

# Edgar Garduño



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Computer Science Department  
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## MOST RECENT RESEARCH POSITION

### **Associate Professor**

June 2017 –

Department of Computer Science  
Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas  
Universidad Nacional Autónoma de México  
Mexico City, Mexico

## EDUCATION

### **Ph.D. in Bioengineering**

August 2002

Department of Bioengineering, University of Pennsylvania, Philadelphia  
Dissertation: *Extraction and Visualization of Structural Components from Reconstructed Volumes*  
Advisor: [Dr. Gabor T. Herman](#)

### **M.Sc. in Bioengineering**

May 1998

Department of Bioengineering, University of Pennsylvania, Philadelphia. **GPA:** 3.64

### **B. Sc. in Computer Engineering**

May 1995

School of Engineering, National Autonomous University of Mexico (U.N.A.M.), Mexico City. **GPA** 9.08/10.00

## HONORS AND AWARDS

### **Member of the National System of Researchers (Mexico), Level II**

Jan 2017 – Dec 2019

Consejo Nacional de Ciencia y Tecnología (CONACyT)

### **Member of the National System of Researchers, Level I**

Jan 2014 – Dec 2016

Consejo Nacional de Ciencia y Tecnología (CONACyT), Mexico

Jan 2007 – Dec 2009

### **DAAD Alumn**

Fall 2013

Short-term Research Visit for Faculty sponsored by the German Academic Exchange Service (DAAD)

### **Young Mexican Scientist Fellow**

Summer 2009

Mexican Academy of Sciences (AMC) and the U.S.- Mexico Foundation for Science (FUMEC)

### **Special Session Grantee**

June 18-21, 2003

Special Session on "The Mathematics of Electronmicroscopic Imaging" in the 1st Joint International Meeting between the AMS and the RSME, Seville, Spain

Title: Fourier Transforms of Trains of Pulses on Various Grids

### **Fulbright Fellow**

Fall 1996 – Summer 2000

International Institute of Education (IIE), USA-Mexico

- Student Travel Award** 13-21 June, 1998  
3rd IEEE EMBS International Summer School on Biomedical Imaging, Berder, France
- CANIFARMA Award** 1994  
Granted by the National Chamber of the Pharmaceutical Industry, Mexico  
Title: Automatic Computation of the Mitotic Index
- Participant** June 13–21, 1998  
Third IEEE EMBS International Summer School on Biomedical Imaging, Bretagne, France

## PROFESSIONAL MEMBERSHIPS

- IEEE** Institute of Electrical and Electronics Engineers, Inc. (IEEE), since 1998  
IEEE Computer Society  
IEEE Engineering in Medicine and Biology Society (EMBS)

## RESEARCH EXPERIENCE

- Associate Professor** June 2017 –  
**Universidad Nacional Autónoma de México (U.N.A.M.), Department of Computer Science, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Mexico City, Mexico**
- Assistant Professor** August 2012 – May 2017  
**Universidad Nacional Autónoma de México (U.N.A.M.), Department of Computer Science, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Mexico City, Mexico**
- Assistant Professor** January 2006 – December 2010  
**Universidad Nacional Autónoma de México (U.N.A.M.), Department of Computer Science, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Mexico City, Mexico**
- Postdoctoral Scholar** March 2003 – December 2005  
**University of California, San Diego, National Center for Microscopy and Imaging Research, La Jolla, CA**  
Worked on the NIH funded project “Segmentation of Electron Tomographic Data Sets Using Fuzzy Set Theory” (PI: Dr. Mark H. Ellisman, Co-PI: Dr. Niels Volkman).
- Postdoctoral Scholar** July 2002 – February 2003  
**City University of New York, Computer Science Department, The Graduate Center, New York, NY**  
Worked on the NIH funded project “Extraction and Visualization of Structural Components from Reconstructed Volumes” (PI: Dr. Gabor T. Herman).
- Research Assistant** Spring – June 2002  
**City University of New York, Computer Science Department, The Graduate Center, New York, NY**  
Worked on the NIH funded project “Extraction and Visualization of Structural Components from Reconstructed Volumes” (PI: Dr. Gabor T. Herman).
- Visiting Scholar** Fall 2001  
**Mathematical Sciences Research Institute, Berkeley, CA**
- Research Assistant** Fall 2000 – Summer 2001  
**Temple University, Center for Computer Science and Applied Mathematics, Philadelphia, PA**  
Worked on the NIH funded project “Extraction and Visualization of Structural Components from Reconstructed

Volumes”  
(PI: Dr. Gabor T. Herman).

