

## Curriculum Vitae of Juan R. Cebal

### CONTACT INFORMATION

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### EDUCATION

**Ph.D.** Computational Sciences and Informatics, July 1996, Institute for Computational Sciences and Informatics, George Mason University, Fairfax, Virginia  
Dissertation Topic: Loose Coupling Algorithms for Fluid-Structure Interaction  
Thesis Advisor: Prof. Rainald Löhner

**M.Sc.** Physics, June 1991, Department of Physics, Faculty of Exact and Natural Sciences, University of Buenos Aires, Buenos Aires, Argentina  
Dissertation Topic: Cosmological Effects of Vector Quantum Fields  
MS Thesis Advisor: Prof. Luis Chimento

### WORK EXPERIENCE

Associate Professor, 2005-Present, Computational and Data Sciences Department, College of Sciences, George Mason University, Fairfax, Virginia

Research Physicist, 2001-Present (Affiliate Position), Institute of Research and Education, Inova Fairfax Hospital, Falls Church, Virginia.

Assistant Professor, 2002-2005, Fluids and Materials Program, School of Computational Sciences, George Mason University, Fairfax, Virginia.

Research Associate Professor, 2000-2002, School of Computational Sciences, George Mason University

Assistant Research Scientist, 1996-2000, Institute for Computational Sciences and Informatics, George Mason University

Graduate Research Assistant, 1992-1996, Institute for Computational Sciences and Informatics, George Mason University

Instructor, 1990-1992, Department of Physics, University of Buenos Aires, Argentina

### RESEARCH ACTIVITIES

Dr. Cebal has been involved in the development and application of advanced image-based computational modeling tools for the study of cerebrovascular diseases. In particular, he has constructed numerous patient-specific models of cerebral aneurysms and atherosclerotic carotid arteries in order to study the pathogenesis, the progression and ultimate outcome of these diseases. In addition, he has studied the blood flow in the cerebral arteries in normal subjects in order to better understand the role of collateral pathways provided by the circle of Willis and the baseline values of hemodynamic variables. He has also constructed patient-specific models of blood flows after endovascular treatment with coils and stents in order to understand the effects caused by these devices and ultimately improve their design and select the best therapeutic option for each individual. This highly multi-disciplinary research has been conducted in close collaboration with clinicians from the Neuroradiology Unit at Inova Fairfax Hospital. Dr. Cebal

also collaborates with a number of other researchers from various institutions, including the Naval Research Laboratory, NASA Goddard Space Flight Center, the Robert Wood Johnson Medical School (New Jersey), and the Pompeu Fabra University (Barcelona, Spain).

## GRANTS

1. Principal Investigator, 2008-2010  
*Reconstruction and Mapping of Human Brain Vasculature*  
Collaborations with National Centers of Biomedical Computing  
National Institutes of Health (NIH) - **pending**
2. Principal Investigator, 2007-2012  
*Computational Analysis of Cerebral Aneurysm Evolution*  
Innovations in Biomedical Computational Sciences  
National Institutes of Health (NIH)
4. Principal Investigator, 2007-2009  
*Computational Hemodynamics Modeling of Endovascular Treatment of Cerebral Aneurysms*  
Boston Scientific
3. Principal Investigator, 2006-2008  
*Study of the Interaction between Wall Shear Stress and Aneurysm Wall Compliance*  
American Heart Association – Grant in Aid
4. Principal Investigator, 2004-2009  
*Patient-Specific Computational Modeling of Cerebral Aneurysms.*  
Philips Medical Systems
5. Principal Investigator, 2002-2005  
*Quantitative Assessment of Endovascular Carotid Angioplasty and Stenting*  
Bioengineering Research Grant RG-01-0085, The Whitaker Foundation
6. Associate Faculty, 2001-2004  
*Development of a Coupled CFD/CSD Methodology Incorporating Both Adaptive Finite Elements and Discrete Particle Methods*  
Science Applications International Corporation (SAIC) / U.S. Army, PI: Rainald Löhner
7. Associate Faculty, 2000-2005  
*High Performance Computing on Massively Parallel Architectures*  
Berkeley Research Associates / Naval Research Laboratory, PI: Rainald Löhner
8. Associate Faculty, 1999-2000  
*Enhancement of Fluid Dynamics Simulation Codes*  
Berkeley Research Associates / Naval Research Laboratory, PI: Rainald Löhner

## European Projects

1. External Collaborator, 2006-2010  
*@neulST: Integrated Biomedical Informatics for the Management of Cerebral Aneurysms*, European Commission Contract IST-2004-027703  
Prime PI: Alejandro Frangi, Pompeu Fabra University, Barcelona, Spain
2. External Collaborator, 2005-2007  
*DISHEART: Grid Based Decision Support System For Assisting Clinical Diagnosis And Interventions In Cardiovascular Problems*, EC CRAFT IST-513226  
Prime PI: Eugenio Oñate, Polytechnic University of Catalunya, Barcelona, Spain
3. Associate Researcher, 2004  
*ANFLOW: Pilot Study On The Role Of Hemodynamics in Cerebral Aneurysms Based on Personalized Computational Fluid Dynamics and 3D Rotational Angiography*, MAPFRE Medicine Foundation, Spain

Prime PI: Alejandro Frangi, University of Zaragoza, Spain

## AWARDS

Best Poster Award of the 2008 Joint Mathematics Meeting of the American Mathematical Society and the Mathematical Association of America, San Diego, CA Jan 5-8, 2008 (Undergraduate Research Poster Competition). Poster title: "Hemodynamics analysis of a cerebral aneurysm prior to its rupture" by S Hendrickson, CM Putman and JR **Cebal**.

Certification of Achievement for participation in the First Virtual Intracranial Stent Challenge held at the 4<sup>th</sup> International Intracranial Stent Meeting, Kyoto, Japan, April 18-20, 2007.

Cum Laude Poster Award in the Physiology and Function session of the SPIE Medical Imaging Conference, San Diego, CA, Feb 2007. Poster title: "Hemodynamic Patterns of Anterior Communicating Artery Aneurysms: A Possible Association with Rupture" by MA Castro, CM Putman and JR **Cebal**.

Best Paper of the Eastern Neuroradiology Society, Boston, MA, August 20-22, 2004.

The Norma E. Leeds Award for best scientific paper includes \$500 honorarium and invitation to present the paper at the American Society of Neuroradiology (ASNR) Annual Meeting, 2005. Paper title: "Characterization Of Cerebral Aneurysms For Assessing The Risk Of Rupture Using Patient-Specific Computational Hemodynamics Models" by JR **Cebal**, MA Castro, JE Burgess, R Pergolizzi and CM Putman.

Cum Laude Poster Award in the Physiology and Function session of the SPIE Medical Imaging Conference, San Diego, CA, Feb 16, 2004. Poster title: "Multimodality Image-Based Models Of Carotid Artery Hemodynamics" by JR **Cebal**, CM Putman, R Pergolizzi, JE Burgess and PJ Yim.

