Rubén Medina

Email: rmedinaenator@gmail.com

Email: ruben.djmedina@ieee.org

EDUCATION

Postdoctoral research stay, The University of Iowa, Department of Electrical and Computer Engineering (ECE), Iowa, USA, 2001-2002.

Doctoral studies, Signal Processing and Telecommunications, Laboratoire traitement du signal et de l'image (LTSI), Université de Rennes 1, Rennes, France, 1998.

Masters degree in Electronics, Universidad Simon Bolívar, Caracas, Venezuela, 1988.

Electrical Engineering degree, Universidad de Los Andes, Mérida, Venezuela, 1981.

Participation in the 2000 IEEE EMBS International Summer School on Biomedical Imaging.

EXPERIENCE AND SKILLS

Teaching

Analog electronics, digital electronics, digital signal processing, digital image processing, biomedical instrumentation, medical image processing.

Administrative skills

Coordination of graduate studies and research groups. Coordination of undergraduate studies in electronics.

Research Activities

Preparation of Research proposals and grant proposals, follow up of research projects, preparation of projects reports, participation in international research projects, preparation of research papers for journals and conferences.

Languages

English: advanced level;

French: advanced level

Experience in programming languages

Matlab, C and C++ programming languages, image processing an visualization libraries VTK and ITK, openCV library, QT library, Windows and Linux operating systems, software for document edition LATEX, MS Office.

Methodological tools

Markov Random Fields, Fuzzy techniques, Mathematical Morphology, Deformable Contours, Active Appearance Models, Support Vector Machines, Non-linear signal processing techniques, Sparse representations, 3–D visualization techniques.

Analog and Digital Electronics, Microcontroller Units, FPGA, NIR devices and IR propagation in tissues. Electrocardiograph design and cardiological instrumentation.

EMPLOYMENT

Prometeo Researcher, Universidad de Cuenca, Electrical, Electronics and Telecommunications Department, Ecuador, 2015-2016

Biomedical Engineering Graduate Program, Universidad de los Andes, Engineering school, Mérida, Venezuela, 2009-2013

Full Professor, Universidad de Los andes, Electrical Engineering Department, Mérida, Venezuela, 2001-2016

Biomedical Engineering Group (GIBULA) Coordinator, Universidad de los Andes, Engineering School, Mérida, Venezuela, 2002 - 2007

Assistant Professor, Universidad de los Andes, Engineering School, Mérida, Venezuela 1989-2001

Lecturer, Universidad de los Andes, Engineering School, Mérida, Venezuela 1981-1989

Electronics and Telecommunication Department coordination, Engineering School, Universidad de los Andes, Mérida, Venezuela 1990-1992

PROFESIONAL AND SCIENTIFIC ASSOCIATIONS MEMBERSHIPS

Member for more than 27 years of the Institute of Electrical and Electronics Engineers (IEEE), USA.
Member of the Universidad de Los Andes Professors Association (APULA)
Member of the venezuelan Biomedical Association (SOVEB)

SCHOLARSHIPS AND AWARDS

Scholarship from SENESCYT as Prometeo Researcher in Ecuador 2016-2016.
Venezuelan Research Award (Research Promotion Program PPI) 2004-2008.
Scholarship from Universidad de Los Andes and CONICIT for performing a postdoctoral stay at The University of Iowa, (USA), 2001-2002
Scholarship from French Government and CONICIT (PCP Program) for pursuing doctoral studies at University of Rennes 1, 1995-1998
Scholarship from Universidad de Los Andes for pursuing the Master degree in Electronics Engineering 1985-1987.

SCIENTIFIC COMMITTEE AND REVIEWER

2016 XXI Symposium on Signal Processing (STSIVA) Scientific Committee Chair.
Pan American Health Care Exchanges (PAHCE) Conference Scientific Committee, 2013-2016.
International Seminar on Medical Information Processing and Analysis (SIPAIM) Scientific Committee, 2011-2015
Venezuelan Biomedical Engineering Conference Scientific Committee, 2012, 2015.
IEEE International Symposium on Biomedical Images (ISBI 2014) reviewer.
Colombian Biomedical Engineering Conference Scientific Committee, 2013.
International Conference on Numeric Methods in Engineering (CIMENICS) Scientific Committee, 2000-2013.
Pattern Recognition Letters, Brasilian Biomedical engineering Journal, Computers in Biology and Medicine journal.
Venezuelan CONICIT Research Projects Reviewer, Panamá SENASCYT Research Projects Reviewer.
Venezuelan FONACIT Award Commision member, 2003.

PUBLICATIONS

Antonio Bravo, Miguel Vera, Mireille Garreau and **Ruben Medina**, *ThreeDimensional Segmen-*

tation of Ventricular Heart Chambers from MultiSlice Computerized Tomography: An Hybrid Approach, In H. Cherifi, J.M. Zain, and E. El-Qawasmeh (Eds.): DICTAP 2011, Part I, CCIS 166, pp. 287301, 2011 Springer-Verlag Berlin Heidelberg

Todd T. Schlegel, Walter B. Kulecz, Alan H. Feiveson, E. Carl Greco, Jude L. De Palma, Vito Starc, Bojan Vrtovec, M. Atiar Rahman, Michael W. Bungo, Matthew J. Hayat, Terry Bauch, Reynolds Delgado, Stafford G Warren, Tulio Nuñez-Medina, **Ruben Medina**, Diego Jugo, Hakan Arheden and Olle Pahlm " *Accuracy of advanced versus strictly conventional 12-lead ECG for detection and screening of coronary artery disease, left ventricular hypertrophy and left ventricular systolic dysfunction*", BMC Cardiovascular Disorders, vol. 10, No. 20, pp. 1471-2261, 2010.