**Research Assistant** Fall 1999 – Summer 2000

**University of Pennsylvania, Medical Image Processing Group**, Philadelphia, PA  
Worked on the NIH funded project “Extraction and Visualization of Structural Components from Reconstructed Volumes”  
(PI: Dr. Gabor T. Herman).

**Visiting Scholar** Fall 1998 – Summer 1999

**National Center of Biotechnology, Bioinformatics Unit**, Madrid, Spain  
Worked on the NIH funded project “Visualization of Reconstructed Volumes using Blobby Model”  
(PI: Dr. Gabor T. Herman and Dr. José María Carazo).

**Research Assistant** Fall 1996 – Summer 1998

**University of Pennsylvania, Medical Image Processing Group**, Philadelphia, PA  
Worked on the NIH funded project “Boundary tracking in 3D binary images to produce rhombic faces for a do-decahedral model”  
(PI: Dr. Gabor T. Herman).

**Research Assistant** Fall 1993 – Spring 1996

**Universidad Nacional Autónoma de México (U.N.A.M.), Image Processing Laboratory, Centro de Ciencias Aplicadas y Desarrollo Tecnológico (formerly Centro de Instrumentos)**, Mexico City, Mexico  
Worked on the project “Automatic Computation of the Mitotic Index”  
(PI: Dr. Gabriel Corkidi-Blanco).

## RESEARCH INTERESTS

Current Research: Image Segmentation by Fuzzy Set Principles, Transfer Function using Fuzzy Set Principles in Volume Rendering, and Bump Mapping for Boundary Tracking, 3D Reconstruction from Projections, Superiorization of Iterative Algorithms.

General Interests: Medical and Biomedical Imaging, Signal and Image Processing, 3D Reconstruction from Projections, Computer Graphics, Scientific Visualization, and Computer Vision.

## TEACHING EXPERIENCE

**Co-Instructor** Spring 2018  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering & Graduate Program in Electrical Engineering**, **National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.

**Instructor** Spring 2018  
INTRODUCTION TO COMPUTER GRAPHICS, **Graduate Program in Electrical Engineering**, **National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.

**Co-Instructor** Spring 2017  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering**, **National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.

- Instructor** Spring 2017  
INTRODUCTION TO COMPUTER GRAPHICS, **Graduate Program in Computer Science and Engineering & Graduate Program in Electrical Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Spring 2016  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Instructor** Spring 2016  
INTRODUCTION TO COMPUTER GRAPHICS, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Spring 2015  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Fall 2014  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Fall 2013  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Instructor** Spring 2013  
INTRODUCTION TO COMPUTER GRAPHICS, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Fall 2012  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Fall 2011  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Co-Instructor** Fall 2010  
INTRODUCTION TO MEDICAL IMAGING, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Instructor** Fall 2008  
MEDICAL IMAGING SYSTEMS AND LABORATORY, **Curricula in Biomedical Engineering, Universidad Ibero Americana (UIA)**, Mexico City, Mexico.
- Instructor** Fall 2008  
COMPUTER GRAPHICS, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Instructor** Fall 2007  
TRIDIMENSIONAL RECONSTRUCTION AND SCIENTIFIC VISUALIZATION, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.
- Instructor** Fall 2006  
TRIDIMENSIONAL RECONSTRUCTION AND SCIENTIFIC VISUALIZATION, **Graduate Program in Computer Science and Engineering, National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.

**Guest Lecturer**

Spring 2004

INTRODUCTION TO IMAGE PROCESSING AND DECONVOLUTION, **NEU259, Department of Neurosciences, University of California, San Diego (UCSD)**, San Diego, CA.

**Teaching Assistant**

Fall 2000

COMPUTER GRAPHICS AND IMAGE PROCESSING, **CIS581, Graduate Program in Computer Science, Temple University**, Philadelphia, PA.