## PUBLICATIONS

### Journal Papers

1. **Cebal** JR, Putman CM, Alley M, Hope T, Bammer R, Calamante F, "Hemodynamics in Normal Cerebral arteries: qualitative comparison of 4D phase-contrast magnetic resonance and image-based computational fluid dynamics", *J. Eng. Math, Special Issue on Mathematical Modeling in Health and Medicine*, 2008 – in review
2. **Cebal** JR, Castro MA, Putman CM, Alperin N, "Flow-area relationship in internal carotid and vertebral arteries", *Physiol. Meas.* 29: 585-594, 2008.
3. Appanaboyina S, Mut F, Löhner R, Putman CM, **Cebal** JR, "Computational Fluid Dynamics of Stented Intracranial Aneurysms using Adaptive Embedded Unstructured Grids", *Int. J. Num. Methods Fluids*, (DOI: 10.1002/fld.1590), 2007.
4. Löhner R, Appanaboyina S, **Cebal** JR, "Parabolic Recovery of Boundary Gradients", *Comm Num Meth Eng*, (DOI: 10.1002/cnm.1054), 2007.
5. Löhner R, Appanaboyina S, **Cebal** JR, "Comparison of Body-Fitted, Embedded and Immersed Solutions of Low Reynolds-Number 3-D Incompressible Flows", *Int J Num Methods Fluids*, (DOI: 10.1002/fld.1604), 2007.
6. **Cebal** JR, Pergolizzi R, Putman CM, "Computational Fluid Dynamics Modeling of Intracranial Aneurysms: Qualitative Comparison with Conventional Angiography", *Acad Radiol*, 14(7): 804-813, 2007.
7. Löhner R, **Cebal** JR, Camelli F, Appanaboyina S, Baum J, Mestreau E, Soto O, "Addaptive Embedded and Immersed Unstructured Grid Techniques", *Arch Comput Methods Eng*, 14:279-301, 2007.
8. Millan D, Dempere-Marco L, Pozo JM, **Cebal** JR, Frangi A, "Morphological Characterization of Intracranial Aneurysms by Using 3D Moment Invariants", *IEEE Trans Med Imaging*, 26(9): 1270-1282, 2007.

9. Wood BJ, Locklin JK, Viswanathan A, Kruecker J, Haemerich D, **Cebal** JR, Sofer A, Cheng R, McCreedy E, Cleary K, McAuliffe M, Glossop N, Yanoff J, "Technologies for Guidance of Radiofrequency Ablation in the Multimodality Interventional Suite of the Future", *J Vasc Interv Radiol* 18: 9-24, 2007.
10. Castro MA, Putman CM, **Cebal** JR, "Patient-Specific Computational Fluid Dynamics Modeling of Anterior Communicating Artery Aneurysms: A Study of the Sensitivity of Intra-Aneurysmal Flow Patterns to Flow Conditions in the Carotid Arteries", *AJNR* , 27: 2061-2068, 2006.
11. Castro, M.A., C.M. Putman, and J.R. **Cebal**, "Computational fluid dynamics modeling of intracranial aneurysms: effects of parent artery segmentation on intra-aneurysmal hemodynamics". *AJNR*, 27: 1703-1709, 2006.
12. Castro MA, Putman CM, **Cebal** JR, "Patient-Specific Computational Modeling of Cerebral Aneurysms with Multiple Avenues of Flow from 3D Rotational Angiography Images", *Academic Radiology*, 13(7): 811-821, 2006.
13. Löhner R, Yang C, **Cebal** JR, Camelli F, Soto O, Waltz J, "Improving the Speed and Accuracy of Projection-Type Incompressible Flow Solvers", *Comp Meth Appl Mech Eng*, 195(23-24): 3087-3109, 2006.
14. **Cebal** JR, Castro MA, Burgess JE, Pergolizzi R, Putman CM, "Characterization of Cerebral Aneurysm for Assessing Risk of Rupture Using Patient-Specific Computational Hemodynamics Models" *AJNR*, 26: 2550-2559, 2005.
15. **Cebal** JR, Castro MA, Appanaboyina S, Putman CM, Millan D, Frangi A, "Efficient Pipeline for Image-Based Patient-Specific Analysis of Cerebral Aneurysm Hemodynamics: Technique and Sensitivity", *IEEE TMI* 24(4): 457-467, special issue on vascular imaging, April 2005.
16. **Cebal** JR, Löhner R, "Efficient Simulation of Blood Flow Past Complex Endovascular Devices Using an Adaptive Embedding Technique", *IEEE TMI* 24(4): 468-476, special issue on vascular imaging, April 2005.
17. Yim PJ, **Cebal** JR, Weaver A, Lutz R, Boudewijn G, Vasbinder C, Ho VB Choyke PL, "Estimation of Pressure Gradients at Renal Artery Stenoses", *MRM*, 51: 969-977, 2004.
18. **Cebal** JR, Summers R, "Tracheal and Central Bronchial Aerodynamics Using Virtual Bronchoscopy and Computational Fluid Dynamics", *IEEE Trans. Medical Imaging*, 23(8): 1021-1033, 2004.
19. Löhner R, **Cebal** JR, Yang C, Baum JD, Mestreau EL, Charman C, Pelessone D, "Large-scale fluid-structure interaction simulations", *Computing in Science and Engineering*, 6(3): 27-37, 2004.
20. Soto O, Löhner R, **Cebal** JR, Camelli F, "A stabilized edge-based implicit incompressible flow formulation", *Comp. Methods Appl. Mech. Eng.*, 193: 2139-2154, 2004.
21. **Cebal** JR, Castro MA, Soto O, Löhner R, Alperin N, "Blood Flow Models of the Circle of Willis from Magnetic Resonance Data", *Journal of Engineering Math*, 47(3-4): 369-386, 2003.
22. Löhner R, **Cebal** JR, Soto O, Yim PJ, Burgess JE, "Applications of Patient-Specific CFD in Medicine and Life Sciences", *Int. J. Numer. Meth. Fluids*, 43: 637-650, 2003.
23. Calamante F, Yim PJ, **Cebal** JR, "Estimation of Bolus Dispersion Effects in Perfusion MRI Using Image-Based Computational Fluid Dynamics", *NeuroImage*, 19: 342-353, 2003.
24. **Cebal** JR, Yim PJ, Löhner R, Soto O, Choyke PL, "Blood Flow Modeling in Carotid Arteries Using Computational Fluid Dynamics and Magnetic Resonance Imaging", *Academic Radiology*, 9: 1286-1299, 2002.
25. **Cebal** JR, Camelli FE and Löhner R, "A Feature Preserving Volumetric Technique to Merge Surface Triangulations", *Int. J. Num. Methods Eng.*, 55:177-190, 2001.
26. **Cebal** JR, "Accurate Segmentation of Vessels from MRA Images", Special Issue of *International Journal of Bioelectromagnetism*, Vol.3, No. 2, 2001.

27. **Cebal** JR, "Flow Predictions During Neuro-Surgery and Carotid Stenting", Special Issue of *International Journal of Bioelectromagnetism*, Vol.3, No. 2, 2001.
28. Yim PJ, **Cebal** JR, Mullick R and Choyke PJ, "Vessel Surface Reconstruction with a Tubular Deformable Model", *IEEE Trans. Medical Imaging*, 20(12), 1411-1421, 2001.
29. **Cebal** JR, Löhner R, Choyke PL and Yim PJ, "Merging of intersecting Triangulations for Finite Element Modeling", *J. Biomech.*, 34, 815-819, 2001.
30. **Cebal** JR and Löhner R, "From Medical Images to Anatomically Accurate Finite Element Grids", *Int. J. Num. Methods Eng.*, 51, 985-1008, 2001.
31. Yim PJ, **Cebal** JR, Zhang Y, Lutz R, Choyke, PL "Evaluation of Magnetic Resonance Angiography for Measuring Arterial Wall Shear Stress", *Annals Biomed. Eng.*, vol. 28, supplement 1, p. S-59, 2000.
32. Löhner, R. and **Cebal**, J.R., "Generation of Non-Isotropic Unstructured Grids via Directional Enrichment", *Int. J. Num. Meth. Engng.*, 49, 219-232, 2000.
33. **Cebal**, J.R. and Löhner, R., "Conservative Load Projection and Tracking for Fluid-Structure Problems", *AIAA Journal*, Vol. 35, No. 4, pp.687-692, 1997.