Miguel Vera, Antonio Bravo, **Rubén Medina**, *Myocardial border detection from ventriculograms using support vector machines and real-coded genetic algorithms*, Computers in Biology and Medicine, pp. 446-455, 2010.

Antonio Bravo, Juan Mantilla, José Clemente, Miguel Vera, **Rubén Medina**, " *Left Ventricle Segmentation and Motion Analysis in Multislice Computerized Tomography*" in Biomedical Image Analysis and Machine Learning Technologies: Applications and Techniques, Editores Fabio Gonzalez, Eduardo Romero, Editorial Medical Information Science Reference, New York, 2010, pp. 307-322

Antonio Bravo, **Rubén Medina**, Gianfranco Passariello, Mireille Garreau, "*Inferring the left ventricle dynamical behavior using a free-form deformations model*", Mathematics and Computers in Simulation, volume 79, issue 6, pp. 1824-1833, February 2009.

Antonio Bravo, **Rubén Medina**, *An unsupervised Clustering Framework for Automatic Segmentation of Left Ventricle Cavity in Human Hearts Angiograms*, Computerized Medical Imaging and Graphics, vol. 32, pp. 396-408, 2008.

Rubén Medina, Mireille Garreau, Javier Toro, Hervé Le Breton, Jean Louis Coatrieux, Diego Jugo, *Markov Random Field Modeling for Three-dimensional Reconstruction of the Left Ventricle in Cardiac Angiography*, IEEE Transactions on Medical Imaging, vol. 25, No. 8, pp. 1087–1100, August 2006.

Antonio Bravo, **Rubén Medina**, and J. Arelis Daz, *A Clustering Based Approach for Automatic Image Segmentation: An Application to Biplane Ventriculograms*, in Progress in Pattern Recognition, Image Analysis and Applications, Editors: J. F. Martinez Trinidad et al., Lecture Notes in Computer Science, Springer-Verlag, Volume 4225, pp. 316–325, 2006.

Ruben Medina, Antonio Bravo, Gianfranco Passariello, Mireille Garreau, "*Estimation of the Deformation Field for the Left Ventricle Walls in 4-D Multislice Computerized Tomography*", in Progress in Pattern Recognition, Image Analysis and Applications, Editors: Alberto Sanfeliu, Manuel Lazo Corts, Lecture Notes in Computer Science, Springer-Verlag, Volume 3773, pp. 348–359, 2005.

Rubén Medina, Mireille Garreau, Javier Toro, Jean Louis Coatrieux, Diego Jugo, *3D Reconstruction of the Left Ventricle from two Angiographic Views: An Evidence Combination Approach*, IEEE Transactions on Systems Man and Cybernetics: part A, vol. 34, No. 3, pp. 359-370, 2004.

Rubén Medina, Andreas Wahle, Mark E. Olszewski, Milan Sonka, *Three Methods for Accurate Quantification of Plaque Volume in Coronary Arteries*, The International Journal of Cardiovascular Imaging 19: 301311, 2003.

Javier Toro, Frank Owens, **Rubén Medina**, *Using Known Motion Fields for Image Separation in Transparency*, Pattern Recognition Letters, vol. 24/1-3, pp.605–613, January, 2003.

M. E. Olszewski, A. Wahle, **R. Medina**, S. C. Mitchell, and M. Sonka, *Integrated system for quantitative analysis of coronary plaque via data fusion of biplane angiography and intravascular*

ultrasound, in Computer Assisted Radiology and Surgery (CARS 2003), H. U. Lemke, K. Inamura, M.W. Vannier, A. G. Farman, K. Doi, and J. H. C. Reiber, Eds., Amsterdam, 2003, vol. 1256 of Excerpta Medica International Congress Series, pp. 1117–1122, Elsevier.

Javier Toro, **Ruben Medina**, Mireille Garreau, Diego Jugo and Hugo Carrasco. ”*Left Ventricle 3D reconstruction using Gibbs Random Fields and Simulated Annealing*,- In Simulation and Modelling in Bioengineering, M. Cerrolaza, D. Jugo and C. Brebbia Editors, Computational Mechanics Publications, Southamptom, pp. 239-248, 1996.

Toro J., **Medina R.**, Garreau M., Carrasco H., Jugo D., ” *A simulated Annealing Approach to left ventricle 3D reconstruction from two angiographic views*”, Revista Brasilea de Ingeniera Biomdica. , vol. 12, n 3, pp. 131–141, Brasil. 1996.

G. Gonzalez, R. E. Badra, **R. Medina**, J. Regidor, ”*Period Estimation Using Minimum Entropy Deconvolution (MED)*”, Signal Processing, vol. 41, pp. 91–100, 1995.

CONFERENCE PROCEEDINGS

Ruben Medina, Sebastian Bautista, Pablo Vanegas and Villie Morocho, ” *Left Ventricle myocardium segmentation in Multi-Slice Computerized Tomography*”, accepted for 2016 IEEE ANDESCON conference proceedings.

Juan Molina, Marco Bartolome, Villie Morocho, **Ruben Medina** and Alexandra La Cruz, ”*Video and Imaging Gastroenterological Medical Equipment Oriented to Telemedicine*”, Proceedings of 2016 XXI IEEE Symposium on Signal Processing, Images and Artificial Vision (STSIVA), pp. 1–5, 2016.

