

# CURRICULUM VITAE

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## *Studies and academic qualifications*

Engineer / Polytechnic School (Ecole Polytechnique Paris - 1977)

Engineer / Telecommunication School (ENST Paris - 1979)

Doctor (PhD): “Doctor-Engineer” Thesis defended at the ENST (1982) on “*Study and Development of an Algorithm for Hidden Surface Elimination*”

Accreditation to Supervise Research: “State Doctorate” Thesis defended at the University of Besançon (1987) on “*Interactive Modeling of Complex Shape Objects from Heterogeneous Data – Application to the Representation of Anatomical Structures*”

## *Current Position*

**Full Professor at the Computer Science Department of the University of Aix-Marseille (since 1991)**

(Status: “Exceptional Class Professor” – top 1% – since 2010)

Member of the G-Mod research group at the LSIS laboratory (UMR CNRS 7296 – Marseille)

Invited Professor at the RADI (Chinese Academy of Sciences) and at the ISIG (Burkina Faso)

IEEE Senior Member

## *Previous Positions*

Professor at the ENSTP (Engineering School) – Yamoussoukro – Ivory Coast (1979 – 1981)

Researcher at the IBM Paris Scientific Center (1981 – 1991) – Paris (France)

including 6 months (1983) in a U.S. laboratory developing a new graphics workstation (IBM 5080)

Co-Founder and Vice-Director of the LSIS laboratory (2002 – 2008)

Head of the LXAO research group (2002-2008) and of the SimGraph research group (2008-2015)

Coordinator of three Master Curricula (1998 – 2010) including one in Shanghai (2005 – 2010)

Executive Committee Member of the ISDE (International Society for Digital Earth)

## *Miscellaneous*

134 publications including 40 in journals and books, 62 in international conferences (with reviews and proceedings), 28 in national conferences (with proceedings) and 4 patents

Supervision of 30 PhD theses (27 passed and 3 in process) and 30 Master research works

Referee for 95 PhD theses and “Habitations to Supervise Research”, including 51 as main reviewer

## **Some relevant activities in various fields during the last years**

### **Global overview on my career:**

I obtained the diploma of “Polytechnic School” in Paris, which is ranked n°1 engineering school in France, in 1977. Then, I obtained the diploma of “Telecommunication School”, which is in the best five engineering schools in France (and n°1 for Computer Science in France) in 1979.

In 1979, I got a position of “Associate Professor” in Computer Science in a famous engineering school of Africa, the ENSTP of Yamoussoukro (Ivory Coast), in which I started to develop research in the field of Computer Graphics.

From 1981 to 1991, I had been a researcher at the IBM Paris Scientific Center (in Paris – France). I obtained my PhD in 1982 with the support of the IBM France Company, and then, I was considered as an expert in the field of Image Processing and Computer Graphics for the IBM in Europe (I gave tutorials in these fields to the IBM engineers of European countries, and also in International Conferences). In 1983, I was sent to United States for six months to participate to the design of the first color graphics workstation (the IBM 5080). Then, in the mid 80s, I started to supervise PhD students, and I obtained my “Habilitation to Supervise Research” in 1987: this habilitation is mandatory to apply to a position of “Full Professor” at the university in France. During the second part of the 80s, I had been the manager of a research group in the IBM and I started collaborations with other structures (as hospitals for “Medical Imaging”, ...).

In 1991, I was recruited directly as a “Full Professor” at the “Aix-Marseille University” and I was asked to create an activity in the field of “Image” in the area of Marseilles (such an activity didn’t exist in Marseilles and its region at this time). I created a whole set of curricula, and especially a Master Degree in “Image”; I also created a laboratory of about 200 researchers, about Computer Science, Systems and Information, and I was the Vice-Director of this laboratory (LSIS Laboratory); I created a research group of about 40 researchers on “Image Processing and Computer Graphics” in the LSIS, and I was the head of this research group. I also worked to set relations with industrial and to develop an international activity.

In the next section, I will introduce with more details my activity during the last ten years, especially with companies, and also through international collaborations.

### **Research activity and projects:**

My research activity deals with image analysis, geometrical modeling and image synthesis. The goal of the research groups I created (LXAO and then SimGraph) was to perform data fusion from images, to extract information from these data, to integrate it into a model and to display it in a way that communicates the relevant information to a specific end user.

This activity is not dedicated to a given application field but to several ones such as Remote Sensing, Medical Imaging, Video Watching, Simulation, knowing that my research group and myself are not specialized in each of these fields. For this reason, I have set partnerships with various institutes, institutions or companies that are specialized in these fields, my contribution being in the area of mathematic and algorithmic for image understanding and image production.

