2008.

3 Teaching, Mentoring and Advising

3.1 Courses

Spring 2010	AMSC 460/ CMSC 460	Computational Methods
Fall 2009	AMSC 662/ CMSC 662	Computer Science for Scientific Computing
Spring 2009	CMSC 828E	Scientific Computing on Graphical Processors
Fall 2008	CMSC 460/AMSC460	Computational Methods
Spring 2008	CMSC 878R/AMSC698R/MAIT 633	Fast Multipole Methods: Fundamentals & Applications
Spring 2007	CMSC 460/AMSC 460	Computational Methods
Fall 2006	CMSC 878R/AMSC698R/MAIT 633	Fast Multipole Methods: Fundamentals & Applications
Spring 2006	CMSC 828D	Spatial Audio
Fall 2005	CMSC 460/AMSC 460	Computational Methods
Spring 2005	CMSC 426	Image Processing (Computer Vision)
Fall 2004	CMSC 878R/AMSC698R	Fast Multipole Methods: Fundamentals & Applications
Fall 2003	CMSC 878R/AMSC698R	Fast Multipole Methods: Fundamentals & Applications
Fall 2002	CMSC 878R/AMSC698R	Fast Multipole Methods: Fundamentals & Applications
Fall 2000	CMSC 828D	Fundamentals of Computer Vision

3.2 Independent Study

Semester	Course	# students	Description
Fall 2004	AMSC 799	1	Topics in Applied Mathematics and Scientific Computing
Fall 2004	CMSC 899	1	Dissertation Research
Spring 2005	CMSC 899	1	Dissertation Research
Summer I&II, 2005	AMSC 799	1	Topics in Applied Mathematics and Scientific Computing
Fall 2005	CMSC 899	1	Dissertation Research
Fall 2005	CMSC 898	1	Topics in Computational Machine Learning
Spring 2006	CMSC 799	1	Topics in Computational Perception
Fall 2006	CMSC 899	1	Dissertation Research
Spring 2007	CMSC 899	1	Dissertation Research
Fall 2008	ENEE 899	1	Dissertation Research

3.3 Course and Curriculum Development

1. CMSC 828D - Computer Vision, Fall 2000: Developed a new graduate computer vision course that employed an innovative approach that emphasized fundamentals and mathematical foundations. Course was co-developed with Larry Davis and Daniel DeMenthon. The course notes (online at <http://www.umiacs.umd.edu/users/ramani/cmsc828.html>) have been used by several others at other universities and have been cited in the literature.
2. CMSC 878R/AMSC6798R. - Fast Multipole Methods: Fundamentals & Applications, Fall 2002-2004. (with N.A. Gumerov). The first course anywhere on an important new algorithm that has tremendous potential. Several graduate students and faculty at other universities have informed me that they have used the course notes at <http://www.umiacs.umd.edu/users/ramani/cmsc878R> as a tool to learn the algorithm. Forms basis for chapters of a research monograph [B1] that has been published, and a graduate textbook that is under contract with Birkhauser. The course has since been included in to the new Masters program in Industrial Mathematics being developed by the Norbert Weiner Center for Harmonic Analysis, and was cross-listed there in Fall 2006 and Spring 2008.
3. CMSC 828D - Algorithms and Systems for Capture and Playback of Spatial Audio. (2006) - This again is a unique course emphasizing the capture and rendering of spatial audio from a computer science viewpoint. I combined elements of signal processing, applied mathematics, psychophysics, physical acoustics, human computer interaction, assistive devices, and audio technology to develop the course. There was no textbook, and I developed the lectures using a broad array of resources. I plan to develop an undergraduate course based on the same materials.
4. CMSC 828E - Scientific Computing on Graphics Processors. (2009) - This is a new course that combines elements of parallel programming, research experience on performing scientific computing on graphics processors, and hands on instruction to provide students with a background in this emerging area. There is no textbook, and I am developing the lectures using a broad array of resources.
5. CMSC662/AMSC 662 - Computer Science for Scientific Computing (2009) - Revived this course, which was a core course in the Applied Math and Scientific Computing. The course introduces computer architecture, parallel computing, and basic algorithms to non CS majors.