Darwin Astudillo, Kenneth Palacio-Baus, Lizandro Solano-Quinde, **Ruben Medina** and Sara Wong, *Characterizing Artifacts in RR Stress Test Time Series*, Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16), pp. 692–695, Orlando, USA, August 2016.

Alexandra La Cruz, **Rubén Medina**, Vega Francisco, Wilson Peréz, Blanca Cruzcaya Ochoa Montoya, Victor Saquicela, Mauricio Espinoza, Lizandro Solano Quinde, Maria-Esther Vidal, ”*Mobile Teleradiology System Suitable for M–health Services Supporting Content and Semantic Based Image Retrieval on a Grid Infrastructure*, Proceedings of the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16), pp. 5380–5383, Orlando, USA, August 2016.

Mantilla, Juan; Paredes, Jose; Bellanger, Jean-J.; Donal, Erwan; Leclercq, Christophe; **Medina, Ruben**; Garreau, Mireille, ”*Classification of LV wall motion in cardiac MRI using kernel Dictionary Learning with a parametric approach*,” Proceedings of the 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'15), pp.7292-7295, August 2015, doi: 10.1109/EMBC.2015.7320075.

Alexandra La Cruz, **Ruben Medina**, Villie Morocho, Pablo Vanegas, and Sara Wong, ”*A Biomedical Engineering Graduate Program at University of Cuenca, Ecuador*”, One page abstract presented at the 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'15), August 2015.

Emiro Ibarra, **Rubén Medina**, Villie Morocho, Pablo Vanegas, *Optical Flow as a Tool for Cardiac Motion Estimation*, Proceedings of the IEEE 2015 Asia-Pacific Conference on Computer Aided System Engineering, DOI 10.1109/APCASE.2015.38, pp. 173-178, Quito, July 2015.

Elymar Rivas, **Rubén Medina**, Franklin Moreno, Alimar Benitez, Villie Morocho, Pablo Vanegas, *Hepatic Steatosis Detection Using the Co-occurrence Matrix in Tomography and Ultrasound Images*, Proceedings of the Twentieth Symposium on Signal Processing, Images and Computer Vision, STSIVA-2015 (Colombian, IEEE Signal Processing Society), pp. 1-7, Bogota, Colombia, September 2015.

Jairo Armijos, David Garca, Darwin Astudillo, Kenneh Palacio-Baus, **Rubén Medina**, Sara Wong. ”*Semiautomatic validation of RR time series in an ECG stress test database*”. Proceedings of the 11th International Symposium on Medical Information Processing and Analysis (SIPAIM 2015). SPIE Proceedings, Pages 968119.1–968119.9, Cuenca, Ecuador, 2015.

Juan Loja, Esteban Velecela, Kenneth Palacio-Baus, Darwin Astudillo, **Rubén Medina**, Sara Wong. ”*CinC Challenge 2013: comparing three algorithms to extract fetal ECG*”. Proceedings of the 11th International Symposium on Medical Information Processing and Analysis (SIPAIM 2015). SPIE Proceedings, Pages 968117.1–968117.8, Cuenca, Ecuador, 2015.

Rubén Medina, Alexandra La Cruz, Andrés Ordoñes, Daniel Pesántez, Villie Morocho, Pablo Vanegas. ”*Level set algorithms comparison for multi–slice CT left ventricle segmentation*”. Proceedings of the 11th International Symposium on Medical Information Processing and Analysis (SIPAIM 2015). SPIE Proceedings, Pages 96810O.1–96810O.12, Cuenca, Ecuador, 2015.

Nelson Dugarte, **Rubén Medina**, Lourdes Huiracocha, Rubén Rojas. ”*Open source cardiology electronic health record development for DIGICARDIAC implementation*”. Proceedings of the 11th International Symposium on Medical Information Processing and Analysis (SIPAIM 2015). SPIE Proceedings, Pages 96810Y.1–96810Y.11, Cuenca, Ecuador, 2015.

Ibarra Emiro and **Medina Rubén**, ”*Sparse Based Optical Flow Estimation in Cardiac Magnetic Resonance Images*”, Proceedings of the IX Seminar on Medical Information Processing and Analysis (SIPAIM 2013), vol. 8922, SPIE Proceedings, pp.(892202.1)–(892202.9), Mexico, 2013.

Ibarra, E. J.; **Medina, R.**; Garreau, M. ” *2-D segmentation of left ventricle in magnetic resonance images based on an optical flow algorithm.* In Proceedings of the IEEE Pan American Health Care Exchanges (PAHCE), pp. 1–6, 2013.

Vera, M., A. Bravo, **R. Medina**, O. Acosta y M. Garreau, *Preprocessing for Left ventricle Segmentation in Cardiac Computerized Tomography*, In Proceedings of the 8th International Seminar on Medical Information Processing and Analysis (SIPAIM- 2012), pages 131-138, San Cristobal, Nov. 2012.

Cuadros, J., **R. Medina**, A. Bravo y T. Nuez, *Analysis of QT intervals in patients with Chagas disease*, In Proceedings of the 8th International Seminar on Medical Information Processing and Analysis (SIPAIM- 2012), pp. 234–241, San Cristobal, Nov. 2012.

Miguel Vera, Antonio Bravo, Mireille Garreau and **Ruben Medina**,*Similarity Enhancement for Automatic Segmentation of Cardiac Structures in Computed Tomography Volumes*, 33rd Annual International Conference of the IEEE EMBS Boston, Massachusetts USA, August 30 - September 3, 2011 pp. 8094-8097.