### Book Chapters

1. **Cebal** JR, Sforza D, Putman CM, "Cerebral Hemodynamics", *Ann. Review of Fluid Mechanics*, vol. 41, 2008 – in press.
2. Radaelli A, Bogunovic H, Villa-Uriol MC, **Cebal** JR, Frangi A, "Image-based hemodynamic simulation in intracranial aneurysms", in *Biomedical Imaging: Modalities, Methodologies and Applications*, 2008, in press.
3. **Cebal** JR, Putman CM, "Relating Cerebral Aneurysm Hemodynamics and Clinical Events", in *Vascular Hemodynamics: Bioengineering and Clinical Perspectives*. P. Yim (ed.), John Wiley & Sons, Chapter 3, ISBN-13: 9780470089477, 2008.
4. **Cebal** JR, Löhner R, Appanaboyina S, Putman CM, "Image-Based Computational Hemodynamics Methods and Their Application for the Analysis of Blood Flow Past Endovascular Devices", in *Biomechanical Systems Technology: (1) Computational Methods*, Cornelius T. Leondes (ed.), Chapter 2, Vol. 1, pp. 29-85, World Scientific, 2007.
5. Yim PJ, DeMarco KJ, Castro MA, **Cebal** JR, "Characterization of shear stress on the wall of carotid artery using magnetic resonance imaging and computational fluid dynamics", *Studies in Health Technology and Informatics, Volume 113 – Plaque Imaging: Pixel to Molecular Level*, J. Suri (ed.), pp. 412-442, 2005.
6. R. Löhner, C. Yang, J. **Cebal**, O. Soto and F. Camelli, "On Incompressible Flow Solvers", pp.50-71 in *Numerical Simulations of Incompressible Flows* (M.M. Hafez ed.), World Scientific, 2003.
7. R. Löhner, C. Yang, J. **Cebal**, J.D. Baum, E. Mestreau, H. Luo, D. Pelessone and C. Charman, "Fluid-Structure-Thermal Interaction Using Adaptive Unstructured Grids", in *Computational Methods for Fluid-Structure Interaction* (T. Kvamsdal et al. eds.), Tapir Press, pp.109-120, 1999.
8. **Cebal**, J.R., and Löhner, R., "Distributed Visualization in Computational Fluid Dynamics", *In Computational Fluid Dynamics Review 1998*, ed. M. Hafez and K. Oshima, Vol. II, pp. 1097-1112, World Scientific, 1998.
9. Löhner, R. and **Cebal**, J.R., "Desarrollos Recientes en Generacion de Mallas No Estructuradas", *In Metodos Numericos en Ingenieria*, ed. M. Doblare, J.M. Correas, E. Alarcon, L. Gavete and M. Pastor, vol. 1, 57-82, Barcelona, Spain, 1996.
10. Löhner, R. Yang, C., **Cebal**, J.R., Baum, J.R., Luo, J.D., Pelessone, D. and Charman, C., "Fluid-Structure Interaction Using a Loose Coupling Algorithm and Adaptive Unstructured Meshes", *In Copmutational Fluid Dynamics Review 1995*, ed. M. Hafez and K. Oshima, John Wiley, 1995.

### Invited Conference Papers

1. **Cebal** JR, Putman CM, "TBD", *Semana de Intervencionismo Minimamente Invasivo (SIMI)*, Buenos Aires, Argentina, May 20-24, 2008.
2. **Cebal** JR, Putman CM, "TBD", *Proc. 5th International Intracranial Stent Meeting*, Ankara, Turkey, May 5-9, 2008.
3. Putman CM, **Cebal** JR, "TBD", *Proc. ASNR 46th Annual Meeting*, New Orleans, Louisiana, May 31-June 5, 2008.
4. **Cebal** JR, Löhner R, Putman CM, "Relating Cerebral Aneurysm Hemodynamics and Clinical Events", *5th International Bio-Fluid Symposium and Workshop*, Caltech, Pasadena, California, March 27-30, 2008.
5. Löhner R, **Cebal** JR, "Computational Fluid Dynamics: State of the Art and Best Practices", *FDA-NSF-NIH symposium*, Bethesda, Maryland, March 18-19, 2008.
6. **Cebal** JR, Frangi A, Valentino D, Putman CM, "Patient-Specific Modeling of Intracranial Aneurysm Hemodynamics: Methods, Sensitivity and Clinical Applications", *Mini-symposium on Computational Biomechanics, 7th World Congress in Computational Mechanics*, Los Angeles, California, July 14-22, 2006 (keynote talk)
7. **Cebal** JR, Castro MA, Löhner R, Burgess JE, Pergolizzi R, Putman CM, "Recent Advancements in Patient-Specific Image-Based Modeling of Hemodynamics", *ENIEF 2004*, Nov. 7-11, Bariloche, Argentina. (Keynote Lecture).
8. **Cebal** JR, Castro M, Löhner R, Soto O, Yim PJ, Alperin N, "Realistic Cerebral Circulation Models from Medical Image Data", *Proc. ASME-BED Summer Bioengineering Meeting*, Key Biscayne, Florida, June 25-29, 2003.
9. **Cebal** JR, "Challenges in Realistic Modeling of Hemodynamics from Medical Images", *Proc. SIAM Conference on Computational Sciences and Engineering*, San Diego, California, Feb. 10-13, 2003.
10. **Cebal** JR, R Löhner, Choyke PL, Yim PJ, "Parallel Patient-Specific Computational Hemodynamics", *Proc. 6th International Conference PARA2002, Espoo, Finland, Lecture Notes in Comp. Science*, 2367:18-34, 2002 (Keynote Lecture)
11. **Cebal** JR, "Realistic Modeling of Arterial Hemodynamics from Anatomic and Physiologic Image Data", *Proc. 14th U.S. National Congress in Theoretical and Applied Mechanics*, Blacksburg, Virginia, June 23-28, 2002 (Keynote Lecture).
12. **Cebal** JR, "Accurate Segmentation of Vessels from MRA Images", *Proc. Cardiovascular Hemodynamics: From Modeling to Clinical Applications, Joint 8th Ragnar Granit Symposium and 1st CSC Scientific Meeting*, Helsinki, Finland, September, 2001. Special Issue of *International Journal of Bioelectromagnetism*, Vol.3 No. 2, 2001.
13. **Cebal** JR, "Flow Predictions During Neuro-Surgery and Carotid Stenting", *Proc. Cardiovascular Hemodynamics: From Modeling to Clinical Applications, Joint 8th Ragnar Granit Symposium and 1st CSC Scientific Meeting*, Helsinki, Finland, September, 2001. Special Issue of *International Journal of Bioelectromagnetism*, Vol.3 No. 2, 2001.
14. **Cebal** JR, Löhner R, Soto O and Yim PJ, "On the Modeling of Carotid Artery Blood Flow From Magnetic Resonance Images", *Proc. ASME-BED Bioengineering Conference*, vol. 50, June 27-July 1, 2001.
15. **Cebal** JR, "Image-Based Modeling of Arterial Hemodynamics", *Workshop on Hemodynamics of Vascular Flows*, Argonne National Laboratory, Argonne, Illinois March 21-23, 2001.
16. **Cebal** JR, Löhner R, Montmayeur and Zhu M, "Advances in Computational Hemodynamics", *Proc. PUCA, Session Computational Biomechanics*, 281-303, Tokyo, November 2000.