**Instructor**

Spring 1996, Spring 1995, Fall 1994

C AND OPENGL AS PART OF THE COMPUTING FOR RESEARCH PROGRAM, **Supercomputer Center, Dirección General de Cómputo y de Tecnologías de Información y Comunicación (DGTIC, formerly DGSCA), National Autonomous University of Mexico (UNAM)**, Mexico City, Mexico.

**Instructor**

Fall 1991 – Spring 1993

MATHEMATICS AND INTRODUCTION TO COMPUTER SCIENCE, **Junior High School and High School, Centro Activo Freire (CAF)**, Mexico City, Mexico.

**TEACHING COMPETENCIES**

Fourier Analysis, Data Structures, Signal & Image Processing, Quantitative Image Analysis, Biomedical Imaging, Scientific Visualization and Computer Graphics.

**UNIVERSITY SERVICE**

**Head of Department:** Department of Computer Science, Institute for Research on Applied Mathematical and Systems (IIMAS), UNAM, July 25th, 2015 – March 31st, 2018.

**Committee for Teaching and Academic Affairs:** Graduate Program in Computer Science and Engineering. Representative of the director of the IIMAS – UNAM. November, 2016 – October, 2018.

**Committee for Teaching and Academic Affairs:** Graduate Program in Computer Science and Engineering. Representative of faculty members of the IIMAS – UNAM. October, 2014 – October, 2016.

**Field of Knowledge Academic Subcommittee:** Graduate Program in Electrical Engineering. Representative of the IIMAS – UNAM. October, 2014 – October, 2018.

**PUBLICATIONS****In Journals**

19. Yair Censor, **Edgar Garduño**, Elias S. Helou, Gabor T. Herman, "Derivative-Free Superiorization: Principle and Algorithm," *Numerical Algorithms*, **Accepted for Publication:** Oct., 2020.
18. Wendy Aguilar, Montserrat Alvarado-Gonzalez, **Edgar Garduño**, Carlos Velarde, Ernesto Bribiesca, "Rotational Symmetry Detection in Curves Represented by Means of the Slope Chain Code," *Pattern Recognition*, vol. 107, p. 107421, 2020.  
doi:[10.1016/j.patcog.2020.107421](https://doi.org/10.1016/j.patcog.2020.107421)
17. José Luis Vilas, Javier Vargas, Marta Martínez, Erney Ramírez, Roberto Melero, Amaya Jimenez, **Edgar Garduño**, Pablo Conesa, Roberto Marabini, David Maluenda, José María Carazo, Carlos Oscar Sánchez Sorzano, "Re-examining the spectra of macromolecules. Current practice of spectral quasi B-factor flattening," *Journal of*