Blanca Guillen, Jose L. Paredes, **Ruben Medina**, *A Sparse Based Approach for Detecting Activations in fMRI*, 33rd Annual International Conference of the IEEE EMBS Boston, Massachusetts USA, August 30 - September 3, 2011, pp 7816-7819.

Bravo, A., Clemente, J., Vera, M. A., Avila, J., & **Medina, R**. ”*A Hybrid Boundary–region Left Ventricle Segmentation in Computed Tomography.* Proceedings of the International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP), pp. 107-114, 2010.

Bravo, A., Clemente, J., & **Medina, R**. ”*Seed–Growing Heart Segmentation in Human Angiograms.* Proceedings of the International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP), pp. 91-96, 2010.

Antonio Bravo, Miguel Vera and **Rubén Medina**. ”*Edge Detection in Ventriculograms using a Support Vector Machine Classifier and Deformable Models.* CIARP2007, Lecture Notes in Computer Science, Springer-Verlag, vol. 4756, pp.793–802, 2007.

Antonio Bravo, **Rubén Medina** and Mireille Garreau, *A Coronary Vessels Enhancement and Extraction from X–Ray Rotational Angiographic Images*, Proceedings of the CVISP 2008 – Fifth International Conference on Computer Vision, Image and Signal Processing, Prague, July 2008.

Juan Mantilla, Antonio Bravo, **Rubén Medina**, *A 3–D Multi–Modality Image Framework for Left Ventricle Motion Analysis*, Proceedings of the International Machine Vision and Image Processing Conference, Potrush, Nord-Ireland, 3rd-5th, September 2008, pp. 130–135.

A. Bravo, **R. Medina**, M. Garreau, M. Bedossa, C. Toumoulin and H. Le Breton, "*An approach to coronary vessels detection in X–ray rotational angiography*", Memorias del IV Congreso Latinoamericano en Ingenieria Biomdica, CLAIB 2007, Proceedings of the International Federation of Medical and Biomedical Engineering, vol. 18, pp. 254–258, 2007.

Arnolfo Marciales, **Rubén Medina** and Mireille Garreau, "*A Level–set Segmentation Approach for 4-D Cardiac Images*", Memorias del IV Congreso Latinoamericano en Ingenieria Biomdica, CLAIB 2007, Proceedings of the International Federation of Medical and Biomedical Engineering,vol. 18, pp. 286–289, 2007.

Maria A. Ayala, Javier Toro and **Rubén Medina**, "*Iris images based personal identification*", Memorias del IV Congreso Latinoamericano en Ingenieria Biomdica, CLAIB 2007, Proceedings of the International Federation of Medical and Biomedical Engineering, vol. 18, pp. 346–350, 2007.

M. Escalona-Morán, A. Hernández, **R. Medina**, and M. Garreau, "*Model–based image analysis of the cardiac function*", Memorias del IV Congreso Latinoamericano en Ingenieria Biomdica, CLAIB 2007, Proceedings of the International Federation of Medical and Biomedical Engineering, vol. 18, pp. 329–333, 2007.

R. Medina, A. Bravo, J. Toro, G. Passariello, M. Garreau, *Three Methods for Left Ventricle 3-D Reconstruction in Angiography*, Proceedings of the II Workshop on Computer Assisted Diagnosis and Surgery, Centro de Modelamiento Matemtico, Universidad de Chile, Santiago de Chile, March 8–10, 2006.

Ruben MEDINA, Antonio Bravo, Piotr Windyga , Javier Toro , "*2-D Active Appearance Model For Prostate Segmentation in Ultrasound Images* ", Proceedings of the 27th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS2005), pp. 3363-3366, 1-4 September 2005 in Shanghai, China.

Antonio Bravo, **Rubén Medina**, Gianfranco Passariello, Mireille Garreau, *Deformable parametric model for left ventricle wall motion simulation*, Proceedings of the IASTED International Conference on Applied Simulation and Modelling (ASM 2005), Málaga Spain, pp 24-29, June, 2005.

Ruben Medina, Andreas Wahle, Mark Olszewski and Milan Sonka, *Curvature and Torsion Estimation for Coronary Artery Motion Analysis*, In A. A. Amini and A. Manduca, editors, Medical Imaging 2004: Physiology, Function, and Structure from Medical Images, vol. 5369, pp. 504-515, Bellingham WA: SPIE Proceedings,2004, [ISBN 0-8194-5282-3]

Andreas Wahle, **Rubén Medina**, Kathleen Braddy, James Fox, Theresa Brennan, John Lopez, James Rossen and Milan Sonka, *Impact of Local Vessel Curvature on the Circumferential Plaque Distribution in Coronary arteries*, . In A. V. Clough and A. A. Amini, editors, Medical Imaging 2003: Physiology and Function: Methods, Systems, and Applications, vol. 5031, pp. 204-213. Bellingham WA: SPIE Proceedings, 2003. [ISBN 0-8194-4832-X].

J. Toro, **R. Medina** and D. Ziou, *Recovery of two Transparent Primitive Images from Two Frames*, Acoustics, Speech, and Signal Processing, 2004. ICASSP '04. Proceedings. 2004 IEEE International Conference on, May 2004, vol. 3, Pages: 225-228.

