

Jérôme Darbon

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Positions

- Since 06/2006** POSTDOCTORAL SCHOLAR AT UCLA DEPARTMENT OF MATHEMATICS
My host is Prof. Tony Chan and Prof. Stanley Osher
- 10/2005-06/2006** ASSOCIATE RESEARCHER AT EPITA.
Work on Exact optimization, Fast Algorithms, Mathematical Morphology
- 04-05/2006** INVITED RESEARCHER AT ELECTRICAL ENGINEERING DPT OF BOGAZICI UNIVERSITY, ISTANBUL, TURKEY
Work on 2D/3D face recognition, and 3D meshes with professor Bülent Sankur.
- 05-09/2003** INVITED VISITOR AT ELECTRICAL ENGINEERING DPT OF BOGAZICI UNIVERSITY, ISTANBUL, TURKEY
Work on hand biometry under the guidance of professor Bülent Sankur.

Education

- 11/2001-10/2005** PHD FROM COMPUTER SCIENCE AND NETWORKS DEPARTMENT OF ECOLE NATIONALE SUPÉRIEURE DES TÉLÉCOMMUNICATIONS (ENST)
Software Components and Exact Energy Minimization Algorithms dedicated to Image Processing.
Very high honors.
- 2000-2001** DEA (EQUIVALENT TO MS) MATHEMATICS, VISION, LEARNING AT ENS DE CACHAN, FRANCE.
Very high honors.
- 98-01** EPITA, COMPUTER SCIENCE AND ADVANCED TECHNOLOGIES ENGINEERING SCHOOL, PARIS, FRANCE.

Grants

ALL OBTAINED WHILE A POSTDOCTORAL SCHOLAR AT UCLA

- Jan.-Setp. 2008** CO-PI : SEGMENTATION OF MULTIMODAL MEDICAL IMAGES WITH VARIATIONAL APPROACHES
Funded by *Groupe des Ecoles des Télécommunications (GET), Paris*, €8,000 for 7 months.
E-mail contact : isabelle.bloch@enst.fr
- 2007** CO-PI : CONTINUUM APPLICATIONS OF DISCRETE OPTIMIZATION
Funded by US NAVY/ONR N000140710810. 2007-\$ 115,000 per year for 2007–2010.

Supervision of Students

- Oct. 2007** PARTICIAPTION OF THE SUPERVISION OF THE PH.D OF AYMEN SHABOU
On the subject *Optimization with Graph-cuts*, at *Ecole Nationale Supérieure des Télécommunications (ENST), Paris*, with Florence Tupin (florence.tupin@enst.fr). Supervision done while a postdoctoral scholar at UCLA.
- 2005** INTERNSHIP ADVISOR WITH LAURENCE LIKFORMAN AT ENST.
Development and evaluation of a reference system for hand shape based authentication (7 months). E-mail contact : likforman@enst.fr

Event Organizations

- February 2008.** CO-ORGANIZER OF THE IPAM WORKSHOP : *Graph Cuts and Related Discrete or Continuous Optimization Problems*
Los angeles. <http://www.ipam.ucla.edu/programs/gc2008/>
Organization done while a postdoctoral scholar at UCLA.
- November 2006.** CO-ORGANIZER OF THE SPECIAL TRACK ON *Energy Minimization Approaches in Image Processing and Computer Vision* AT ISVC 2006, LAKE TAHOE, NEVADA.
<http://www.isvc.net/>
- August 2005** CO-ORGANIZER OF THE RESIDENTIAL WORKSHOP FOR THE EUROPEAN PROJECT BIOSECURE.
<http://www.biosecure.info/>
- July 2005** CO-ORGANIZER OF THE COMBINED DOCTORAL SYMPOSIUM AND 15TH PHDOOS WORKSHOP HELD AT ECOOP2005 IN GLASGOW, SCOTLAND,
<http://www.ecoop.org/phdoos/ecoop2005phd/>

Submitted journal papers

WHILE A POSTDOCTORAL SCHOLAR AT UCLA

- 4) **J. DARBON** AND S. OSHER, *Fast Discrete Optimizations for Sparse Approximations and Deconvolutions*.
- 3) A. CHAMBOLLE AND **J. DARBON**, *On surface evolution using parametric maximum flows*.
- 2) L. DENIS, F. TUPIN, **J. DARBON** AND M. SIGELLE, *SAR Image Regularization with Fast Approximate Discrete Minimization*.
- 1) W. YIN, S. OSHER, D. GOLDFARB AND **J. DARBON**. *Bregman Iterative Algorithms for Compressed Sensing and Related Problems*

