Andrés **Romero**

PhD computer vision and parallel architectures

About

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Languages

Full working proficiency in spanish, english and french

Programming/ architectures

C and C++ (12+ years), Matlab (8+ years), Python (4+ years), PHP (4+ years), Javascript, LaTeX

OpenMP, SIMD (SSE, AVX, Neon and Altivec)

Notions of massive data mining using MapReduce (Hadoop) and R

TI C6000 and C5000 Panda boards, Raspberry PI's and Intel ULV platforms

Operating systems

Strong Linux/Unix skills, Mac OS X, Windows

Interests

My research focuses on the development and acceleration of signal processing and computer vision algorithms. A key goal of my research is to develop high performance algorithms for **visual object detection**, **tracking** and **texture description** for real-world problems. The algorithms I have worked with require comprehensive understanding of a broad set of domains: **machine learning**, **software engineering**, **computer architecture** and **statistics**.

In total, I have more than 8 years of research experience working with signal and image processing algorithms in embedded architectures. I am familiar with **ARM architectures** (ARM Cortex A9 and A15) and the **Texas Instruments C6000 DSP** family. On those platforms I have implemented many image, voice and audio processing algorithms. During my PhD I worked on the acceleration of computer vision algorithms on desktop and embedded platforms using **OpenMP** and **SIMD** instructions sets (SSE, Neon and Altivec).

Other fields of interest to me are **data science**, **natural language processing** (NLP), **data mining**, **information theory**, **complexity theory** and **cybernetics**.

Education

2010-2013 **Ph.D.** in Computer Science — Laboratoire de Recherche en Informatique, Université Paris Sud
Advisors: Lionel Lacassagne and Michèle Gouiffès
Real-time multi-target tracking: A study on color-texture covariance matrices and descriptor/operator switching.
The results of this work were considered for the **ITEA/Spy european project**.

2006–2008 **M.Sc.** Signal Processing — Instituto Politécnico Nacional (IPN)
Advisors: Héctor Pérez Meana and Mariko Nakano Miyatake
Subject: Acoustic active noise controllers in TMS320C6713DSK platforms.

2000-2005 **Telecommunications Engineering** — Universidad Nacional Autónoma de México (UNAM)
Advisor: Bohumil Psenicka
Graduation project: Acoustic active noise cancellation.

2000 **High-school** — Centro Universitario México, Mexico City
Specialization in mathematics and physics

Experience

2013-2014 **Université Paris Sud, Orsay Faculty of Sciences** — Invited researcher and teacher
Research work: Covariance descriptor algorithm implementation on "Many-core" architectures (Xeon-Phi)

2012-2013 **ITEA/Spy European Project** — R&D engineer
Tracking and pedestrian re-identification module, project in collaboration between CASSIDIAN, EOLAN, ENSTA and IEF

2009 **Minalum de México S.A. de C.V.** — R&D engineer
Controller development for a brushless DC motor using PIC's

2009 **Czech Technical University in Prague, Czech Republic** — Visiting Student
Hosted by Prof. Pavel Saradnik

2007-2009 **Computer security department, DGSCA, UNAM** — Software engineer
Emergency response team (CERT) system development.

2006-2007 **Qualcomm, Omnitracs, Mexico City, Mexico** Operations engineer
Satellite and GPS surveillance system operator

2004 **Electoral Institute of Oaxaca, Oaxaca,Mexico** Software engineer
Pre-electoral results system for the 2004 governor and local congress elections

Teaching experience

2013-2014 **ATER (Invited researcher and teacher)** Université Paris-Sud, France
Courses:
- SIMD instructions for image processing,
- On-line data representations (XML, DOM, XPath, XSLT),
- Relational data bases (SQL),
- Advanced C programming,
- Logical component and computer architecture,
- Scilab.

2012-2013 **Laboratory teacher** Université Paris-Sud, France
Courses: SIMD instructions for image processing.

2005-2008 **Laboratory teacher** Universidad Nacional Autónoma de México, Mexico
Courses:
- Digital signal processing algorithm implementations on DSP architectures,
- Digital and analog filtering.

Publications

Articles in peer-reviewed journals

Color tracking with contextual switching: Real-time implementation on CPU
F. Laguzet, A. Romero Mier y Terán, M. Gouiffès, L. Lacassagne
Journal of Real Time Image Processing (JRTIP) *Special Issue on Real-Time Color Image Processing (2013). Springer, 2013*

H, Perez-Meana, A Hybrid Noise Canceling Structure with Secondary Path Estimation
A. Romero, M. Nakano-Miyatake
WSEAS Recent Advances in Systems, Communications and Computers *(2008) pp. 194–199. 2008*

International peer-reviewed conferences/proceedings

Total Bregman Divergence for Multiple Object Tracking.
A. Romero, M. Gouiffès, L. Lacassagne
IEEE, International Conference on Image Processing (ICIP), 2013

Real-time covariance tracking algorithm for embedded systems
A. Romero Mier y Terán, L. Lacassagne, A. Hassan Zahraee, M. Gouiffès
Conference on Design & Architectures for Signal & Image Processing (DASIP) proceedings. 2013

Enhanced Local Binary Covariance Matrices ELBCM for texture analysis and object tracking
A. Romero, M. Gouiffès, L. Lacassagne
MIRAGE 2013, Berlin, Germany. ACM International Conference Proceedings Series, 2013

Covariance Descriptor Multiple Object Tracking and Re-Identification with Colorspace Evaluation
A. Romero, M. Gouiffès, L. Lacassagne
ACCV 2012 Workshops, Part II, LNCS 7729 proceedings, 2012

Feature points tracking adaptive to saturation
A. Romero, M. Gouiffès, L. Lacassagne

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Signal and Image Processing Applications (ICSIPA), 2011 IEEE International Conference on, 2011

Synthesis of the Low-pass and High-pass Wave Digital Filters
B. Psenicka, Francisco J. García-Ugalde, A. Romero Mier Terán
ICINCO-SPSMC, 2008

Synthesis of digital structure by matrix method
B. Psenicka, F.G. Ugalde, L.E. Salguero, A. Romero
Proceedings of the 7th IASTED International Conference on Signal and Image Processing, 2005

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References

Lionel Lacassagne, Associate Professor (MCF HDR)
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