Wahle A, Olszewski ME, Vigmostad SC, **Medina R**, Coskun AU, Feldman CL, Stone PH, Braddy KC, Brennan TMH, Rossen JD, Chandran KB, Sonka M, *Quantitative Analysis of Circumferential Plaque Distribution in Human Coronary Arteries in Relation to Local Vessel Curvature*, 2004 IEEE

International Symposium on Biomedical Imaging, IEEE Press, Page 531-534, Arlington, USA, 2004.

P. Windyga, N. Hiransakolwong, K. Vu, **R. Medina**, G. Onik, *Ultrasound-Based Liver Computer Assisted Surgery*, Proceedings of the IEEE 26th Annual International Conference Engineering in Medicine and Biology Society (EMBS), San Francisco, California, USA, Volume 3, pp. 1774-1777, September 2004.

Piotr Windyga, Gary Onik, **Rubén Medina**, *Virtual Trainer for Prostate Cryosurgery*, Proceedings of 14th Proceedings of the IASTED International Conference on Applied Simulation and Modelling (ASM 2003), Palm Springs USA, pp. 229-233, February 24-26, 2003.

P. S. Windyga, N. Hiransakolwong, K. Vu, **R. Medina**, G. M. Onik *Augmented Vision for Minimally Invasive Abdominal Cancer Surgery*, Proceedings of the 25th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS), Cancun, Mexico, Volume 2, pp. 1160-1163, September 2003.

Rubén Medina, Andreas Wahle, Mark E. Olszewski, Milan Sonka, *Volumetric Quantification of Coronary Arteries Reconstructed by Fusion Between Intravascular Ultrasound and Biplane Angiography*, Proceedings of the IEEE 2002 International Symposium on Biomedical Imaging, Washington D.C., USA, pp. 891-891, 2002.

J. Toro, F. Owens, **R. Medina**, *Multiple Motion Estimation and Segmentation in Transparency*, Proceedings of the 2000 IEEE International Conference on Acoustic Speech and Signal Processing (ICASSP-2000), pp. 2087-2090, Istambul, June,2000.

R.Medina, M. Garreau, H. Lebreton, D. Jugo, " *Three-Dimensional Reconstruction of the Left Ventricle from two angiographic views*", Proceedings of the Nineteenth Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Chicago, USA, Volume 2, pp. 569-572, October, 1997.

R. Medina, M. Garreau, C. Navarro, JL. Coatrieux, D. Jugo, " *Reconstruction of 3D Cardiac Shapes in Biplane Angiography: A Fuzzy and Evolutionary Approach*", Proceedings of IEEE Computers in Cardiology, Hannover, Alemania, pp. 663-666, 1999.

Jugo D., **Medina R.**, Carrasco H., Rojas R., *Chronic Chagasic Patients Classification using Normalized Cumulants*, Proceedings of the 1999 IEEE Engineering in Medicine and Biology 21st Annual Conference, pp. 297, Atlanta, USA, 1999.

R.Medina, M. Garreau, JL. Coatrieux, H. Lebreton, " *An Evidence Combination Approach to Reconstruction of the Left Ventricle from Two Angiographic Views*", Computers in Cardiology, Lund, Sweden, pp. 315-318, Septiembre, 1997.

Javier Toro, **Medina Rubén**, Mireille Garreau, Diego Jugo y Hugo Carrasco "*Left Ventricle 3D reconstruction using Gibbs Random Fields and Simulated Annealing*",. en Simulation and Modelling in Bioengineering, M. Cerrolaza, D. Jugo and C. Brebbia Editors, Computational Mechanics Publications, Southamptom, pp. 239-248, 1996.

Jugo Diego, Carrasco Hugo, **Medina Rubén** and Castillo Carlos, " *Usefulness of High Resolution Electrocardiogram and Heart Rate Variability in Chronic Chagas Disease*", 17th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, pp. 175-176, vol. 1, Montréal Canada, Septiembre,1995.

Ruben, M., Mireille, G., Diego, J., Carlos, C., & Javier, T. "**Segmentation of ventricular angiographic images using fuzzy clustering**". Proceedings of the IEEE 17th Annual Conference of the Engineering in Medicine and Biology Society, Vol. 1, pp. 405-406. September 1995.

Jugo, Diego, **Medina Ruben**, and Carrasco Hugo. " *Spectral analysis of the surface electrocardiogram in patients with Chagas disease.*" Engineering in Medicine and Biology Society, 1992 14th Annual International Conference of the IEEE. Vol. 2. IEEE, 1992.

Ruben, M., Diego, J., Hugo, C., Ramiro, L., & Carlos, C. "An acquisition and processing system for the High Resolution Surface Electrocardiogram." 1992 14th Annual International Conference of the IEEE Engineering in Medicine and Biology Society. 1992.

PUBLICATIONS IN SPANISH

Ruben Medina, Emiro Ibarra, Villie Morocho, Pablo Vanegas, *Estimación del Movimiento Cardiaco en Imágenes de Resonancia Magnética usando Flujo Óptico (Cardiac Motion Estimation in Magnetic Resonance Images Using Optical Flow)*, Accepted for publication in Revista IEEE América Latina,Volume: 14, Issue: 6 (ISSN: 1548–0992), 2016.

Rubén Medina, Emiro Ibarra , Villie Morocho, Pablo Vanegas , *Validación de un Algoritmo Robusto para la Estimación del Movimiento en Secuencias de Imgenes Cardiacas*, Revista Maskana, Numero especial, 2–5 de Diciembre 2015, pp. 37–43, 2015.

Hugo D. Reyes, **Rubén Medina**, *"Diseño e implementación de un dispositivo para la medición de la velocidad de la onda de pulso por fotopletismografía"*, Memorias del V Congreso Venezolano de Bioingenieria, pp. 58–61, Mérida, Venezuela, 2015.