Journal papers

- 3) **J. DARBON** AND M. SIGELLE. *Image Restoration with Discrete Constrained Total Variation Part I : Fast and Exact Optimization*.
Journal of Mathematical Imaging and Vision. Vol. 26, no. 3, pages 261-276, December 2006.
- 2) **J. DARBON** AND M. SIGELLE. *Image Restoration with Discrete Constrained Total Variation Part II : Levelable Functions, Convex Priors and Non-Convex Cases*.
Journal of Mathematical Imaging and Vision. Vol. 26, no. 3, pages 277-291, December 2006.
- 1) E. YORUK, E. KONUKOGLU, B. SANKUR AND **J. DARBON**. *Hand Shape Based Authentication*.
IEEE transactions on Image Processing. Vol. 15, no. 7, pages 1803-1815, July 2006.

Submitted conference papers

WHILE A POSTDOCTORAL SCHOLAR AT UCLA

- 3) **J. DARBON**, A. CUNHA, G. JENSEN, T.F. CHAN AND S. OSHER. *An Efficient Neighborhood Filtering Algorithm and its application to Biological Images*.
Submitted to the IEEE International Symposium on Biomedical Imaging (**ISBI 2008**).
- 2) **J. DARBON**, S. LEFEBVRE, T.F. CHAN AND S. ESEDOGLU . .
In the proceedings of the International Congress on Industrial and Applied Mathematics (**ICIAM'08**), Zurich, Switzerland, July 16-20 2007.
- 1) L. DENIS, FLORENCE TUPIN, **J. DARBON** AND M. SIGELLE. *SAR Amplitude filtering using TV prior and its application to building delineation*.
Submitted to the 7th European Conference on Synthetic Aperture Radar (**EUSAR'08**).

Conference papers

PAPERS FROM 14 TO 18 WERE DONE WHILE BEING A POSTDOCTORAL SCHOLAR AT UCLA

- 18) **J. DARBON**. *Global Optimization for First Order Markov Random Fields with Submodular Priors*.
In the proceedings of the twelve International Workshop on Combinatorial Image Analysis (**IWCIA'08**), Buffalo, New York, USA, April 3-4 2008.
- 17) A. CUNHA, **J. DARBON** AND BULENT SANKUR. *A Fast and Accurate Total Variation Based Feature Detection and Triangulation of Biological Images*.
In the proceedings of the IEEE International Symposium on Biomedical Imaging (**ISBI 2007**), Washington DC , USA, 12-15 April 2007.
- 16) G. FOUQUIER, L. LIKFORMAN, **J. DARBON** AND BULENT SANKUR. *The BIOSECURE Geometry-Based System for Hand Modality*.
Accepted in the IEEE International Conference on Accoustic, Sppech and Sigarl Processing (**ICASSP 2007**), Hawaii, USA, 15-20 April 2007.
- 15) **J. DARBON**. *A Note on the Discrete Binary Mumford-Shah Model*.
In the proceedings of MIRAGE 2007, Springer-Verlag, LNCS Series INRIA Rocquencourt, France, 28-30 March 2007.
- 14) **J. DARBON**, M. SIGELLE AND F. TUPIN. *The use of levelable regularization functions for MRF restoration of SAR images while preserving reflectivity*.
Accepted in IS&T/SPIE 19th Annual Symposium Electronic Imaging. Conference on Computational Imaging (E112). San Jose (USA), 28 January-1 February 2007.
- 13) D. LESAGE, **J. DARBON** AND C.B. AKGUL. *An Efficient Algorithm for Connected Attribute Thinnings and Thickenings*.
In the proceedings of the 2nd International Symposium on Visual Computing (**ISVC 2006**), LNCS Series vol. 4292, pages 393-404, Lake Tahoe, Nevada, USA, November 6-8, 2006.