3.4 Advising: Research Advisor

3.4.1 High School Students

- Anirudh Agrawal, 2009. Mr. Agrawal worked on signal processing algorithms.
- Justina Abah, 2008-2009. Ms. Abah is an African American student intern via the SIRP program. She is working with graduate student Gordon Rubin and myself on developing signal processing tools to characterise vibrato in singing.
- Sherrif Jolaoso, 2007-2008. Mr. Jolaoso is an African American student intern via the SIRP program. He is working with graduate student Adam O'Donovan and myself on developing experiments to determine people's ability to perceive sound location in virtual audio. Mr. Jolaosa was recently awarded a commendation at a research fair.
- Kenrick Rilee, Summer 2007. Mr. K. Rilee worked on developing signal processing algorithms to detect rise time in audio signals.

- Alexander Rilee, Summer 2007. Mr. A. Rilee worked on developing microphone arrays using rapid prototyping techniques.
- Matthew Curtis, 2006-2007. Mr. Curtis is an African American student intern via the SIRP program. He is working with graduate student Adam O'Donovan and myself on developing a relation between anthropometry and the HRTF. He has gone on to college at Bethune-Cookman university.
- Whitney Hymes, 2005-2006. Ms. Hymes, came to me via the CMPS STAND Internship Research Program (SIRP) that pairs minority and disadvantaged students with faculty mentors. She is an African American student from the Charles Herbert Flowers school. She worked with my postdoctoral scientist (Dr. Elena Grassi) and myself in developing new experiments for spatial audio. Ms. Hymes has since gone on to college.
- Brittany Garr and Brandon Shaheed, 2003-2004. Ms. Garr and Mr. Shaheed were interns via the CMPS STAND program. They were also from the Charles H. Flowers High School, and are African American. They worked with my former graduate student (Zhiyun Li) and myself to develop computer software to assist music learning for beginners. Their work included music notation generation, rhythm classification, user interface design, and experiments. Their work was competitively selected to be present at a county-wide scientific symposium in 2004. They have both since gone on to college.

3.4.2 Undergraduate

- Yuancheng Luo, 2008-2009: Mr. Luo is a dual-degree student in mathematics and computer science. He has worked on a number of different projects related to graphics processors and scientific computing. His work has lead to two publications ([C13, C9]), two open-source software projects, and the possibility of more papers based on ongoing work.
- Jane Hwang, 2002-2003: Ms. Hwang was an electrical engineering student who did an honors project with post-doctoral scientist Dmitry Zotkin and myself. Her work lead to a publication [C68]. She has since gone on to graduate school.

3.4.3 Masters

- Balaji Vasan Srinivasan, 2008. "Gaussian Process Regression for Model Estimation."MS Electrical Engineering. (now a Ph.D. student in Computer Science).
- Yang Wang, MS Applied Mathematics, 2005. "Animation of the Fast Multipole Algorithm for Display and Optimization," Graduate Advisor. (now at the University of Michigan Law school with a full fellowship).
- Vikas Raykar, 2004, "Position Calibration of Acoustic Sensors and Actuators on Distributed General Purpose Computing Platforms, MS Electrical Engineering.
- Kexue Liu, MS., Applied Mathematics and Computer Science, 2003. Ph.D. 2004 (Now at a small R&D firm in VA).
- Ankur Mohan, M.S., Electrical Engineering, 2002. (now at Applied Media Analysis, College Park, MD) "Robust Vision Based Tracking for Virtual Auditory Spaces." (principal advisor)
- Shravya Reddy Konda, MS, CS, 2009.
- Liping Liu, MS, CS, 2009.