My field of expertise is related to algorithmic, to pattern recognition, to image segmentation and registration, to geometrical modeling and to scientific visualization. I have projects on “Image Enhancement” for video watching and Forensics with the National Scientific Police Institute in France, I work on “Image Registration” for Remote Sensing with the RADI (Chinese Academy of Sciences) and other institutes, I develop research on “3D Reconstruction from clouds of points” in the frame of partnerships with companies that use Underwater Sonar to detect and characterize specific objects in the sea (Coast Watching), I designed a method (and obtained a patent for it) to perform real-time wire detection using a LIDAR (for helicopters), and I defined several reconstruction approaches for 3D anatomical structure representation, especially in the frame of collaboration with medical institutions.

### **International activity:**

During the last ten years, I have developed bilateral collaborations with many countries such as Portugal (University of Aveiro), United States (University of California Berkeley), but the main ones are with:

- China: I mainly work with the RADI (mentioned above) on Remote Sensing projects (co-supervised PhD, research projects), but have also set relations with other institutions (Zhejiang University in Hangzhou, Shanghai Ocean University in Shanghai) and companies (as ChinaRS).
- Canada: I have been developing a fruitful collaboration with the University of Montreal for more than fifteen years on medical imaging projects (PhD co-supervision.)
- Burkina Faso: I have created a laboratory and a Master degree in an Institute dedicated to Computer Science whose name is ISIG, my involvement being in Research, in Teaching and through the participation to this institution (as a Scientific Committee Member).
- India: I have set a collaboration with the Karunya Institute of Technology (Coimbatore) that led to the supervision of a PhD research work on multispectral images.
- Algeria: I have set a collaboration with the University of Skikda, and I am the co-supervisor of two PhD students
- Peru: I am starting a collaboration with the UCSP (Universidad Catolica San Pablo) in Arequipa (which is the second town of Peru)

In 2006, I participated in the creation of an international organization, ISDE (International Society for Digital Earth) of which I had been an Executive Committee member for ten years; and I also participated in the creation of an international journal, IJDE (International Journal of Digital Earth – Taylor & Francis Edition).

I am also involved in the organization of international workshops (such as TAIMA, every two years in Tunisia) and conferences or summits (every year with the ISDE), or as a reviewer for several international journals and conferences (I am the reviewer for about 20 papers and 4 PhD per year).

### **Industrial activity:**

Besides fundamental research activities, I have developed industrial partnerships that gave me the opportunity to increase the value of this activity through technology transfers (patents, licensing.).

The companies I recently worked with are:

- Eurocopter (real-time wire detection using a LIDAR)
- Optis (physically realistic image production – Virtu'Art project with Eurocopter, EADS)
- Kaolab and Nexvision (video watching using an intelligent 360° video camera)
- Subsea Tech and Kaolab (underwater watching using a Sonar)
- SII (Simulfoot: a simulator for analyzing soccer configurations from video sequences)
- Synapsys (eye tracking using a video camera for detecting balance disorders)
- Airbus Helicopters (Image analysis and pattern recognition).

### **Teaching activity:**

I teach all courses that deal with images (image processing, pattern recognition, geometrical modeling, scientific visualization, simulation) and algorithmic at all levels (Bachelor and Master degrees) and to any audience (in various countries, to professional and to students).

## **A selection of recent relevant publications (within the last ten years):**

*The list below is a selection of recent publications. These publications are not the best ones but they illustrate my research activity quite well (they are sorted from the most recent to the oldest)*

Z. Du, Y. Guo, C. Zhang, F. Zhang, R. Liu, J. Sequeira – “ParSymG: a parallel clustering approach for unsupervised classification of remotely sensed imagery” – International Journal of Digital Earth – 2016.

S. Ouchtati, J. Sequeira, M. Lashab, M. Bedda, "A Neural Network and Central Moments of Zones Histograms Obtained by Sliding a Window on the MRI Brain Image for the Classification of Brain Tumors", Proceedings of the International Symposium on Computer Science and Computer Engineering (ISCSCE 2016), pp: 40-52, Hambourg, Germany - September 4-5, 2016.

J. Zhang, S. Mavromatis, Q. Meng, J. Sequeira, Z. Ying – “Using mathematical morphology on lidar data to extract information from urban vegetation” – IGARSS, July 2016, Beijing, China.