- 12) **J. DARBON**, RICHARD LASSAIGNE AND SYLVAIN PEYRONNET. *Approximate Probabilistic Model Checking for Programs*.
In the electronic proceedings of the second IEEE International Conference on Intelligent Computer Communication and Processing (**ICCP 2006**), Cluj-Napoca, Romania, September 2006.
- 11) M. CHEKROUN, **J. DARBON** AND I. CIRIL. *On a Polynomial Vector Field Model for Shape Representation*.
In the proceedings to the International Conference on Image Analysis and Recognition (**ICIAR 2006**), LNCS Series vol. 4142, pages 386–397, Póvoa de Varzim, Portugal, September 2006.
- 10) **J. DARBON** AND S. PEYRONNET. *A Vectorial Self-Dual Morphological Filter based on Total Variation Minimization*.
In the 1st International Symposium on Visual Computing (**ISVC 2005**), LNCS Series vol. 3804, pages 388–395, Lake Tahoe, Nevada, December 2005.
- 9) **J. DARBON**. *Total Variation Minimization with L^1 Data Fidelity as a Contrast Invariant Filter*.
In the IEEE proceedings of the 4th International Symposium on Image and Signal Processing and Analysis (**ISPA 2005**), pages 221-226, Zagreb, Croatia, September 2005.
- 8) **J. DARBON** AND C. AKGUL. *An Efficient Algorithm for Attribute Openings and Closings*.
In the electronic proceedings of the European Signal Processing Conference (**EUSIPCO 2005**), Antalya, Turkey, September 2005.
- 7) **J. DARBON** AND M. SIGELLE. *A Fast and Exact Algorithm for Total Variation Minimization*.
In the proceedings of the Second Iberian Conference on Pattern Recognition and Image Analysis (**IbPRIA 2005**), LNCS Series vol. 3522, pages 351–359, Estoril, Portugal, June 2005.
- 6) **J. DARBON** AND M. SIGELLE. *Exact Optimization of Discrete Constrained Total Variation Minimization Problems*.
In the proceedings of International Workshop on Combinatorial Image Analysis (**IWCIA 2004**), LNCS series vol. 3322, pages 548-557, Auckland, New-Zealand, December 2004.
- 5) E. YORUK, E. KONUKOGLU, B. SANKUR AND **J. DARBON**. *Person Authentication based on hand shape*.
In the electronic proceedings of European Signal Processing Conference (**EUSIPCO 2004**), Austria, September 2004.
- 4) E. YORUK, E. KONUKOGLU, B. SANKUR AND **J. DARBON**. *Shape Based Hand Recognition*.
In the electronic proceedings of 12th IEEE Signal Processing and Telecommunication Applications Conference (**IEEE-SIU**), Kusadasi, Turkey, April 28-30, 2004.
- 3) **J. DARBON**, T.GÉRAUD AND A. DURET-LUTZ. *Generic Implementation of Morphological Image Operators*.
In the proceedings of the International Symposium on Mathematical Morphology VI (**ISMM'2002**), pages 175–184, Sydney, New South Wales, Australia, April 2002.
- 2) T. GÉRAUD, P. STRUB AND **J. DARBON**. *Color Image Segmentation Based on Automatic Morphological Clustering*.
In the Proceedings of the IEEE International Conference on Image Processing (**ICIP'2001**), vol. 3, pages 70-73, Thessaloniki, Greece, October 2001.
- 1) **J. DARBON**, B. SANKUR, AND H. MAITRE. *Error Correcting Code Performance for Watermark Protection*.
In the Proceedings of Electronic Imaging 2001 (**EI'2001**) – Security and Watermarking of Multimedia Contents III (EI27), vol. 4314, pages 663-672, San Jose, CA, USA, January 2001.

Talks

TALKS FROM 16 TO 30 WERE DONE WHILE BEING A POSTDOCTORAL SCHOLAR AT UCLA

- 30) **Tutorial** OF 15 HOURS ON *Graph Cuts Methods for Image Processing*
at the Mathematical Imaging and Digital Media Summer School in Singapore, June 2008.
<http://www.ims.nus.edu.sg/Programs/imaging08/index.htm>
- 28) ORAL PRESENTATION OF THE PAPER : GLOBAL OPTIMIZATION FOR FIRST ORDER MARKOV RANDOM FIELDS WITH SUBMODULAR PRIORS.
Buffalo, NY, USA, April 4-5 2008
- 27) MAXIMUM-FLOWS/MINIMUM-CUTS ALGORITHMS FOR ENERGY MINIZATION.
Oral presentation at IPAM Workshop Cyber-Enabled Discovery and Innovation : Knowledge Extraction, IPAM CDI, October 2007, Los Angeles, USA.
- 26) DISCRETE AND CONTINUOUS PARAMETRIC MAX-FLOWS, GRAPH-CUTS AND TV OPTIMIZATION.
Colloquia of the department of computational and applied mathematics of RICE University, October 2007, Houston, USA.
- 25) TV OPTIMIZATION AND GRAH-CUTS.
Banff International Research Station–Trends in Applied Harmonic Analysis, September 24-28 2007, Banff, Canada.

