

D.Sc. Alonso Ramírez Manzanares

Contact Information

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Current Activities

- Teacher/Researcher *Titular A* at the Mathematic Department of the University of Guanajuato. Member of the Mexican National Research System (SNI).

Areas of Interest

Computer Vision:

- Computer Vision, Early Vision
- Diffusion Weighted Image Processing
- Biological motivated models
- Optical Flow Estimation
- Medical Image Processing
- Computer Science Education
- Computational Chemistry

Education

- *Penn Image Computing and Science Laboratory, University of Pennsylvania, Philadelphia, United States of America.*
Position: Postdoctorate **Graduation: Nov, 2008**
Topic: Medical Image Processing
Research Title: Modelling complex axón architecture
The objective was to develop tools for estimating multiple as well as single intra-voxel diffusion profiles based on brain Diffusion Weighted (DW) MR images. Nowadays, this is an important research area due to the fact that approximately one third of white matter voxels contain more than a single fiber. Our aim was to provide low-requirement methods that can be applied to clinical studies and to measure the uncertainty on the recovered solutions.
- *Research Center in Mathematics (CIMAT), Guanajuato, Guanajuato, Mexico*
Degree: Doctor of Sciences **Graduation: Jun, 2007**
Major: Computer Science – Computer Vision **Grade Point Average: 100/100**
Dissertation: A Multimodal Regularization Framework. Application to Axon Fiber Orientation Estimation and Transparent Optical Flow Estimation.
We proposed in this work a framework for performing multimodal regularization on early vision. Such a framework allows to solve in a pixel-wise fashion the multi-labeling problem by means of derivative-based minimization techniques. We applied our method in two challenging problems: brain axon fiber estimation (based on DW-MRI data) and transparent optical flow recovering.
- *Research Center in Mathematics (CIMAT), Guanajuato, Guanajuato, Mexico*
Degree: Master in Science in Computer Science **Graduation: Aug, 2003**
Major: Computer Science **Grade Point Average: 97/100**
Thesis: Estimación de las trayectorias de manojos de nervios cerebrales, por medio de la restauración y el filtrado de la información intra-voxel en imágenes de Tensor de Difusión de Resonancia Magnética (Brain

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Journals

- A. Ramirez-Manzanares, P. A. Cook, M. Hall, M. Ashtari and J. C. Gee. *Resolving Axon Fiber Crossings at Clinical b-values: An Evaluation Study*, Journal of Medical Physics (Impact Factor: 1.902) Volume 38, Issue 9, 5239-53, Sep. 2011.
- A. Ramirez-Manzanares, M. Rivera, P. Kornprobst and F. Lauze. Variational multi-valued velocity field estimation for transparent sequences, Journal of Mathematical Imaging and Vision (Impact Factor: 1.437), Volume 40, Issue 3, 285-304, July 2011.
- P. Fillard, M. Descoteaux, A. Goh, S. Gouttard, B. Jeurissen, J. Malcolm, A. Ramirez-Manzanares, M. Reisert, K. Sakaie, F. Tensaouti, T. Yo, J. F. Mangin, C. Poupon. Quantitative Evaluation of 10 Tractography Algorithms on a Realistic Diffusion MR Phantom, Neuroimage (5-Year Impact Factor: 7.168), Volume 56, Issue 1, 220-234, May 2011,
- M. Rivera, O. Dalmau, W. Mio, and A. Ramirez-Manzanares, Spatial Sampling for Image Segmentation. Oxford Journals: The computer Journal (Impact factor: 1.394, 2009), Published online, DOI 10.1093/comjnl/bxr032, 2011,
- A. Ramirez-Manzanares, M. Rivera, B. C. Vemuri, P. Carney and T. Mareci. *Diffusion Basis Functions Decomposition for Estimating White Matter Intra-voxel Fiber Geometry*. IEEE Transactions on Medical Imaging. Agosto, Vol. 26, No. 8, pp.1091-1102.
- A. Ramirez-Manzanares and M. Rivera. *Basis Tensor Decomposition for Restoring Intra-Voxel Structure and Stochastic Walks for inferring Brain Connectivity DT-MRI*. International Journal of Computer Vision, 69(1), pp. 77-92, 2006.