S. Ouchtati, J. Sequeira, M. Bedda – “A Neural Approach for the Offline Recognition of the Arabic Handwritten Words of the Algerian Departments” – International Journal of Computer, Electrical, Automation, Control and Information Engineering, World Academy of Science, Engineering and Technology – 2015, 9, pp.1910-1916.

S. Ouchtati, J. Sequeira, M. Bedda – “Features Extraction Methods for the Handwritten Words of the Algerian Departments” - ICPRMA Paris 2015: 17th International Conference on Pattern Recognition Methods and Applications, Paris, August 2015.

S. Mavromatis, J. Sequeira - "3D Reconstruction of Sport Scenes", in: Wiley, 3D Video, Ch. 20, pp. 405-420, December 2013

G. Thibault, B. Fertil, S. Pereira, Cl. Navarro, P. Cau, N. Levy, J. Sequeira, J-L Mari - "Shape and texture indexes - Application to cell nuclei classification", in: International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI), Vol. 27 (1), pp. 1357002 (23 pages) – 2013

S. Mavromatis, Ch. Palmann, J. Sequeira – “Characterization of Similar Areas of Two 2D Point Clouds” – Advances in Visual Computing, July 2012, Crete, Greece. Springer Berlin Heidelberg, pp.509--516, 2012

Ch. Palmann, S. Mavromatis, and J. Sequeira. “Pairing regions in remote sensing images of different modalities”, International Journal of Remote Sensing, 2012

F. Graglia, S. Mavromatis, and J. Sequeira. “Physically-based Rendering for Real-Time Walkthrough”. *VisiGrapp 2012 Conference*, Roma, Italy, February 2012.

Ch. Palmann, S. Mavromatis, and J. Sequeira. “A new geometric invariant to match regions within remote sensing images of different modalities”. *SPIE Europe Remote Sensing*, Prague, Czech Republic, September 2011.

Y. Caulier, A. Nicolini, J. Sequeira. “Free-form Specular Surface Inspection with Adapted Coded-Light”, IASTED International Conference on Signal Processing, Pattern Recognition, and Applications; Innsbruck, Austria, February 2011.

H. Huynh, J. Meunier, J. Sequeira, M. Daniel, "Enhancing the Recognition of Medication Intake using a Stereo Camera", the Third International Conference on Communications and Electronics (ICCE 2010), Nha-Trang, Vietnam, August 2010.

F. Graglia, J-L Mari, G. Baïkoff, J. Sequeira, “Contour Detection of the Cornea from OCT Radial Images”, Electronic Journal SCIO, April 2010

M. Jourdain, J. Meunier, J. Sequeira, J-CI Tardif, G. Cloutier, “Intravascular Ultrasound Image Segmentation: A Helical Active Contour Method”, IPTA 2010 (international conference on image processing theory, tools and applications), Paris, France, July 2010.

H. Huynh, J. Meunier, J. Sequeira, and M. Daniel. "Real Time detection, tracking and recognition of medication intake". *International Conference on Machine Vision, Image Processing, and Pattern Analysis*; Bangkok, Thailand, December 2009.

E. Selvan, A. Mustatea, C. Xavier, and J. Sequeira. "Accurate Estimation of ICA Weight Matrix by Implicit Constraint Imposition Using Lie Group". *IEEE Transactions on Neural Networks*, 20(10):1565-1580, October 2009.

Ch. Palmann, S. Mavromatis, and J. Sequeira. "A new approach for registering Remote Sensing images from various modalities". *SPIE Europe Remote Sensing*, Berlin, Germany, September 2009.

G. Thibault, B. Fertil, C. Navarro, S. Pereira, P. Cau, N. Lévy, J. Sequeira, and J-L. Mari. "Texture indexes and gray level size zone matrix. Application to cell nuclei classification". *10th International Conference on Pattern Recognition and Information Processing, PRIP 2009*, Minsk, Biélorussia, pages 140-145, May 2009.

M. Jourdain, J. Meunier, J. Sequeira, J-M. Boï, and J-C. Tardif. "A robust 3D IVUS Transducer Tracking using Single-Plane Cineangiography". *IEEE Transactions on Information Technology in Biomedicine: Special Issue on Computer Vision for Intravascular and Intracardiac Imaging*, May 2008.

Ch. Palmann, S. Mavromatis, M. Hernandez, J. Sequeira, and B. Brisco. Earth observation using radar data: an overview of applications and challenges. *International Journal of Digital Earth (Taylor and Francis)*, vol 2, 2008

Y. Loya, L. Some, B. Some, M. Daniel, and J. Sequeira. "Remote Sensing and Modeling Contribution to Ecosystem Control in Burkina Faso". *Digital Earth Summit on Geoinformatics 2008: Tools for Global Change Research*, Potsdam, Germany, November 2008.