3.4.4 Graduated Doctoral Students

- Vasanth Philomin, Ph.D., Computer Science, 2000. “Quasi Random Sampling for Condensation.” (co-advisor, primary advisor Larry S. Davis) (now at Philips Research, Aachen, Germany)
- Dmitry Zotkin, Ph.D., Computer Science, 2002. “Audio input and display devices for audio-visual user interfaces and virtual reality.” (now a research scientist at the University of Maryland, College Park)
- Ahmed Elgammal, Ph.D., Computer Science, 2002. “Fast Gauss Transform for Kernel Density Estimation in Vision.” (Co-advisor, primary advisor Larry S. Davis) (now a member of the faculty at Rutgers University)
- Zhihui Tang, Ph.D., Applied Mathematics, 2003. “Fast transforms based on matrices with structure with applications to the Fast Multipole Method.” (now a research analyst at a Wall Street investment firm)
- Ali Zandifar, Ph.D., Electrical Engineering (2004), “Textual Information Access for the Visually Impaired.” (now a senior staff member at Epson research laboratories)
- Changjiang Yang, Ph.D., Computer Science, (2005), “Fast multipole methods for density estimation and interpolation, with applications to image processing and vision.” (now a scientist at Sarnoff Corporation)
- Zhiyun Li, (2005) Ph.D., Computer Science, “Acquisition and Rendering of Virtual Audio.” (now at Microsoft Live Labs)
- Zhenyu Zhang, (2007) “Studies of Electrostatic Plasmon Resonance,” (primary advisor: Prof. Isaak Mayergoyz) (member of his thesis committee) (now at GE).
- Vikas Raykar, (2007) “Scalable algorithms for machine learning”. (now a scientist at Siemens Corporate Research, Malvern, PA).

3.4.5 Current Students

- Adam O’Donovan, CS, “Algorithms for sound analysis with spherical microphone arrays”
- Balaji Vasani ECE, “Analysis of Climate Data via Statistical Machine Learning Techniques”
- Hu Qi, CS, “Scientific Computing on Graphics Processors.”
- Yuancheng Luo, CS, Real Time Scientific Computing.

3.4.6 Postdoctoral

- Elena Grassi, 2003-2005
- Dmitry N. Zotkin, 2003-2005
- Jounghoon Beh, 2009-2011

3.5 Advising: Ph.D. Committees (other than advisees)

- Thanarat Horprasert Chalidabhongse, Computer Science, PhD 2002
- Vasanth Philomin, Computer Science, 2002
- Kexue Liu, Applied Mathematics, 2004
- Kyong-il Yoon, Computer Science, 2004
- Bo Hyung Han, Computer Science, 2005
- Sandeep Gupta, Doctorate, ENAE, 2005
- Gustavo Rohde, Applied Mathematics, 2005
- Philip David, Computer Science, 2006
- Haixia Zhao, Computer Science, 2006
- Ser-Nam Lim, Computer Science, 2006
- Nargess Memarsadeghi, Computer Science, 2007
- Edward Zhijian Pan, Computer Science, 2007
- Sankalita Saha, Electrical and Computer Engineering, 2007
- M. Shivnaga Vittaldevuni Prasad, Computer Science, 2007
- Vinay Shet, Computer Science, 2007
- Dongming Wei, Applied Mathematics, 2007
- Haw-ren Fang, Computer Science, 2008
- Son-Tran Dinh, Computer Science, 2008
- Scott McMaster, Computer Science, 2008
- Sameer Sheorey, Computer Science, 2008
- Yik-Loon Kee, Aerospace Engineering, 2008
- Ingmar B. Broemstrup, Physics, 2008
- Michael Barnes, Physics, 2008
- Hazem El-Alfy, Computer Science, 2009
- Mohamed Hussein, Computer Science, 2009
- Il-Chul Yoon, Computer Science, Current
- Mudit Agrawal, Computer Science, Current
- Vinod K. Lakshminarayana, Aerospace Engineering, current

- Arunkumar Mohananchettiar, Electrical Engineering, current
- Moble Benedict, Aerospace Engineering, current
- Brandon Bush, Aerospace Engineering, current
- Ryan Harvey, AMSC, current
- Benjamin Silbaugh, Aerospace Engineering, current
- Asitav Mishra, Aerospace Engineering, current
- Vlad Morariu, Computer Science, current

3.6 Advising: Master's Committees (other than advisees)

- Karthikeyan Duraisamy, Applied Mathematics and Scientific Computing, 2004
- Umut Akdemir, Electrical Engineering, 2005
- Gary Gang Zi, Electrical Engineering, 2005
- Eric Greenwood, Aerospace Engineering, 2008

3.7 Advising: AMSC Academic Advising

- Steve Penny, 2005
- Scott Seiler, 2005
- Kathleen Chapman, 2005
- Yang Wang, 2004

3.8 Advising: AMSC 663-664 Project Course

- Fei Xue, AMSC, 2005-2006
- Marina Kirn, Physics, 2006-2007

3.9 Senior Visitors Hosted

- Prof. Pascal Fua, EPFL. Summer 2001.
- Prof. Bayya Yegnanarayana, Department of Computer Science, Indian Institute of Technology, Madras, India. Summer 2001; Summer 2002 and Summer 2004
- Prof. Fadoulourahmane Seydou, Department of Electrical Engineering, University of Oulu, Oulu, Finland, 2002-2003; Summer 2004.