International Congress

- J. Rafael-Patiño, A. Ramirez-Manzanares, M. Rivera: *Estimation of Anisotropic Water Diffusion Indexes on Axon Bundle Crossings*, IEEE Proceedings on 10th Mexican International Conference on Artificial Intelligence (MICAI), pp. 196-201, Dec. 2011
- R. Aranda, M. Rivera, and A. Ramirez-Manzanares: *Improved Diffusion Basis Functions Fitting and Metric Distance for Brain Axon Fiber Estimation*. In Proc. Fifth Pacific-Rim Symposium on Image and Video Technology, pp.36-47, Nov. 2011.
- C. C. Brun, H. Wang, R. Aranda, A. Ramirez-Manzanares, M. Rivera, P. A. Yushkevich, J. C. Gee: *Involving machine learning and particule mass in the segmentation of cortico-spinal tract. DTI Tractography Challenge, MICCAI, September, 2011*
- A. Ramirez-Manzanares, A. Palafox-Gonzalez, M. Rivera: *Robust Spatial Regularization and Velocity Layer Separation for Optical Flow Computation on Transparent Sequences*. Advances in Artificial Intelligence, Lecture Notes in Computer Science, 2010, Volume 6437/2010 : 325-336 DOI: 10.1007/978-3-642-16761-4_29
- Ramón Aranda, Mariano Rivera, Alonso Ramírez-Manzanares, Manzar Ashtari and James C. Gee, *Massive Particles for Brain Tractography*, Advances in Artificial Intelligence, Lecture Notes in Computer Science, 2010, Volume 6437/2010, 446-457, DOI: 10.1007/978-3-642-16761-4_39
- A. Ramirez-Manzanares, J. Rafael-Patiño, M. Ashtari, *Single and Multi Diffusion-Tensor Based Kernels for Anisotropic Filtering of Brain DW-MR Images*, IEEE Electronics, Robotics and Automotive Mechanics Conference, pp.399-404, 2010
- E. Hernandez, T. Cordova, A. Ramirez-Manzanares, D. K. B. Li, M. F. Dvorak, A. Curt, E. L. MacMillan, B. Mädler, A. L. Mackay. *Pitfalls of Spinal DTI in Cervical Spondylotic Myelopathy*. Annual Meeting ISMRM, 1-7 May 2010, Stockholm, Sweden.
- A. Ramirez-Manzanares, M. Rivera, and J. C. Gee. *Denoising Intra-voxel Axon Fiber Orientations by Means of EC-QMMF Method*. Alonso Ramirez-Manzanares, Mariano Rivera, and James C. Gee. In 8th Mexican International Conference on Artificial Intelligence 11-Nov-2009, Guanajuato, LNCS. Pp. 303-311.
- A. Ramirez-Manzanares, M. Rivera, and J. C. Gee. *Depicting axon fibers on a diffusion phantom by means of hybrid DBF-DT data*. In Workshop Diffusion Modelling and Fiber Cup at MICCAI 2009. London, U.K. 24 Aug. 2009. pp. 1-4.

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- A. Ramírez-Manzanares, P. A. Cook, and J. C. Gee. *A comparison of methods for recovering intra-voxel white matter fiber architecture from clinical diffusion imaging scans*. In *Med Image Comput Comput Assist Interv* (New York, USA, Sep 2008), vol. 5241 of *Lecture Notes in Computer Science*, Springer Berlin / Heidelberg, pp. 305-312.
- A. Ramírez-Manzanares, H. Zhang, M. Rivera, and J. C. Gee. *Robust regularization for the estimation of intra-voxel axon fiber orientations*. In *Workshop Math Methods in Biomed Imag Anal* (Anchorage, Alaska, Jun 2008), pp. 1-8.
- A. Ramírez-Manzanares, M. Rivera, P. Kornprobst and F. Lauze. *A Variational Approach for Multi-Valued Velocity Field Estimation in Transparent Sequences*. 1st International Conference on Scale Space and Variational Methods in Computer Vision, Ischia, Italy. LNCS. pp. 227-238. May. 2007.
- A. Ramírez-Manzanares and M. Rivera, *Basis Pursuit based algorithm for intra-voxel recovering information in DW-MR*, *Procc. IEEE Sixth Mexican International Conference on Computer Science (ENC'05)*, pp. 152-157, Puebla, México, 2005.
- A. Ramírez-Manzanares, M. Rivera, B. C. Vemuri and T. Mareci. *Basis Functions for Estimating Intra-voxel Structure in DW-MRI*. *Procc. IEEE Medical Imaging Conference 2004*, Rome, Italy, pp. 4207- 4211, October 2004.
- A. Ramírez-Manzanares and M. Rivera. *Brain Nerve Bundles Estimation by Restoring and Filtering Intra-Voxel Information in Diffusion Tensor MRI*. *VLSM 2003*. Nice France, pp. 71-80. October 2003. (*Prizewinner as Best Student Paper*)