17. **Cebal**, J.R., Löhner, R., and Burgess, J. "Computer Simulation of Cerebral Artery Clipping: Relevance to Aneurysm Neuro-Surgery Planning", *Proc. ECCOMAS*, Sep. 11-14, Barcelona-Spain, 2000.
18. **Cebal** J.R. and R. Löhner, "Image-Based Computational Hemodynamics", *Proc. World Congress in Medical Physics and Biomedical Engineering*, Chicago, Illinois, July 23-28, 2000.

### AIAA Papers

1. Camelli F, **Cebal** JR, Löhner R, "Timings of an Unstructured-Grid CFD Code on Common Hardware Platforms and Compilers", AIAA-2008-0477, *46<sup>th</sup> Aerospace Sciences Meeting and Exhibit*, Reno Nevada, January 7-10, 2008.
2. Löhner R, Appanaboyina S, **Cebal** JR, "Comparison of Body-Fitted, Embedded and Immersed Solutions of Low Reynolds-Number 3-D Incompressible Flows", *45<sup>th</sup> Aerospace Sciences Meeting and Exhibit*, Paper No. 1296, Reno, Nevada, January 2007.
3. **Cebal** JR, Löhner R, "On the Loose Coupling of Implicit Time-Marching Codes", AIAA-05-1093, 2005.
4. **Cebal** JR, Camelli FE and Löhner R, "Unstructured Grid Generation Over Buildings Intersecting Terrain Data Using A Feature-Preserving Volumetric Technique", AIAA-2002-0860, 2002.
5. Soto O, R. Löhner R and **Cebal** JR, "An Implicit Monolithic Time Accurate Finite Element Scheme for Incompressible Flow Problems", *15th AIAA Computational Fluid Dynamics Conference*, Anaheim, California, June 11-14, AIAA 2001-2616, 2001.
6. **Cebal** JR and Löhner R, "Flow Visualization On Unstructured Grids Using Geometrical Cuts, Vortex Detection and Shock Surfaces", AIAA-01-0915, 2001.
7. Löhner R, Yang C, Cebal JR, Soto O, Camelli C, Baum JD, Luo H, Mestreau E and Sharov D, "Advances in FEFLO", AIAA-01-0592, 2001.
8. **Cebal**, J.R., and Löhner, R., "Advances in Visualization: Distribution and Collaboration", AIAA-99-0693, January 1999.
9. **Cebal**, J.R., and Löhner, R., "Interactive On-Line Visualization and Collaboration for Parallel Unstructured Multidisciplinary Applications", AIAA-98-0077, January 1998.
10. Löhner, R., Yang, C., **Cebal**, J.R., Pelessone, D. and Charman, C., "Fluid-Structure-Thermal Interaction Using A Loose Coupling Algorithm and Adaptive Unstructured Grids", AIAA-98-2419, 1998 **[Invited]**.
11. **Cebal**, J.R. and Löhner, R., "Fluid-Structure Coupling: Extensions and Improvements", AIAA-97-0858, January 1997.
12. **Cebal**, J.R. and Löhner, R., "Conservative Load Projection and Tracking for Fluid-Structure Problems", AIAA-96-0797, January 1996.

### Conference Papers

1. Sforza D, Putman CM, Oubel E, DeCraene M, Frangi A, **Cebal** JR, "Characterization of cerebral aneurysm wall motion from dynamic angiography", *Proc. ASNR 46th Annual Meeting*, New Orleans, Louisiana, May 31-June 5, 2008.
2. Sforza D, Putman CM, Oubel E, DeCraene M, Frangi A, **Cebal** JR, "Cerebral aneurysm hemodynamics and local wall injury: computational modeling and clinical observations", *5<sup>th</sup> International Bio-Fluid Symposium and Workshop*, Caltech, Pasadena, California, March 27-30, 2008.
3. Castro MA, Putman CM, Radaelli A, Frangi A, **Cebal** JR, "Image-based investigation of hemodynamics and rupture of cerebral aneurysms of a single morphological type: terminal aneurysms", *Proc. SPIE Medical Imaging*, San Diego, CA, Feb. 2008.
4. Hendrickson S, Putman CM, **Cebal** JR, "Hemodynamic Analysis of a Cerebral Aneurysm

- Prior to its Rupture”, *Joint Mathematics Meeting*, San Diego, CA Jan 6-9, 2008.
5. Wright SN, Brown KM, **Cebal JR**, Kochunov P, Mazziota JC, Senft SL, Toga AW, Ascoli GA, “Digital reconstruction and morphometric analysis of human brain vasculature from magnetic resonance angiography”, *Society of Neurosciences Annual Meeting*, San Diego, CA, Nov. 3-7, 2007.
  6. **Cebal JR**, Lohner R, Putman C, “The role of hemodynamics in cerebral aneurysms”, *World Congress on Computational Mechanics*, San Francisco, CA, July 22-26, 2007.
  7. **Cebal JR**, Castro M, Putman C, “Hemodynamics and the natural history of cerebral aneurysms”, *ASME Summer Bioengineering Meeting*, Keystone, Colorado, June 20-24, 2007.
  8. Appanaboyina S, Mut F, Lohner R, Putman C, Cebal JR, “Techniques for computational stenting of intracranial aneurysms”, *ASME Summer Bioengineering Meeting*, Keystone, Colorado, June 20-24, 2007.
  9. **Cebal JR**, Putman C, “Hemodynamics in the evolution and rupture of brain aneurysms”, 4<sup>th</sup> Intracranial Stent Meeting, Kyoto, Japan, April 18-20, 2007.
  10. **Cebal JR**, Lohner R, Appanaboyina S, Putman C, “Personalized computational modeling of stented cerebral aneurysms”, 4<sup>th</sup> Intracranial Stent Meeting, Kyoto, Japan, April 18-20, 2007.
  11. Castro, M.A., C.M. Putman, and J.R. **Cebal**. “Hemodynamic patterns of anterior communicating tery aneurysms: a possible association with rupture”, *SPIE Medical Imaging*, 6511-84, San Diego, Ca, Feb 2007.
  12. **Cebal JC**, Radaelli A, Frangi A, Putman CM, “Qualitative Comparison of Intra-aneurysmal Flow Structures Determined from Conventional and Virtual Angiograms”, *SPIE Medical Imaging*, 6511-49, San Diego, Ca, Feb 2007.
  13. **Cebal JC**, Radaelli A, Frangi A, Putman CM, “Hemodynamics before and after Bleb Formation in Cerebral Aneurysms”, *SPIE Medical Imaging*, 6511-85, San Diego, CA, Feb 2007.
  14. Appanaboyina S, Mut F, Löhner R, Putman CM, **Cebal JR**, “Patient-Specific Modeling of Intracranial Aneurysm Stenting”, *SPIE Medical Imaging*, 6511-86, San Diego, Ca, Feb 2007.
  15. Radaelli A, **Cebal JR**, Sola-Martinez T, Viva-Dias E, Mellado X, Guimaraens L, Frangi A, “Combined clinical and computational information in complex cerebral aneurysms: application to mirror cerebral aneurysms”, *SPIE Medical Imaging*, San Diego, Ca, Feb 2007.
  16. Oubel E, DeCraene M, Putman CM, Cebal JR, Frangi A, “Analysis of Intracranial Aneurysm Wall Motion and its Effects on Hemodynamic Patterns”, *SPIE Medical Imaging*, San Diego, Ca, Feb 2007
  17. Dempere-Marcos L, Oubel E, Castro MA, Putman CM, Frangi A, **Cebal JR**, “CFD Analysis Incorporating the Influence of Wall Motion: Application to Intracranial Aneurysms”, *Medical Image Computing and Computer Assisted Interventions (MICCAI)*, Copenhagen, Denmark, October 1-6, 2006.
  18. Löhner R, **Cebal JR**, Appanaboyina S, Baum JD, Mestreau EL, Soto O, “Embedded and Immersed Methods for Adaptive Unstructured Grid Solvers”, *Proc. ENIEF’ 06*, Santa Fe, Argentina, November 2006.
  19. **Cebal JR**, Castro MA, Putman CM, “A Study of the Hemodynamics of Anterior Communicating Artery Aneurysms”, *Proc. SPIE Medical Imaging*, 6143:166-175, 2006.
  20. Castro MA, Putman CM, **Cebal JR**, “Effects of Parent Vessel Geometry on Intraaneurysmal Flow Patterns”, *Proc. SPIE Medical Imaging*, 6143: 123-131, 2006.
  21. Cebal JR and Calamante F, “MRI-Based Modeling of Vascular Territories and Collateral Circulation of the Brain”, *Proc. Intl. Soc. Mag. Reson. Med.*, 13: 528, 2005.
  22. Löhner R, J.R. **Cebal**, C. Yang, J.D. Baum, E.L. Mestreau and O. Soto, “Extending the Range and Applicability of the Loose Coupling Approach for FSI Simulations”; invited paper presented at the *DGF Workshop on Fluid-Structure Interaction*, Pforzheim, Germany, October 2005.