3.10 Senior Group Members Supported

- Dr. Nail A. Gumerov, Associate Research Scientist, UMIACS, 2000 - present.
- Dr. Dmitry N. Zotkin, Assistant Research Scientist, UMIACS, 2005-present.

4 Service

4.1 Professional

4.1.1 Offices in Professional Organizations

- Member of the Technical Committee on Audio and Electro Acoustics, IEEE Signal Processing Society, 2004-present
- Vice President, University of Maryland Chapter, Signal Processing Society, IEEE

4.1.2 Reviewing activities for agencies

- Proposal reviewer, National Science Foundation, 1998-2008.
- National Academy of Sciences
- National Institutes for Health

4.1.3 Other non-University Panels and Positions

- Co-chairing a DARPA ISAT study on “Machine Listening: Learning the Sense of a Firefight”, 2007-2008.
- Member of a DARPA panel of eleven selected young computer science faculty to suggest future directions for computer science research to DARPA, April-June, 2006. The panel was organized by the Potomac Institute for Policy Studies to advise DARPA director Dr. Tony Tether on approaches to address the crisis caused by declining enrollment of young US students in computer science graduate students.
- Exhibitions Chair, IEEE Image Processing, 2008, San Diego, MD
- Local Arrangements and Industrial Liaison Chair, IEEE Visualization, 2006, Baltimore, MD
- Co-Organizer and Program Chair of 3rd International Conference on Mobile and Ubiquitous Multimedia, October 2004, College Park, MD
- Local Organizing committee and Finance Chair, IEEE CVPR, May 2004, Washington, DC
- Lead Organizer of a workshop on “Fast Multipole Methods and Related Approximate Algorithms” at the CSCAMM, UMD, April 2004
- Lead organizer for Workshop on Auditory Displays for the Blind, held in association with International Conference on Auditory Displays, Boston, 2003
- Program Committee Symposium on Applied Perception in Graphics and Visualization, Boston, 2006
- Program Committee for IEEE WASPAA 2003, 2005, 2007
- Program Committee for Event Detection in Video 2003, 2004
- Submissions Chair for International Conference on Face and Gesture, 2002

4.1.4 Consulting/Entrepreneurial Activities

- Co-founder, Fantalgo, LLC, Elkridge, MD, 2006-present. Software for scientific computing.
- Co-founder, Acting CEO, VisiSonics Corporation, Highland, MD, 2009-present. Systems for Audio-Visual Scene Analysis.
- Consultant, Applied Media Analysis, LLC, College Park, MD, 2003-present. Perception based technologies for mobile e-commerce
- Consultant, Skycomp Inc., Columbia, MD, 2006-2007. Photogrammetry for traffic monitoring
- ACD Simulators, Partner, 1998. A software company that provided simulation solutions to the marine industry (partnership now disbanded)
- Internet Cargo Services, System Design Principal, 1998. A now defunct venture-funded dot-com that designed high-volume e-commerce solutions

4.2 Campus

4.2.1 Departmental Service

- Educational committee, 2004 - present
- Teaching evaluation committee, 2004 - present
- Graduate admissions committee, 2006 - present
- Friday faculty lunch, 2008.

4.2.2 UMIACS

- UMIACS Education Committee Member, 2002–2004
- UMIACS Infrastructure Committee Member, 2002–2004
- UMIACS Industrial Interactions Committee Member, 2003-2004
- Organizer/co-organizer of the weekly CFAR seminar since 1999

4.2.3 CMPS

- Have presented various demonstrations of research in my laboratory to college visitors, donors, and other important guests at the request of Dean Halperin, CMPS, 2004-present.
- On a committee appointed by the dean to write a proposal to Google on climate and associated data and forecast serving on the internet.