Research Reports

- A. Ramírez-Manzanares, M. Rivera, P. Kornprobst and F. Lauze. *Multi-Valued Motion Fields Estimation for Transparent Sequences with a Variational Approach*. *Rapport De Recherche Inria*, Report number RR-5920. Jun. 2006.
- A. Ramírez-Manzanares, M. Rivera, P. Kornprobst and F. Lauze. *Multi-Valued Motion Fields Estimation for Transparent Sequences with a Variational Approach*. *Reporte Técnico del CIMAT*, number 22.06.2006, I-06-12 (CC). 2006.
- A. Ramírez-Manzanares, M. Rivera, B. C. Vemuri and T. Mareci. *Basis functions for estimating intra-voxel structure in DW-MRI*. *Reporte Técnico del CIMAT*, number 18.10.2004, I-04-10 (CC). 2004.

Industrial/government Projects

- Road detection on satellite images (2012-2011), Project leader, Developed for the Planning Institute of the Guanajuato State (IPLANEG, México).
- Object detection on 2D images (2011). Collaborator, Developed for the a private company under a confidentiality agreement.

Skills

- Software: C, C++, Java, VB, Prolog, HTML, php, MS-SQL Server.
- Operating Systems: MS-DOS, Windows 95, 98, NT, 2000 Server, XP, Linux, UNIX.
- Mathematical software: Matlab, Mathematica, R.
- Computer vision and graphics packages: OpenGL, CImg library.
- Office software: Open Office, MS-Office.

Work Experience

- **D.Sc. Candidate** Feb. 2004 – Current
Center for Research in Mathematics (CIMAT), Guanajuato, Gto, Mexico.
Activities: Develop of the research topics associated to the thesis. Collaboration in the development of Technical Reports in the area of image processing. Teaching assistant at

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the University of Guanajuato for the undergraduate course: Mathematical programming in C.

- **Lecturer** Ago. 2003 – Jan. 2004
University of Guanajuato, Guanajuato, Guanajuato, Mexico.
Activities: Teaching undergraduate course Mathematical programming in C.
- **System Development Manager** Sep. 1997 – Jul. 2001
Transmit Data Terminal de Mexico S.A. de C.V (TDT), D.F., Mexico
Activities: Team leader on project management and development of new software products. The projects included computer systems for control of industry process, stock management, access control, mobile transactions and WEB applications. Instructor of software development.
- **Support Technician** Nov. 1995 – Aug. 1997
Transmit Data Terminal de Mexico S.A. de C.V (TDT), D.F., Mexico
Activities: Support to industrial hardware, mobile hardware and software.

Teaching Experience

- *University of Guanajuato, Guanajuato, Guanajuato, Mexico*
Teacher of undergraduate/postgraduate courses:
Mathematical programming in C, Algorithms and Data Structures
Advanced programming, Operative Systems and Numerical methods. **Date: From 2007 to Date**
- *Research Center in Mathematics (CIMAT), Guanajuato, Guanajuato, Mexico*
Teaching Assistant in undergraduate course: Mathematical programming in C **Date: 2006**
- *University of Guanajuato, Guanajuato, Guanajuato, Mexico*
Lecturer of undergraduate course: Mathematical programming in C **Date: 2003**

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General

Professional Memberships:

Mexican Society of Computer Science

Languages:

Spanish (Native Speaker)

English (Advanced Skills)

Academic Scholarships:

Scholarship for D.Sc. studies, 2004-2007

Mexico's National Council of Science and Technology (CONACyT)

Scholarship for attending the Fourth Franco-Mexican Summer School Images and Robotics, Laboratoire Franco-Mexicain d' Informatique (LAFMI), 2003

Academic Awards:

- Performance Student Award (Master Degree), 2002

Research Center in Mathematics (CIMAT)

- Best Student Paper, 2003

Workshop on VLISM 2003. Nice France.

Student Activities:

Student Committee Member, CIMAT, 2004-2006

CIMAT's Film Club, staff member, CIMAT, 2003-2006.

Additional Activities:

CIMAT's Film Club, Manager, CIMAT, 2008 to Date.

References

Available upon request