- Structural Biology*, vol. 209, no. 3, p. 107447, 2020.  
doi:[10.1016/j.jsb.2020.107447](https://doi.org/10.1016/j.jsb.2020.107447)
16. Montserrat Alvarado, Wendy Aguilar, **Edgar Garduño**, Carlos Velarde, Ernesto Bribiesca, Veronica Medina, "An Approach to Mirror Symmetry Detection in 2D Curves using the Slope Chain Code," *Pattern Recognition*, vol. 87, pp. 67–79, 2019.  
doi:[10.1016/j.patcog.2018.10.002](https://doi.org/10.1016/j.patcog.2018.10.002)
  15. **Edgar Garduño** and Gabor T. Herman, "Computerized Tomography with Total Variation and with Shearlets," *Inverse Problems*, vol. 33 (4), p. 044011, 2017.  
doi:[10.1088/1361-6420/33/4/044011](https://doi.org/10.1088/1361-6420/33/4/044011)
  14. Montserrat Alvarado-González, **Edgar Garduño**, Ernesto Bribiesca, Oscar Yáñez-Suárez, and Verónica Medina-Bañuelos, "P300 Detection Based on EEG Shape Features," *Computational and Mathematical Methods in Medicine*, vol. 2016, ID 2029791, 14 pages, 2016.  
doi:[10.1155/2016/2029791](https://doi.org/10.1155/2016/2029791)
  13. Verena M. Moock, Benjamín Reyes-Ramírez, Crescencio García-Segundo, A. García-Valenzuela, Fernando Arámbula-Cosío, and **Edgar Garduño**, "Frequency analysis for an extended photoacoustic transport model," *Optics Letters*, vol. 40 (17), pp. 4030–4033, 2015.  
doi:[10.1364/OL.40.004030](https://doi.org/10.1364/OL.40.004030)
  12. Eduardo Lemus, Ernesto Bribiesca, **Edgar Garduño**, "Surface Trees – Representation of boundary surfaces using a tree descriptor," *Journal of Visual Communication & Image Representation*, vol. 31, pp. 101–111, 2015.  
doi:[10.1016/j.jvcir.2015.06.004](https://doi.org/10.1016/j.jvcir.2015.06.004)
  11. **Edgar Garduño** and Gabor T. Herman, "Superiorization of the ML-EM Algorithm," *IEEE Transactions on Nuclear Science*, vol. 61(1), pp. 162–172, 2014.  
doi:[10.1109/TNS.2013.2283529](https://doi.org/10.1109/TNS.2013.2283529)
  10. Bruno Motta de Carvalho, **Edgar Garduño**, Lucas M. Oliveira, and Rafael B. Gomes, "Fuzzy Segmentation of Video Shots using Hybrid Color Spaces and Motion Information," *Pattern Analysis and Applications*, vol. 17 (2), pp. 249–264, 2014.  
doi:[10.1007/s10044-013-0359-1](https://doi.org/10.1007/s10044-013-0359-1)
  9. Eduardo Lemus, Ernesto Bribiesca, **Edgar Garduño**, "Representation of voxelized enclosing surfaces by means of a chain code," *Pattern Recognition*, vol. 47(4), pp. 1721–1730, 2014.  
doi:[10.1016/j.patcog.2013.11.002](https://doi.org/10.1016/j.patcog.2013.11.002)
  8. Gabor T. Herman, **Edgar Garduño**, Ran Davidi, and Yair Censor, "Superiorization: An optimization heuristic for medical physics," *Medical Physics*, vol. 39, pp. 5532–5546, 2012.  
doi:[10.1118/1.4745566](https://doi.org/10.1118/1.4745566)
  7. **Edgar Garduño**, Gabor T. Herman, and Ran Davidi, "Reconstruction from a few projections by  $\ell_1$ -minimization of the Haar transform," *Inverse Problems*, vol. 27, p. 055006, 2011.  
doi:[10.1088/0266-5611/27/5/055006](https://doi.org/10.1088/0266-5611/27/5/055006)
  6. **Edgar Garduño** and Gabor T. Herman, "Parallel Fuzzy Segmentation of Multiple Objects," *International Journal of Imaging Systems and Technology*, vol. 18, pp. 336–344, 2008.  
doi:[10.1002/ima.20170](https://doi.org/10.1002/ima.20170)
  5. **Edgar Garduño**, Mona Wong-Barnum, Neils Volkman, Mark H. Ellisman, "Segmentation of Electron Tomographic Data Sets Using Fuzzy Set Theory Principles," *Journal of Structural Biology*, vol. 162, pp. 368–379, 2008.  
doi:[10.1016/j.jsb.2008.01.017](https://doi.org/10.1016/j.jsb.2008.01.017)

4. **Edgar Garduño** and Gabor T. Herman, "Implicit Surface Visualization of Reconstructed Biological Molecules," *Theoretical Computer Science*, vol. 346, pp. 281–299, 2005. In memoriam: Alberto Del Lungo.  
doi:[10.1016/j.tcs.2005.08.027](https://doi.org/10.1016/j.tcs.2005.08.027)
3. **Edgar Garduño** and Gabor T. Herman, "Optimization of basis functions for both reconstruction and visualization," *Discrete Applied Mathematics*, vol. 139, pp. 95–111, 2004.  
doi:[10.1016/j.dam.2002.12.002](https://doi.org/10.1016/j.dam.2002.12.002)
2. Gabor T. Herman, Roberto Marabini, José M. Carazo, **Edgar Garduño**, Robert M. Lewitt, and Samuel Matej, "Image processing approaches to biological three-dimensional electron microscopy," *International Journal of Imaging Systems & Technology*, vol. 11, no. 1, pp. 12–29, 2000.  
doi:[10.1002/\(SICI\)1098-1098\(2000\)11:1<12::AID-IMA3>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1098-1098(2000)11:1<12::AID-IMA3>3.0.CO;2-N)
1. **Edgar Garduño**, Gabor T. Herman, and Hava Katz, "Boundary tracking in 3D binary images to produce rhombic faces for a dodecahedral model," *IEEE Transactions on Medical Imaging*, vol. 17, pp. 1097–1100, 1998.  
doi:[10.1109/42.746729](https://doi.org/10.1109/42.746729)