23. Löhner R, B. Hübner and J.R. **Cebal**, "Advances in FSI Using Body-Fitted Unstructured Grids"; pp. 25-34 in *Fluid Structure Interaction and Moving Boundaries*, S.K. Chakrabati, S. Hernandez and C.A. Brebbia eds., WIT Press, La Coruña, Spain, September 2005.
24. **Cebal** JR, Castro MA, Putman CP, "Numerical Simulation of Flow Alterations after Carotid Artery Stenting From Multi-Modality Image Data", *Third MIT Conference on Computational Fluid and Solid Mechanics*, Boston, MA, June 14-17, 2005.
25. Castro MA, Putman CP, **Cebal** JR, "Application of Vascular CFD for Clinical Evaluation of Cerebral Aneurysms", *Third MIT Conference on Computational Fluid and Solid Mechanics, Boston*, MA, June 14-17, 2005.
26. Löhner R, J.R. **Cebal**, M. Castro and C. Putnam, "Clinical Applications of Patient-Specific Vascular CFD", *Workshop on Mini-Invasive Procedures in Medicine and Surgery: Mathematical and Computational Challenges*, Montreal, Canada, May 2005.
27. Löhner R, C. Yang, J.R. **Cebal**, F.F. Camelli, F. Togashi, J.D. Baum, H. Luo, E.L. Mestreau and O.A. Soto, "Moore's Law, the Life Cycle of Scientific Computing Codes and the Diminishing Importance of Parallel Computing", *Parallel CFD05*, College Park, MD, May 2005.
28. **Cebal** JR, Castro MA, Millan D, Frangi A, Putman CP, "Pilot Clinical Investigation of Aneurysm Rupture Using Image-Based Computational Fluid Dynamics Models", *SPIE Medical Imaging Conference*, Paper 5746-29, San Diego, CA, Feb. 12-17, 2005.
29. Castro MA, Putman CP, **Cebal** JR, "Computational Modeling of Cerebral Aneurysms in Arterial Networks Reconstructed from Multiple 3D Rotational Angiography Images", *SPIE Medical Imaging Conference*, Paper 5746-28, San Diego, CA, Feb. 12-17, 2005.
30. Appanaboyina S, Castro MA, Löhner R, **Cebal** JR, "Simulation of Endovascular Interventions of Cerebral Aneurysms: Techniques and Evaluation", *SPIE Medical Imaging Conference*, Paper 5746-91, San Diego, CA, Feb. 12-17, 2005.
31. **Cebal** JR, Castro MA, Burgess JE, Pergolizzi R, Putman CM, "Characterization of Cerebral Aneurysms for Assessing Risk of Rupture Using Patient-Specific Computational Hemodynamics Models", *Proc. Eastern Neuroradiological Society (ENRS)*, Boston, Massachusetts, November 2004.
32. Löhner R, J. **Cebal**, M. Castro, J.D. Baum, H. Luo, E. Mestreau and O. Soto, "Adaptive Embedded Unstructured Grid Methods", plenary keynote paper, *Proc. ENIEF04*, Bariloche, Argentina, November 2004.
33. Löhner R, Yang C, **Cebal** J, Soto O, Camelli F, "Improving the Speed and Accuracy of Projection-Type Incompressible Flow Solvers;", *Proc. 1st LNCC Meeting on Computational Modeling*, Petropolis, Brazil, August 2004.
34. Löhner R, J.R. **Cebal**, M.A. Castro, S. Appanaboyima, J.E. Burgess and C.M. Putnam, "Patient-Specific Modelling of Blood Flow Past Endovascular Devices Using Unstructured Embedded Grid Methods", *Proc. 1st LNCC Meeting on Computational Modeling*, Petropolis, Brazil, August 2004.
35. **Cebal** JR, Castro MA, Satoh T, Burgess JE, Putman CM, "Evaluation of Image-Based CFD Models of Cerebral Aneurysms Using MRI", *Proc. ISMRM Flow Motion Workshop*, Zurich, Switzerland, July 11-13, 2004.
36. **Cebal** JR, Castro MA, Pergolizzi R, Putman CM, Burgess JE, "Clinical Applications of Computational Fluid Dynamics in Analysis and Treatment of Cerebral Aneurysms", *Proc. BECON 2004*, Bethesda, Maryland, June 21, 2004. (Poster)
37. **Cebal** JR, Castro MA, Burgess JE, Putman CM, "Cerebral Aneurysm Hemodynamics Modeling from 3D Rotational Angiography", *Proc. IEEE Symposium on Biomedical Imaging (ISBI 2004)*, pp. 944-947, Arlington, Virginia, April 15-18, 2004.
38. **Cebal** JR, Hernandez M, Frangi A, Putman CM, Pergolizzi R, Burgess JE, "Subject-Specific Modeling of Intracranial Aneurysms", *Proc. SPIE Medical Imaging*, Vol. 5369, pp. 319-327, 2004.