Ch Palmann, S. Mavromatis, and J. Sequeira. "SAR image registration using a new approach based on the Generalized Hough Transform". *ISPRS 2008 - Beijing, China*, July 2008.

L. Lluçia, S. Mavromatis, S. Perrotte, P. Dias, and J. Sequeira. "Camera location and aperture characterization using the transformation between a 2D plane and the image captured by the camera". *In Springer Verlag, editor, ICIAR 2008 - Povia de Varzim, Portugal*, June 2008.

F. Graglia, J-L. Mari, G. Baïkoff, and J. Sequeira. "Contour Detection of the Cornea from OCT Radial Images". *29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC 2007*, pages 5612-5615, Lyon, France, August 2007.

M. Jourdain, J. Sequeira, J. Meunier, J-C. Tardif, and J-M Boï. "Automatic positioning of features in low-contrast fluoroscopic images". *Graphicon 2007 - Moscow, Russia*, June 2007.

G. Menegaz, A. Le Troter, J.M. Boï, and J. Sequeira. "Semantic driven resampling of the USA-UCS". *CCIW 07 - Modena, Italy*, September 2007.

R. Pire, F-X. Filias, J. Sequeira, D. Bouheret, and M. Gillet. "Digital Range Image Algorithms for Flight Guidance Aids for Helicopter Low-Level-Flights". *AHS (American Helicopter Society) 63rd Annual Forum and Technology Display*, May 2007.

#### Recent patents:

F-X. Filias and J. Sequeira. "Method for telemetric detection of suspended wire-like objects", International Patent, January 2007. Note: PCT: WO 2007/010113 A1

Ch. Palmann, S. Mavromatis, J. Sequeira - "Method and system for estimating a similarity between two binary images", Vol. US20140044362, WO2012117210A1, International Patent, February 2014

#### PhD supervision (since 2007):

Easter Selvan – Linear combination of images and Independent Component Analysis – June 2007 (Board of referees: Eric Moreau, Danièle Nuzillard, Françoise Prêteux, Jean-Marc Boï, Jean Sequeira)

Melissa Jourdain – 3D reconstruction of arteries from a single projection IVUS system – May 2009 - (Board of referees: Jean Meunier, Jean-Claude Tardiff, Denis Laurendeau, Jean Sequeira, Sébastien Roy, Victor Ostromoukhov)

Guillaume Thibault – Characterization and classification of 3D shapes – June 2009 - (Board of referees: Stéphane Lallich, Chafiaa Hamitouche-Djabou, Bernard Fertil, Jean-Luc Mari, Jean Sequeira, Pierre Cau)

Ludovic Lucia – Object tracking in video sequences – February 2011 (Board of referees: Samir Akkouche, Dominique Faudot, Laurent Lucas, Marc Daniel, Sébastien Mavromatis, Jean Sequeira)

Christophe Palmann – Image segmentation and registration for data fusion in Remote Sensing – June 2011 (Board of referees: Christian Roux, Jean-Marie Nicolas, Jocelyn Chanussot, Xingfa Gu, Frédéric Bouchara, Sébastien Mavromatis, Jean Sequeira)

Yuxi Wang – Registration of images from different modalities and different geometries – October 2012 (Board of referees: Renyi Liu, Qinju Tian, Zetian Ye, Xingfa Gu, Sébastien Mavromatis, Jean Sequeira).

Florian Graglia – “Photon Mapping” algorithm improvement when the geometry of the 3D scene remains stable – November 2012 – (Board of referees: Saida Bouakaz, Franck Marzani, Jean-Pierre Jessel, Gilles Gesquière, Sébastien Mavromatis, Jean Sequeira).

Jinnian Wang – A study on hyperspectral remote sensing data processing and analysis applied to 3D mineral mapping – October 2014 (Board of referees: Franck Marzani, William Puech, Gilles Gesquière, Sophie Viseur, Sébastien Mavromatis, Jean Sequeira).

Ongoing PhD supervision:

Pierre Zoppitelli (since October 2015) – Tracking moving targets from a helicopter using a video camera in the frame of “Search And Rescue” missions (PhD defense planned for September 2018) in collaboration with the Airbus group.

Nan Jin (since June 2017) – 3D eyes and head relative motion capture and analysis in order to evaluate human stability disorders (PhD defense planned for September 2020) in collaboration with the Synapsys company.

Two PhD co-supervision starting in 2017 in the frame of a collaboration with Skikda University (Algeria)