## Electronic Journals

Bruno M. Carvalho, **Edgar Garduño**, and Gabor T. Herman, "Multiseeded fuzzy segmentation on the face centered cubic grid," in *ICAPR* (S. Singh, N. A. Murshed, and W. G. Kropatsch, eds.), vol. 2013 of *Lecture Notes in Computer Science*, pp. 339–348, ICAPR, Springer, 2001.

**Edgar Garduño** and Gabor T. Herman, "Optimization of basis functions for both reconstruction and visualization," in *Electronic Notes in Theoretical Computer Science* (S. Fourey, G. T. Herman, and T. Y. Kong, eds.), vol. 46, pp. 1–17, Elsevier Science Publishers, 2001.

## At Conferences

Hélio Siebra, Bruno M. Carvalho, **Edgar Garduño**, "Fuzzy Clustering of Color Textures using Skew Divergence and Compact Histograms: Segmenting Thin Rock Sections," *Journal of Physics: Conference Series*, vol. 574, pp. 012116, 2015.

doi:[10.1088/1742-6596/574/1/012116](https://doi.org/10.1088/1742-6596/574/1/012116)

Bruno M. Carvalho, **Edgar Garduño**, Iraçu O. Santos, "Skew Divergence-Based Fuzzy Segmentation of Rock Samples," *Journal of Physics: Conference Series*, vol. 490, pp. 012010, 2013.

doi:[10.1088/1742-6596/490/1/012010](https://doi.org/10.1088/1742-6596/490/1/012010)

Verena M. Moock, **Edgar Garduño**, Crescencio Garcia-Segundo, and Fernando Arambula Cosio, "Photoacoustic Tomography with Diffusion Approximation," Proceedings of The World Congress on Engineering 2013, Editors: S. I. Ao, L. Gelman, D. W. L. Hukins, A. Hunter and A. M. Korsunsky, Publisher: Newswood Limited, vol. 1 (The 2013 International Conference of Applied and Engineering Mathematics, ICAEM), pp 65-68, Londres, 3-5 julio, 2013. ISBN: 978-988-19251-0-7

Verena Moock, Crescencio C. Garcia-segundo, **Edgar Garduño**, Fernando F. Arambula Cosio, "Signal Processing for Photoacoustic Tomography," in *5th International Congress on Image and Signal Processing*, (Chongqing, China ), October 16-18, 2012.

Bruno Carvalho, Tiago Santos and **Edgar Garduño**, "Texture Fuzzy Segmentation using Adaptive Affinity Functions," in *27th ACM Symposium On Applied Computing, Computational Intelligence and Video & Image Analysis*, (Riva del Garda, Trento, Italy ), March 25-29, 2012.

F. Arambula-Cosio, E. Lira-Berra, N. Hevia-Montiel, C. Garcia-Segundo, **Edgar Garduño**, M. Alvarado-Gonzalez, R. M. Quispe, B. Reyes-Ramirez, E. Hazan-Lasri, "Computer Assisted Biopsy of Breast Tumors," in *32nd Annual International IEEE EMBS*, (Buenos Aires, Argentina), August 31 - September 4, 2010.

A. M. Alvarado, **Edgar Garduño**, M. E. Martinez-Perez, "Segmentation Of Retinal Blood Vessels by Multi-Scale Feature Extraction and Fuzzy Segmentation Methods," in *11th World Congress on Medical Physics and Biomedical Engineering*, (München, Germany), September 7-11, 2009.

A. M. Alvarado, B. M. Carvalho, and **Edgar Garduño**, "Incorporating a Measure of Texture in Fuzzy Segmentation Approaches," in *9th Mexican Symposium on Computer Aided Surgery and Medical Image Processing / MEXCAS 2008*, (Mexico City, Mexico), September 4-5, 2008.