39. **Cebal** JR, Putman CM, Pergolizzi R, Burgess JE, Yim PJ, "Multi-Modality Image-Based Modeling of Carotid Artery Hemodynamics", *Proc. SPIE Medical Imaging*, Vol. 5369, pp. 529-538, 2004. (Cum Laude Poster Award)
40. **Cebal** JR, Putman C, Pergolizzi R, Burgess JE, "Patient-Specific Modeling of Atherosclerotic Carotid Arteries from Multi-Modality Image Data", *Proc. IMECE'03*, Washington DC, Nov. 16-24, 2003.
41. **Cebal** JR, Soto O, Lutz RJ, Wood BJ, "Effects of Blood Perfusion on Radiofrequency Ablation of Tumors: Finite Elements and In Vitro Models", *Proc. IMECE'03*, Washington DC, Nov. 16-24, 2003.
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44. **Cebal** JR, Castro M, Löhner R, Soto O, Yim PJ, Alperin N, "Finite Element Modeling of the Circle of Willis from Magnetic Resonance Data", *Proc. SPIE Medical Imaging*, 5031:11-21, 2003.
45. Yim PJ, **Cebal** JR, Weaver A, Lutz RJ, Bodewijn G, Vasbinder C, "Estimation of Pressure Gradients at Renal Artery Stenoses", *Proc. SPIE Medical Imaging*, 5031: 22-30, 2003.
46. Calamante F, Yim PJ, **Cebal** JR, "Estimation of Bolus Dispersion Errors in Perfusion MRI using Image-Based Computational Fluid Dynamics", *8<sup>th</sup> Annual Meeting of the British Chapter of ISMRM*, September 2-3, Sheffield, UK, 2002.
47. Yim PJ, **Cebal** JR, Vasbinder B, Ho VB, van Engelshoven JMA, Choyke PL, "Hemodynamic Significance of Renal Artery Stenoses from Magnetic Resonance Imaging", *Proc. First IEEE Symposium on Biomedical Imaging (ISBI'02)*, July 7-10, Washington DC, 2002. (Poster)
48. **Cebal** JR, Löhner R, Soto O, Yim PJ, "Finite Element Modeling of Blood Flows in Healthy and Diseased Arteries", *Proc. 5<sup>th</sup> World Congress on Computational Mechanics*, July 7-12, Vienna, Austria, 2002.
49. Yim PJ, **Cebal** JR, Weaver A, Lutz R, Vasbinder GBC, Choyke PL, "Measurement of Pressure Drops at Arterial Stenoses from MR Imaging", *Proc. BMES*, 2002 (Poster)
50. Calamante F, Yim PJ, **Cebal** JR, "A New Method for Quantitative Estimation of Bolus Dispersion Errors in Perfusion MRI", *Proc. ISMRM*, May 18-24, Honolulu, Hawaii, 2002.
51. **Cebal** JR, Löhner R, Soto O, Choyke PL and Yim PJ, "Image-Based Finite Element Modeling of Hemodynamics in Stenosed Carotid Artery", *Proc. SPIE Medical Imaging*, Vol. 4683, paper No. 34, San Diego, California, February 2002.
52. **Cebal** JR, Löhner R, Soto O, Choyke PL and Yim PJ, "Patient-Specific Simulation of Carotid Artery Stenting Using Computational Fluid Dynamics", *Lecture Notes in Computer Sciences No 2208 (Proc. MICCAI 2001, Utrecht, The Netherlands, Oct. 14-17)*, Springer, 153-160, 2001.
53. Yim PJ, **Cebal** JR, Ho VB, Marcos HB, Boudewijn G, Vasbinder C, Rowedder A, Sortur A, van Engelshoven JMA, Soto O, Löhner R and Choyke PL, "Computational Modeling of Blood Flow Patterns from Magnetic Resonance Imaging", *Proc. RSNA*, October 2001.
54. Yim PJ, **Cebal** JR, Löhner R, Ho VB and Choyke PL, "Estimation of Mechanical Stress on the Carotid Artery", *Proc. BMES 2001*, October 2001 (Poster).
55. Soto O, Löhner R, **Cebal** JR and Codina R, "A Time-Accurate Implicit Monolithic Finite Element Scheme for Incompressible Flow Problems", *Proc. ECCOMAS CFD*, Swansea, UK, September 2001.

56. Löhner R and **Cebal** JR, "Image-Based Blood Flow Modeling as a Prediction Tool for Planning Medical Interventions", *Proc. ECCOMAS CFD*, Swansea, UK, September 2001.
57. Löhner R, **Cebal** JR, Soto O, Yim PJ and Burgess JE, "CFD in Medicine and Life Sciences: Applications in the Living Human Being" *Proc. 5<sup>th</sup> World Conference on Applied Fluid Dynamics*, Freiburg, Germany, June 18-21, 2001.
58. **Cebal** JR, Yim PJ, Löhner R, Soto O, Marcos H and Choyke PL, "New Methods for Computational Fluid Dynamics of Carotid Artery From Magnetic Resonance Angiography", *Proc. SPIE Medical Imaging*, Vol. 4321, paper No. 22, San Diego, California, February 2001.
59. Yim PJ, **Cebal** JR, Löhner R, Marcos H, and Choyke PL, "Interpretation of Arterial Velocity Waveforms Using Computational Fluid Dynamics", *Proc. SPIE Medical Imaging*, Vol. 4321, paper No. 11, San Diego, California, February 2001.
60. Summers R and **Cebal** JR, "Tracheal and Central Bronchial Aerodynamics Using Virtual Bronchoscopy", *Proc. SPIE Medical Imaging*, Vol. 4321, paper No 04, San Diego, California, February 2001.
61. Yim PJ, **Cebal** JR, Zhang Y, Lutz R and Choyke PL, "Evaluation of Methods for Measurement of Arterial Wall Shear Stress", *Proc. BMES*, Seattle, Washington October 12, 2000.
62. Yim, PJ, Mullick R, Summers RM, Marcos H, **Cebal** JR, Löhner R, Choyke PL, "Measurement of stenosis from magnetic resonance angiography using vessel skeletons", *Proc. SPIE Medical Imaging*, Vol 3978, p245-255, (2000).
63. Löhner, R., Yang, C., **Cebal**, J.R., Baum, J.D., Luo, H., Mestreau, E., Pelessone, D. and Charman C., "Fluid-Structure Interaction Algorithms for Rupture and Topology Change" Japan 2000.
64. **Cebal**, J.R., and Löhner, R., "Automatic Grid Generation for Anatomically Accurate Computational Hemodynamics Calculations" *Proc. ICMMB-11*, April 2-5, Hawaii, 2000.
65. **Cebal**, J.R., and Löhner, R., "From Medical Images To CFD Meshes", *Proc. 8<sup>th</sup> International Meshing Roundtable*, South Lake Tahoe, California October 10-13, 1999.
66. Löhner, R., and **Cebal**, J.R., "Parallel Advancing Front Grid Generation", *Proc. 8<sup>th</sup> International Meshing Roundtable*, South Lake Tahoe, California October 10-13, 1999.
67. **Cebal**, J.R., and Löhner, R., "Loads Transfer for Viscous Fluid-Structure Interaction", *Proc. IV World Congress in Computational Mechanics*, Buenos Aires, Argentina, June 29-July 2, 1998.
68. Löhner R. and **Cebal** J.R., "Fluid-Structure-(Thermal) Interaction in Industry: Issues and Outlook (1998)", *Proc. 4th World Conference and Exhibition in Applied Fluid Dynamics*, Freinurg i. Br., Germany, June 7-11, 1998.
69. **Cebal**, J.R., Löhner, R. and Sandberg W., "Interactive Visualization for Parallel Marine CFD Applications", *Proc. 1<sup>st</sup> Marine CFD Symposium*, McLean VA, May 19-21, 1998.
70. Löhner, R., **Cebal**, J.R., Baum, J.D. and Luo, H., "Capabilities and Issues of Unstructured-Grid CFD for High-Speed Flight Vehicles", *Proc. Int. CFD Workshop for Super-Sonic Transport Design*, Tokyo, Japan, March 16-17, 1998.
71. Löhner, R., Yang, C., **Cebal**, J.R., Pelessone, D. and Charman, C., "Fluid-Structure-Thermal Interaction Using A Loose Coupling Algorithm and Adaptive Unstructured Grids", *AIAA-98-2419*, 1998.
72. **Cebal**, J.R., "ZFEM: Collaborative Visualization for Parallel Multidisciplinary Applications", *Proc. Parallel Computational Fluid Dynamics 1997*, Manchester, U.K., May 19-21, 1997.
73. Löhner, R. and **Cebal**, J.R., "Fluid-Structure Interaction in Industry: Issues and Outlook", *Proc. World User Association in Applied Computational Fluid Dynamics, 3rd World Conference in Applied Computational Fluid Dynamics*, Germany, May 19-23, 1996.
74. Löhner, R. Yang, C., **Cebal**, J.R., Baum, J.R., Luo, J.D., Pelessone, D. and Charman, C., "A Loose Coupling Algorithm for Fluid-Structure Interaction Simulations", *Proc. Eighth*