Ana A. Arriz, **Rubén Medina**, *"Detección de cncer de mama empleando luz cercana al infrarrojo mediante modelaje y simulación usando técnicas de elementos finitos"*, Memorias del V Congreso Venezolano de Bioingenieria, pp. 90–93, Mérida, Venezuela, 2015.

Yoleidy K. Huérfano, Miguel A. Vera, Antonio J. Bravo, Atilio S. Nava, **Rubén J. Medina**, *"Estrategia para la segmentación de la aurícula derecha en tomografía cardíaca"*, Memorias del V Congreso Venezolano de Bioingenieria, pp. 102–105, Mérida, Venezuela, 2015.

Miguel Vera, **Rubén Medina**, *"Estimación de Descriptores de la Función Ventricular Derecha en Imgenes de Tomografía Cardiaca"*, En Memorias del XI Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas (CIMENICS-2014), Isla de Margarita, Venezuela, Marzo 2014.

Jhosmary Cuadros, **Rubén Medina**, Antonio Bravo, Tulio Nuñez, *"Estimación del Intervalo QT multicanal en Pacientes Chagasicos Utilizando Técnicas Estadísticas "*, En Memorias del XI Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas (CIMENICS-2014), Isla de Margarita, Venezuela, Marzo 2014.

Ibarra Emiro, **Medina Ruben**, *"Estimación del Movimiento Cardiaco Mediante Flujo óptico Usando la Norma L1 en un modelo poco Denso*, En Memorias del XI Congreso Internacional de Métodos Numéricos en Ingeniería y Ciencias Aplicadas (CIMENICS-2014), Isla de Margarita, Venezuela, Marzo 2014.

Blanca Guillén, José L. Paredes, **Rubén Medina**, *"Detección de Zonas de Activación en Datos fMRI Mediante Umbralización del Mapa Estadístico Basada en el Modelo Gaussiano Generalizado"*, En Memorias del XI Congreso Internacional de Metodos Numericos en Ingenieria y Ciencias Aplicadas (CIMENICS-2014), Isla de Margarita, Venezuela, Marzo 2014.

Hernando Velandia, **Rubén Medina**, L. E. Mendoza y Muñoz L. Bedoya A., *"Clasificación de Segmentos Normales, Hyperkinéticos e Hypokinéticos en Imgenes Ventriculogrficas, Aplicando el Método de Línea Central"*, Memorias del Congreso Peruano de Ingeniería Biomédica, Bioingeniería, Biotecnología y Física Médica (TUMI II 2013), Pontificia Universidad Católica del Perú, Lima, Perú, 2013.

Ariza, C., **R. Medina** and F. Moreno, *Realce y visualizacion de microclacificaciones en mamografia de mama densa*, En Memorias del XI Congreso Internacional de Metodos Numéricos en Ingenieria y Ciencias Aplicadas (CIMENICS-2012), paginas PI7-PI12, Isla de Margarita, Venezuela, Marzo 2012.

Dugarte, N., J. Cuadros, **R. Medina**, R. Rojas, D. Jugo y T. Nuñez, *Sistema de adquisicion multicanal y analisis de la señal electrocardiografica de alta resolucion aplicado a pacientes chagasicos*, En

Memorias del XI Congreso Internacional de Metodos Numericos en Ingeniera y Ciencias Aplicadas (CIMENICS- 2012), paginas PS31–PS36, Isla de Margarita, Marzo 2012.

Guillen, B., J. Paredes and **R. Medina**, *Deteccion de Zonas de Activacion en fMRI mediante modelos temporal-espacial que prmueven la representacion poco densa de la señal BOLD*, En Memorias del XI Congreso Internacional de Metodos Numericos en Ingeniera y Ciencias Aplicadas (CIMENICS-2012), paginas PS13–PS18, Isla de Margarita, Marzo 2012.

Medina, R., F. Duran, M. Vera y A. Balza *Herramienta de clasificacion aplicada a imagenes de celulas de Purkinje*, En Memorias del XI Congreso Internacional de Metodos Numericos en Ingeniera y Ciencias Aplicadas (CIMENICS- 2012), paginas BSB31–BSB36, Isla de Margarita, Marzo 2012.

Rivas, E., **R. Medina**, F. Moreno y J. Ortiz, *La matriz de co-ocurrencia como herramienta para la deteccion de la esteatosis hepatica en imagenes tomograficas*. En Memorias del XI Congreso Internacional de Metodos Numericos en Ingenieria y Ciencias Aplicadas (CIMENICS- 2012), paginas PI13–PI18, Isla de Margarita, Marzo 2012.

Vera, M., **R. Medina**, A. Bravo y F. Duran *Segmentacion de los ventriculos cardiacos, en imagenes de tomografia, usando realces por similaridad y crecimiento de regiones*, En Memorias del XI Congreso Internacional de Metodos Numericos en Ingeniera y Ciencias Aplicadas (CIMENICS-2012), paginas PI–PI6, Isla de Margarita, Marzo 2012.

Cuadros, J., **R. Medina**, A. Bravo y T. Nuñez, *Analisis de la variabilidad del ritmo cardiaco y residuo de la onda T en pacientes chagasicos*, En Memorias del IV Congreso Venezolano de Bioingeniera (BIOVEN-2012), paginas 80–83, San Cristobal, Nov. 2012.