Bruno M. Carvalho, Lucas M. Oliveira, and **Edgar Garduño**, "Semi-automatic single particle segmentation on electron micrographs," in *3rd IEEE International Symposium on Biomedical Imaging: From Nano to Macro*, (Arlington, Virginia, USA), pp. 1024 – 1027, April 2006.

**Edgar Garduño** and Gabor T. Herman, "Applications of the geometry of digital spaces to medical imaging," in *Proceedings Fourth IEEE Workshop on Applications of Computer Vision. WACV'98* (IEEE, ed.), (Los Alamitos, California, USA.), pp. 244–245, IEEE Computer Society, IEEE Computer Society, 1998.

**Edgar Garduño**, Gabor T. Herman, and Hava Katz, "Boundary tracking in 3D binary images to produce rhombic faces for a dodecahedral model," in *EUSIPCO 98, Island of Rhodes, Greece, September, 1998* (University of Athens, ed.), EUSIPCO, 1998.

G. Hernández, A. Ángeles, A. Herrera, G. Corkidi-Blanco, and **Edgar Garduño**, "Diseño y entrenamiento de una red neuronal para la clasificación de núcleos de linfocitos," in *Memorias del X Congreso de Instrumentación, September, 1994* (SOMI, ed.), (Xalapa, Ver, México.), SOMI, 1995.

**Edgar Garduño** and G. Corkidi-Blanco, "Sistema para el cálculo automático del índice mitótico por procesamiento de imágenes," in *Memorias del IX Congreso de Instrumentación, September, 1994* (SOMI, ed.), (Cancún, Qro, México.), pp. 64–70, SOMI, 1994.

## Technical Reports

**Edgar Garduño** and Gabriel Corkidi-Blanco, "Manual de operación: Sistema MIT 2000," Tech. Rep. B-194-1, Centro de Instrumentos, National Autonomous University of Mexico, Circuito Interior, Ciudad Universitaria, Mexico City, Mexico, June 1995.

## Submitted Manuscripts

Cinthya Ceja, Caleb Rascon, Bruno M. Carvalho, **Edgar Garduño**, "Smooth Normals for Surfaces from 3D Binary Images," *Journal of Mathematical Imaging and Vision*.

Yair Censor, **Edgar Garduño**, Elias S. Helou, Gabor T. Herman, "Derivative-Free Superiorization: Principle, Algorithms, Applications," *Optimization Methods and Software*.

## Manuscripts in Preparation

Rosario Cruz, Andreas Buehler, Vasilis Ntziachristos, **Edgar Garduño**, "Reconstruction of Optoacoustic Images by Superiorization," *Inverse Problems*.

## LECTURES AND PRESENTATIONS

**E. Garduño**, "Reconstruction from projections using shearlets." Presentación como parte del *Sixth Annual Minisymposium on Computational Methods for Three-Dimensional Microscopy Reconstruction*, The Graduate Center, C ty University of New York, Nueva York, USA, August 5th, 2015.



**E. Garduño**, "Image Reconstruction by Superiorization and Shearlets." Presentación como parte de los Seminarios del Departamento de Ciencias de la Computación, The Graduate Center, City University of New York, Nueva York, USA, July 27th, 2015.

**E. Garduño**, "Superiorization in Medical Imaging." *Guest Speaker* in the Seminar Series of the Área de Señales, Imágenes y Ambientes Virtuales, IIMAS-UNAM, Mexico City, Mexico, February 2015.

**E. Garduño**, "Superiorization of iterative algorithms: Application to PET." *Guest Speaker* in the Seminar Series of the Área de Señales, Imágenes y Ambientes Virtuales, IIMAS-UNAM, Mexico City, Mexico, February 2013.

**E. Garduño**, "Surface Rendering by Cubirille Smoothed with Blobs." *Guest Speaker* in the Departamento de Informática e Matemática Aplicada (Centro de Ciências Exatas e da Terra) of the Federal University of Rio Grande do Norte, Natal, Brazil, May 2011.

**E. Garduño**, "Image Classification of Micrographs at the Department of Computer Science, IIMAS-UNAM." Lecture in the Cycle of Conferences of SIAV-UNAM, Mexico City, Mexico, May 2010.