*Annual Idaho National Laboratory Computing Symposium*, October 4-7, Idaho Falls, Idaho, 1994.

75. **Cebal**, J.R. "Solving the Fluid-Solid Heat Interaction Problem Using PVM", *Proc. Second PVM User's Group Meeting*, Oak Ridge, Tennessee, May 1994.

#### **Other Publications (As Undergraduate)**

1. **Cebal**, J.R and Kafatos, M., "Visualization of Sources in the Universe", *Bull. American Astron. Soc.*, 183, #48.03, 1993.
2. Nemiroff, R.J., Marani, G.F., Norris, J. and **Cebal**, J.R., "What is 2CG 010-31 ?", *AIP Conf. Proc. No. 304: The Second Compton Gamma-Ray Observatory*, ed. M. Friedlander, N. Gehrels and D.J. Macomb (AIP Press: New York), 356, 1994.
3. Nemiroff, R.J., Marani, G.F. and **Cebal**, J.R., "Correlations with Gamma Ray Bursts", *AIP Conf. Proc. No. 307: Gamma Ray Bursts*, ed. G.J. Fishman, J.J. Brainerd and K. Hurley (AIP Press: New York), 137, 1994.
4. Garcia, J., **Cebal**, J.R., Scoccimarro, R., Wahnon, P., Arena, R., Bazterra, V., Pelliza, L., Risi, A., Rodriguez, M. and Zimmermann, M., "A Catalogue of Variable Stars in the Lower Instability Strip" *Astron. Astrophys. Suppl.*, 109, 201-262, 1995.
5. Garcia, J., **Cebal**, J.R., Romano, P., Scoccimarro, R., Wahnon, P., and Zimmermann, M., "On the Distinction Between Delta-Scuti and SX-Phoenicis Variable Stars", *Revista Mexicana de Astronomia y Astrofisica*, Vol. 21, 395, 1990.
6. Garcia, J., **Cebal**, J.R., Romano, P., Scoccimarro, R., Wahnon, P., and Zimmermann, M., "A Catalogue of Variable Stars in the Lowest Part of the Instability Strip", *Bulletin d'Information du Centre de Donnees Stellaires*, No. 34, 67-105, 1988.

#### **PhD Thesis**

**Cebal**, J.R., "Loose Coupling Algorithms for Fluid-Structure Interaction", *Ph.D. Thesis*, George Mason University, Fairfax, Virginia, June 11, 1996.

#### **MS Thesis**

**Cebal**, J.R "Efectos Cosmologicos de un Campo Cuantico Vectorial", *Tesis de Licenciatura en Ciencias Fisicas*, University of Buenos Aires, Argentina, May 1991.

#### **Patents**

"Computer Algorithm for Early Colon Cancer Diagnosis",  
Iordanescu G (NIH), Summers R (NIH) and **Cebal** JR (GMU), pending.

#### **Press Releases**

"Undergraduate's Aneurysm Research Helps Him Win National Competition", *The Mason Gazette*, Feb. 5, 2008.

"George Mason University and @neurist awarded NIH research grant", *@neurist newsletter* 4, Barcelona, Spain, November 2007.

"Researchers Apply Computational Modeling to Blood Flow", by Robin Herron,  
*GMU Daily Gazette*, Fairfax, Virginia, April 2004.

"Blood Flow During Surgery", by Aila Kinnunen (ed. in chief),  
*CSC News*, Helsinki, Finland, November 6-7, 2001.

## PROFESIONAL SERVICES

### Workshops and Seminars

1. "Computational Analysis of Cerebral Aneurysms", ENERI, Buenos Aires, Argentina, November 23, 2007.
2. "Análisis Computacional de Aneurismas Cerebrales", Physics Department, University of Buenos Aires, Argentina, November 29, 2007.
3. "Computational Hemodynamics of Cerebral Aneurysms", Neurosurgery Grand Rounds, Allegheny General Hospital, Pittsburgh, Pennsylvania, October 24, 2007
4. "Computational Modeling of Cerebral Aneurysm Evolution Initiative", @neurist annual meeting, Pompeu Fabra University, Barcelona, Spain, September 14, 2007.
5. "Studying the Hemodynamics of Cerebral Aneurysms and their Endovascular Treatment using Patient-Specific Computational Models", International Symposium on Endovascular Surgery in Cerebral Aneurysms, St. Petersburg, Russia, April 13-14, 2006.
6. "Special seminar on Hemodynamics: Recent developments in patient-specific modeling of cerebral aneurysms", Laboratory of Neuroimaging, University of California Los Angeles (UCLA), July 24, 2004 (Invited by Philips Medical Systems)
7. "Evaluation of Image-Based CFD Models of Cerebral Aneurysms Using MRI", *ISMRM Flow Motion Workshop*, Zurich, Switzerland, July 11-13, 2004.
8. "Image-Based Modeling of Cerebral Aneurysm Hemodynamics", *Flow Imaging Workshop*, Philips Medical Systems, Son, The Netherlands, January 29-30, 2004.
9. "Image-Based Computational Hemodynamics", *HPCS Workshop on Biomedical Computing*, DARPA, Arlington, Virginia, January 17, 2003.
10. "Image-Based Modeling of Biological Flows", Seminar given at the School of Medicine, University of Colorado, Denver, Colorado, February 22, 2001.
11. "Image-Based Modeling of Arterial Hemodynamics", *Workshop on Hemodynamics of Vascular Flows*, Argonne National Laboratory, Argonne, Illinois March 21-23, 2001.
12. "Computational Hemodynamics", Institute for Computational Sciences and Informatics, George Mason University, Nov., 1999.
13. "Image-Based Modeling of Arterial Blood Flow for Virtual Surgery", Institute for Computational Sciences and Informatics, George Mason University, Nov. 29, 2001.
14. "Image-Based Modeling of Blood Flows in Cerebrovascular Diseases", School of Computational Sciences, George Mason University, Feb. 11, 2004.
15. "Fluid-Structure Interaction", ANSYS, Pittsburgh, Pennsylvania, February 27, 2001.