- 24) TOTAL VARIATION OPTIMIZATION AND "GRAPH-CUT".
Seminar at ENST, medical imaging group, August 2007.
- 23) TOTAL VARIATION OPTIMIZATION AND "GRAPH-CUT".
Oral presentation at International Congress on Industrial and Applied Mathematics ICIAM 07, July 2007, Zurich, Switzerland.
- 22) L^1 -NORM AND MORPHOLOGICAL FILTERS
Image Processing Seminar of UCLA, April 2007.
- 21) GLOBAL OPTIMIZATION OF MARKOVIAN ENERGIES WITH PAIRWISE INTERACTIONS VIA MAXIMUM-FLOW
Applied Mathematics Colloquium of UCLA, April 2007.
- 20) FAST AND EXACT OPTIMIZATION OF THE DISCRETE TOTAL VARIATION.
Seminar of SIEMENS Corp., Princeton, New Jersey, USA. March 2007.
- 19) FAST AND ACCURATE FEATURE DETECTION AND TRIANGULATION USING TOTAL VARIATION FILTERING OF BIOLOGICAL IMAGES
Seminar at ENST, medical imaging group, March 2007.
- 18) EXACT OPTIMIZATION FOR DISCRETE IMAGE PROCESSING ENERGIES WITH PAIRWISE SUBMODULAR AND SUPERMODULAR PRIORS
Seminar of l'INRIA Sophia-Antipolis, January 2007.
- 17) EXACT OPTIMIZATION FOR DISCRETE IMAGE PROCESSING ENERGIES WITH PAIRWISE SUBMODULAR AND SUPERMODULAR PRIORS
Image Processing seminar of ENST, January 2007.
- 16) ORAL PRESENTATION *of the paper : An Efficient Algorithm for Connected Attribute Thinnings and Thickenings.*
Lake Tahoe, USA, November 2006.
- 15) MINIMUM CUTS IN NETWORKS AND ITS APPLICATION TO EXACT OPTIMIZATION OF NON-CONVEX ENERGIES.
Seminar at UCLA mathematics department, August 2006.
- 14) MINIMUM CUTS IN NETWORKS AND ITS APPLICATION TO EXACT OPTIMIZATION OF TV-BASED MODEL.
Seminar at UCLA mathematics department, June and August 2006.
- 13) FAST AND EXACT $L^1 + TV$ MINIMIZATION AND SOME LINKS WITH MATHEMATICAL MORPHOLOGY.
Seminar at ENST, medical imaging group, June 2006.
- 12) *Fast and Exact Discrete Image Restoration Based on Total Variation and on Its Extensions to Levelable Potentials.*
SIAM Conference on Imaging Science, Minneapolis, Minnesota, May 2006.
- 11) IMAGE RESTORATION WITH DISCRETE LEVEL SETS AND MARKOVIAN ENERGIES : EXACT OPTIMIZATION.
Seminar at ENST, Recognition methods for speech, writing and gesture group, March 2006.
- 10) EXACT DISCRETE TOTAL VARIATION MINIMIZATION.
ESIEE Laboratoire A2SI, Paris, January 2006.
- 9) IMAGE RESTORATION WITH MARKOV RANDOM FIELDS : TOTAL VARIATION, LEVELABLE AND CONVEX ENERGIES.
Seminar at the Instituto Superior Técnico (IST) Lisboa, Portugal, January 2006.
- 8) IMAGE RESTORATION WITH MARKOV RANDOM FIELDS : TOTAL VARIATION, LEVELABLE AND CONVEX ENERGIES.
Séminaire Méthodes Mathématiques du Traitement d'Images ,GDR MSPC Optimisation Discrète, Graph Cuts et Analyse d'Images, Paris, November 2005.
- 7) ORAL PRESENTATION *of the paper : Total Variation Minimization with L^1 Data Fidelity as a Contrast Invariant Filter.*
Zagreb, Croatia, September 2005.
- 6) ORAL PRESENTATION *of the paper : An efficient Algorithm for Attribute Openings and Closings.*
Antalya, Turkey, September 2005.
- 5) **J. DARBON** AND MARC SIGELLE. *Image restoration based on total variation minimization : Exact sampling and exact optimization.*
Pierre et Marie Curie University PARIS 6 (in January 2005).
- 4) POSTER PRESENTATION *of the paper : Exact Optimization of Discrete Constrained Total Variation Minimization Problems.*
Auckland, New-Zealand, December 2004.
- 3) ORAL PRESENTATION *of the paper : Generic Algorithmic Blocks dedicated to Image Processing.*
Oslo, Norway, June 2004.