Nelson Dugarte J., **Rubén Medina**, Rubén Rojas, *Sistema para la adquisición de la señal electrocardiográfica de alta resolución*, Revista Universidad, Ciencia y Tecnología de la Universidad Nacional Experimental Politécnica "Antonio José de Sucre" (UNEXPO), ISSN: 1316–4821, Vol.15, N 61, 2011, pp 206–215

Nelson Dugarte J., **Rubén Medina**, Rubén Rojas. "*Adquisición y Procesamiento de la Señal Electrocardiográfica de Alta Resolución para la Identificación de Enfermedades Cardiovasculares como el Mal de Chagas*". Revista Electrónica de Conocimiento Libre y Licenciamiento "ELCLIC". Vol. 1, N 4, 55-66, 2011.

Nelson Dugarte J., **Rubén Medina**, Rubén Rojas. "*Desarrollo del Prototipo de un sistema de Adquisición de Datos para la Digitalización de la Señal Electrocardiográfica de Alta Resolución*". Revista del Instituto Nacional de Higiene "Rafael Rangel". Vol. 43, N 1, 2011.

Jugo González Diego, **Medina Molina Rubén**, Rojas Rubén, Schlegel Todd, Arenare Brian, "*Aplicación de nuevos métodos de análisis de la Variabilidad de la Frecuencia Cardiaca en pacientes chagásicos crónicos*, revista Universidad, Ciencia y Tecnología (UCT), Aceptada para publicación (No. 48, septiembre 2008).

Drs. Ricardo Barrios, Tulio José Núñez Medina, José H. Donis, Diego Dávila Spinetti,Ing. **Rubén Medina**, "*Electrocardiografía de alta frecuencia y su utilidad en la cardiopatía isquémica y parámetros de remodelado ventricular*", Avances Cardiologicos de Venezuela 2007;27(2):62–84.

Juan Ramírez, Franklin Moreno, **Rubén Medina**, *Análisis de la Serie Temporal del Balanceo en la Marcha de Pacientes con Parkinson*, Revista Universidad Ciencia y Tecnología, Venezuela, Vol. 10, No. 40, pp. 205–210, Septiembre 2006

Antonio Bravo, **Rubén Medina**, Gianfranco Passariello, Mireille Garreau, *Simulación Del Comportamiento Dinámico Del Ventrículo Izquierdo Usando Tecnicas De Deformación De Forma Libre*, Revista Universidad Ciencia y Tecnología, Venezuela, Vol. 9, No. 36, pp.175–182, 2005.

Diego Jugo González, **Rubén Medina Molina**, Hugo Carrasco Guerra, *Electrocardiografía de alta resolución y su utilidad en la enfermedad de chagas.*, Revista Clon, Universidad de Pamplona, vol.

2, No. 2, pp. 49-60, 2004

R. A. Tolosa, M. Ochoa, C. Núñez, **R. Medina**, *Programas de computación para determinar parámetros estereológicos*, Revista Ciencia e Ingeniería, vol. 25, No. 3, pp. 155–159, 2004

Rojas Rubén, Jugo Diego, **Medina Rubén**, *Modelado de la respuesta del sistema cardiovascular durante ejercicio moderado*, Universidad, Ciencia y tecnología, Vol. 4, N 13, Marzo, 2000

Diego Jugo González, Hugo A. Carrasco-Guerra, **Rubén Medina**, Agustín Landaeta, Jesús Bellera, El Balance Autonómico Cardiaco es normal en Pacientes Chagásicos Agudos, Avances cardiológicos, vol. 19, No. 6, pp. 203–208, 1999.

Bravo A., **Medina R.**, Castillo C., Jugo D., Carrasco H.," Evaluación Cuantitativa de la Función Ventricular a Partir de Imágenes Videoangiográficas". Revista Mexicana de Ingeniería Biomédica, 17:1, pp. 33–39, Mexico. 1996.

Jugo D., Carrasco H., **Medina R.** and Castillo C., "*Avances en el conocimiento de la enfermedad de Chagas*", Capítulo en BIOINGENIERíA APLICADA: Técnica ingenieril para la practica médica. Editorial SVMNI. Capítulo 14. Caracas, Venezuela. 1996.

Rubén Medina. "*Técnicas Básicas de Procesamiento de Imágenes*"- En Imágenes Médicas, Editores: Gianfranco Passariello, Fernando Mora, Editorial Equinoccio, pp. 61–99, Universidad Simón Bolívar, 1995.

Lobelo Ramiro, Carrasco Hugo, Jugo Diego, **Medina Rubén**, " *Validación Clínica de un Sistema de Adquisición, Procesamiento y Análisis del Electrocardiograma de Alta Resolución*", Revista Mexicana de Ingeniería Biomédica, vol. 15, No. 2, 1994.

DIRECTION OF DOCTORAL THESIS

Segmentation of Cardiac cavities in Multislice Computerized Tomography Images
Student: Miguel Vera
Degree: Doctoral studies in Engineering.
Institution: Universidad de Los Andes, Mérida, Venezuela
Date: July, 2014.

DIGICARDIAC System: High Resolution Electrocardiographic Signal Acquisition and Processing.
Student: Nelson Dugarte
Degree: Doctoral studies in Engineering.
Institution: Universidad de Los Andes, Mérida, Venezuela
Date: July, 2014.

Detection of Activations in fMRI Data: an Sparse based Approach for Representing the BOLD Signal.
Student: Blanca Guillén
Degree: Doctoral studies in Engineering.
Institution: Universidad Simón Bolívar, Caracas, Venezuela
Date: July, 2013.