**E. Garduño**, "Mathematical and Computational Methods in Electron Microscopy of Biological Specimens." *Guest Speaker* in the Collaborative Program in Biomedical Research, UNAM, Mexico City, Mexico, April 2008.

**E. Garduño**, "Image Processing of Biomedical Transmission Electron Microscopy." Lecture in the Annual Workshop in Digital Signal and Image Processing and Virtual Environments, UNAM, Mexico City, Mexico, November 2007.

**E. Garduño**, "Mathematical and Computational Methods in Electron Microscopy of Biological Specimens." Lecture held as part of the *Guest Speaker* Seminars, I.T.A.M., Mexico City, Mexico, October 2007.

**E. Garduño**, "The Blobby Model to Visualize Electron Microscopic Data." Lecture held during Visual Computing: Fundamental and Applications 2006., U.N.A.M., Mexico City, Mexico, September 2006.

**E. Garduño**, "Mathematical and Computational Methods in Electron Microscopy of Biological Specimens." Lecture held during the 4th Biomedical Engineering Week, School of Engineering, U.N.A.M., Mexico City, Mexico, September 2006.

**E. Garduño**, "Mathematical and Computational Methods in Electron Microscopy of Biological Specimens." Lecture held as part of the Invited Lectures Seminar, U.C.M., Mexico City, Mexico, May 2006.

**E. Garduño**, "Multi Object Segmentation Using Fuzzy Connectedness." Talk held at the Data Club Series, National Center for Microscopy and Imaging Research, UCSD, La Jolla, California, USA, Aug. 2004.

**E. Garduño**, "Segmentation of Electron Tomographic Datasets Using Fuzzy Theory Principles" Talk held at the NBCR Technical Series, San Diego SuperComputer Center, UCSD, La Jolla, California, USA, Jan. 2005.

**E. Garduño**, "Mathematical Methods for Electron Microscopy." Presentation at the Third International Congress on Electron Tomography, Rensselaerville, NY, Apr. 2004.

**E. Garduño**, "Fourier transforms of trains of pulses on various grids." Talk held at the Special Session on Mathematics of Electronmicroscopic Imaging, First Joint International Meeting between the American Mathematical Society and the Real Sociedad Matemática Española, Seville, Spain, Jun. 2003.

**E. Garduño**, "Ejemplos de procesamiento de imágenes en microscopía electrónica de especímenes biológicos." Talk held at the Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, U.N.A.M., Mexico City, Mexico, Jun. 2003.

**E. Garduño**, "Boundary tracking for both the simple cubic and the facecentered cubic grids." Talk held at the DIMACS Workshop on Computational Geometry and Medical Applications, DIMACS Center, Rutgers University, Piscataway, New Jersey, USA, Apr. 2003.

**E. Garduño**, “Three-dimensional reconstruction of macromolecules consisting of repeating subunits.” Talk held at the Computer Science Department Seminar, The Graduate Center, City University of New York, New York, USA, Feb. 2003.

**E. Garduño**, “Blobs for reconstruction and visualization.” Talk held at the Computer Science Department Seminar, The Graduate Center, City University of New York, New York, USA, Feb. 2003.

**E. Garduño**, “Extraction and visualization of structural components from reconstructed volumes.” Talk held at the Medical Imaging Processing Group, University of Pennsylvania, Philadelphia, Pennsylvania, USA, Apr. 1998.

## TECHNICAL SKILLS

**Programming Languages:** C, C++, FORTRAN, Java, UNIX Shell, OpenMP.

**Graphical/Visualization Libraries:** OpenGL, VRML 2.0.

**Operating Systems:** UNIX-like, Windows, OS X.

**Editing Software:** LaTeX, LyX, Microsoft Word<sup>®</sup>, JabRef, EndNote<sup>®</sup>.

**Software Packages:** OpenDX<sup>®</sup>, Amira<sup>®</sup>, Photoshop<sup>®</sup>, Maya<sup>®</sup>, NIH Image, Matlab<sup>®</sup>, Mathematica<sup>®</sup>  
Microsoft Office<sup>®</sup> (Word, Excel, PowerPoint and Access).

## LANGUAGES

**English:** fluent.

**Spanish:** fluent.

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