2) POSTER PRESENTATION of the paper : *Generic Implementation of Morphological Image Operators*. Sydney, Australia, April 2002.

1) ORAL PRESENTATION of the paper : *Error Correcting Code Performance for Watermark Protection*. San Jose, USA, January 2001.

Other papers

5) G. GILBOA, **J. DARBON**, S. OSHER AND T. CHAN *Nonlocal Convex Functionals for Image Regularization*. UCLA CAM report 06-57. October 2006.

4) **J. DARBON**. *Composants logiciels et algorithmes de minimisation exactes d'énergies dédiés au traitement des images*.

PhD Thesis, October 2005.

3) **J. DARBON**, T. GERAUD AND P. BELLOT. *Generic Algorithmic Blocks dedicated to Image Processing*.

In the electronic Proceedings of the PhD Workshop of European Conference on Object Oriented Programming (ECOOP 2004).

2) S. LEFEBVRE, **J. DARBON**, F. NEYRET. *Unified Texture Management for Arbitrary Meshes*

INRIA research report RR-5210, May 2004.

1) T. GÉRAUD, P. STRUB AND **J. DARBON**. *Segmentation d'Images en Couleur par Classification Morphologique Non Supervisée*.

In the Proceedings of the 1st International Conference on Image and Signal Processing (**ICISP'2001**), pages 387-394, Agadir, Maroco, May 2001.

Reviewer

REVIEWER FOR *ACM Journal of Advances in Computational Mathematics* (2007).

REVIEWER FOR *SIAM Multiscale Modelling and Simulation* (2007).

REVIEWER FOR *IEEE Trans. on Pattern Analysis and Machine Intelligence* (2007).

REVIEWER FOR *IEEE Trans. on Image Processing* (2007).

REVIEWER FOR *IEEE Signal Processing* (2007).

REVIEWER FOR *IEEE Trans. on Systems, Man and Cybernetics* (2006).

REVIEWER FOR *Computer Vision and Image Understanding* (2006).

REVIEWER FOR *Signal Processing* (2006).

REVIEWER FOR THE *Journal of the "Annales des Télécommunications"* (2006).

REVIEWER FOR THE *International Workshop on Multimedia Content Representation, Classification and Security (MRCS 2006)*.

REVIEWER FOR THE *European Conference on Signal Processing (EUCIPCO 2005)*.

REVIEWER FOR THE *International Workshop on Biometric Recognition Systems (IWBRIS 2005)*.

REVIEWER FOR THE *International Symposium on Visual Computing ISVC 2005 and ISVC 2006*.

Teaching Experience

2005-2006 CONVEX OPTIMIZATION LECTURES AT EPITA LAST ENGINEERING YEAR
30h each year.

2003-2005 TEACHING ASSISTANT AT ENST
- 15 hours of java for Master students, each year, since 2003
- 15 hours of C++ for 2nd year of engineering and Master students, each year, since 2003
- 30 hours of C under unix for 2nd year of engineering students, 2005
- 8 hours on Markov Random Fields (2005)

2002-2006 COMPUTER VISION LECTURES AT EPITA LAST ENGINEERING YEAR
30h each year.

2000-2005 TEACHING ASSISTANT OF COMPUTER SCIENCE AT LYCÉE CONDORCET, PARIS, FRANCE.
Preparation for competitive examinations to enter French Higher Engineering Schools. Basic algorithms and their implementations in CAML. 30h each year.

2000-2002 LECTURES ON MATHEMATICS FOR 1st AND 2nd YEAR OF PREPARATION CLASS AT EPITA
60h each year.

2001 LECTURES ON SIGNAL PROCESSING FOR 2nd YEAR OF PREPARATION CLASS AT EPITA
60h.