Simulation and reconstruction of 4-D Left Ventricle Images in Medical Imaging
Student: Antonio Bravo
Degree: Doctoral studies in Engineering.
Institution: Universidad Simón Bolívar, Caracas, Venezuela
Date: April, 2006.

DIRECTION OF MASTER THESIS AND UNDERGRADUATE PROJECTS

Directed Undergraduate Projects: 17
Directed Master Thesis : 9

RESEARCH PROJECTS

Title: **Chaos, non-linear signal processing and sparse representations for attribute extraction in rotating machinery vibration signals**
Funding: Research Department at Universidad de Cuenca(DIUC), Universidad de Cuenca. Ecuador
Status: In progress.

Title:**Left Ventricle myocardial segmentation in MSCT images as a tool for Left Ventricle Hypertrophy**.
Funding: Research Department at Universidad de Cuenca(DIUC), Universidad de Cuenca. Ecuador
Status: Finished.

Title: **Intelligent Instrumentation Systems in Cardiology (SIC)**
Funding: BID-CONICIT E-08
Institutions: Universidad Simn Bolvar, Universidad de Carabobo, Universidad de los Andes, Fundacin Instituto de Ingeniera, Hospital Universitario de Caracas.Venezuela
Status: Finished

Title: **Angiographic Image Processing and left ventricle 3-D reconstruction from projections.**
Funding: CDCHT-ULA, Project No. I-439-94, Mérida, Venezuela
Status: finished

Title: **Surface Electrocardiographic Signal analysis using Adaptive Filters.**
Funding: CDCHT-ULA, Project No. I-341-91, Mérida, Venezuela
Status: Finished

Title: **Clinical validation of a High Resolution Electrocardiogram acquisition, processing and analysis system.**
Funding: CDCHT-ULA, Project No. M-342-90-07, Mérida, Venezuela
Status: Finished

Title: **Human Visible Heart Animation**
Funding: CDCHT-ULA, Project No.: I-672-00-02-B, Mérida, Venezuela
Status: Finished

Title: **Development and implementation of an automatized system for pattern recognition and analysis of capillary electrophoresis data.**
Funding: Fonacit, Caracas, Venezuela
Status: Finished.

Title: **Intra-QRS potentials and Heart Rate Variability in Chagasic Patients.**
Funding: CDCHT-ULA, Project No.: I-947-06-07-A, Mérida, Venezuela
Status: Finished

Title: **Left Ventricle Motion Estimation based on 4D Image analysis.**
Funding: CDCHT-ULA, Project No.: I-1075-07-02-B, Mérida, Venezuela
Status: Finished

Title: **Project ECOS NORD**
Description: Project funded by the French government and FONACIT from Venezuela. The project topic was Quantification of 4D cardiac Images for Diagnosis and Therapeutics.
Participants: Biomedical engineering Group from ULA (GIBULA), Bioengineering Group from UNET., Mérida, Venezuela
Status: Finished.

Title: **Project ALFA-BETA**
Description: The Project was funded by the European community between 1996-2000. The Project included research groups from the following institutions:
Universidad Simon Bolivar (USB) from Venezuela
Universidad de Carabobo (UC) from Venezuela
Universidad de Los Andes (ULA) from Venezuela
Universidad de Los Andes (ULA) from Colombia
Universidad Politecnica de Rio de Janeiro (UPRJ) from Brazil
Universitat Politecnica de Catalunya (UPC) from Spain
Universite de Rennes 1 from France
Ecole Nationale Superieure de Telecommunications de Brest (ENSTB) from France
University of Ulster (UU) from UK
The General Coordinator was Professor: Normand Black (Email: nd.black@ulster.ac.uk)

Title: **Ibero-American Telemedicine and Medical Informatics Network**.
Funding: The Project was funded by Centro Ibero-americano de Cooperacin Tecnolgica (CYTEC). In this Project there were institutions from Chile, Brazil, Peru, Colombia, Venezuela, Cuba, Mxico and Spain.
The coordinator of the Project was: Dr. Cristian Gabella (Emai: cgabella@mutualseg.cl)

Title: **Project ALFA-IPECA**
The Project was funded by the European Community between 2004 and 2007. The subject of the Project was multi-modality medical image processing. In this project participated the following institutions:
1 Faculdad de Ciencias, Universidad de Chile, Santiago de Chile.
2 Universidad de Guanajuato, México
3 Universidad de los Andes, Mérida, Venezuela
4 Universidad Simón Bolívar, Caracas, Venezuela
5 Université J. Fourier de Grenoble, France
6 Université de Rennes 1, France
7 University for Health Informatics and Technology Tyrol Innsbruck, Austria.

REFERENCES

Pablo Vanegas
    President of Universidad de Cuenca   Teléfono: 4051001
    Computer Science Department   E-mail: pablo.vanegas@ucuenca.edu.ec
    Universidad de Cuenca, Cuenca, Ecuador.

Milan Sonka
    Professor and Chair of Electrical/Computer Engineering   Teléfono: (319)-335-5191
    Director, Iowa Institute for Biomedical Imaging   E-mail: milan-sonka@uiowa.edu

The University of Iowa,Iowa, USA

Jean-Louis Coatrieux
    Emeritus Research Director   Teléfono: +33-2-23-23-62-20
    Laboratoire Traitement de Signal et de L'Image (LTSI)
    Université de Rennes 1, Rennes, France   E-mail: Jean-louis.coatrieux@univ-rennes1.fr

Mérida, January 03, 2017.

Rubén MEDINA