### Conference Organizer / Chair

- Organizer and Chairman of an invited session on Patient-Specific Cerebrovascular Hemodynamics Modeling for the SPIE Medical Imaging Conference (2006)
- Member of the Program Committee of the Physiology and Function Conference of the SPIE Medical Imaging meeting (2005-Present)
- Member of the organizing committee of the 5<sup>th</sup> International Conference on Computational Bioengineering (ICCB 2005), Instituto Superior Tecnico, Lisboa, Portugal, Sept. 14-16, 2005.
- Member of the Scientific Committee of the 3<sup>rd</sup> Conference on Functional Imaging and Modeling of the Heart 2005 (FIMH2005), Barcelona, Spain, June 2-4, 2005.
- Organizer and Chairman of an invited session on Computational Hemodynamics for the XIV Congress on Numerical Methods and Their Applications (ENIEF), Bariloche, Argentina, Nov. 8-11, 2004.
- Chairman of the session on Treatment of Medical Images of the 4<sup>th</sup> International Conference on Computational Bioengineering (ICCB 2003), Sept. 24-26, Zaragoza, Spain, 2003.

### **Reviewer of Journal Papers**

- American Journal of Neuroradiology (AJNR)
- Annals of Biomedical Engineering (ABME)
- ASME Journal of Biomechanical Engineering (ASME-JBE)
- Computers and Fluids (CAF)
- Computer Methods in Applied Mechanics and Engineering (CMAME)
- Computing in Science and Engineering (CiSE)
- Finite Elements in Analysis and Design (FEAD)
- IEEE Transaction in Information Technology in Biomedicine (IEEE TITB)
- IEEE Transactions in Medical Imaging (IEEE TMI)
- International Journal of Computational Fluid Dynamics (IJCFD)
- International Journal for Numerical Methods in Engineering (IJNME)
- International Journal for Numerical Methods in Fluids (IJNMF)
- Journal of Endovascular Therapy (JEVT)
- Journal of Fluid Mechanics (JFM)
- Medical and Biological Engineering and Computing (MBEC)
- Medical Engineering and Physics (MEP)
- Medical Physics
- Physiologic Measurement

### **Reviewer of Conference Papers**

- Medical Image Computing and Computer Assisted Interventions (MICCAI 2008)
- Physiology and Function Session of the SPIE Medical Imaging 2008 conference
- Modeling and Simulation Society of Australia and New Zealand 2007 (MODSIM07)
- Physiology and Function Session of the SPIE Medical Imaging 2007 conference
- Physiology and Function Session of the SPIE Medical Imaging 2006 conference
- Physiology and Function Session of the SPIE Medical Imaging 2005 conference
- Special Session on Computational Hemodynamics for the ENIEF 2004 Conference

### **Reviewer of Grant Proposals**

Member Review Panel

NSF, NIH, NASA, DOE Interagency Opportunities in Multi-Scale Modeling in Biomedical, Biological and Behavioral Systems

The Research Council of Norway

Division of Innovation, Research institution-based strategic project (technology)  
*Vascular CFD: Computational Fluid Dynamics for Predictative Vascular Surgery*

### **Consultancies**

Engineering Systems International (ESI), 2002, Paris, France.

Segmentation and geometric modeling of ligaments from MRI images of the knee for finite element analysis.

ANSYS, 2001, Pittsburgh, Pennsylvania.

Consultancy on fluid-structure coupling techniques.

Engineering Systems International (ESI), 2001, Paris, France.

Conducted simulation of the aerodynamics in the human airways using CT image data.

Applied Simulations Inc (ASI), 1997-1998, McLean, Virginia.

Developed a pre-processor for computational fluid dynamics on

unstructured grids.

Automotive Systems Laboratory (ASL), 1996, Detroit, Michigan.

Conducted fluid-structure coupled simulations of airbag deployment.

### **Memberships**

Washington Area Computer Assisted Surgery Society (WashCAS) (1999-Present)

American Institute of Aeronautics and Astronautics (AIAA) (1994-1998)

### **TEACHING**

CSI 701: *Foundations of Computational Sciences*, spring semesters 2006-Present

CSI 720: *Fluid Mechanics*, spring semesters 1999-Present.

MATH 491: Reading and Problems: *Hemodynamics of a Ruptured Aneurysm*, Fall 2007.

CSI 796: Directed Reading and Research: *Non-Newtonian Biological Flows*, Fall 2004.

CSI 796: Directed Reading and Research: *Brain Perfusion Models*, Spring 2004.

CSI 796: Directed Reading and Research: *Computational Hemodynamics*, Spring 2004.

CSI 796: Directed Reading and Research: *Micro-Biofluid Dynamics*, Summer 2002.

CSI 996: *Topics in Parallel CFD*, Spring 1999.

*Classical Electrodynamics*, Dept. of Physics, University of Buenos Aires, Argentina, 1990-1992

*Short Course on Computational Biofluids*, Instituto Balseiro, Bariloche, Argentina, November

2001 - Received travel support from FOMEC, Argentina

*Short Course on Scientific Visualization Using FAST*, Institute for Computational Sciences and Informatics, George Mason University, 1993

### **Students Advised**

Thesis advisor of Fernando Mut, 2004-Present.

PhD in CSI, School of Computational Sciences, George Mason University.

Thesis topic: modeling of endovascular devices.

Status: candidate.

Thesis advisor of Sunil Appanaboyina, 2003-Present.

PhD in CSI, School of Computational Sciences, George Mason University.

Thesis topic: modeling of endovascular devices.

Status: candidate.

Thesis advisor of Marcelo Castro, 2002-2006.

PhD in CSI, School of Computational Sciences, George Mason University.

Thesis topic: Image-based modeling of biofluids.

Status: graduated.

Thesis co-director of Susan Wright, 2006-Present

PhD in Neuroscience, Krasnow Institute of Advanced Studies, George Mason University.

Thesis topic: Reconstruction of brain vasculature from MRA data

Director: Giorgio Ascoli

Status: in progress

Director of Undergraduate Research in Computational Mathematics of Steve Hendrickson

MS in Mathematics, George Mason University

Research topic: Computational analysis of cerebral aneurysms

Director of Undergraduate Research in Computational Mathematics of David Amarasinghe

MS in Mathematics, George Mason University

Research topic: Sensitivity analysis of hemodynamics models of brain aneurysms

### **Student Committee Service**

- Dissertation committee member of Scott Orlof, 2006-Present.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: molecular dynamics.  
Thesis Advisor: Dr. E. Blaisten-Barojas.  
Status: advanced to candidacy.
- Dissertation committee member of Yafei Dong, 2004-Present.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: molecular dynamics.  
Thesis Advisor: Dr. E. Blaisten-Barojas.  
Status: graduated.
- Dissertation committee member of Xiao Dong, 2004-2006.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: molecular dynamics.  
Thesis Advisor: Dr. E. Blaisten-Barojas.  
Status: graduated.
- Dissertation committee member of Mathew Harrel, 2001-Present.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: SPH modeling of solid collisions.  
Thesis Advisor: Dr. J. Wallin.  
Status: advanced to candidacy.
- Dissertation committee member of Nai-Hua Chen, 2001-2004.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: unstructured multigrid algorithms for computational fluid dynamics.  
Thesis advisor: Dr. R. Löhner.  
Status: graduated.
- Dissertation committee member of Fernando Camelli, 1998-2002.  
PhD in CSI, School of Computational Sciences, George Mason University.  
Thesis topic: atmospheric dispersion modeling using CFD.  
Thesis advisor: Dr. R. Löhner.  
Status: graduated.