

# Andrés Romero

PhD computer vision and parallel architectures

## About

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in romeromier

## 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, L<sup>A</sup>T<sub>E</sub>X

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

Notions of data science and  
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	<b>Ph.D. in Computer Science</b> <b>Advisors:</b> 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 <b>ITEA/Spy european project</b> .	Laboratoire de Recherche en Informatique, Université Paris Sud
2006–2008	<b>M.Sc. Signal Processing</b> <b>Advisors:</b> Héctor Pérez Meana and Mariko Nakano Miyatake Subject: Acoustic active noise controllers in TMS320C6713DSK platforms.	Instituto Politécnico Nacional (IPN)
2000-2005	<b>Telecommunications Engineering</b> <b>Advisor:</b> Bohumil Psenicka Graduation project: Acoustic active noise cancellation.	Universidad Nacional Autónoma de México (UNAM)
2000	<b>High-school</b> Specialization in mathematics and physics	Centro Universitario México, Mexico City

## 📁 Experience

2013-2014	<b>Université Paris Sud, Orsay Faculty of Sciences</b> Research work: Covariance descriptor algorithm implementation on "Many-core" architectures (Xeon-Phi)	Invited researcher and teacher
2012-2013	<b>ITEA/Spy European Project</b> Tracking and pedestrian re-identification module, project in collaboration between CASSIDIAN, EOLAN, ENSTA and IEF	R&D engineer
2009	<b>Minalum de México S.A. de C.V.</b> Controller development for a brushless DC motor using PIC's	R&D engineer
2009	<b>Czech Technical University in Prague, Czech Republic</b> Hosted by Prof. Pavel Saradnik	Visiting Student
2007-2009	<b>Computer security department, DGSCA, UNAM</b> Emergency response team (CERT) system development.	Software engineer

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## Operating systems

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OS X, Windows

2006-2007

### Qualcomm, Omnitracs, Mexico City, Mexico

Satellite and GPS surveillance system operator

Operations engineer

2004

### Electoral Institute of Oaxaca, Oaxaca, Mexico

Pre-electoral results system for the 2004 governor and local congress elections

Software engineer

## Teaching experience

2013-2014

### ATER (Invited researcher and teacher)

#### 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.

Université Paris-Sud, France

2012-2013

### Laboratory teacher

**Courses:** SIMD instructions for image processing.

Université Paris-Sud, France

2005-2008

### Laboratory teacher

#### Courses:

- Digital signal processing algorithm implementations on DSP architectures,
- Digital and analog filtering.

Universidad Nacional Autónoma de México, Mexico

## 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*

## References

Lionel Lacassagne, Associate Professor (MCF HDR)  
Laboratoire de Recherche en Informatique (LRI) Université Paris Sud  
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Michèle Gouiffès, Enseignant Chercheur  
Laboratoire d'Informatique pour la Mécanique et les Sciences de l'Ingénieur  
Université Paris Sud  
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Bohumil Psenicka, Full-time definite C-level Professor  
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